

GETTING LEARNING RIGHT

Report to the President's Education Initiative Research Project

**Edited by Nick Taylor and Penny
Vinjevold**

**The President's Education Initiative Research Project was
funded by DANIDA and managed by the Joint Education Trust
on behalf of the Department of Education**

Published by: The Joint Education Trust PO
Box 178

Wits 2050 Republic of South Africa

Email: info@jet.co.za

URL: www.jet.org.za

© 1999, Nick Taylor and Penny Vinjevold All
rights reserved.

ISBN: 0-620-24030-x

Production by MMINO +27 +12 654 3855

Preface

This research was commissioned by the Teacher Development Centre on behalf of the Department of Education, under the auspices of the President's Education Initiative. The purpose was to provide a scientific basis for the future planning and delivery of educator development and support programmes.

The research has been narrowly focused on the school and classroom context, and has interrogated issues of teacher practice, curriculum, and the use of teaching and learning materials, as well as the inter-relatedness of these matters in whole school development processes. There is not a strong tradition in South Africa of empirical research into educational matters, and the research project has directed resources and attention to this aspect. The project has also succeeded in empowering a number of previously disadvantaged researchers and institutions, by recognising and supporting the work they have done in schools and classrooms.

The research findings are informative, and will help to construct an agenda for the future. Coupled with other related initiatives of the Teacher Development Centre, specifically the investigation into the content and delivery mechanisms of current educator development and support programmes, the research report provides a body of knowledge which will serve as a useful basis for the development of policy on teachers.

The Department of Education wishes to record its appreciation to all involved in the project, especially Nick Taylor and Penny Vinjevold of JET, the many researchers around the country who have contributed, and the research committee of the Teacher Development Centre which has provided leadership for the project. We also record our thanks to DANIDA for funding the project as part of their support to the President's Education Initiative.

Duncan Hindle

Chief Director, Human Resources

Department of Education

Acknowledgements

The editors wish to thank the following:

- ✍ DANIDA who provided generous support for the PEI Research Project.
- ✍ The Department of Education for their support and input into the Research Project,
- ✍ The PEI Research Committee for their work in considering and shaping the research proposals.
- ✍ Mashwahle Diphofa, Kholofelo Sedibe, Hemant Waghmarae, Johan Muller and Brahm Fleisch for reading and commenting on the report.
- ✍ The researchers for meeting impossible deadlines.
- ✍ Kathy Tracey for administration of the PEI Research Project and the preparation of the manuscript.
- ✍ MMINO for the design, layout, editing, proofreading and production management.

Contents

Chapter 1	Introduction	1
Chapter 2	Systemic and institutional contexts of teaching and learning	13
Chapter 3	Research, reality and public trust: The case of educational research for policy	37
Chapter 4	Research methods	65
Chapter 5	Curriculum 2005: Finding a balance between school and everyday knowledges	105
Chapter 6	Teaching and learning in South African schools	131
Chapter 7	Learning materials	163
Chapter 8	Learning outcomes: How will we know them?	185
Chapter 9	Language issues in South African classrooms	205
Chapter 10	Conclusion	227
	Bibliography	237
	List of Research Projects	255
	Summaries of PEI research reports	260

List of Acronyms

African National Congress	ANC
African Teachers' Association of South Africa	ATASA
Assessment Criteria	AC
Centre for Education Policy Development	CEPD
Committee for Teacher Education Programmes	COTEP
Department of Education	DOE
Educator Development and Support	EDS
Education Labour Relations Council	ELRC
Education Quality Improvement Project	EQUIP
English Second Language	ELS
Expected levels of performance	ELP
Further Diploma in Education	FOE
Further Education and Training	FET
Gauteng Department of Education	GDE
Gauteng Education and Training Council	GETC
Gauteng Institute for Curriculum Development	GICD
Human Sciences Research Council	HSRC
In-service education	INSET
Joint Education Trust	JET
Language, Literacy and Communication	LLC
Language in Education Policy	LIEP
Mathematical Literacy, Mathematics and Mathematical Sciences	MLMMS
National Education Policy Investigation	NEPI
Non-governmental Organisation	NGO
Primary Education Upgrading Programme	PEUP
Primary Maths Programme	PMP
President's Education Initiative	PEI
Primary Science Programme	PSP
Project for the Study of Alternative Education in South Africa	PRAESA

Research Institute for Education Planning	RIEP
South African Institute for Distance Education	SAIDE
Sectoral Education and Training Authority	SETA
Specialisten in Leerplanontwikkeling	SLO
Southern African Development Community	SADC
South African Qualification Authority	SAGA
Specific Outcome	SO
Statistical Package for Social Science	SPSS
The Third International Mathematics and Science Study	TIMSS
Transfer of African Language and Knowledge Programme	Talk Programme
Teacher Development Centre	TDC
University of Port Elizabeth	UPE
Western Cape College of Education	WCCE
Apartheid Education Departments:	
Department of Education and Training (African)	DET
House of Assembly (white) (Model C)	HOA
House of Delegates (Indian)	HOD
House of Representatives (Coloured)	HOR

Chapter 1

INTRODUCTION

Mashwahle Diphofa, Penny Vinjevold and Nick Taylor

The state's resources must be deployed according to the principle of equity, so that they are used to provide essentially the same quality of learning opportunities. This is an inescapable duty upon government, in the light of this country's history and its legacy of inequality, and it is a constitutional requirement... (Department of Education 1995.21).

Education is assuming a new importance across the world. This is most evident in the increase in financial resources allocated to national education systems. But it is also signified by the number of conferences, research reports and programmes concerned with improving the efficiency and effectiveness of education systems. Schooling systems everywhere are thought to be in crisis and improvement and change are high on the agenda of politicians, academics and education bureaucrats. Media attention and coverage of educational issues confirms the importance of education as the information age and the global economy become urgent realities for developed and developing countries alike.

Today education systems are expected not only to act as vehicles for redress and transformation but also to produce the kind of citizens that will enable their countries to become globally competitive. For the first time in history international studies which indicate comparative standing in pupil attainment are conducted and taken seriously by governments.

South Africa's first democratic government not only faced the above challenges but also those relating to the renewal and transformation of a racially divided and inequable education system. The challenge was exacerbated by the dearth of classroom and school-based research available to guide the transformation and policy-making processes. The Report of the Education Sectoral Team for the Medium Term Expenditure Framework indicates that the 'serious gaps in the research base on education in South Africa ... make informed decision-making difficult' (Department of Education 1997a:3).

In the first five years of government, the new national and provincial education departments have been concerned with two imperatives:

- ✍ the development and implementation of a policy framework which will provide for redress of past inequities and the provision of equitable, high quality and relevant education.
- ✍ the complex process of amalgamating seventeen different education departments and the consequent redeployment and re-organisation of teachers and bureaucrats.

Considerable progress has been made in both objectives. Policy documents and legislation have provided a framework for the renewal and transformation of education. This has been supported by budget increases and reallocations to ensure the development of a more equitable system. South Africa spends, comparably to other developed and developing countries, a high proportion of Gross Domestic Product and total budget on education.

In terms of the redeployment of educators, the Department of Education (DOE) began implementing an agreement reached in the Education Labour Relations Council on the rightsizing of the education establishment in order to effect an equitable provisioning of staff. It was recognised that the rightsizing process would deal primarily with quantitative aspects of the establishment and that, as a result, human resource development interventions would be necessary as well.

The Presidents Education Initiative(PEI) was born out of such a need. In 1996 President Mandela appealed to the international community to assist South Africa with the reskilling of, and support for, educators. Against this background, the PEI was established and the following were identified as critical areas for which international assistance should be sought:

- ✍ the upgrading and reskilling of serving teachers in science, mathematics and technology.
- ✍ the improvement of the quality of education in schools, including the improvement of teaching in large classes, in multigrade classes in small farm schools, and in a multilingual environment.

Nineteen countries expressed an interest in the initiative, and in November 1996 the Joint Education Trust (JET) was appointed by the DOE to co-ordinate the first phase of the project. The terms of reference called for JET to:

- ✍ consult with the interested donor countries to establish, among other things, the nature and extent of support they were willing to provide.
- ✍ collate and analyse research information to provide source documents on teaching in large classes, in multigrade classes and in a multi-lingual environment.
- ✍ consult with the education departments (provincial and national) to establish the nature and extent of existing Educator Development and Support (EDS) initiatives and to identify specific priorities to be addressed.
- ✍ to develop project proposals based on the above priorities.

This phase was completed in 1997 and culminated in the release of a set of reports based on the above brief. Following a detailed review of the first phase of the project and discussions with a number of partners, it was decided to embark on a second phase comprising the following components:

- ✍ Continued facilitation of project activities between donor countries and the departments of education. A number of PEI educator development programmes involving international donor

countries/agencies are already at different stages of conceptualisation, planning and implementation. These projects are collectively worth over R250m and cover both technical and financial assistance.

- ✍ The establishment of a Teacher Development Centre (TDC) in the DOE. The Centre is playing a central role in PEI activities. In addition, the Centre is, among other activities, engaged in the establishment of a national database of EDS programmes, research on selected EDS programmes and how these synergise with existing DOE policy, support for small-scale capacity building initiatives in each province and co-ordination of the Commonwealth of Learning initiative to provide distance training in mathematics, science and technology education in all countries of the Southern African Development Community (SADC).
- ✍ Commissioning further research informed by the priorities of the PEI.

PEI management and governance

The PEI has involved appropriate government officials at national and provincial levels and the organised teaching profession. Three committees (the Executive, Advisory and Research Committees) were established to drive the PEI. With the transition from the first phase of the PEI to the establishment of the TDC, the composition and role of these committees has been reviewed but they largely retain their original purpose and mode of operation.

Advisory Board

The Advisory Board serves as a stakeholder forum with the role of determining overall policy direction for the TDC. The specific functions of the Board are:

- ✍ review of work undertaken by the TDC
- ✍ approval of semi-annual work plans
- ✍ supporting relations with provinces and stakeholders
- ✍ overall co-ordination of teacher development programmes and projects
- ✍ funding policy.

Executive Committee

The EXCO receives its mandate from the Advisory Board. The specific functions of the EXCO are:

- ✍ approval of detailed monthly work plans reviewing progress reports
- ✍ control of finances
- ✍ personnel issues: appointments and conditions of service relations with other agencies
- ✍ evaluations and reporting obligations
- ✍ any other matters referred to it by the Advisory Board.

Research Committee

The Research Committee, comprising representatives of the DOE, the three teacher organisations and the Joint Education Trust as fund holder and project manager, considered and approved the research projects which are the basis of this report.

The research component of the PEI in recent years, education research in South Africa has tended to focus on policy aspects, where it was inclined towards the normative (what should be). Research of an investigative nature (which models might best embody particular values) or evaluative nature (which models work best under specific conditions) have been relatively neglected. The PEI Research Project focused on these latter two aspects. Its broad intention is formative: to assist policy makers and practitioners to implement the intentions of the new education system more effectively. The 35 research studies commissioned are particularly aimed at providing direction to the implementation of EDS programmes. The areas of research are:

- ✍ establishing best practices in the teaching of mathematics, science, or English with particular reference to Curriculum 2005.
- ✍ identifying difficulties in the teaching of large classes, multigrade classes or multilingual classes and investigating ways of overcoming these.
- ✍ investigating the availability and use of learning materials in primary school classrooms.

Preference was given to proposals which, in addition, aimed to:

- ✍ work collaboratively with one or more of the provincial education departments.
- ✍ employ researchers from disadvantaged groups.
- ✍ conduct research in 1998 and produce reports by the end of the year.

The process for the identification of PEI projects began with requests for proposals through a number of channels including the public media. JET staff received proposals on behalf of the Research Committee, sought clarification from researchers on the details of their proposals, summarised the proposals and then presented them to the Committee for consideration. The decisions of the Research Committee took the form of recommendations to the EXCO and once such decisions had been accepted, JET engaged with the researchers on the requirements and recommendations of the Committee, drew up contracts for the management of approved studies, and monitored the projects.

The contract set out the requirements for reporting on the particular research study and set dates for the submission of the reports. Research proposals were approved between November 1997 and April 1998 and the contracts required that the final reports be submitted by mid-December 1998. This placed enormous demands on the researchers and, in effect, meant that in six to eight months researchers should select the sites for their research, obtain permission to undertake research in these schools, develop instruments for use in the study, pilot the instruments, undertake the research and produce a final report.

This time-consuming process was made more difficult by two factors:

- ✍ There are not established processes and procedures for obtaining permission to conduct research in schools.
- ✍ There is no tradition of classroom or school-based research and so there is a dearth of tried and tested instruments for use in education studies.

In many cases researchers had to consult officials at three different levels - provincial and district bureaucrats and principals - to obtain permission to conduct their studies. This was time-consuming in that it was not always clear who the appropriate officials were. Once the relevant officials were identified, considerable time was spent in explaining the research project and negotiating the details of classroom visits. These processes were hampered by the lack of, or intermittent operation of, telephone and fax facilities in many schools.

The development and trialing of instruments was also time-consuming because it was the first time that some researchers had developed school and teacher questionnaires and classroom observation schedules. Collaboration between PEI researchers aided this process. In the Western Cape and Gauteng the researchers scheduled regular meetings to share ideas and frustrations. In many cases instruments were developed collaboratively and then adapted to the particular interests of a research project.

The researchers faced many obstacles as they tried to meet the demanding deadlines which had been set. Despite these demands the researchers demonstrated responsible and ethical behaviour in their approach to their studies. In a large number of cases the schools in which the research was conducted received reports, workshops, feedback and even professional development and support from the researchers. In the end, only four projects failed to meet the deadline. A further three follow-up studies were commissioned later and their findings are also not included in this report.

The collective output of the PEI research process reflects a considerable and important achievement. In addition, the PEI Project also played an important role in building research capacity and a body of tried and tested research instruments.

In the first instance this report is a synthesis of the individual studies commissioned by the PEI Executive Committee into teaching, learning and classroom conditions. The principal focus is thus teachers and their work. Classrooms are the ultimate focus of the schooling system, the terrain where the purpose of schooling - teaching and learning - reaches fruition. But classrooms are situated within a nested set of institutions and systems: the school itself, the culture of which is critical to the quality of classroom work; district offices which supply and support schools; teacher appraisal systems, which spread from national bargaining chambers to school-based peer review committees; curriculum processes and products, constructed, delivered and keenly watched by interested parties and institutions throughout society - to name but a few. Teachers' work is thus constrained and enabled by a myriad of influences which emanate from all directions in the web comprising public schooling. Chapter 2 locates classrooms within this busy and complex theatre. In particular, it traces the influence on the government in South Africa of the progressive reform movement in the United States and the United Kingdom, as it struggles against the inertia of public indifference and large administrative systems in those countries to inject vitality into mass schooling.

There is not a strong tradition of empirical research in South Africa. Since the revolt against positivism, commencing in the seventies, empirical work was associated with the forces of conservatism and the status quo. While this trend was by no means confined to South Africa, it did take on a particularly strong political flavour in this country. The advent of postmodernism in the eighties caused a further hardening of this attitude. Under these conditions, a necessary first step in undertaking a project aimed at the analysis of what happens in schools and classrooms is to rehabilitate not only the empirical project but indeed the very notion of reality. This is the

purpose of Chapter 3, where Johan Muller reviews current methodological and epistemological disputes in social scientific and educational research. He argues that, unless we reclaim a moderate realist position for research practice, educational research will become irrelevant for policy.

Given the above revolt against positivism it is hardly surprising that students of education, not only in South Africa, are not familiar with the methods of empirical research, or the principles for deciding what constitutes evidence, or the constraints on the inferences and conclusions which may or may not be drawn from observations made in the various arenas of educational practice. Chapter 4 examines these issues, with particular reference to the individual research studies contributing to the PEI.

Chapter 5 examines in some detail the new curriculum in its second year of implementation in South Africa (1999). There is a sense in which the curriculum represents a distillation of the aspirations of all the various interests comprising public schooling. With the reforming zeal and energy of a movement which had been in exile for almost half a century, the new government has seized upon progressive models in other countries and embodied these in Curriculum 2005, the national curriculum to be followed in all the country's schools. This is a bold experiment indeed: nothing of its kind has ever been tried, on anywhere near this kind of scale, anywhere in the world. Chapter 5 analyses the intentions of Curriculum 2005 and the implications these hold for teachers and teaching.

Chapter 6 is a summary and analysis of those PEI reports which investigated teaching and learning in schools and classrooms. The South African public schooling system is enormously diverse with regard to resourcing, socio-economic status, and quality of outputs. The most important educational priority must be to improve the quality of disadvantaged schools. The PEI research reports focused their gaze almost exclusively on this, the majority sector of the system. Collectively, the research projects by no means sample this sector systematically, and a great deal of further research is required. Nevertheless, it would be surprising if the PEI findings are not widely

applicable in many township and rural schools. These reports have much to say about the characteristic features of teachers, learners, teaching/learning practices, and learning outcomes. Some of the findings are surprising, but converge decisively on the conclusion that the majority of teachers require a great deal more attention than they are presently receiving, if learning is to improve in our schools.

Three issues are not strictly separable from the concerns of Chapter 6: the use of teaching and learning materials in the classroom, the assessment of learning outcomes, and language policy and its effects on school and classroom practices. Thus, Chapter 6 contains references to these issues. Nevertheless, each of these components also has substantive aspects which fall outside both the school and the classroom. Chapters 7, 8 and 9 deal with these latter issues.

One of the myths that surrounds Curriculum 2005 - largely generated through rumour and implication, but not unsupported by official attitudes and documents - is the idea that textbooks are not significant contributors to learning, and that, in any event, teachers should construct their own material to suit the local conditions of their learners and the learning programmes developed at school and classroom levels. Chapter 7, through an analysis of PEI and other research on various topics related to learning materials, examines the viability of these ideas, against existing practices in South African classrooms.

South Africa has adopted high-level learning goals to guide its curriculum practices. Assessing these goals will require the development of instruments sensitive to the full range of learning outcomes at various levels of complexity in three domains: knowledge, skills and attitudes. A number of PEI projects attempted to adapt or construct from scratch appropriate

instruments for the assessment of Curriculum 2005 outcomes, and discovered that this task is easier to conceive than achieve. Chapter 8 reflects on these tribulations against the background of similar attempts in other countries.

Language policy and practice, at national, school and classroom levels, is a critical factor in learning. At present there is little congruence between the national consensus on language policy, what parents want for their children, and the use of language in the classroom. Indeed, controversial as they have been in the past, never have these issues been in a greater state of flux than at present. Furthermore, rapidly changing demographics play havoc in all these spheres. Chapter 9 reflects some of the confusions and emerging patterns in these developments around language.

Chapter 10 draws together the conclusions of the preceding discussions and derives from these a set of recommendations for improving the work of teachers in the immediate future. It also outlines areas in which further research is required.

Conclusion

The PEI Research project can in no way be said to constitute a systematic research programme into those factors relating to teachers and teaching which make a difference to the quality of schooling in South Africa. However, we believe that it takes at least four significant steps in this direction, through:

- ✍ identifying some of the principal research questions, locating these within the international literature on education reform, and placing the separate questions in juxtaposition to one another within the context of systemic school reform.
- ✍ describing the conditions and consequences of teaching and learning in many disadvantaged South African classrooms.

- ✎ identifying research priorities for expanding our knowledge base about school reform in South Africa.
- ✎ assisting in the building of capacity to undertake empirical research in classrooms, schools and other components of the education system.

CHAPTER 2.

SYSTEMIC AND INSTITUTIONAL CONTEXTS OF TEACHING AND LEARNING

Nick Taylor, Mashwahle Diphofa, Hemant Waghmarae, Penny Vinjevold, and Kholofelo Sedibe

The goal of complex reform is specifically to improve instruction, and thereby student achievement. Bringing about this type of reform is long-term work requiring additional capacity at both the state and local level. It is also work that no one to date has had much success with,

particularly on a state-wide scale. No one knows exactly how to bring complex reform about (Lusi 7997. 1 70).

Unravelling the knot of school reform

Public schooling is the largest and most important collective enterprise undertaken by modern societies. It generally consumes more money (aside from debt repayment in many developing countries), employs more people and, it is commonly believed, has a larger influence on the values, skills, and work and leisure habits of citizens than any other set of public institutions. Small wonder that there is such concern in so many countries about the quality of their schooling systems.

This concern is expressed in a voluminous international literature on the subject of improving the quality of teaching and learning in schools. Dozens of voices call for particular reform programmes, many of which diverge fundamentally, yet all of which cite research findings to support their approaches. Checklists for success are frequently proposed and these reflect different perspectives on this literature. (See, for example, Henneveld 1994; Sammons 1994; Archer 1995; and the entire edition of the Review of Educational Research, 1993).

By far the most important reason for the vexed nature of school reform is its complexity. This is caused by both the size of the public schooling sector and the interconnected nature of its numerous component parts. The enterprise of public schooling is composed of a set of institutions, none of which is easily separable from others. Thus, while the district office is usually housed within a single building, the tentacles of its activities and responsibilities stretch upward into regional, provincial and even national institutions, downwards into schools, and sideways into the community. It is responsible for the maintenance of numerous systems and subsystems: financial management, curriculum, provisioning, human resource deployment and management, the monitoring of performance in schools, and school governance.

Most of the PEI research projects focus on teaching and learning. The classroom work of teachers and students is both dependent on and constitutive

of the policy, structural and sociocultural features of the education system (Combleth 1990). The purpose of this chapter is to locate classrooms within this context. We analyse the principal issues in the debate around school reform, both internationally and in South Africa, and emphasise those strands of the debate which are exerting a major influence on the policies of the new South African government. We end by drawing conclusions for future priorities for the reform of schooling in this country, and for research into these issues. We commence our discussion by looking at three general issues which complicate the debate on school reform.

Political values and policy vehicles

Public schooling has, among a number of other goals, the goal of infusing the next generation of citizens with a set of values considered politically appropriate by the government of the day. For example, Goodlad (1997) notes that the definitions of public need and good, and the prevailing balance in the satisfaction of both private and public interests, vary widely from society to society. According to Grant and Murray (1996), a tension lies at the heart of the debate around schooling in America between liberty and equality, and between the freedom of opportunity for all to achieve and more equal outcomes for all children regardless of race or class. The NEPI Framework Report posed the problem as follows:

It is in principle possible to increase both equity (defined as improved distribution of educational resources to disadvantaged communities), and efficiency (defined as maximising rates of return on educational investments), but in practice policy choice will involve some or other trade-off between them (NEPI 1993: 11).

Thus, policy choices in education are, in the first instance, determined by political rather than research considerations. However, the relationship between political values and the policy vehicles chosen to give effect to these values is by no means simple. For example, in the South African context, the new curriculum for schools is based on the principle of providing equal opportunities for all children to develop the knowledge best suited to

building a peaceful and prosperous society. But there are important practical questions which query whether Curriculum 2005, as presently constructed, will provide the best vehicle for achieving these aims in the majority of South African schools.

Politicians on both sides of educational debates invariably conflate values and vehicles, and generally assume that questions raised concerning their policy choices constitute an attack on the principles guiding those policies. One of the tasks of research is to open the space between principles and policies and to delineate the conditions and contingencies with which policy vehicles must contend in order to achieve their aims. This is not to imply that research is objective to the point of being free of political value. But the best research provides space for perceptive and informative analysis, which is relieved of the burden of short-term party political considerations.

The absence of longitudinal data

A second and closely related factor complicating the debate around school reform is the fact that the cycles which govern political elections or donor preferences are generally shorter than those needed to determine the success or otherwise of education policies. Invariably, therefore, reforms are modified or, more usually, inverted before their effects become discernible. Consequently, longitudinal studies which track the implementation and impact of educational practices over time are very rare. As a result, education systems often lurch from one set of reforms to the next, guided more by ideology than a careful assessment of outcomes and an analysis as to whether or not policies are counterintuitive to their own aims. As Fullan and Miles (1992) have noted, such conditions are conducive to focusing on the symbolic aspects of reform rather than the substance.

Different strategies for different contexts

Partly as a consequence of the above factors, few research studies take account of the differential effects of policy on practice in different types of schools. Cuban (1997) distinguishes three tiers of American schools. In the top tier, serving the 10% of affluent, mainly white communities, schools

score well on indicators of quality, but the various reform movements have had little influence on their organisation, governance, curriculum or pedagogy, as parents are satisfied with existing arrangements. The middle tier, comprising around half of all schools and which also show acceptable scores on quality indicators, have embraced reforms and successfully implemented them in the areas of organisation, governance and curriculum, although pedagogical practices remain resistant to change. In the bottom tier of schools in the US, serving mainly big-city districts with large proportions of minority and poor children, reforms of whatever kind have, in general, had little effect, except in pockets, and then only when driven by considerable additional resources from outside the system. (Meier 1997; Darling-Hammond 1997).

Lusi (1997) identifies a 'troubled' subset of bottom tier American schools: those that are recalcitrant or corrupt, as opposed to simply lacking in knowledge and other resources, and notes that in such schools the state needs to be more authoritative in its demands for change and in its enforcement of regulations.

But even within each tier, differences between schools are so great - in terms of capacities, resources, leadership, culture, and relationships with the environment - that finding a blueprint for school improvement remains an elusive holy grail. Under these conditions it is more productive to think of change as a guided journey rather than a process which can be planned entirely rationally from the start (Fullan and Miles, 1992).

Similarly, writing in the UK context, Hopkins and MacGilchrist (1998) advocate three types of strategies for approaching reform in low-performing, moderately effective, and highly effective schools, respectively. Type 1 strategies are aimed at assisting low performing schools to become moderately successful. These schools require a high level of external support because they lack the minimum threshold capacity required to initiate and manage their own reform, and they focus on a limited number of clearly defined, achievable pupil learning objectives in order to build the confidence

and competence to continue with further reform. Type 2 strategies are appropriate for moderately effective schools. These focus on specific teaching and learning issues and improving management, and they often require a certain level of external support. Type 3 strategies are those adopted by highly effective schools. These involve a wide exposure to new ideas and practices, an open discussion of values, collaboration within the school through partnership teaching and outside the school through consortia arrangements. Such schools do not require external assistance, although it is often welcomed, or initiated from within the school.

Furthermore, Hopkins et al. (1996) note that finding a balance between change and stability is perhaps the most crucial challenge facing schools in times of innovation. They distinguish between maintenance activities - the regular day-to-day functions of the school - and development: those activities that add value to the regular routine of the school. These authors caution that:

A common problem is that many schools overload their development plans. Because there is insufficient distinction between plans for development and plans for maintenance (e.g. those devoted to timetables, budgeting, staffing), there is a tendency to put off external changes into development, thus ensuring that nothing gets done properly (Hopkins et al. 1996:9).

The above observations on reform initiatives in the United States and United Kingdom are useful for South Africa only up to a certain point. As we shall argue later, conditions in large parts of the schooling sector in this country are at least as bad as they are in the most poorly performing schools and districts in developed countries. Under such conditions of widespread dysfunction, reform initiatives in South Africa should heed two lessons from the international debate. Firstly, innovative reform requires a minimum threshold of institutional efficiency to have any effect. Secondly, in low-performing schools, modest, achievable objectives should be targeted if the school community (parents, principals, teachers and students) is not to be overwhelmed by too much too soon. How to develop an appropriate strategy for each kind of school is the task of research.

An emerging progressive consensus

The intense, often ideologically charged debate around school reform notwithstanding, something of a consensus is emerging in 'progressive' writing in the US and UK. This is to be distinguished from a more conservative lobby, often associated with the religious right in America and the right flank of the Conservative Party in Britain, which argues for a greater emphasis on tradition, as opposed to multiculturalism, in the curriculum; the use of vouchers in matters of finance; and increased parental control in the areas of governance and school choice. This 'progressive' agenda, occupying the broad political middle ground on both sides of the Atlantic, proceeds as follows.

Motivation and values

In the political domain it is premised on the achievability of both equity and excellence (Darling-Hammond 1997). For Grant and Murray (1996), this involves a shift in the relative weights accorded to individualism and cooperation, on the one hand, and liberty and equality, on the other. It recognises the increasing diversity of the student and parent populations and argues for equality in matters of ethnicity, culture, class and gender. It is dedicated to democratic forms of governance.

In the terrain of economics, it is mindful of the demands of the information age: the need for workers to be responsible, intelligent, and flexible in adapting to changing, highly competitive conditions (Weeres & Kerchner 1996).

Culture

Any institution has a particular character, defined by the extent to which its members feel committed to a common vision, and in the quality of their relationships with one another in working towards achieving that purpose. No institution can function effectively without a vision and sense of teamwork amongst its members, be it a relatively 'cool', professionally-oriented ethos that may pervade a district office, or a 'warmer', more family-oriented spirit that animates a school.

Any attempt to address the dysfunctionality of an institution must begin with the issue of culture. Leadership is critical in shaping institutional culture. At the school level, the role of the principal is key in establishing and maintaining a positive and cohesive culture, although in any successful institution leadership is likely to be exercised both individually and collectively and to emanate from a variety of sites, such as a senior management team, the teaching staff as a whole, a very dynamic administrator, the school governing body, the student representative council, and a host of cultural and sporting teams.

The progressive consensus aims to engender a community oriented, cooperative and collegial culture in schools (Darling-Hammond 1997; Lusi 1997). Leithwood (1996) argues that two further legs need to be added: efficiency and effectiveness, and adaptability to change. Not only should schools act as a community in order to support changing family structures and hard working parents, but they should also act as high reliability organisations - such as air traffic control operations - in consistently achieving basic learning outcomes.

Curriculum

Epistemologically the progressive consensus is constructivist: learning must start in the life experiences of learners and classroom activities must consequently be learner-centred and equip children for applying knowledge to real world problems. This does not imply the pursuit of a simplistic practical curriculum: all learners must have equal access to the high status, intellectually challenging knowledge rooted in school disciplines. Darling-Hammond describes the curriculum challenge as one which revolves around the question:

How to fashion work that [is] rigorous as well as relevant, how to employ variable student-based strategies and also teach for high levels of disciplined understanding in content areas (1997.-12).

The constructivist epistemology and its implications for teaching and learning constitute one of the most controversial and difficult visions to implement in education today. We will return to this issue at length in Chapters 5 and 6.

Agents

Teachers are the key to interpreting policy visions. Teachers never merely implement policy: they act as 'street level bureaucrats' (Lipsky 1980), active agents in shaping policy and enacting their interpretations of it in the classroom. They exercise what Darling-Hammond (1991) has referred to as the power of the bottom over the top. The sum of the work choices of teachers comprises the de facto policy of the school (Lusi 1997). If this is so, then, in order to work towards the progressive vision outlined above, teachers must be proficient in a challenging range of competences.

In the domain of knowledge, the goal that all students should acquire high-level content knowledge and high-order problem-solving skills, demands a depth and sophistication in teachers' grasp of academic subjects, which, Cohen and Spillane (1992) believe, are far beyond most American teachers. This demand, in turn, poses challenges to the pre- and in-service preparation of teachers: Darling-Hammond (1997) notes that high-achieving American States, where students are among the top performers in the world, have standards boards that pose rigorous requirements for teacher education and licensing. The opposite is true for low-achieving states. In addition, given more fluid and uncertain family structures, the teacher, now more than ever, is a primary nurturer and role model for the development of a culture of civility and caring in the school community and beyond.

The progressive agenda sees professionalism amongst teachers as fundamental to achieving its vision. Professionals have the knowledge and confidence to make complex decisions about individual pupils and their needs in busy classrooms (Darling-Hammond 1997). Sykes (1998) identifies the essence of professionalism as a social compact between a particular

occupational group and those it serves: in exchange for a high degree of autonomy in exercising professional judgement, service providers pledge to act in the best interests of their clients. However, trust lies at the heart of such social compacts, and it is precisely this trust that is experiencing erosion in the postmodern era. For Sykes (1998) teachers have never enjoyed a high professional status, and the key to establishing a professional image lies in teacher organisations moving away from their present union-based adversarial approach to labour relations, towards what Kerchner and Koppich (in press) have termed integrative bargaining, where both sides seek a common road for mutual benefit.

For policy makers the challenge is to establish appropriate standards and procedures for educator development programmes and the licensing and certification of teachers. Furthermore, since teachers are to exercise judgement in bringing to bear analogous standards on pupil performance, and since the progressive vision is premised on compliance and cooperation rather than coercion, it follows that the participation of teachers in the formulation of standards is essential (Carnoy 1998). Finally, professionalism is built in the workplace through collective reflection on practice and a collegial approach to building a learning community (Hopkins et al. 1996).

For administrators, principals and other school leaders, the key task, in cooperation with teachers and parents, is to set and monitor standards, to support teachers in their efforts to provide quality instruction, to build capacity, and to initiate change (Lusi 1997). In addition, these institutional managers need to orchestrate the numerous complex systems which make up the schooling system, such as financial procedures and responsibilities in the acquisition and spending of funds, the management of personnel, and resources, including teaching and learning materials, the organisation of the school day, and the maintenance of the buildings and grounds. The curriculum is both the most complex of all education systems and the focus of all other systems as they contribute towards the delivery and support of teaching and learning in classrooms. Chapters 5 to 9 of this report examine

various aspects of the curriculum as it weaves its way through all the institutional levels of public schooling.

Parents too have an important role to play in the governance of schools as learning communities. They have the task of bringing local aspirations and traditions to bear on the activities of the school, of integrating schooling into community life, and of engendering a culture of leaning in the home. Yet this is not easy in all but upper middle class communities in which the parent body is dominated by professionals. In poorer communities, the prevalence of low levels of literacy and apathy amongst parents is a hurdle to their involvement in the life of the school in general and in governance in particular.

The developing world

Riddell (1997) notes that thinking about school change in developing countries is dominated by the kind of production-function models long discredited in the industrialised countries, at least in progressive circles. Riddell underlines the need to unite the two traditions of reform - these focused on national policies and those concerned with classroom-level changes - in order to enhance overall understanding between all the actors. Although Riddell makes these observations from the perspective of research, it seems likely that they would reflect the larger culture of schooling in many poorer countries. However, there is much evidence to indicate that the kind of systemic reform espoused by the progressive consensus outlined earlier is taking hold in many developing countries, often under the influence of international donor agencies (Black et al. 1993).

The levers of reform

Achieving school reform along the lines outlined above is a daunting task, the complex nature of which has resulted in the majority of initiatives focusing on only one or at most two levels: classroom, school or state policy. Lusi (1997) distinguishes three waves of school reform in the US. The first was directed at the policy level through instruments such as teacher and student testing and increased graduation requirements. When it

became apparent that top-down policy directives were insufficient to change school and classroom practices and outcomes, a second wave focused on school restructuring. While this has had significant impact on the quality of teaching and learning in many schools, school-level reform, on its own, has a number of limitations. In the US it has affected, at most, a few hundred schools out of a national total of some 100 000. Moreover, it requires extraordinary efforts on the part of external actors and is often short lived. The systemic, or complex reform movement arose out of the realisation that reform which does not target all three levels simultaneously - classroom, school and administration - is unlikely to bring about change which is fundamental, sustainable and generalisable. Systemic reform strives to achieve coherence and complementarity across the numerous components comprising the public schooling system, and is aimed at supporting school efforts to redesign teaching and learning. For Fullan this requires the harmonisation of policy mandates and school invention:

Neither a heavy handed view of top down reform nor a romantic vision of bottom-up change is plausible (Fullan 1991: 211).

In summary, systemic reform from a progressive perspective:

- ✍ is directed towards instituting democratic values and practices at all levels of the system.
- ✍ is directed to achieving quality learning which is characterised by high-order conceptual knowledge and skills amongst students.
- ✍ coordinates, supports and monitors the work of teachers, principals, school governing bodies and district officials, and builds their capacity.
- ✍ provides clear policy guidelines for student learning and achievement, teacher certification and licensing, and school governance and management.
- ✍ establishes systems of accountability at all levels.
- ✍ improves the effectiveness of management systems.

- ✍ is only achieved through extraordinary and sustained efforts, requiring commitment from the school staff and broader community, as well as additional resources and external support.
- ✍ in poorly performing schools and districts is best approached in a phased manner, requiring minimum levels of institutional capacity as a base for innovation and a phased approach to change, commencing with modest, achievable goals.

Expansion and resistance in the South African school sector

The South African public school system has experienced exceptional growth in the last two decades, partly as a result of pressure from business for a better skilled workforce, and partly too as the result of an effort to increase the legitimacy of the apartheid state, but largely as a result of political pressure from black youth. The number of school-going pupils increased from 3,5 million in 1976 to close on 12 million in 1996. Other indicators of the rapid expansion of the education system are:

- ✍ the number of schools increased from 18 000 in 1976 to over 27 000 in 1996.
- ✍ the number of teachers grew from 145 000 to 375 000 in this period.

Table 2.1 indicates the increase in the number of pupils between 1970 and 1996. While there was a four-fold growth in black pupils between in this period, the number of white pupils increased by only 170 000.

This growth has been most marked in the secondary school population. In 1970 only 106 945 black pupils or 4% of all black pupils in school were in secondary schools. The number increased to 318 568 or 9% of black pupils in 1976 and to over 2,8 million or 30% by 1996. The number of black pupils in Std 10 in 1970 was 2 608, 8 378 in 1976, and over 500 000 in 1996.

Table 2.1: Growth in the South African school population, by race between 1970 and 1996 (SAIRR surveys 1970, 1976, 1996/7)

Period	Black	White	Coloured	Indian	Total
1970	2 545 755	821 961	515 336	157 89	14 031 943
1976	3 697 441	903 062	655 347	188 008	5 443 858
1996	9 500 00	980 000	910 000	280 000	11 987 965

Growth of the magnitude described above places considerable strain on any system and quality is inevitably compromised in the drive for increased participation. However, in South Africa quality was particularly compromised by the apartheid state's policy of separate and unequal education provision. While there was considerable increase in the total budgets allocated to black education between 1972/3 (R117 m) and 1990/1 (R2 642 m), the difference in spending on black and white pupils remained high (Hartshorne 1992). In 1972 the ratio of black to white per capita spending on education was 1:15. This improved to 1:10 in 1980 and to about 1:5 in 1990 (Harthorne 1992). Ironically, the expansion of schooling for black youth, particularly at the secondary level, fuelled opposition to apartheid. Schools of manifestly inferior quality to those in white areas, provided sites of mobilisation for large numbers of students and there was an air of inevitability about the Soweto student uprising in 1976. Apartheid education thus provided the seeds of its own downfall. It also provided the foundation for one of the most intractable problems faced by the new government. Between 1976 and 1994 black schools were sites of political struggle in which frequent and sustained class boycotts, strong opposition by teachers and students to school visits by district staff high rates of staff and student absenteeism, and endemic vandalism of school property led to what Christie (1998) has called a school culture inimical to learning and teaching. Christie defines this culture as 'a breakdown of rhythmical, disciplined learning and teaching, formally structured in time and space' (1998: 289), which is characterised by four features: poor

physical and social facilities, organisational problems, poor school/community relationships, and poor relationships between the education department and the schools.

A major manifestation of the systemic malfunction caused by the above factors is the internal inefficiency of the public schooling system, as shown by learner progression rates. The most striking statistic in this regard is the calculation by Crouch and Mabogoane (1997) that it takes, on average, 18 learner years of effort to produce one Grade 12 enrollee. Another indicator is that, although South Africa spends a significantly higher proportion of its operating budget (budgeted at R48.5 billion, or 22.1 % in 1999/2000), than countries like Chile, Egypt, Portugal and Turkey, a far smaller proportion of our school students go on to tertiary education (Collings 1999).

Expansion of schooling in South Africa is relatively recent and, given the rapid rate of this growth, the fragmented and inequitable nature of the apartheid system, and the destabilising effects of resistance, consolidation of the sector was never achieved. It remains one of the highest priorities of the new government to effect this consolidation through the establishment of a functioning bureaucracy at all levels and the improvement of operational efficiency.

The first five years of democracy

With the institution of the first democratically elected government in the history of the country in 1994, a vigorous effort was mounted to reform South African schooling. Three areas of activity have been prioritised: reorganising the 17 apartheid Departments of Education into a single national and 9 provincial Departments, achieving high levels of representativity amongst staff at all levels of the system, and establishing a policy framework which embraces the progressive consensus on school reform outlined above.

Structure and composition of the public service

Progress to date in addressing the massive task of restructuring the apartheid education system represents a major achievement for the new government. The White Paper on the Transformation of the Public Service (Department of Public Service and Administration 1995) and the Presidential Review Commission on the Reform and Transformation of the Public Service in South Africa (Presidential Review Commission 1998) reflect a strong commitment towards adopting new ways of thinking about the nature and role of government. Although the majority of the proposals contained in these papers have not yet been put into effect, there is evidence that they are being taken seriously by government.

Much progress has been made in terms of changing the composition of the public sector so as better to reflect the racial composition of the country, although progress has been uneven across departments (Munslow, FitzGerald & McLennan 1997). (The gender situation is considerably less favourable, with few women in senior management positions.)

These developments notwithstanding, the transformation process is far from complete. For example, Landman (1998) calculates that the public sector as a whole supports 54 000 supernumeraries - officials who could not be accommodated in the restructured departments and who therefore no longer have a designated post but who continue to draw a salary. The annual cost of these officials is estimated to be between R1.5 and R3 billion. Nevertheless, some progress has been made in decreasing the size of the civil service, with overall numbers having declined almost 10% between 1995 and 1998, although the cost has risen sharply due to the three year wage agreement concluded in 1996 (Landman 1998)

Education policy framework

In the policy arena the new government has embraced the vision of the international progressive agenda for systemic change, and has made much progress in establishing a number of key policy instruments in the following areas:

- ✍ Constitutional rights. The new constitution establishes basic education, and equal access to educational institutions as the right of all citizens. (Constitution of the Republic of South Africa 1993).
- ✍ Qualifications. The South African Qualifications Authority (SAQA) Act (SAQA 1995) is the first step towards establishing a coherent framework for the recognition of all education qualifications. Structures which will give effect to the framework have begun to be established.
- ✍ School governance. The South African Schools Act (Department of Education 1996) makes provision for the establishment of school governing bodies through which parents will exercise considerable authority and responsibility in the governance of schools.
- ✍ School funding. The National Norms and Standards for School Funding (Department of Education 1998a) establishes principles for redressing past imbalances in financing schools.
- ✍ Language. The Language in Education Policy promotes initial instruction in the primary language and, through the policy of additive bilingualism, the learning of South African languages (Department of Education 1997b).
- ✍ Teacher management. Four instruments - Norms and Standards for Educators (Department of Education 1998b), Employment of Educators Act (Department of Education 1998c), Manual for the Development Appraisal of Teachers (ELRC 1998), and Duties and Responsibilities of Educators (Department of Education 1998d) - aim to align regulations governing teacher qualifications, certification and management, and make provision for establishing a system of performance management for teachers.
- ✍ Curriculum. The Policy Document for the Foundation Phase (Department of Education 1997c) and numerous other documents establish the basis for a revolutionary approach to teaching and learning.
- ✍ Assessment. The Assessment Policy in the General Education and Training Phase (Department of Education 1998e) seeks to align assessment with the aims of the new curriculum

✎ Gender. The Report of the Gender Equity Task Team (Wolpe et al 1998) makes recommendations for the establishment of gender equity measures throughout the education system.

Taken together these documents represent an impressively coherent vision for the fundamental transformation of the South African schooling system. In effect, these and other new policies have tended to foreground the transformation of public schooling and background the strengthening of the foundations necessary for the efficient functioning of the system, such as the institution of procedures for sound financial management, information collection, and textbook distribution. Thus the daunting task of building the human and systemic capacity which form the foundation on which innovation depends, lies ahead. The following section illustrates some of the challenges faced by government, particularly at the provincial level, in fulfilling this task.

Operational capacity

One of the most revealing indicators of both the differences in management capacity across the provinces, and the levels of mismanagement in the weaker provincial Departments of Education, is given by the extent to which budget figures were achieved for the 1996/7 financial year. Crouch and Mabogoane (1997) estimate total overexpenditure by the 9 provinces to be some R8,4 billion, or 23% of the R36,7 billion budget. These budget overruns were caused by large increases in spending, mainly in the field of personnel, where 90% of provincial budgets are dedicated to salaries. Estimates for 1998/9 indicate that the situation had further deteriorated, with provinces allocating between 88% and 97% on staff salaries (Business Day 1999a). This situation has had disastrous effects on non-salary expenditure, reducing the money available for textbooks, for example, from R895m in 1995/6 to R80m in 1997/8 (see Chapter 7).

Nowhere are the key requirements of systemic reform, and the lack of government capacity to implement its policies effectively, better illustrated than in the findings of an evaluation recently commissioned by the Department of Education. The study traced the distribution of four policy

documents and sets of support materials intended to carry key information about the new curriculum and arrangements for school governance to teachers, principals and parents (Palmer 1998). The study found the following:

- ✍ in the four provinces sampled large variations were found within and between provinces but, on average, the following rates were achieved at successive levels of distribution:

LEVEL	DISTRIBUTION RATE
National	100%
Provincial	86%
District	65%
School	47%
Staff and Governing Body	19%

Overall, only one in five documents reached its intended target. This indicates high levels of inefficiency within the education system as a whole. These figures also give a rough indication of the relative degrees of dysfunction of the system at the different levels: while there is a steady fall-off as the documents travel the hundreds of kilometres between the national office and successive levels of the provincial systems, and while about one in two documents dispatched reaches the school level, there is a dramatic fall-off in travelling the few metres between the principal's office and the staff room.

- ✍ On the basis of the finding that many teachers interviewed admitted that they do not like to read, the study concluded that the distribution of unmediated, unsupported material is not an effective strategy for changing the classroom behaviour of teachers. There was a strong plea by teachers for more direct training, as opposed to the very weak cascade design employed, for practical classroom demonstrations in the implementation of the new curriculum, and for exemplar lesson plans and assessment items.

These findings illustrate the key principle of systemic reform: attempts to change any aspect(s) of schooling - school governance and the curriculum in this example - are heavily dependent for their success on a host of systems and actors, some residing in the school and others extending way beyond its boundaries into the multiple levels of the education administration.

In line with the international progressive consensus on school reform, there are calls in South Africa to move the culture of the public service from the traditional rational-legal model, based on principles of centralisation, hierarchy and administrative authority, to one which is more developmentally-oriented, decentralised and responsive to local conditions. Wallis (1997) warns against taking this proposition too far: in his view a system which combines the efficiency of the rational-legal model with the flexibility of a developmentally oriented model characterises successful organisations. There are clear indications that some of the provincial systems fall into the category described by Munslow et al. (1997) as being reconciled to gross inefficiency, maladministration and chaos. Evidence for this conclusion includes the existence of thousands of 'ghost' teachers (fictitious persons drawing real salaries) in some of the provinces, and very low levels of productivity amongst teachers and other education officials. Government impatience with these features of the education administration is reflected in the extraordinary outburst against the teaching corps in September 1998, led by the Deputy President (Mbeki 1998) and followed in close order by the Ministers of Education, and Post and Telecommunications, and the General Secretary of the SA Communist Party. Under these circumstances, MacLennan (1996) notes, the establishment of order must be the first priority on government's reform agenda. Whether the education system is able to institute systems for the control and regulation of routine functions, while simultaneously achieving all aspects of its reform vision, must be open to question.

Nevertheless, notable gains have been made on both fronts. Thus, improvements in financial management in all provinces led to a widespread

consensus ahead of Minister Manuel's budget speech on 17 February 1999 that significant progress has been made in controlling education spending (Business Day 1999b). For example, according to Reserve Bank figures, in December 1998 the provinces' combined bank overdrafts stood at R1,6 billion, compared with R2,8 billion in the previous year (Business Day 1999c). At the same time impressive equity gains have been achieved in the allocation of spending. Firstly, spending on social services has increased significantly as a proportion of total budget (Crouch and Mabogoane 1997). Secondly, a significant internal redistribution within the education system is in process, with inequities in budgetary allocations between provinces appreciably reduced between 1990 and 1996 (Crouch and Mabogoane 1997). Whether these increases in inputs can be translated into quality improvements is one of the greatest challenges facing the second five-year term of government in democratic South Africa.

School reform

Attempts to improve teaching and learning have undergone a rapid metamorphosis over the last five years. Prior to the institution of the new government in 1994, most initiatives were driven by Non-governmental Organisations (NGOs) and consisted of INSET courses in mathematics, science and English. School management was the first new component to be added, initially also as a stand-alone input aimed at improving the skills of school principals.

Over the last three years two new developments have become discernible, both influenced by a more integrated, systemic perspective on school reform. Firstly, provincial governments have become involved in district-level restructuring and establishing school governance structures. During the second half of 1998, central government, through an additional allocation of R200m, began to dedicate additional resources to improving the operational efficiency of school districts.

Secondly, NGOs and donor agencies have begun to locate their INSET activities within a 'whole school development' framework, generally in

support of government initiatives. Dozens of such initiatives are in various stages of planning and implementation across the country. Perhaps the most striking feature of these projects is that they reflect a shift, in a very short space of time, from classroom-level programmes aimed at increasing teacher skills, to school- and district-level interventions. Thus, in 1995, the National Teacher Education Audit (CEPD 1995) identified over 90 INSET programmes of the first type, and only a few 'whole school development' projects. By contrast, at the present time, stand-alone INSET programmes are few and far between.

A second feature of this donor and NGO activity is that, despite their rapidly increasing number, collectively these initiatives reach, at most, some 5-7% of South African schools. The key to broadening the impact of such programmes must lie in building capacity in provincial Departments, particularly at the district level, to initiate, support and monitor school reform. Although the majority of the projects involve some or other form of partnership with government, the degree to which they are owned and driven by provincial, regional or district officials is in many cases open to question. This is not an easy relationship to build. The greater the level of dysfunctionality in any part of the system, the greater is the need for such programmes - but, at the same time, the greater is the difficulty in establishing and maintaining the right balance between government and the outside parties. Those initiatives which do not attempt simultaneously to mobilise change at the classroom, school, and systemic levels will not take root, and if these efforts are not sustained until they have become institutionalised, they are likely to be ephemeral.

Finally, the evidence from similar initiatives in other parts of the world tells us that impacting significantly on the quality of teaching and learning outcomes is by far the most difficult dimension of school reform. It is also the most important if not the ultimate goal of school change programmes, and certainly a key focus of South Africa's education reform strategy.

Evaluation of the many school reform initiatives at present under way is essential to understanding their effects on the quality of teaching and learning.

Conclusion

Compared with other African countries, and many developing countries on other continents, South Africa has high participation rates at all levels of the school system. However, the efficiency of public schooling must be one of the lowest in the world. Strengthening the capacity of all the institutions and systems comprising the schooling sector in order to achieve more effective delivery is a matter of national priority. Without a significant increase in the ability of the system to maintain routine functions, no innovation is possible. In terms of the latter - transforming the system - the new government has set itself an ambitious agenda, targeting high-level student learning and participatory governance and management processes, to date not achieved on any scale in many developed countries. Under these conditions it may be advisable to implement the envisaged changes in a phased manner, commencing with basic priorities such as the achievement of minimum levels of institutional functioning and basic literacy and numeracy, before more ambitious goals are targeted.

In any event, it is not possible to direct either component of reform - improving system efficiency or instituting innovation - without the systematic collection of policy relevant information. Reliable data which presents a coherent picture of schooling is not only a prerequisite for tracking progress on improving the quality of education, but also assists in setting realistic targets for all the actors. Furthermore, it is essential to the promotion of an informed public debate. Such a debate is important, not only as a key element for holding civil servants accountable for the expenditure of public revenue, but also for generating wider ownership of the public schooling system.

The first priority in generating a coherent data base must be the establishment of an education management information system (EMIS). Secondly, research and

evaluation studies are an important tool in tracking progress on the transformation goals which the new South Africa has set itself. While acknowledging that these two kinds of information overlap to a considerable degree, the principal focus of the remainder of this report is concerned with the latter priority.

CHAPTER 3.

REASON, REALITY AND PUBLIC TRUST. THE CASE OF EDUCATIONAL RESEARCH FOR POLICY

Johan Muller

The fragile world: science, politics, relativism

We live in a time when faith in the viability of politics based on science and objective knowledge as an antidote to poverty, race, unemployment and social insecurity) has all but disappeared. These are postmodern times, it is said, and such old-fashioned notions as objective knowledge have lost their purchase on popular imagination and the national will.

Is this overstating the case? There are those who say that all we really need is a strong national movement of restoration, an ethical or cultural 'back-to-basics' that involves a stout defence of the modern project and the state's leading role in it; a quick but devastating attack on postmodern cynicism and irony, and a clear re-dedication of faith and resources to the enterprise of researching useful knowledge for politics. But perhaps it is too late. Perhaps, as some of the more persuasive accounts would have it, the nature of the institution of science really has changed. Perhaps its relation to the worldly spheres of politics and the economy really has been re-aligned, and perhaps the debates around the objectivity, neutrality and relativism of knowledge really have changed the nature of knowledge and the practice of its construction, research.

The greatest pitfall in considering these issues is to imagine that it is all one, or all the other, an apocalyptic style of thought which marks out particular positions in the debate rather than depicts the debate itself. As I hope to show below, this 'all or nothing' style of thought can be found on both extremes of the debate - from those who say that the enterprise of science hasn't changed fundamentally at all and that the doubters must be repelled at all costs, to those who believe we have left one paradigm behind forever, and that we now inhabit some or other post-scientific brave new world.

The position to be defended in this paper is the following: the institution of science has changed; notions of 'useful knowledge' have left us in little doubt that ideas of absolute certainty, objectivity and neutrality can no longer be supported. For all that, even if we accept most of it, it is still possible, and more important than ever, to maintain that there is a real world relatively independent from our ways of viewing it, about which we can make assertions whose veracity we can reliably judge. Just because there are no universal rational values or norms does not spell the end of the enterprise of rational knowledge and research. The naked truth might no longer be attainable, but a modestly clothed one surely is, and is therefore to be prized all the more highly.

The two sub-sections which follow attempt to establish the grounds for this position. First, the question of the changing social role of science will be investigated; secondly, some contemporary debates around the nature of knowledge, truth and reality will be reviewed. It is from the adoption of certain positions in this debate that a paralysis seems to emerge. The argument made here is that these positions exceed their philosophical warrant, that they conclude far beyond the remit of their propositional base: that they are, in good, old-fashioned language, wrong. This will then set the stage for the next section, which examines the emergence of this style of 'over-reach' in educational thinking. Finally, this part of the paper will reflect on the unfortunate and quite unproductive polarisation that has resulted, a veritable 'dance of the straw men', and will explore some routes to its supercession.

1. Science/politics

The argument to be made in this section is that politics has become much more scientific, that is, much more knowledge-based at the same time as the public at large has lost a great deal of its faith in scientific authority, and science has become, as a consequence, much more worldly. These two dynamics, seemingly contradictory, are in fact two sides of the same coin, effecting the closer coupling of the endeavours of science and politics (Weingart 1998). The moral to be drawn here, however, is not that all science therefore becomes merely political, as certain postmoderns and feminists to be discussed below would conclude. It is, rather, that the increasing precariousness of the border between the two different enterprises entails constant redrawing, challenge, re-establishment, and reiteration.

The grand era of technocracy in world politics is over; its founding ideals have been completely discredited. When Vannevar Bush in 1945 announced in his report 'Science: The Endless Frontier' that the USA would embark on the glorious path of the scientific eradication of poverty and all other social ills, he could not know that he was putting a capstone on a tradition that, from Francis Bacon to Max Weber, conceived of

politics as the 'world of values' which created problems for the 'world of science' to solve (Sclove 1998). Politics was the realm of interests; science was the realm of disinterested knowledge that produced knowledge for policy dilemmas based on those interests. The two realms were, and had to be kept, quite separate. The scientists would produce knowledge, but not decisions. They would speak truth to power, but, just as the political problems originated with politics, so the decisions based on the truth would reside there. The researcher-as-technocrat was thus conceived as a neutral truth-relay between political problem-setting and decision-making. This tradition has come to an end.

It broke down at both ends of the relay. Most spectacularly, it broke down when important, public and visible scientifically-based decisions turned out to be wrong, as in the disasters arising out of nuclear reactors, pharmaceuticals, and in a rapidly proliferating set of ecological areas where scientifically-based interventions produced unanticipated outcomes - the destruction of the ozone layer, for example, and global warming. Or is it, in fact, 'really' getting warmer? Herein lies the second rub: scientists don't necessarily agree on these matters. In this and in countless other matters from cholesterol to exercise, it came as a shattering blow to public confidence in science that science could be plural - that not all scientists necessarily agreed, or that Science with a big S didn't deliver Truth in the singular, and with a big T.

And why did these scientists disagree? Was it merely that the truth had not yet been finalised, like some kind of engine prototype that was rough around the edges but correct in 'the essentials'? Or was it, as some in the public sphere began to suspect, because scientists too had interests, and these different results were quite simply explicable in terms of the different interests, agendas and ideologies that scientists held or served? Was science, in fact, simply the fancy, and expensive 'continuation of war by other means', as Latour has famously claimed?

The reality is rather more mundane, though no more reassuring to an anxious public. There had in fact always been dispute and differences of opinion amongst scientists, in Aristotle's time as well as in Bacon's and Weber's. Two factors served to shield this from the public's gaze, which has been quite incurious until recently. The first was the inwardness of science, its relative insulation from the outside world. This insulation kept most of the workings of science from public view, showing only its products, and then selectively. The second was the relatively small numbers in the scientific community. The massification of higher education in the developed countries had by the 1960s and 1970s produced an exponentially greater number of competent, knowledgeable scientists and potential researchers than the traditional take-up capacity in the higher education institutions, traditional think-tanks and Research and Development laboratories could absorb. New forms of research-based bodies sprang up, in the private sector, in NGOs, and in civic advocacy forums. These were all increasingly numerous competitors for increasingly finite and, by the early 90s, globally dwindling resources for research. Consequently, the internal disputes of science could no longer be easily contained, especially when scientists began to align themselves with worldly civic interest groups, as they increasingly did as the instrument of uncertainty-reduction par excellence, science itself, began to contribute to the very uncertainty it was supposed to contain. And so, while uncertainty became lodged as a political factor in the consciousness of the public in the developed, and to a lesser extent, developing world, so science, which was now a prime producer of the now 'riskiness', was also and increasingly looked to in order to assuage or arbitrate the burgeoning uncertainty and complexity of everyday life.

The interlinked (or close-coupled) nature of the phenomenon should be clearer. As society has more and more recourse to research or knowledge-mediated products, so uncertainties proliferate. As uncertainties proliferate, so people turn to science for uncertainty-reduction. The increase in uncertainty is partly a product of the increased visibility of disputation, as discussed above. But the proliferation of science-generated errors and,

sometimes, disasters must also be explained. The increased use of expertise and knowledge in political and economic decision-making drives experts to go beyond the scope of their knowledge -'beyond the evidence' as it were. The pressure of politics and competitiveness drives scientists to produce judgements about real world problems that go beyond the current level of consensus in the expert community. They stray, in other words, out of their scientific zone and into the sphere of prescription and advocacy. Mistakes are made, and disagreement is aired. When that happens, science begins to leak legitimacy. This leads in turn to a greater, not a lesser, desire for expertise. Thus we can see that even attempts to control expertise will proliferate its social need and function.

This is only paradoxical if one imagines that close-coupling entails an erosion of the functional differentiation between the science system and the politics system, leading to a convergence in kind between science and politics. On the contrary, even as the systems become more closely coupled, so, at the same time and by the same logic, the systems, or at least the science system, is spurred to greater internal differentiation. Closer coupling thus accompanies, and causes, differentiation; it does not occur instead of differentiation. Yet it is this latter conclusion that the postmoderns persistently derive from the phenomenon of systemic close coupling. And it is this derivation that leads to particular consequences in the practice of educational research.

The postmodern interpretation, which has become relatively common, has a further social impact of its own: it signals to the public not only that scientists, in the execution of their scientific work, have interests which cannot be expunged from the process. It takes the further step which portrays scientists and researchers as merely another interest group, with no special claim to arbitrate the veracity of warrantable assertions. As Couzzen and Woodhouse (1995:533) say: 'From guardians of the common good producing objective knowledge, scientists are now perceived as hired brains of special interests and lobbyists for their own'. Alexander (1995:3) has called this the 'sociological fallacy', namely, the view that because

ideas have social sources, they can be adequately explained by reference to the social source alone. This form of reductionism entails a kind of dumbing-down of expertise. It is a view which scientists and academics, for understandable reasons, have begun vigorously to rebut:

The displacement of the idea that facts and evidence matter by the idea that everything boils down to subjective interests and perspectives is second only to American political campaigns - the most prominent and pernicious manifestation of anti-intellectualism in our time (Laudan 1990; quoted in Sokal).

There is at least one indisputable social benefit that accrues from the new sceptical gaze that society now casts on the scientists. In the past, scientists could safely assume that society regarded science and the products of their expertise as inherently worthwhile. This is no longer the case. As disputes arise, and as politicians and the public wonder increasingly who they should believe, the scientific community will increasingly be expected to demonstrate the worth of its endeavours to a bemused public - whether this worth is economic (does it lead to technological advance?) or political (does it help us make better decisions?). This new demand for social utility and for public accountability is a direct outcome of the repositioned status of the scientific community in a closer coupled social complex (Couzzens & Woodhouse 1995) Though scientists will chafe under the new restrictions which accompany these demands for utility and accountability, and though it could lead to abuses of power and corruption (as in the Virodene case), close coupling in the end makes visible links that have in various ways always been present, and allows society therefore to build democratic safeguards. What this new public scepticism does not need is artificial amplification by a reductive postmodernism that reduces all expertise to power and interest.

2. Constructivists and realists

Almost without anyone quite noticing its approach, social science research in general and educational research in particular finds itself in the middle of a fully-fledged methodological war. Who is winning the war cannot easily be gleaned from the writings of the protagonists, since both sides claim dominance by the others and underdog status for themselves. For Guba and Lincoln (1994), for example, it is 'positivism' (or perhaps 'post-positivism') that has supplanted what they call 'Aristotelian' approaches to research. It is not easy to tell whether they mean anything more by this than that quantitative methods seem to enjoy precedence over qualitative ones in the high-status publishing forums. For Martin and Sugerman (1993), on the other hand, it is the 'Aristotelian' approaches themselves that have overrun the research terrain, and they call for a turn to 'Galilean' social science instead. What they seem to mean is that the qualitative approaches prized by Guba and Lincoln are, in their frequent invocation of 'grounded theory' (which is mostly used as an alibi for no theory at all), are in fact atheoretical and naively empiricist: 'Without truly explanatory theory that can act as map to assist navigation through such empirical labyrinths, researchers are left without sufficient theoretical guidance, and the research effort inevitably becomes "hit and miss" (Martin & Sugerman 1993:21).

This is, at the very least, confusing. The onslaught by the 'Aristotelians' resembles something like a holy war against 'positivism' as the 'dominant discourse of science' (Usher & Edwards 1994), which somehow 'imprisons difference'. The 'Galileans' respond with charges of a- or anti-theoreticism, and a critique of the empiricism that results when the researchers attempt to release the 'imprisoned voices', an empiricism that, paradox upon paradox, seems suspiciously positivist! 'Is a radical qualitative empiricist not perhaps a masked positivist?' asks Henning (1995:31).

It is certainly clear that being a positivist is not a good thing to be. Why that is, is the proper place to start. As we shall see, the protagonists in this contest do not so much disagree about what is wrong with positivism: where they differ, and differ radically, is in understanding of what the implications are for conducting research.

What is positivism and what is wrong with it? Just what, as Taylor (1995:2) asks, is one wanting to deny? The Aristotelian view, against which positivism is cast, makes the assumption that the observing mind does not merely depict the objects in the world; it also participates in their constitution. For positivism, the scientific gaze must be separate from the world it observes, in order to create an objective, true representation of reality. Truth then is the degree of correspondence between the representation and the reality. The degree of correspondence is measured by evidence, by which certainty about the correspondence is generated. This operation depends in turn upon a certain self-reflexivity, a certain 'self-transparency', enabling the scientist to interrogate the representation methodically.

This view of knowledge and truth depends pre-eminently upon the idea of the disengaged observer as well as upon a notion of truth as representation. The most profound critiques of this view therefore all attempt to demonstrate that observers are always also agents, and that, as such, are always also engaged in the world they seek to depict as objectively as possible, 'that the condition of our forming disengaged representations of reality is that we must be already engaged in coping with our world, dealing with the things in it, at grips with them' (Taylor 1995:11).

This critique of positivism is thus perhaps the most important source of the now commonplace notion of humankind as an active, producing, fabricating agent of her or his destiny, an 'implicatedness in the world' which can never be completely suspended, even when doing science: 'Even in our theoretical stance to the world, we are agents' (Taylor 1995:11)

It may seem surprising to enthusiastic anti-positivists, but there is very little in this critique that is controversial. Every serious contemporary philosophical current accepts this as a starting point. The issue is: what are its implications for the pursuit of truth, or science, or even more practically, for the conduct of research?

To say that we actively construct our world is not controversial, as I have said, nor is it so to say that all assertions are paradigmatic, or theory-laden, or community or language game-specific. It only becomes so when the conclusion is drawn that therefore there can be no objectivity, truth, evidence, or warrant simply because, by not being able to step outside worldly implicatedness, all talk of truth is forever after fatally compromised. In other words, the constructivist thesis is not relativist as it stands, and is in fact embraced by every serious contemporary social theory. The thesis only becomes so when it is applied to social research itself (Hammersley 1995:16). When that happens, then the possibility of making epistemic distinctions between assertions is lost.

It is on this point that the social theory universe splits into two. Taylor speaks of the 'neo-Nietzschiens' on the one hand and the 'defenders of critical reason' on the other. The former group includes 'constructionists, constructivists, deconstructionists, pragmatists, postmodernists, epistemological relativists, subjectivists, sceptics, interpretivists, and reflexivists'. 'The family resemblance is a determined for stubborn) anti-realism' (Edwards, Ashmore & Potter 1995:43). What 'anti-realism' means here is simply that there is no reality beyond constructive description, that there is nothing 'outside of the text' (nothing that is not a product of representation), and that science therefore takes its place as a human activity next to all other activities. Science is in this gesture 'dethroned' as a producer of privileged statements about the world. The knowledge it produces becomes one kind of knowledge amongst other knowledges that are all worthy in their own way. By denying that there can be better statements about the world, and believing that the world is made not discovered, the constructivists end up denying that there is any such thing as 'the' world. It is in this sense that they are 'anti-realist'.

This barefaced denial of the existence of reality regularly enrages realists whose ripostes are often grimly humorous (as in the realist joke, 'show me a relativist at 30 000 feet and I'll show you a hypocrite'). Indeed these ripostes typically fall into two sorts of bottom-line argument against relativism, 'death' arguments and 'furniture' arguments. The joke above is implicitly a 'furniture' argument; so is Samuel Johnson's kicking the table. 'Furniture' arguments point at the materiality of the world and imagine that nothing more needs to be said. They are arguments of 'no argument', of unvarnished reality. Such arguments frequently too include a claim that relativists 'must' also believe in the world's materiality, or be either mad or duplicitous. 'Death' arguments point at the irrefutably real fact of suffering and death, and challenge the relativists to deny them.

This strategy is often adduced as the main reason why we have to draw the distinction between fact and falsehood. As Hobsbawm (1997:272) remarks, 'Life and death, or - what is quantitatively more important - money, depend upon it: Without drawing the distinction, furthermore, the social scientist's 'public responsibility' (1997:274) can't be demonstrated, because good assertions can't be distinguished from bad. How, is, of course, the question. 'Death' and 'furniture' arguments seem compelling, but they miss the point, which is that, formally speaking, scientific arguments are no different from non-scientific arguments. Rorty (1991:53) makes the point: 'My own, strictly amateurish, guess would be that any 'inferential principle' (or any other principle, I would add) which is 'central to scientific explanation' is going to turn out to be central to practically every other area of culture.' True, and anthropologists have been demonstrating the point now for many years (Worsley 1997). But that is not the crux of the matter either. Inferences may be formally the same, but, especially insofar as they are intended as guides to action, as research for policy surely is, they are not all equally commendable. They differ in terms of their 'super-empirical virtues' - consistency, explanatory power, fecundity, comprehensiveness, and simplicity. They differ, in other words, in terms of their coherence or 'epistemic gain' (Taylor 1995:17; see also Haack 1993, and Farrell 1996).

'Epistemic gain' is just what the constructivists don't want to concede: 'the social constructionist arguments have shown that scientific knowledge has no privileged claims to truth and has thus placed all knowledges, in theory, on a common epistemological footing' (Cozzens & Woodhouse 1995:545/6). But that can never mean that inferences and assertion can't be epistemically distinguished. The activity of research depends upon it. The critique of positivism may have displaced views of absolute truth, and of absolute epistemic privilege (views which had, after all, more to do with scientific self-image than anything else), but it does not displace the notion that we can discern epistemic gain: 'what is special about science is not that it has a unique method for getting at the truth, but that it has done rather well, by and large, at meeting the criteria - experiential anchoring and explanatory integration - by which we appraise the well-foundedness of any empirical beliefs. Science, in my view, is not privileged epistemically; it is only rather distinguished from an epistemic point of view' (Haack 1992:10). Put like that, it is hard to disagree.

Assessing the positions soberly, it is somewhat surprising that the dispute has generated, and continues to generate, so much heat. In large part, it is a dance of straw men, with each side exaggerating and caricaturing the other. For the constructivists, any claim to 'epistemic gain' is obdurate positivism. For the realists, the relativists are malicious and scientifically ignorant trouble-makers, and fair game for hoaxes like Sokal's (see Sokal's homepage) and other forms of brisk retaliation. The relativists have at times seemed hurt that the realists take their deconstructions so seriously (for example, see Fuller 1995:a and b), but, as we shall see later, the implications for social governance are somewhat more serious than the relativists usually concede.

In the end, the difference between realists and constructivists comes down to the following:

- ✍ Realists want to distinguish clearly between two different levels of observation: first order observation (ordinary observation) and second order observation (researchers observing people observing). Because observation is constructivist (first order), this does not mean that second order observation is therefore the same as first order observation (Fuchs 1995). To equate them is to take an existential or psychological claim (that knowledge of the world is mediated) as an epistemological claim (Schwandt 1994:131; see also Moore & Muller forthcoming).
- ✍ Because scientific and non-scientific statements are formally equivalent, this does not mean that they are substantively equivalent. In other words, because statements have the same structure, this does not mean that they are equally valid.

Constructivists and relativists thus collapse and conflate distinctions that realists regard as essential to the very enterprise of science and research. These confluences are regarded as consequent on the critique of positivism for the constructivists, but not for the realists, who agree in most essential respects with the critique of positivism. I will end this section with a brief discussion of two implications of the constructivist position for the professional conduct of research.

2.1 'Science is indeed politics pursued by other means' (Latour 1993: 11)

As we saw above, constructivists take the dictum of world-implicatedness to refer also to researchers. This is sometimes taken to mean that researchers represent a constituency of interests, or that the knowledge produced favours one or other set of interests. Some versions of the 'knowledge/interests' view, like Marxism for example, retain a belief in the distinction between good and bad assertions (here, between ideology and critique) so that even though knowledge may be interested, the aspect of interest can be isolated and relatively objectively commented on.

Other versions of the 'knowledge/interests' view adopt a strong or radical constructivist view which denies that we can distinguish ideology from non-ideology. In this version, one is ineluctably 'in' one's interest-constituency - most often an ethnic or gender one - and one speaks the 'truth' of one's situatedness even though this 'truth' is admittedly partial.

In this tradition, the 'voice' of the members of the group in question is what research should articulate, a 'voice' that the 'voice' of dominant science (male reason) is said to suppress. If given the chance, the dominated 'voice' will 'speak for itself'. The vocation of research is to give it this chance. Partisanship here is presented as a virtue: since we are always 'world-implicated' - which is to say, since we are condemned to the inevitability of politics everywhere - the way to beat a partisan-dominant science is to be partisan and engaged in return. In some versions of this tradition, like standpoint epistemology, the claim is made that, while the validity of all knowledge is relative to social location, one particular social location has a unique access to the truth (see, for example, Harding 1991).

A science and research practice of this sort surrenders any possibility of making knowledge claims that can be arbitrated on intellectual grounds. Here, truly, 'all is politics', a view shared by Nazism, Stalinism and Maoism, rather inconveniently, because standpoint theory and other relativist approaches generally present themselves as progressive and emancipatory. The feminist realist, Patai, puts the case well:

feminism, today, as it conflates politics and education and effaces any distinction between political agendas and the protocols of research, is in danger of suppressing - it already dismisses - any calm, reflective stance that sees some strengths in the effort (however difficult to achieve/ to set biases aside and that still regards research as a valuable and satisfying endeavour not in need of quite so much postmodernist angst. ... By its refusal to recognise the distinct

boundaries that do and, in my view, should demarcate the realms of politics and education, and politics and scholarship, feminism threatens to entirely delegitimise any research effort not hopelessly mired in collective ideological conformity of in individualistic self reflexive shenanigans (Patai 1994:62).

Patai makes evident here too the particularly self-crippling effects of an 'all is politics' research strategy. In a climate of increasing public apprehension about the equivocal virtues of expertise, about the fallibility of experts and expertise, a methodological strategy that openly announces its partisanship to a sceptical public in need of reassurance is, as Patai puts it, a strategy of 'extraordinary blindness' (1994:62). It is a strategy that will also probably jeopardise not only the constructivist cause, but that of educational research in general.

It is for this reason that social scientists like Bourdieu (1998), noting with alarm the signs of mounting public impatience with a 'frivolous' research community, calls for a 'real politics of reason', a concerted international campaign to defend the probity and integrity of the 'scholastic attitude' which, despite all the modifications made to it in the light of the positivist critique, still remains the only path of 'access to the universal' (Bourdieu 1998:137), and the only one out of the particularisms of postmodern research practices.

2.2 'Who believes in naked truths?' (O'Neill 1995:104)

Constructivists hold to a construal of the research world as one where a small number of enlightened but beleaguered souls hold out against a mass of unreflective positivists, who care about only what they can see, replicate, prove, and generalise. In other words, those resisting the constructivist turn are widely believed to be crude empiricists. This is curious for a number of reasons.

First, realists, far from being empiricists, are as interested in unobservable as in observable entities. Many if not most of them believe that the most important organising entities of social life - class, status or trust, for example - are unobservable. Theories hypothesize about the way unobservable entities connect to, and organise, observables, and empirical research is the means to see whether these connections indeed function as the theory expects them to. This means that the world, for realists, cannot be 'incurably known': it is always a hypothetical order that is under investigation, and, as such, can always be refuted by the data.

For example: one of the stable results from the USA, UK and Australia in school choice studies shows that social class predicts patterns of choice. That is, the idea of monitoring indices of school quality, and exercising a 'rational' choice on the basis of them, is a feature of the habitus of middle class, not of working class parents. While the theory may be quite complicated in that it assumes links between socio-economic position, class culture, consciousness and choice, the empirical test of the hypothesis is quite simple: are there or are there not class-based regularities in patterns of school choice? As it happens, some evidence is beginning to emerge (see Hoadley's PEI study) that suggests that working class parents, and students, are exercising forms of rational choice of school. This goes against the theory, and the next step would be to ask why that is. This would lead to a new hypothesized set of (unobservable) relations which can again then be tested.

In this example, two things are visible. The first is that assertions in realist epistemology are fundamentally open to refutation. For constructivists, who deny the truth-value of assertions, assertions are as irrefutable as they are unverifiable. This leads on to the second point. Constructivists deal with the flux of construction most usually by means of methods - like interviews and questionnaires - that allow the constructors to 'speak' about their construction. In this approach there are rarely unobservables: the account is regarded as the presented

'reality'. To use an old formulation, the data is expected 'to speak for itself': categories for analysis must not be suggested from without. They are to be discovered 'emically'. This is the principal supposition of and rationale for 'grounded theory'. But there is a central fallacy at work here, and it consists in expecting interviewees, for example, necessarily to have access to the grounds for their actions. Bourdieu calls it the 'scholastic fallacy', which consists in 'asking interviewees to be their own sociologists' (Bourdieu 1998:132), a practice which he also refers to as 'the most serious epistemological mistake in the human sciences, namely, ... putting a 'scholar inside the machine' ... to place the models that the scientist must construct to account for practices into the consciousness of agents ... ' (ibid:133). Or as Fuchs (1995:315) more scathingly puts it, 'ornithologists don't communicate with one another through chirps and twitters'. Trying to generate 'theory from the ground', is, then, to mistake 'chirps and twitters' for ornithology. Relativism and realism are, as they stand, not incompatible. Relativism is about warrantability; realism is about the ontological status of a discourse. We are all relativists of one kind or another: certainly many people would be cultural relativists. It is a particular kind of cognitive relativist, combined with an anti-realist ontology, that constitutes the radical pole of this kind of research.

Of course, very few people will admit to being the radical kind of constructivist depicted here. Most would admit only to being moderate constructivists. But here too there lies another kind of danger, that of inconsistency. One cannot be a selective constructivist: that is, one cannot easily believe in 'grounded theory' and then also claim superior truth status for one's research assertions. This is what Woolgar and Pawluch (1985) call 'ontological gerrymandering', trying to have it both ways. The results of such a stance are, in the end, incoherent.

Finally, though the constructivist or relativist position often portrays itself as 'progressive' or 'emancipatory' (as in the action research school of constructivism), 'Relativism has no ethical and political implications at all' (O'Neill 1995:1031). Nor has realism for that matter. For both, what matters is what one does with them, how they are deployed in practice. It is to this that I now turn.

The fragile world revisited: what educational research can and can't do

In the first part of this paper I examined the paradox of how an increase in the production and circulation of social knowledge leads to an increase in social indeterminacy. Indeterminacy is a Janus-faced condition. On the one hand, it may enlarge the sphere of human action and thus contribute to the possibilities for human freedom. On the other hand, it may lead to an increase in complexity, making decisions more risky, and their outcomes more uncertain. Both increased complexity and enlarged freedom contribute to the increased fragility of our social world, and contribute to the difficulty of governing it. It is in this context that the potential role of educational research in reducing complexity and contributing to policy and political decision-making arises in a new way. I say 'in a new way', since the utility or social usefulness of educational research has been debated for decades, largely in terms of the distinction between basic ('pure', not immediately useful) and applied research, where first the truth is discovered, to be later applied. Debates used to ponder the niceties of how to make research more 'useful', by which was meant how to create applications for relatively certain, already-discovered knowledge. With the world changing towards an innovation-based economy and an informational society; with the challenges to notions of truth and reality as we have seen, and with the increase in social fragility, the expectations directed

towards social research have in recent times become rather more urgent. The distinction between basic and applied has tended to blur, and, in certain quarters, the idea of basic research is seen as a luxury we can no longer afford. Nevertheless, there are some limits to what research can and cannot, should and should not, do. It is the changes, but also the continuities, in the social role of research, that I will examine in greater detail below.

1. Usefulness and accountability

Is it reasonable and legitimate for the Minister of Education to expect from policy research that it produce useful knowledge - that is, knowledge that not only explains why things happened the way they did, but also predicts how they will happen in future (or, better still, how they should happen)? Can and should policy research produce reliable guidelines for policy decision-making, for better practice and performance?

From the minister's perspective, the expectation is eminently reasonable. He is all too practically aware that success in his job depends on simplifying the complexity we have discussed above in a systematic way. Indeed, this is another way of saying that all governance is the systemic practice of complexity reduction. Which systems will produce the desired results? That is what he is after, and what he will expect research to answer.

It may surprise the minister to learn that not everyone will agree with him. In fact, the idea of forward extrapolation, of prediction, is of rather recent origin, arising, as the constructivists point out, in its modern form with the logical positivists. For the first three hundred years of productive science in the modern era, the primary aim of scientists, in accordance with the Western philosophical project, was to explain events and phenomena 'after the fact': 'an explanation told you why the event had to occur given that it already has' (Fuller 1995b:2). This was the meaning of Hegel's famous aphorism that the owl of Minerva (goddess of wisdom) always flies only at dusk (at the end of the event to be explained). In this tradition - and it

is worth remembering that it was the mainstream or dominant tradition - the job of science was to remain not only out of politics, but out of the game of functionality altogether. Explaining the conditions of possibility for an event to occur constituted the boundaries beyond which scientists ought not to go. This view is still current, and displayed for example by Nobel prize-winning physicist Weinberg in a recent article on Thomas Kuhn:

If one scientific theory is only better than another in its ability to solve the problems that happen to be in our minds today, then why not save ourselves a lot of trouble by putting these problems out of our minds? We don't study elementary particles because they are intrinsically interesting.... What drives its onward in the work of science is precisely the sense that there are truths out there to be discovered, truths that once discovered will form a permanent part of human knowledge (Weinberg 1998:50).

We saw above that this view of knowledge was co-opted by the technocratic vision of good government, and that it, by and large, served it well, from the responsibility - disclaiming 'useful idiots' of Lenin and Hitler to the scientists in the Manhattan Project who exploded the first atom bomb. The technocratic promise was that dispassionate knowledge could be wedded to social ends. That vision of the relation of knowledge to politics and policy now lies in tatters. What seems to be taking its place in the closer-coupled world that we increasingly inhabit is a view that researchers and research should exhibit greater public accountability and responsibility to society, to the public good, to policy. This is a far harder edged mandate to satisfy. It will be as uncongenial to the contemporary neo-Kantian 'basic' researchers as the technocratic lure of cooperation in rational good government was to their forebears. But it will be uncongenial too to the postmodern constructivists for a range of reasons that bear closer scrutiny.

First, I must flesh out a little what it means to say that constructivists refuse to put their assertions up for confirmation or disconfirmation, and

thus refuse, as it were, to play the 'truth game'. When constructivists encounter an assertion about the world, they do not automatically treat it as an assertion requiring validation or refutation. They do not treat it as referring to states of the world. Rather, they put inverted commas around it (they 'ironize' it) and treat it as a piece of language, a textual symptom, signifying something quite other than its assertional purport. Otherwise put, they treat 'uses' of language as 'mentions' - they do not recognise the use/mention distinction (O'Neill 1995). The refusal to treat assertions as assertions is the central move in current mainstream relativism, which conforms to Alexander's (1995) diagnosis of an epistemological fallacy (namely, that because engagement cannot be voided from reason, that generality (or universality) is therefore impossible).

An example makes the point. At the time that the De Lange Commission Report appeared in 1981, it was received in certain 'progressive' quarters as 'another brick in the wall'. This diagnosis was rarely based on taking the De Lange claims as assertions and putting them to conceptual or empirical test. Mostly, the denunciations were based on the lack of representivity in the research committees - as if the truth content of the assertions were determined by the social origin of the commissioners or researchers, or their social base, or the need to obtain consensus: in other words, as rhetorical symptoms of something else, rather than their substantive content (good examples of Alexander's sociological fallacy). This refusal to treat assertions as assertions has another crucial effect. Ironism brackets decisions about assertions, and in so doing, by refraining from judgement, removes us from the possibility of any discourse about action (at least in terms of the assertion). There may be a supervening or gerrymandering discourse about action, as there frequently was in commentaries on De Lange, namely that apartheid must be overthrown, but this did not issue from an analysis of the assertions of the Commission as such. This abstention is not so much the high-minded neo-Kantian abstention from prescription that we find, for example, in Foucault (1991:157): 'I absolutely will not play the part of one who prescribes

solutions'. It is, rather, an ironic desire, a refusal to treat language as in any way an extension of action. Neither of them, however, are of any help to a complexity-ridden minister, or to a policy in need of systematic investigation. Neither of them, therefore, present themselves as candidates for policy research.

When the constructivist does go into the field, she (or he), partly out of an assumption that empirical methods would tar her with the positivist brush (mistakenly, as we saw above), invariably decides to use perspectival methods - interviews, questionnaires and the like. Because the world is constructed by actors, it seems to constructivists that it follows that we should therefore obtain reports from those actors on their constructions. By why does it so follow? Why have actors any privileged insight into the way they see (or construct) their world? Indeed, as we saw above, this merely limits us to the subjectively perceivable, and eliminates from possible examination the intransitive unobservables that may well, as grammar does for speech, construct the objective possibilities for expression. How helpful will this be for the minister or for policy? It may be perfectly helpful to find out what various constituencies think about this or that feature of their lives, or about this or that policy, but this will not tell us much about whether the policy actually works or not, or why it does so. In other words, perspectival data has a useful but limited role to play in policy research.

Finally, in flight from generality, the constructivist going into the field is likely to want to concentrate on the study of singularities, or case studies, although the latter term may have different connotations (in medicine, for instance, untroubled by doubts about universality, case study results are frequently taken to establish the basic parameters of a generalisable finding). In educational research, the generalisable case study is rarely found. In education, by and large, cases are singulars, especially when prosecuted by constructivists.

But will this be helpful for the minister? Probably not. It is fairly well-

established in the methodological field that the study of singulars is most likely to be helpful to practitioners, the study of generalities to policy-makers (see, for example Bassey 1995:108). It may well be reasonable to suppose that practitioners in specific concrete localities ought to be the primary focus of policy concern, but the minister is unlikely to share that view, not because he is uncaring or disengaged, but because it is the broader systemic effects that command his attention. It is the very existence of systemic effects that the constructivist denies.

In this section I have reviewed a series of implications that may flow from the theoretical commitments of constructivists seeking to do policy research in education.

These include:

- ✍ an ingrained anti-empiricism
- ✍ a preference for the study of singulars
- ✍ a preference for perspectival methods
- ✍ a reluctance to engage with a discourse of action

It seems inevitable to conclude that constructivist research has little to offer educational research for policy.

The final section here will review the attendant implications for research and social responsibility.

2. Research and social responsibility

Is there no-one left in the Left stiff prepared to argue that scholarship is valuable in and of itself? (Patai 1994.-69)

here are three issues that are invoked by the word 'responsibility' which must be separated. The first is the idea of 'engagement'. As I

claimed above, by acceding to the critique of positivism, one accedes too to the ineluctability of 'engagement'. We are always engaged, whether we like it or not: this is the force of the critique. The same, incidentally, goes for 'reflexivity': also as a consequence of the critique, reflexivity is a constitutive part of being-in-the-world, not something that constructivists do in their research practice and others don't. Reflexivity, or 'reflex reflexivity', as Bourdieu (1996:18) calls it, is sometimes invoked to indicate the need to 'reduce as much as possible the symbolic violence which is exerted' (1996:19) as a consequence of the conceptual framework the researcher imports into the lifeworld of the interviewee. 'Engagement' is, in any case, as I have said, part of being-in-the-world, and can only be reduced or minimised, not eliminated. 'Engagement' is, in this sense, an impediment to good research.

Some constructivists construe 'engagement' not as a hindrance but as a virtue. In this sense, researchers ought to be engaged, and the research ought to be politicised. In this form of 'responsibility', the more the researcher identifies with the group being studied, the better the research is thought to be. But even advocates of politicisation recognise the risks involved. Black and Solomos (1993:185) warn against 'insiderism' and 'radical credentialism', where the researchers' main concern is solidarity rather than careful research. There are certainly ways to minimise the effects of this kind of commitment, though the most effective ways will eventually pit objectivity against commitment. This is because commitment, or indeed group membership, often entails that the researcher comes to share the same habitus as that of the people she is studying, comes to take the same things for granted, with the same things being invisible for both. 'One of the major reasons for these failures is the perfect match between interviewer and respondent, which allows the latter to say everything ... except that which goes without saying ...' (Bourdieu 1996:35). When this occurs, it is only solidarity, not understanding or explanation that is served.

The third meaning of social responsibility implies something rather different

to these first two. It comes closer to addressing the idea of accountability that, I claimed above, comes to press more heavily on researchers in a fragile world. Responsibility in this sense tries to answer the question: what ought researchers ideally to be doing in order to 'serve' society in the way that accountability seems to expect of them? They must guard at all costs against going 'beyond the data', a temptation especially in important policy-related research where the data doesn't quite allow the researcher to say what she passionately would like to say. Why must this be guarded against? Is a bit of fudging for the right cause not a permissible transgression? No, it is not. This interdict has ethical as well as democratic force, and the researcher is triply bound to it, first, by the rules of her discipline (of science); secondly, by the implicit public trust she carries by virtue of taking public money; and, thirdly, by virtue of the democratic mandate she carries as a co-participant and partner in public governance, for that, as I claimed above, is what policy research is (see also Radder 1998).

It may well be argued that we always do go beyond the data, and of course, this is true, but it behoves the researcher to be as vigilant as possible here, since the quality of public trust and believability invested in researchers is a fragile and increasingly vulnerable one. Once lost, this trust is not easily regained.

The responsibility of the researcher must be exercised not only via the state, but also in the name of an informed citizenry, indeed in the name of their right to be informed. As Brown and others put it:

When we think about all the claims to empirical 'truth' made by politicians and journalists over the last two decades, the need for independent research which subjects such assertions to account is crucial to the future of democracy (Brown et al 1996.371.

What Brown and his colleagues have explicitly in mind here is empirical research which, provocatively, they wish to label a 'new political

arithmetic', and more, to present 'arguments for a new political arithmetic'. They are mindful that they will attract the ire of the constructivists but have also arrived at the conclusion that 'By rejecting quantitative methods, post-modernist researchers ... turn their back on the vital task of holding the state to account for its policies' (ibid:37). So, perceiving the lack, precisely by way of trying to exercise their social responsibility, Brown et al have joined their voice to a growing number that see that it is the task of a revitalised Left to reclaim the ground vacated by both the positivists and now the postmoderns.

Must we choose?

The case I have tried to defend in this paper can be summarised as follows: everybody, barring perhaps the odd Rip van Winkelish natural scientist, nowadays accepts the critique of positivism as definitive. In other words, the constructedness of reality is no longer controversial and we all are, to some degree, constructivist. Constructivists, on the other hand, go further than this, and this extension of the conventional position creates for them, as it does for educational and social research in general, dilemmas of relativism, generalisability, accountability and social responsibility. To avoid these dilemmas, I have argued, requires tempering the idea of the constructedness of the world with a certain moderate realism in order to admit the idea of epistemic of cognitive gain. Without this key idea, I have argued, educational research loses its central rationale as a socially aware and politically responsible practice.

Given this relatively moderate and modest conclusion, it is sometimes hard to credit, let alone account for, the vituperation and bile that characterises the ongoing agonism between the realists and the constructivists (see Hammersley & Gomm 1997a,b and Romm 1997 for a recent contest around the proper nature of educational research). And while both sides decry the dysfunctionality of the polarisation, the mock heroics show no signs of abating. Quite the contrary.

A tolerant pluralism has been suggested in some quarters (Davis 1997), but this really defers the question of reasoned adjudication, and leaves research communities in their present polarised state, which is hardly desirable, because it leaves them weak and vulnerable to powerful outside interests and forces. Besides, this solution is likely to appeal to liberal postmoderns only: it will satisfy neither the radical postmoderns nor the realists, for whom the problem will merely have been exacerbated.

Must we then choose? This seems a drastic solution, but the terms of debate seem to admit of no other alternative. Yet there are compelling reasons why an either/or choice is also far from desirable. To opt for constructivism is to make a claim, implicitly or explicitly, for its superiority over realism. But since the inherent relativism of constructivism disallows such a claim, the very gesture of choosing constructivism undermines itself, since to claim superiority while avowing relativism is unintelligible. To opt for an exclusive realism, on the other hand, would mean eliminating constructivism, which can be achieved only by means of an apodictic (or foundationalist) argument of the sort that has been discredited with positivism. Death and furniture, the two major classes of bottom-line arguments against relativism fall prey to just this trap, as I showed earlier. In other words, it is precisely when realists try to eliminate the entire constructivist ensemble of premises that they slide back into positivism, as constructivists gleefully like to point out (Edwards, Ashmore & Potter 1995). In short, constructivists can't eliminate realism without being unresolvably self-contradictory, and realists can't eliminate constructivism without resorting to a form of argument that leads straight back to positivism. Hobson's choice indeed.

If, in the present chapter, I have spent rather more time in pointing out the shortcomings of some contemporary constructivist research, it is not from the conviction that constructivism is all bad, and realism all good.

It is, rather, because constructivism, as it stands, and especially a radicalised constructivism, does not and cannot on its own yield a defensible research practice or a strategy for responsible political participation. For this, the constructivist opening salvo that helped to bring positivism down must be enriched by a bracing dash of realism, 'a form of realism that avoids the problems affecting foundationalism' (Hammersley & Gomm 1997a:8). This means a move beyond relativism. To do this we do not have to make any claims about the absolute veracity of assertions. A comparative claim is perfectly adequate: 'Its message is: whatever else turns out to be true, you can improve your epistemic position by moving from x to y; this step is again' (Taylor 1995; author's emphasis added). To concede this is to concede no more than that some research findings tell us more than others do. Otherwise put, some claims to knowledge are less valid than others are: 'We are not free to interpret reality just however we like, that is part of the meaning of the word 'reality'' (Hammersley & Gomm 1997b:2).

With this move towards a moderate realist research practice, I believe the educational research community puts itself in a position to reclaim a responsible, accountable, and perhaps indispensable role, not only in an increasingly fragile world seen globally, but in the shared governance of society committed to rational transformation.

CHAPTER 4.

RESEARCH METHODS

Penny Vinjevold and Nick Taylor

Progressive curricula in general land Curriculum 2005 is no exception – see Chapter 5), aspire to higher order learning goals, such as the analysis and application of knowledge, in addition to the acquisition of simple information. It is assumed that such learning outcomes are facilitated by active learning. This assumption may seem so obvious as not to warrant comment. But it is commonly accompanied by a second and more problematic premise, namely that active learning is best promoted by particular kinds of learning activity such as working in groups, discussion amongst learners, the use of practical materials, and working with examples drawn from the experience of the learners.

The problem with this double premise is that it can conceal the fact that learning must involve cognitive and affective activity and not merely movement and speech. Thus, while the activities listed above may result in high level outcomes, they may, if not carefully structured and guided by the teacher, succeed only in passing the time without engaging the cognitive faculties of participants, and thus result in little or no learning. Furthermore, it is also possible that active learning may occur in a whole-class situation where learners are totally absorbed, sitting still and listening to a teacher who engages their attention and imagination through force of personality, delivery and interesting content.

Two implications for research methodology follow from these observations. The first implication is that the final test of the effectiveness of teaching/learning strategies lies in the outcomes of learning. Thus, learner performance on a set of tasks carefully designed to assess the full range of learning goals is the best way to gauge the quality of curriculum design and implementation, and of learner application. Supplementary techniques include the analysis of pupil verbal and written behaviour in class. The second implication is that classroom observation techniques need to go beyond a description of the forms of classroom practices to assess the quality of the teaching/learning transactions amongst learners and between the teacher and learners. These considerations, in turn, have implications for the kind of research designs utilised, the instruments used to collect data, and the characteristics required of good researchers.

Selection of research sites

Bassey (1995) distinguishes between two kinds of empirical enquiry: the search for generalisations and the study of singularities. For Bassey these are two quite different forms of research enquiry and probably constitute the most important dichotomy in social research. Formulating valid generalisations requires the investigation of large populations through carefully selected samples. The study of singularities or case studies, by contrast, cannot be used to make predictions but can be related to other situations. The majority of the PEI studies can be described as case studies. Thus, while Bassey's cautionary words about formulating generalisations from research into singularities should be heeded when reading these PEI reports, they nevertheless provide important lessons.

Firstly, well-designed and carefully described case studies allow readers to relate the study to situations they know. Secondly, the PEI studies were conducted in over 300 schools, a sample that covered a wide range of schools in terms of socio-economic status, geographical location and resources. These provide a rich picture of South Africa's classrooms and schools - especially

those disadvantaged by apartheid policies. (See table 4.1 at the end of this chapter) Thirdly, there is convergence on particular findings of the various research reports, elevating them to the status of strong hypotheses. Fourthly, many of the PEI projects may be seen as pilots which prepare the ground for large-scale search for generalisation.

Most PEI researchers adopted non-probability sampling techniques (Huysamen 1994) in the choice of their research sites. Non-probability sampling occurs when no attempt is made to choose the sites in a systematic manner, and thus no assumption can be made concerning the probability that the schools selected are representative of the South African school population. Under these conditions the researcher cannot know the extent to which the findings are generalisable.

The PEI researchers adopted a wide variety of strategies for selecting the schools and teachers for their studies. In most cases the selection strategy was influenced by one or more of the following factors:

- ✍ Participation in a particular intervention intended to change teacher knowledge and practices or whole school development.
- ✍ Choosing schools to 'represent' a particular type of school or different types of schools.
- ✍ The particular interests and aims of the research project.

A small number of studies had no selection strategy at all and simply chose to investigate schools and teachers that happened to be known to the researchers.

Intervention studies

In twelve studies, schools were selected because they had participated in a particular intervention run by either university education departments, colleges of education or NGOs. Schools and teachers who participate in such intervention programmes have already undergone some or other pre-selection

process. Thus, for example, they may have volunteered for the programme. This process, in turn, tends to have a homogenising effect on the sample of schools or teachers that participate in the programme and subsequently in the PEI research project.

Three studies examined the impact of university or college-based courses on teachers' knowledge and practices. The study of Webb et al. of a two-year part-time Further Diploma in Education (FDE) used all first year students/teachers and second year students/teachers as the sample for testing teacher knowledge. Teachers from both years were asked to volunteer for classroom observations. In the South African Institute for Distance Education (SAIDE) study of the University of the Witwatersrand FOE, the lecturers on the course were asked to recommend teachers who they thought had benefited most from the FDE. Permission from these teachers was then sought for two classroom observation visits. Twenty-six teachers were invited to participate in the Teaching Intervention and Support Programme at the Western Cape College of Education (WCCE). Six teachers from this group participated in the study. The selection was based on the teachers' willingness to participate, the approval of principals and the schools' proximity to WCCE. In the three studies of interventions run by NGOs, teachers were also asked to volunteer to participate in the studies.

In three studies, schools involved in whole school development programmes run by NGOs, participated in the study. Ota chose a 10% random sample of the 200 schools which participated in the Quality Schools Programme in the Eastern Cape for his study. Twenty matching control schools also participated in the study. In Eric Schollar's study of the Education Quality Improvement Project (EQUIP), four of the nine schools involved in this programme in Mamelodi participated in the study. Three schools, which had participated in the Transfer of African Knowledge (TALK) programme, formed the sample for Sarah Murray's evaluation of this programme. The schools were selected to provide as much variety as possible. Thus the nature of the school itself, the perceived success of the course, involvement of the principal in the course, and so on, were taken into account.

Two PEI studies, one by Wright and another by Duncan, focused on the impact of particular reading programmes. Again the teachers involved in the two programmes formed the sample for these studies. Both researchers used control groups. Duncan used control schools which were chosen because they enrol children of matching socio-economic background. Wright chose her sample from 110 pupils nominated by teachers as 'failing readers'. The sample was divided into three groups - those receiving training in one instructional method, those receiving instruction in a second method, and a control group.

Homogeneity and heterogeneity

number of the studies attempted to select schools to represent types of schools. In some cases the schools were intended to be representative of a particular type of school in South Africa. In their study of mathematics teaching, Reeves and Long chose twelve teachers from nine former Department of Education and Training (OET) schools located in established townships near Cape Town. The researchers tried to select sites 'where the social and educational variables were as slight as possible so that any differences in learner achievement could be attributed to differences in the teaching methods used'.

Other studies tried to find a set of schools that were representative of the different types of schools in a region. In Dachs's study of large classes, 'a conscious attempt was made to ensure that the range of schools would include rural, peri-urban and urban schools; large, medium and small ones and schools which had a lengthy involvement in (teacher in-service programmes) and those with limited involvement'. The Project for the Study of Alternative Education in South Africa (PRAESA) study of problems in multilingual classes in the Western Cape also chose schools so as to provide as wide a variety of schools with classes which were as multilingual as possible. Similarly the National Language Project's (NPL) Investigation into teaching styles and cognitive processes in language learning selected schools which represented a broad spectrum of South

African schools ranging from former DET schools to former Model C schools. The schools also differed in the ranges of languages spoken and used as the media of instruction.

In most of the above cases no systematic sampling exercise was undertaken. Rather, schools known to the researchers or established through their networks were selected for participation in the studies. Three studies attempted more systematic selection procedures than those described above. A study by Ewing and Setsubi of primary schools in the lower South coast region of KwaZulu Natal used what they called 'representative targeting', which was based on the type and number of schools in the region. The criteria used were:

- ✍ diversity in the school population. class size.
- ✍ regional representivity in terms of urban, peri-urban/township and rural environments.
- ✍ regional representivity in terms of resources, services etc.
- ✍ geographic spread of the schools in the area.

Onwu's study of science materials used a three-stage purposive stratified sampling strategy. When they compiled a sample of schools, the researchers considered all the schools with Grade 12 science classes in the Northern Province. The district with the greatest range in matriculation pass rates in science was then selected for the study. The ten schools chosen represented high-, medium- and low-performing schools with a 100% pass rate at one end of the spectrum and a 5.6% pass rate at the other end. The schools were also selected to 'represent' urban, peri-urban and rural locations.

In their study of multi-grade schools in the Free State, the Human Science Research Council (HSRC), in consultation with the Free State Department of Education's Education Management Information System (EMIS),

attempted to select a sample that represented all the regions of the Free State. They divided the province into nine geographic zones. One magisterial district in each geographic zone was randomly selected. A database search was done for schools with 40 to 100 pupils and with pupils in grades 4, 5 and 6. This search yielded 168 schools in the nine selected districts. The schools for the study were chosen from these schools and an equal number was chosen from each district.

Fit for purpose

Six studies selected particular types of schools which the researchers thought would best serve their research projects. In Gilmour's investigation into the ethos of schools, schools with good reputations amongst teachers and teacher educators were selected to provide data on the types of governance and management structures and policies and values that prevail in good schools. In Maja's study into good mathematics practices, schools with good reputations and good results in the matriculation examinations and the The Third International Mathematics and Science Study (TIMSS) were selected so that teacher practices in these schools could be observed. In Bayona's whole school development study, five functional schools and five dysfunctional schools (chosen by using matriculation results) were chosen in order to understand the practices and perceptions that exist at these vastly different schools and so understand how whole school development should be designed.

Bell's study, entitled Implementing good group work in ESL classrooms, targeted schools in the Northern Province where there is a common perception that group work will not be successful because of their particular conditions. The specific school within each category was also selected for two practical reasons: proximity to the University where the research was located, and the principals' willingness to co-operate in the study.

Setati developed the following criteria for her study of the language practices of primary mathematics teachers: (1) teachers with a good reputation for mathematics teaching; (2) teaching experience (at least two years), and (3) at least a M+3 qualification. The teachers also had to be multilingual and teachers of second language learners. The N5 district office of the Gauteng Department of Education(GDE) was approached for assistance in identifying these teachers. The district could not provide the names of specific teachers but did provide the names of schools with good reputations. The researcher accepted these on the assumption that good teachers are found in good schools.

The study by the University of Natal (Pietermaritzburg) of the practices of teachers intended to choose teachers with good reputations working in resilient schools, that is schools 'able to cope and develop in the face of diversity'. They used Christie's (1997) categories for defining resilient schools. These were schools that:

- ✍ had a sense of urgency and responsibility. had flexible and purposive leadership.
- ✍ focused on learning and teaching as the central activities of the school.
- ✍ had a safe and organisationally functioning institutional environment. had consistent disciplinary practices.
- ✍ had a culture of concern in the school.

The Kwazulu Natal Department of Education and Culture officials, whose permission the researchers sought, expressed doubts as to whether any sort of sample was possible using the selection criteria proposed. However, the officials were so keen for the research to take place that they suggested expanding the criteria to include six schools. The research team had 'little option but to assent to the selection of schools 'given' to it '(17). In the event he researchers were grateful for the diversity of schools in the sample.

Baxen and Green aimed to investigate the presence and use of materials in a range of school types in and around Cape Town. They requested area managers to provide lists of state schools in their area and to mark these as either urban or rural and as well-resourced or under-resourced. From these lists a sample of 50 schools was drawn by using a table of random numbers. From these, 30 schools known to be under-resourced and representing rural and urban settings were chosen. Six well-resourced schools were added to this list. A final choice of nineteen schools representing different local areas, types of schools and medium of instruction were selected.

Mitchell, in his study of change management in the Northern Cape, asked the provincial education department to nominate schools from a wide range of regions, which the department thought had managed change well.

Obstacles to choice of research sites

Once the selection had been made, most PEI researchers sought to gain access to schools by seeking permission from the provincial department concerned. Provincial officials invariably referred the researchers to district officials. In most instances permission was quickly granted but in some cases the process took up to three months. In one case the researchers changed the province in which they were to conduct the research because of the complications and delay in the granting of official permission for the research.

Access to schools to conduct the research also had to be negotiated with principals. In only a minority of cases was this refused - although principals were in many cases concerned about the benefits of the research for the school. In some instances the principals were keen to know the results of the research. In others, the researchers offered schools feedback and even support after the research process. Finally, the researchers had to obtain the permission of the teachers to undertake the

study. Again only a small minority of teachers opted not to participate. Teachers asked about the benefits for them. In a number of cases the researchers provided learning materials and other equipment as a reward for participation in the research. In two cases access to the school proved increasingly difficult as the research proceeded. In one case the final observations could not be conducted because of hostility to the fieldworker. In the other case, teachers not involved directly in the research began to suspect that the researchers were spies or 'agents of the provincial department' and the teachers involved in the research had to intervene on behalf of the researchers.

Permission to conduct the research was not the last of the obstacles confronting researchers conducting their studies. In a number of cases observations could not take place because of unexpected and unscheduled changes to the school day. In some cases, these changes were caused by the absence of the teacher but, in other cases, activities at the school presented problems. These ranged from choir competitions, funerals, staff meetings, teacher union meetings and, in June 1998, threatened industrial action.

In some research projects the data collection was seriously delayed by these disturbances to the teaching programme and the research had to be curtailed. At the same time it must be acknowledged that the researchers' lack of experience in working in schools and developing research instruments was also a reason why they were not able to complete their proposed research programme in the given time. In these cases the quality of some of the data and the findings was compromised.

Table 4.1 at the end of this chapter summarises the schools involved in the PEI research projects. Collectively the studies cover a wide range of analyses of teaching and learning conditions across the spectrum of the public school sector. A collection of free-standing investigations of this kind cannot be said to represent the sector, or to present a coherent picture. However, as we shall show in Chapter 6, the convergence of a

number of findings is strongly indicative of the kinds of factors which promote or inhibit learning in many South African schools.

Research design

The PEI researchers mainly adopted a design comprising case studies or a design which incorporated case studies and small scale quasi-experimental studies. Within these categories, there were wide variations in design and quality. As a result, the validity of findings is highly variable across projects.

Case studies

In Bassey's terms (1995), case studies are singulars, involving the systematic description of a unique situation so as to bring out its characteristic features. They are not intended to provide a basis for drawing general conclusions about the schooling system. Under exceptionally well-controlled conditions, case studies may provide convincing demonstrations of change. Attributing such changes particular to interventions is highly problematic. The principal strength of the case study method lies in their descriptive power.

Most of the PEI case studies involved six to twelve teachers or schools and attempted to capture a 'snapshot' of the classrooms or schools through classroom observation. Observation schedules were generally employed to gather information about teaching and learning. This data was supplemented by information gathered through questionnaires and interviews on the context and characteristics of schools, teachers and learners. A common approach was for

- principals to complete a school questionnaire on the identity and characteristics of the school.
- teachers to complete a questionnaire on qualifications, experience and language proficiency.
- researchers to conduct classroom observations.

It is common for teachers to 'put on a show' for researchers. This subverts the researchers' intention to observe a routine teacher performance. In order to obviate this problem, a few studies went further than single observations in attempting to understand teachers' practices. So, for example, Setati's study consisted of observations of five consecutive lessons and Wickham and Versfeld conducted five observations of each teacher over four weeks. In Onwu's study of Grade 12 science teachers, three lessons of each teacher were observed. Some researchers also attempted to strengthen their understanding of teachers' knowledge and practices by conducting pre- and/or post-lesson interviews on the practices observed in the lessons. Others used pupils' verbal and written responses to further analyse and understand the content and processes of teaching and learning.

Collectively and individually, the PEI case studies illuminate what is happening in South African classrooms. The four examples outlined below are illustrative of the methodologies employed. Substantive findings of the reports are analysed in Chapters 6, 7, 8 and 9.

SETATI: Innovative language practices in multilingual mathematics classrooms

This was principally a classroom observation study, involving five visits to each of six Grade 4 classes in Mamelodi primary schools. An observation schedule was used to describe teacher-pupil and pupil-pupil interactions and it focused on language practices and the context in which these practices occurred. Pupils' written work was analysed by means of an examination of their class/homework books. A schedule which was used to guide this analysis focused on the forms of writing, the question types, and teachers' marking practices.

Background information was gathered through questionnaires which probed teacher biographical data and information on potential teaching time in the classes. In-depth questions were probed in pre- and post-observation interviews with the teachers. Each teacher was asked to select six pupils - two from each

of the top, middle and lower achieving sectors of the classes - to be interviewed. The pupils were interviewed in pairs so that the researcher might better understand their strategies for solving mathematical problems and their conversational practices in doing so.

PILE AND SMYTH: "Language in the Human' and, Social - Sciences Project

The project investigated whether using more accessible texts, including those in the primary language, improves teachers' mastery and coverage in the classroom to the extent that they move to a more effective; learner-centred approach.

Twelve teachers from six urban township schools and two farm schools in the Free State were involved in the study. An ethnographic approach was adopted, with classroom observation: as the chief method. Teachers were encouraged to take an active role in the research by commenting on the materials and on their own lessons:

Three lessons by each teacher were observed. The first was used to establish the norm in teaching styles. In the second, the teacher used material in Sotho from Bona magazine's Bala O lthute to prepare. In the third lesson the teacher was provided with support material in English (in addition to the Sotho' material): The successive observations attempted to describe and analyse differences across the lessons, and to relate any changes to the influence of the materials provided. The authors. conclude that no change in teacher practice as a result of the use of any of these materials is discernible. .

Pupil learning was also assessed by classroom observation through an analysis of pupils' answers to questions and pupils' workbooks.

WESTERN CAPE COLLEGE OF EDUCATION: Teachers' knowledge of their practices: impact of an intervention, and support programme

The intervention on which this case study is based aimed at developing teachers' knowledge of assessment, classroom management, materials, programmes and subject knowledge. The same structured interview was conducted before and after the intervention. The second interview included an additional question in each section on how teachers' views had changed. The four-classroom observations of each participant before and during the intervention attempted to capture changes in the teachers' knowledge and practices in relation to the subjects covered in the intervention.

In the recent past, when the distinction between qualitative and quantitative methods was an article of faith for many researchers (see Muller, Chapter 3), it was rare for case studies to employ anything other than qualitative forms of description. It is becoming increasingly common for such designs to incorporate quantitative elements. One such example is Maja's study of the teaching and learning of mathematics in Mpumalanga and the Northern Province.

MAJA: The enabling conditions for successful learning environments

Maja's study used achievements tests adapted from TIMSS and the HSRC's item bank to test Grade 8 pupils from 20 schools with good mathematics results and reputations. A learner questionnaire was administered to all learners writing the test. This, required biographical data such as gender, age, home language, education of parents, habits and activities relating to school work and leisure and home conditions; questions on the pupils' attitudes and achievements in mathematics, and finally questions on practices in the mathematics classes.

The teachers from the four top achieving schools in each of the Northern Province and Mpumalanga (eight teachers) were observed in their classrooms. The observation schedule was designed to collect data on teachers' instructional approaches to teaching mathematics concepts and processes. The

lessons were followed by interviews on aspects of the lesson that were not evident from observation of the teachers' lessons. The interview schedule probed criteria for grouping learners, information used to plan for the lesson, and adverse factors affecting the lesson. The teachers also completed a questionnaire on their qualifications; experiences and attitudes to mathematics.

Two factors distinguish this study from the comparative quantitative designs .

- ✍ No attempt was made to measure changes over time.
- ✍ While information was collected on contextual variables, teaching methods and learner outcomes, no attempt was made to establish a causal link between these elements. Thus, in his discussion of the relationship between the characteristics of the schools, teacher behaviour and learning, Maja was careful to confine his conclusions to statements of the form 'The key finding of this study is that method does not seem to be as important a s meaning during a lesson' (126).

Quasi-experimental designs

There are two absolute prerequisites for demonstrating a change in any educational situation. Firstly, two sets of observations, separated in time and measuring the same attributes, must be made. Secondly, it must be shown beyond reasonable doubt that any change detected was not due to the natural, random variation in the attributes measured. These requirements are not easily met and, while the case study method lends itself very well to describing processes, it is not ideal for the degree of precision required in ascertaining whether change has occurred. Establishing a causal relationship between any change observed and a particular intervention, such as a teacher in-service programme, is the most difficult of all research objectives. In addition to the above two requirements, the quasi-experimental method involves showing beyond reasonable doubt that no alternative explanations for the effect exist

except the assumed cause. This is the most difficult step in constructing a rigorous quasi-experimental design and always involves approximation to a greater or lesser degree. When quasi-experimental designs are performed on samples which represent the school population, or some subset thereof, they enable generalisation to be made about the characteristics of that subset. The most common method for eliminating competing explanations is through the use of a control group. This involves choosing a group of students who are as close as possible to the experimental group (those receiving the intervention) except for the fact that they do not experience the intervention in question. Any differences in learning gains made by the experimental group is then attributed to the intervention. When members of a larger population are assigned at random to the groups, a true experimental design is achieved, but this is rarely possible in educational research. A second approach used in quasi-experimental designs for controlling for variations between the two groups is to collect information about contextual variables - such as teacher qualifications or parental education level - and to examine their relationship to the learning gains by means of statistical methods.

It is common to combine the case study method with pre-test/post-test designs in order to collect contextual information and to illuminate the processes through which the measured learning gains are achieved. Thus, while pre-test/post-test methods may establish what is learnt and the extent of such gains, case studies may reveal how classroom activities and behaviours are involved in this learning.

Over a third of the PEI research projects used pre-test/post-test designs of one or another kind. A major problem for these studies was finding a control population that was sufficiently close to the experimental population to validate their conclusions. This is always an elusive goal in education research. In the majority of cases insufficient data on the control group was provided to know how well matched the two groups are. Nevertheless the qualitative and quantitative descriptive aspects of these projects produce a rich picture of classroom life in South African schools.

In addition, depending on the degree to which they approximated to quasi-experimental requirements, their conclusions posit hypotheses with greater or lesser degrees of plausibility.

REEVES A N D LONG: Focus on Seven: report on an investigation into language-sensitive activity-based methodology in primary science at the Grade 7 level This is a micro study of the ways 11 teachers are using a language-sensitive activity-based methodology to teach Natural Sciences to Grade 7, and of the way learners in these classes are learning. The materials and methodology were developed by the-Primary Science Program (PSP)

The following procedure was used

- ✍ Schools were chosen so as to minimise variations between teachers and learners with respect to contextual variables.
- ✍ Pre- and post-tests which used the same selected items from TIMSS were used to test a sample of 416, learners from 11 Grade 7 classes in 10 schools.
- ✍ Two observations of 11 Grade 7 Natural Sciences lessons were undertaken. The observation schedule used seven criteria to investigate a quality of classroom interaction.
- ✍ Eleven teachers were interviewed.
- ✍ A comparison of pre- and post-test results using Statistical Package for Social Sciences (SPSS) was made.
- ✍ comparison of post-test results of the experimental group with the control group of former DET learners from the larger TIMSS study, conducted in 1995 was made.
- ✍ A comparison of post-test results with their teachers' assessment of their learning was made.
- ✍ A comparison of post-test results of the sub-samples of experimental group with PSP assessment using carefully designed performance tasks, was made
- ✍ SPSS was used to, establish relationships between the implemented curriculum, the social and educational context for learning and learner achievement.

Comment

In the Focus on Seven study, the experimental and control groups were not strictly comparable. Teachers participating in the PSP programme may well differ in significant ways from the rest of their former DET counterparts who constituted the control group.

REEVES AND LONG: Focus on Four: report on an investigation into Grade 4 mathematics teaching and learning

This project focuses on teachers' classroom practices and the growth in learners' understanding of mathematical concepts and principles, problem-solving strategies, and attitude and self-concept in mathematics. The intention of the project was in particular to identify the pedagogical processes and teaching practices that may be effective for improving the quality of learning outcomes of Curriculum 2005.

The design was identical to that of Focus on Seven - except for the absence of an outside intervention. Focus on Four was an attempt to describe and evaluate the kinds of mathematics teaching normally prevalent in township schools. Twelve Grade 4 mathematics teachers and their pupils in schools in townships around-Cape Town were involved in the study. The researchers used questionnaires to establish key data on the schools and teachers and an observation schedule to record the practices of each teacher. In order to test pupil achievement, 25 items were selected from the TIMSS study to match topics that the teachers indicated they intended covering in the first term - 18 multiple choice and seven free response questions.

Comment

The test items selected proved too difficult for the pupils. Thus the absolute achievement of the pupils, on both pre- and post-tests, were very low, and the differences were consequently not amenable to meaningful comparison. We discuss this issue at greater length in Chapter 8.

WEBB et al.: The nature and impact of accredited, inservice education on under-qualified science and mathematics teachers: Which factors generate best practice?

This study investigated the impact of a two year Further Diploma in Education (Mathematics and Science) on the knowledge and practices of participating teachers and the performance of their learners. Twenty teachers from the first and second year groups were observed teaching fractions, electricity or measurement. The classroom observation focused on the intended outcomes of the teacher in-service course: variety of teaching methods, use of materials by learners and teachers, learners working in groups, critical and creative thinking, questioning skills, feedback to learners, and use of language to improve learner understanding. Semi-structured interviews were conducted in order to probe aspects of the lessons observed.

Pre and: post test sets of assessment tasks were used to gather data on skills and understandings of scientific and mathematical concepts in the areas of fractions, electricity and measurement. These topics were identified as being particularly problematic to teachers and pupils alike. Teachers participating in the teacher in-service programme and their pupils were administered, the same tests.

Tests were administered to:

- ✍ first-year teachers on the FDE programme (pre-treatment sample) and second year teachers (post-treatment).
- ✍ 888 pupils of 19 first-year teachers and 502 pupils of 18 second-year teachers - both before being taught the topic and after being taught the topic. Pupils were from Grades 5, 6 and 7.

Non-parametric statistical analyses were applied to establish a possible correlation between classroom outcomes and teacher knowledge of the topics taught.

Comment

A possible source of data unreliability is the fact that different cohorts (first and second year FDE participants) constituted the experimental and control groups.

DUNCAN: Research into initial reading programmes

This study was a comparison of different approaches to teaching initial reading and was intended in particular to evaluate the Montessori-inspired, straight-for-English approach developed by Zama. The study compared three township schools using the Zama method to initial English Second language reading with three township schools of a similar socio-economic profile and a fourth school located in a suburban area.

The study used the following approach:

- ✍ School data was collected by means of a questionnaire.
- ✍ A Zama teacher training workshop was observed so that an understanding could be acquired of the approach adopted in the experimental schools.
- ✍ Pre- and post-tests were administered to five- to eight-year old children in the seven schools. The tests used were a communicative reading test and discourse analysis of learner-talk. The baseline data was captured in February/March and the pupils were tested again in August/September. The mean averages and mean gains per group were calculated and described. Each of the 14 teachers involved in the study was interviewed on their language practices and beliefs.
- ✍ Each of the 14 educators involved in the study was observed once and attempts were made to use the differences in classroom practices to explain pupil scores.

Comment

Two dependent variables are involved in the Zama method: an activity-based approach to reading, and straight-for-English. Duncan does not distinguish between these, and hence his study is unable to establish the extent to which each may be implicated in any improvement in reading.

NATIONAL LANGUAGE PROJECT: Investigation into teaching styles and cognitive; processes in language-learning

The purpose of the study was to investigate ways in which pupils' learning styles matched the different teaching modes or teaching styles of 13 teachers in seven-schools selected to represent a broad spectrum of schools. The assumption underpinning the study was that different learners engage different modes when learning, and that language learners are more successful if there is a match between the styles of teachers and learners.

The study used the following approach:

- ✍ Multiple observation of teachers using an observation schedule and audio and video recordings, was undertaken. The main objective was to characterise different Teaching Styles.
- ✍ Testing the Cognitive Styles of Grade 3 and 7 learners using Riding's Cognitive Styles Analysis (CSA) - a computer-based method of measuring cognitive styles. This was used to identify learners' preferred cognitive modes of information representation and processing. (Riding's claim is that various Cognitive Styles are associated with different social attributes that have an effect on the way learners respond to different instructional styles.)
- ✍ The grammar and vocabulary of the same Grade 3 and 7 learners was - tested by means of the Michigan Language Tests.
- ✍ The results from the CSA were related to the performance of the learners on the linguistic tests.

Comment

The project attempted to establish a complex logical chain between teaching styles, learning styles and learning gains. The different kinds of evidence are provided but not mobilised and linked to provide important data about teaching and learning.

WRIGHT: Phonological training and metacognitive strategy instruction for children with reading difficulties in multilingual contexts - a one year follow-up study

This research investigated the comparative effects of two instructional methods on the reading performance of children with reading difficulties, for whom English is a first or second language. The participating primary schools included three suburban schools in Johannesburg and four township schools in Soweto. Seventeen teachers from these schools were trained in one of the two instructional methods. Some received systematic training in phonological awareness (method 1) and the others received phonological awareness training in conjunction with explicit teaching in metalinguistic concepts and metacognitive strategies (method 2).

The study adopted the following approach:

- ✍ The seventeen teachers recruited from seven schools were trained in the two different approaches in early 1998 and received support from the researcher throughout the year.
- ✍ The researcher, with the assistance of the teachers, identified a sample of 110 failing readers aged 7 to 10 years, for whom English is a first or second language. Forty-six of the sample were trained in method 1 and 48 were trained in method 2, while 16 children formed the control group.
- ✍ The experimental teaching programme in instructional methods 1 and 2 was conducted over 17 weeks. The intervention began in May and concluded in the third week of October. Pupils in each experimental group received instruction on twice-weekly 40-minute teaching sessions. Teaching was conducted with small groups of 3 to 7 children. Approximately 34 teaching sessions were conducted with each group.
- ✍ Reading performance was measured by using a battery of standardised and criterion-referenced measures with a pre-test in February/March 1998 and post-test in the last three months of the year. A delayed post-test design is planned for 1999.

✍ Analysis of data and results for the two experimental groups and the control group was conducted using analysis of variance (ANOVA) for the analysis of significant difference in mean effects within the data. A comparison of statistically significant differences in means between groups was conducted using the Bonferroni t-test.

Wright's findings are that while the reading competence of both groups improved significantly, those who were taught metacognitive strategies gained a significant advantage over the other group.

Comment .

The children participating in the study were drawn from widely differing socio-economic and language backgrounds and this may well have had differential effects on their responses to the two interventions. In addition, the teachers on the programme had different qualifications, experiences and understandings of the programmes: The research report does not describe these differences nor does it include them in the analysis of pupil scores.

All the above studies have developed innovative designs for the examination of classroom activities and learning. The majority came close to meeting the rigorous controls demanded by quasi-experimental methods. As with most quasi-experimental studies, especially in education, selecting suitable control samples and controlling for contextual variables proved to be the most difficult aspects of the research designs.

Type of data and their collection

Research data can be categorised broadly into two kinds, namely independent and dependent measures. The first directly assess some or other phenomenon, for example, asking children to write down the answer to the calculation $9 + 6$. A dependent measure of the same phenomenon would ask the same children whether or not, without writing down the answer, they could perform the same task. This kind of data is dependent on an interpretation by a party which has an interest in the shape of the data.

While no data is entirely independent, some kinds of dependencies lead to lower levels of reliability. Thus, of the two examples above, the pencil and paper test is a more reliable measure of whether the children can add nine and six.

There is a danger in not distinguishing different degrees of independence in deciding what kind of data is appropriate for investigating the particular research question, and in collecting and analysing that information.

A variety of instruments are available for the collector of data.

Questionnaires and interview schedules

These instruments may gather data with varying degrees of independence. For example, asking teachers about their qualification levels is likely to lead to more reliable data than asking Grade 4 children about the educational levels of their parents. Questionnaires and interview schedules - both structured and unstructured - were used extensively in the PEI research projects. The questionnaire and interview schedules were used to capture both contextual and perspectival data.

Contextual data

Given the powerful effect of context, especially home background, on learning, it is essential that context be taken account of in any study of learning. It is particularly important to control for contextual variables when assessing pupil learning. The most common way of controlling for context is to attempt to keep it constant. Only three of the PEI research projects, Focus on four, Duncan's research on initial reading, and Sigabi's study of OBE, set out to do this. Most of the other research projects either purposefully sought a range of contexts or did not pay particular attention to keeping the variables constant.

The majority of PEI research projects gathered contextual data on the identity and characteristics of schools. In some cases the data was very limited and no questionnaire appeared to have been used. In the main, the data captured consisted of general information on the number of pupils and teachers, former departments of education, facilities and resources. A minority of reports captured school data directly pertinent to the research topic. PRAESA, for example, focused on the language policies and practices of the schools, the home languages of pupils and the languages in which teachers were fluent. Onwu's study of science materials concentrated on school expenditure on science, purchase and maintenance of science equipment, school facilities for teaching science and resources available for teaching science.

The information gathered through the school questionnaire was usually used descriptively, that is, to describe the sites at which the research took place but this data was seldom used in the data analysis. So, for example, although Wright works with failing readers in a range of schools - former DET schools in Soweto and former Model C schools in Johannesburg - she does not de-aggregate the pre- and post-test results to establish differences or similarities in the effects of the intervention.

Perspectival data

Perspectival data refers to the views of observers: by definition, such information is highly dependent on the interpretation of the observer. A large number of research projects used structured, semi-structured and unstructured interviews to elicit the opinions and views of teachers and principals on issues related to the research projects. For example, Onwu, Bayona, the HSRC, Research Institute for Education Planning (RIEP), Baxen and Green, Wickham and Versfeld, Schollar and Maja, among others, use these instruments to find out about the availability and use of learning materials. In the majority of cases these responses are presented without comment or further investigation, even in cases where the researchers have visited classrooms. In the few cases when the researchers followed up these responses and views, it is clear that information gathered in this way is unreliable.

Pile and Smyth demonstrate the weak status of this type of information. They find a contradiction between what individual teachers said about how they thought children learn (e.g. discovery, building on prior knowledge, working in groups, etc.) and the methods these teachers pursued in these classrooms. Classroom observations showed that none of the teachers practised the activities they described. Children were not given the opportunity to discover; there was no evidence of building on prior knowledge, and exclusive whole class teaching occurred. Both the SAIDE and Baxen and Green studies show the gap between what teachers say they do and their actual practice with reference to developing materials. Whereas teachers claimed to be developing their own materials, there was no evidence of this in the classes observed.

The WCCE project provides a further example of data which is unreliable because of its dependent nature. In this research, teachers were asked whether they thought a particular teacher in-service intervention had changed their classroom practice. Given that the researchers were the same people who had delivered the teacher in-service programme, it would

be very surprising if the large majority of teachers did not report that they had implemented what they had learnt on the programme.

Self-report (perspectival) data is useful in ascertaining the disposition of stakeholders to the education situation, but as Muller comments in Chapter 3, has a limited role in policy research.

Classroom observation

Classroom observations can provide an enormously rich source of data about general conditions in schools, teaching methods, the quality of learning taking place, the use of equipment and materials, and the relationship between the forms of teaching and learning behaviours and their outcomes. Our analysis of the schedules used by PEI researchers to guide their classroom investigations highlighted three issues: the logic of the schedules, the depth with which they were able to analyse classroom interactions, and the role of expert judgement.

The logic of observation schemes

The first and most obvious requirement of any research instrument is that it must fit the purpose of the research: it must elicit the information required to illuminate the research question. In one case the observation schedule bore little resemblance to the stated purpose of the project. Thus, the stated purposes of the RIEP observation schedule in the study of the availability and use of learning materials in multi-grade classes were to observe:

- ✍ whether teachers could use teaching aids.
- ✍ whether teachers still taught in the traditional way, how effectively they could use teaching aids.
- ✍ However, only one of the 15 items in the observation schedule deals with teaching aids. The research report is, as a result, unable to report on the use of learning materials in the classes in the study.

A second example of poor fit to purpose is afforded by the schedule devised by Duncan in his evaluation of the Zama reading programme. The observation schedule covers a wide range of activities from resources and languages used to learner activities. Only a handful of observation questions focus on the teaching of reading - the focus of the research project.

In a number of instances, no background or explanation for the design of the observation schedule was provided. In other cases a brief description of the purpose of the observation was given. The WCCE study simply noted that the field notes were structured around the four topics under discussion - subject knowledge, the curriculum, classroom management and assessment. Other research reports provide detailed accounts of the reasons for choosing particular categories for inclusion in their observation schedules. For example:

- ✍ The SAIDE study uses the description of the Wits FDE programme, observation of residential sessions conducted for students on the programme and the review of the course materials to draw out the main elements in the kinds of practices in English teaching being promoted by the course.
- ✍ The study of Webb et al. of the UPE FDE developed a structured observation schedule in line with the intended outcomes of the FDE course and in accord with other research findings on effective teaching and learning.
- ✍ The University of Natal (Pietermaritzburg) did an analysis of the six roles for teachers proposed in the draft Norms and Standards document and drew up indicators of these roles which resulted in a total of 48 competences, 'expressed as active verbs which could be observed or inferred' (13). The researchers then classified the six roles into two categories - the mainly visible and mainly invisible. A classroom observation schedule was developed for the mainly visible (observed) roles and a descriptive matrix for the invisible (or inferred) roles.

The observation schedules used by the PEI researchers varied significantly from being completely unstructured to being very tightly structured. Qualitative information is notoriously difficult to capture systematically and consistently. This is so even in the case of the same researcher working across different sites at different times, and the problem is aggravated enormously when the observations are conducted by different researchers.

A number of the PEI researchers used observation schedules which encouraged descriptions of classroom activities. For example the Primary Mathematics Project (PMP), Wickham and Versfeld, Baxen and Green and WCCE all used broad categories to guide the description of classroom activities. In all cases the format of the schedule allows open-ended responses to broad headings such as teacher actions, pupil actions, or resources. Baxen and Green provide 'a simple set of guidelines' for observation but the schedule itself provides no guidance on the areas of focus of the observation. The researchers argue that the aim of the 45 to 60 minutes of observation is to 'gain a rich and detailed descriptive account of the unique realities of individual classrooms' (20). This is the strength of the unstructured observation schedule. However, the danger of such approaches is that, without analytic categories, there is no obvious way to get out of the particular description to any level of abstraction and hence generality. The varied descriptions do not necessarily provide insights into the research questions and the lack of systematic capture of data makes it difficult to draw conclusions. In this situation the temptation is for researchers to go beyond the data.

For example, the study Investigating and establishing best practices in the teaching of English as a second language in under resourced and multilingual contexts concludes that 'teachers use textbooks in terms of their established or coded practices rather than according to the material developers' vision' (42). It is difficult to know how this conclusion is reached from the data. Firstly, teachers used textbooks in only three of

the 32 lessons observed for the study. More importantly for this argument, in the ten detailed descriptions of lessons observed, no common analytic categories were used and so possible evidence for one of the most important findings of the research is lost in the detailed descriptions.

Analysing the depth of classroom interactions

In our introduction to the present chapter we argued the importance of (distinguishing between surface expressions of good classroom practices and the quality and depth of the knowledge transactions which occur amongst teachers and students. Careful observations are key to elucidating which teaching/learning practices are associated with different kinds of learning. In particular, we are interested in how to promote the higher order learning outcomes targeted by Curriculum 2005 (see Chapter 5).

A number of the research projects developed observation schedules for quantifying and comparing classroom behaviours. These observation schedules develop criteria to make explicit the practices on which researchers focus during observation. In this way collection of comparable data across teachers' lessons is made possible. The observation schedules used in the PEI research adopted different formats to capture the data. Dachs uses observation schedules which require the observer to record teacher behaviour against 16 specified behaviours at one-minute intervals and pupil behaviour against 14 specified behaviours. These time lapse studies allow the quantification of the amount of time teachers and pupils spend writing, speaking, listening and reading.

Another type of quantifiable observation schedule uses four or five descriptors of classroom interactions to capture the level and quality of these interactions. SAIDE developed three descriptors for some categories and four or five for others, while Webb et al. developed four descriptors for each of 12 components of the observation schedule. Each set of descriptors in Webb's study was supplemented by a space for detailed description.

Although these classroom observation schedules allow comparison across and among samples of teachers, they may only describe the forms of classroom interaction. For example, the descriptors used by Webb in his observation schedule in general only provide a description of what the pupils are doing:

- ✍ Uses no materials.
- ✍ Uses one kind of material.
- ✍ Uses two kinds of materials.
- ✍ Uses more than two kinds of materials.

It is not clear from these descriptions whether learning of any kind is taking place and, if it is, what kind of cognitive abilities are being developed. The same question can be asked of the following scheme from Webb's study:

- ✍ Learners sit in groups but work as individuals.
- ✍ Only two or three learners in a group interact.
- ✍ Group of learners with limited interaction.
- ✍ Groups of learners discuss problems, questions and activities by themselves.

These categories can only tell us of the outer forms of pupil activity and do not necessarily say anything about learning.

In contrast, the observation schedules used by Reeves and Long, Maja, Setati, and Pile and Smythe attempt to investigate the quality of teaching/learning activities. The most sophisticated scheme was developed by Reeves and Long for the Focus on Four and Focus on Seven projects, and adopted by Maja in his study of mathematics learning. The observation schedules for these studies were designed around criteria to capture and describe the conceptual quality of teachers' mediation of scientific/mathematical knowledge (concepts, process skills and attitudes) and to measure the extent to which individual teacher's mediation enabled

learners' conceptual development. The schedules consist of a matrix composed of seven criteria and five indicators. The five indicators measure the extent to which learners are encouraged to engage with each of the criteria at progressive depths of conceptual complexity.

Setati developed an observation schedule on two axes with pupil and teacher verbal activities on the one axis and languages used and language practices (code-switching, chanting and chorusing) on the other. Space on the schedule allowed comments and examples. This then provided both a quantitative and qualitative description of classroom activities.

Reliability of judgement

One of the problems with classroom observation schedules is that expert judgement is indispensable in the assessment of the quality of classroom interactions. As such, this data always contains a degree of dependence. Clear and well-structured observation schedules can only go so far in obtaining commensurability across different situations and observers. Some researchers attempted to alleviate these problems by attending the same lessons together for the first couple of times the schedule was used. Others used videotapes to gain a comparable understanding of the use of the schedule.

Bell in his study of group work acknowledges the problems of classroom observations and so only used videotapes of lessons. Categories for analysis were developed. Three observers then rated each videotape. The researcher who developed the categories for analysis argues that because the categories are 'of the high-inference type', coding is difficult. For this reason a conscious effort was made to standardise the interpretations of the three raters. A training workshop was run and short practice runs were conducted in order to arrive at a common understanding of the categories. Inter-rater reliability tests were conducted after every six tapes to make sure the common interpretation of the categories remained satisfactory. The ratings of each category from the observations and the intervention phase were compared and all changes were measured for significance. The

final inter-rater reliability test for all 24 tapes for all three raters was compared in a correlation matrix. All correlations indicated a high reliability between the interpretations and scores of the different raters.

In order to look beyond the outer forms of classroom practices and to understand the quality of what teachers and learners are doing, researchers must have a good understanding of the subject under study in the particular classroom, and the distinction between different kinds of learning outcomes and how to recognise them.

Assessment of student learning

A number of the PEI research projects attempted to investigate what and how pupils learn. The classroom observations were most fruitful in indicating not only what pupils know and are able to do, but also in identifying effective teaching strategies. In addition, a few studies examined pupils' workbooks in their attempts to understand pupil learning. We discuss the results of these observations in Chapter 6.

Pencil and paper tests are relatively independent measures of student competence and thus produce data of relatively high reliability. Eleven research studies used written tests to assess learning. These studies demonstrate the complexity of the process of developing valid and reliable tests. Their efforts are discussed at length in Chapter 8.

PEI research projects

No:	NAME OF PROJECT	RESEARCHER/S	PROVINCE	LOCATION
1.	Problems and possibilities in multilingual classrooms in the Western Cape	P. Plüddeman PRAESA	W. Cape	Cape Town area
2.	Initial reading programmes	Ken Duncan Duncan Education	Gauteng	Johannesburg Daveyton
3.	Implementing good group work in ESL classrooms	Brad Bell Univ. of the North	N. Province	Sovenga
4.	Investigating and establishing best practices in the teaching of English as a second language in under-resourced and multilingual contexts	Sharman Wickham Ruth Versfeld TLRC UCT	W. Cape	Cape Town area
5.	Seeking the possible: An evaluation of an intervention which seeks to help teachers learn African languages using an approach which integrates language and culture	Sarah Murray Rhodes University	Gauteng	Lenasia and East Rand
6.	Innovative language practices in multilingual mathematics classrooms	Mamokgheti Setati	Gauteng	Johannesburg
7.	Investigation into teaching styles and cognitive processes in language learning	Prof. Sifree Makoni Wiseman Ngwata NLP	W. Cape	Cape Town area
8.	Language in the human and social sciences project	Kerry Pile Annie Smythe Wits University	Free State	Sasolburg, Parys, Viljoenskroon Kroonstad
9.	Seeking lessons for teacher professional development	Deborah Ewing Mpunie Setsubi CRCD	KZN	Port Shepstone area
10.	Phonological training and metacognitive strategy instruction for children with reading difficulties in multilingual classroom contexts: A one year follow-up study	Judith Wright JCE	Gauteng	Johannesburg and Soweto
11.	An investigation into the availability and use of teaching and learning material in multigrade classes in Free State	Prof. JP Strauss RIEP - UOFS	Free State	Bloemfontein Area
12.	An investigation of multigrade classroom practices in the Free State province of South Africa	Dr. AW Drost Dr. I Ural HSRC	Free State	Surrounding farm areas of Bloemfontein
13.	Development of diagnostic tests to assess Grade 7 literacy and numeracy skills.	Khulisa Management Services & St. Bamabas School	Gauteng N. Province	Various locations

TOWN SHIP	SUBURB	RURAL	FARM	GRADE	EX-DEPARTMENT				
					DET	HOA	HOR	HOD	PRIVATE
9	1			1	6	1	3		
6	1			1	6	1			
1	1		1	7	2	1			
3	1			Primary/ High Schools	2		2		
2	1			Primary/ High Schools		1	1	1	
6				4	6				
3	4			3 & 7	2	1	4		
6			2	6-9	8				
2	2	3		1-7	4	2	1		
4	3			7-10 yr old	4	3			
			10	3-7	10				
			12	4-6	12				
3	1			7	3				1

PEI research projects (continued)

No:	NAME OF PROJECT	RESEARCHER/S	PROVINCE	LOCATION
14.	Report on the development of a protocol for profiling progress towards best practices in science	Loyiso Jita Jenni Karlsson EPU-UNTU	KWZ	Durban area
15.	The nature and impact of accredited in-service education on under-qualified science and mathematics teachers: Which factors generate best practice in the classroom?	Paul Webb CENCE UPE	E. Cape	Queenstown, King Williams Town, Port Elizabeth
16.	Investigating the role of co-operative group work in learner achievement in mathematics	Dudu Mkhize RADMASTE WITS University	Gauteng	East Rand
17.	Teachers' views on Mathematics, Mathematics Teaching and their existing Practices	Lynn Roussouw PMP, UWC	W. Cape	Cape Town area
18.	The enabling conditions for successful learning environments: A quantitative/qualitative synthesis of mathematics and teaching and learning	Botshabelo Maja HSRC	N. Province Mpumalanga	Pietersburg Nelspruit
19.	Focus on Seven: report on an investigation into language-sensitive activity-based methodology in primary science teaching at the Grade 7 level	Cheryl Reeves Caroline Long	W. Cape	Cape Town area
20.	An investigation of the availability and use of learning materials in Grade 12 science classes in some selected schools in the Northern Province	Prof. Gilbert Onwu University of Venda	N. Province	Thohoyandou District
21.	Focus on Four: An Investigation into Grade 4 Maths Teaching & Learning	Cheryl Reeves Caroline Long	W. Cape	Cape Town
22.	Assessing the impact of the QSP in selected schools in the E. Cape	Dr. Cleaver Ota EPU-Univ of F. Hare	E. Cape	Varied
23.	Learner progress and achievement study	Heather Jacklin Ursula Hoadley Xolisa Guzula UCT	W. Cape	Cape Town
24.	Change management: Best practice in whole school development	Gordon Mitchell	N. Cape	Various Locations
25.	A case study of four schools participating in the EQUIP project of the National Business Initiative	Eric Schollar NBI	Gauteng	Mamelodi

TOWN SHIP	SUBURB	RURAL	FARM	GRADE	EX-DEPARTMENT				
					DET	HOA	HOR	HOB	PRIVATE
1	2			1		1		2	
				5-7					
4				11	4				
				3					
5	4	9	2	8	15	4			1
11				7	11				
		10		12	10				
12				4	12				
				8					
4				Primary/ High schools	4				
4	3	1	1	7-12	2	3	4		
4				1-7	4				

No.	NAME OF PROJECT	RESEARCHER/S	PROVINCE	LOCATION
26.	The real and the ideal: Field analysis of roles and competences of educators	Ken Harley Volker Wedekind University of natal	KWZ	Pietermaritzburg
27.	An investigation into appropriate ways of implementing institutional development	Prof. ELM Bayona University of Venda	N. Province	Tohoyandou
28.	A descriptive study of the nature and effectiveness of in-service teacher training and support in the implementation of OBE	Makhosi Sigabi RADMASTE Wits	Gauteng	Lenasia & Diepsloot
29.	Primary teachers' use of learning materials	Jean Baxen Lena Green · UCT	W. Cape	Cape Town area
30.	Strategies for the design and delivery of quality teacher education at a distance	SAIDE	N. Province Gauteng N. West	Pietersburg Daveyton Hammanskraal
31.	Teachers's knowledge of their practices: Impact of an Intervention and Support Programme	Bunita Kohler Eddie Smith W. Cape College of Education	W. Cape	Cape Town area
32.	Large Class teaching: A pilot study of eight Grade 5 classrooms in Kwazulu/Natal	Dr. Terry Dachs	KZN	Various locations
33	Academic performance and sustainable institutional development.	David Gilmour UCT	W. Cape	Cape Town
34	A very noisy OBE: A report on the implementation of OBE inside Grade 1 classrooms.	Prof. J. Jansen T. Maqutu R. Sookrajh CEREP UDW	KZN Mpumalanga	Various locations
35	An investigation of the impact of mathematics teacher training and the introduction of standardised mathematics tests on learner motivation and achievement.	Link Community Development University of Venda	N. Province	Vuwani Inspection area

TOWN SHIP	SUBURB	RURAL	FARM	GRADE	EX-DEPARTMENT				
					DET	HOA	HOR	HOD	PRIVATE
1	3	2		High Schools	3	1	1	1	
		10		High Schools	10				
4			2	1	6				
5	10	4		1 & 7	6	3	9	1	
1		3		Primary /High schools	4				
				5 & 7					
2		4		5	6				
7	1			High Schools	4	1	3		
24	4	2		1	22	4		6	
				6	10				

Conclusion

In 1995 we conducted a survey of some 50 evaluation studies of South African teacher in-service programmes (Taylor 1996). The prevalence of a number of major methodological shortcomings were noted. Chief amongst these was a heavy reliance on self-report (perspectival) data, and a tendency to accept without question that in-service interventions had been successful because a number of interested participants said that they were.

The above discussion indicates a definite change in the quality of classroom based research methodology in the country. There has been a shift, not only towards a greater use of classroom observations, but also in the sophistication and rigour of these methods. There has also been a marked increase in the number of projects using quantitative methods, where the assessment of student learning is a common element. The majority of the quantitative studies exhibit methodological flaws to a greater or lesser degree and these undermine confidence in some of their findings.

The principal fruits of the PEI studies lie in their descriptions of teaching and learning across a wide spectrum of South African classrooms. Chapters 6 to 9 reveal how rich a harvest this is.

The search for generalisations should feature at the top of the list of future research priorities. In order to make realistic policy choices and fashion effective interventions, information is urgently required on the state of learning in the different subsectors of the system. Relatively large-scale studies leading to generalisable results will be an indispensable platform for deriving such a database. Longitudinal studies will be important in tracking the nature and extent of any changes which may occur. Case studies and an analysis of correlations between learning and different contextual conditions will be important in matching teaching practice to pupil needs.

CHAPTER 5.

CURRICULUM BALANCE BETWEEN SCHOOL AND EVERYDAY KNOWLEDGES

Nick Taylor

The quality of student learning is influenced by many factors: home background, individual aptitudes, school culture, teaching quality and the availability of resources. Figure 5.1 presents one scheme for showing the interplay of the principal processes, influences and actors involved in delivering the curriculum. The present chapter is an analysis of the new intended curriculum for South African schools. The chapters that follow describe the curriculum which is presently being implemented in many schools, and some of the learning outcomes of these processes.

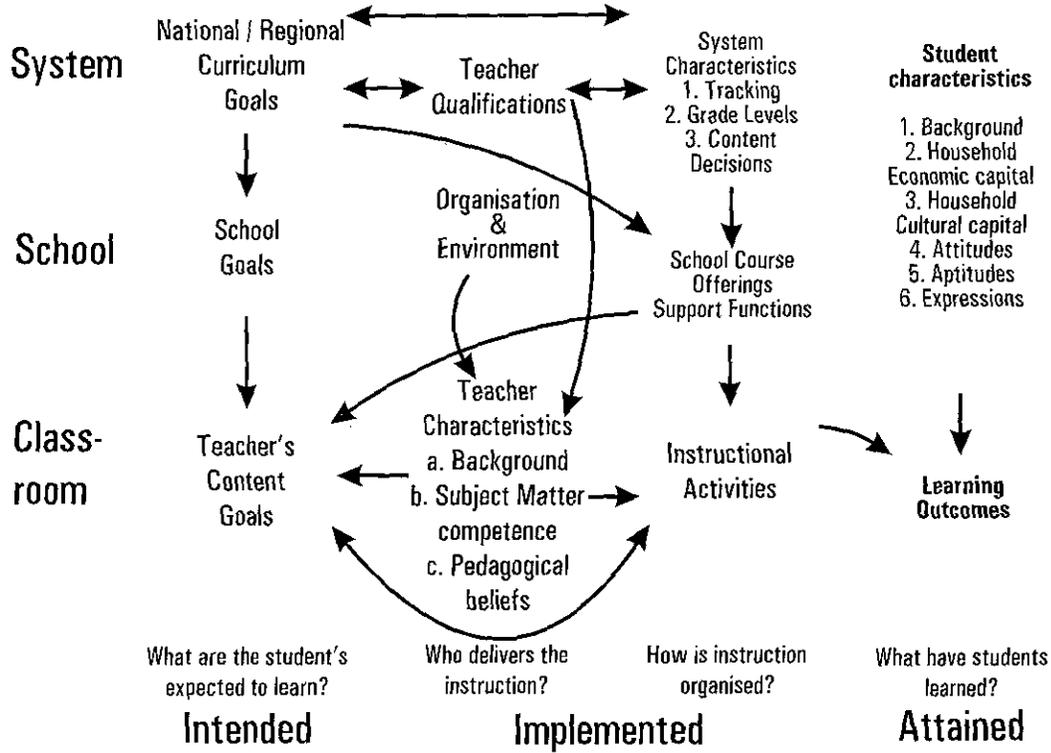


Figure 5.1: Outline of the curriculum process (Adapted from Schmidt et al 1997a : 182)

While the proponents of systemic school reform argue that school- and classroom-level factors are critical in shaping student learning, curriculum policy is nevertheless seen as a key factor in setting the direction for and providing coherence in teaching and learning. A curriculum framework sets out the intentions of policy makers. As such, it guides teachers as they plan their daily classroom activities; it guides textbook writers about what materials they should provide to support teachers and students; and it informs those who construct assessment instruments for measuring what has been learnt at classroom, district, provincial or national levels. A curriculum framework also has a lot to say, albeit largely implicitly, about the kinds of teachers required to give effect to its intentions. The intended curriculum therefore indirectly sets the agenda for the selection, training, management and support of teachers.

While school level actors, and teachers in particular, always reinterpret policy, effectively remaking it, a curriculum framework remains the chief instrument for aligning the work of the multiple sets of actors who deliver teaching and learning. This chapter analyses the role of curriculum frameworks, and of Curriculum 2005 in particular, in setting the agenda for the main business of the schooling system: teaching and learning.

In this discussion, Curriculum 2005 is set against the background of international debates in the curriculum field. The purpose here is not to undertake a comprehensive review of different curriculum models, nor to highlight models which in our view may be most appropriate for South African conditions. We shall rather confine ourselves to two strands of the debate which are exerting considerable influence in South Africa: the principles underlying the approach to the curriculum adopted by the progressive consensus outlined in Chapter 2, and some of the elements informing the model followed by the Third International Mathematics and Science Study (TIMSS).

Curriculum models

Bornstein (1996) describes two distinct types of approach to the curriculum. These he labels as competence and performance models. Competence models are linked to the learner-centred movement which experienced its heyday in the UK in the sixties and early seventies. Cuban (1997) points out that such models have appeared at regular intervals over many centuries. Learner-centred approaches are based on an emancipatory vision in which learners take control of their own learning; they are active, creative and self-regulatory. Direct interventions by the teacher are seen as suspect and as interfering in a natural process. The role of the teacher is thus covert, i.e. he or she is seen as a guide and facilitator.

Competence models are directed towards what the learner knows and can do at the end of learning. They focus on a destination rather than a specific prescribed path and the outcomes of learning may be achieved in a variety of ways. In competence approaches, evaluation is based on the notion of difference: individuals express their competence in different ways and all learners are capable of achieving the broadly defined outcomes of learning. Thus, in a competence model, there is no failure. There are only longer or shorter periods which are required for achieving competence, and these depend on greater or lesser external obstacles in the path of the learner.

Performance models, on the other hand, focus on specific learning contents and texts. The role of the teacher is more overt and interventionist. Evaluation in the performance mode is based on deficits, i.e. what learners do not possess in terms of specific knowledge and skills and well-defined criteria of right and wrong.

Different kinds of competence approaches may be distinguished. Bernstein (1996) recognises a liberal/progressive form of competence model which emphasises cognitive empowerment; a populist form which focuses on cultural empowerment, and a radical mode which is the basis for political

empowerment. The liberal/progressive and populist modes exhibit a sufficient degree of overlap for us to run them together in the present discussion. We therefore distinguish between progressive and radical competence models. The distinctions represent ideal types which seldom occur naturally in the pure forms described above. Nevertheless they provide a useful framework for analysing curricula in terms of tendencies to approximate to one or other of these forms, or to consist of combinations of ideal types.

We noted in Chapter 2 that the new progressive approach to school reform in the developed world adopts a competence stance, and that the new South African government has begun to express a remarkably coherent vision for education, which revolves around the principal tenets of the new progressivism. However, a number of important differences between the South African vision and its progressive analogues in other countries are evident in the curriculum sphere.

These divergences are apparent in the different ways in which the format and content of curriculum frameworks are expressed. Debates in this area revolve around four kinds of questions: the goals of teaching and learning; the degree of integration of school subjects with each other and with everyday knowledge (school versus everyday knowledge); the number of topics to be covered (depth versus breadth); and the knowledge content of curriculum frameworks, and in particular the degree of detail to which topics are specified (specific versus general).

The goals of teaching and learning

The new progressive movement is clear on the kind of learning goals appropriate to its vision for education. Schooling should equip learners to exhibit independence and initiative in directing their own learning. They should be able to ask questions, evaluate evidence, defend arguments, and apply their knowledge to new situations. In short, learners should acquire higher order

thinking skills that go beyond recall, recognition and reproduction of information, to the evaluation, analysis, synthesis, production and application of ideas (Darling-Hammond 1997; Gardner 1991; Sizer 1996; Robitaille et al 1993; American Association for the Advancement of Science 1998). While this language focuses on learner empowerment and exhibits all the characteristics of a competence approach to the curriculum, the new progressive vision articulates its learning goals, by and large, in cognitive terms. In this sense it falls into the progressive competence mode.

By contrast, the new South African curriculum takes as its starting point a clear political agenda and the need to transcend the curriculum of the past, which 'perpetuated race, class, gender and ethnic divisions and ... emphasised separateness, rather than common citizenship and nationhood' (Department of Education 1997c: 1). The new curriculum is directed towards achieving 'a1 prosperous, truly united, democratic and internationally competitive country with literate, creative and critical citizens leading productive, self-fulfilled lives in a country free of violence, discrimination and prejudice' (ibid:1). This vision is captured by the learning goals formulated by the South African Qualifications Authority in its seven critical outcomes which are to underpin all curricula (SAGA 1997). According to the critical outcomes, learners will:

- ✍ identify and solve problems and make decisions using critical and creative thinking.
- ✍ work effectively with others as members of a team, group, organisation and community.
- ✍ organise and manage themselves and their activities responsibly and effectively.
- ✍ collect, analyse, organise and critically evaluate information.
- ✍ communicate effectively using visual, symbolic, and/or language skills in various modes.
- ✍ use science and technology effectively and critically, showing responsibility towards the environment and the health of others.
- ✍ demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation.

What the critical outcomes, in conjunction with SAQA's additional five outcomes, achieve is not only to target higher order learning goals, but to tie the skill components of these goals to the need to understand the knowledge principles underlying these skills, and to relate knowledge and skills to the social, political and economic contexts in which they are acquired and applied. In this sense, SAGA embraces elements of both the progressive and radical competence modes.

School versus everyday knowledge

The difference between school and everyday knowledge

The fundamental distinction between the formal knowledge of schooling and everyday knowledge is well illustrated by the following piece of research undertaken by Bernstein (1996). Two groups of seven-year old children from the same school, one from middle-class homes and the other of working-class origin, were given a series of cards showing pictures of the food on offer for school lunch. After making sure that the children recognised the pictures, they were asked to group those pictures which they thought belonged together: they could use all or only some of the cards, and they could use any reason for grouping which they saw fit. Working-class children predominantly used criteria drawn from their own life context as a principle for classification ('I have this for breakfast', 'I cook this for my mum'). For these children the reason for grouping is embedded in the local context and personal experience of the learner. Middle-class children, on the other hand, were far more likely to use as their principle of classification something the pictures have in common ('They come from the sea', 'They're vegetables').

The children were then asked to put the cards together in another way. This time a significant number of the middle-class children switched their classificatory principle to one based on local context and experience, while the working-class children merely used another reason based on their personal experience. In short, middle-class children have access to two principles of classification: one formal and specialised (school knowledge) and the other personal and localised (everyday knowledge). In the school context, where the research was conducted, the first principle is preferred by the middle-class children. Working-class children have access only to non-specialised principles of classification, based on their personal experience.

The problem raised by this research is obvious: middle-class children, because of factors such as the kinds of conversations which occur in their homes and social circles, and access to books, computers, travel and other sources of information and experience, have ready entry into the principles which underlie school knowledge. Consequently education tends to reinforce the codes which these children bring to school, and it provides more opportunities to the middle classes for success, greater access to higher education and to the professions and other higher-earning occupations. Working-class children have a greater distance to travel to acquire the elaborated language codes and specialised principles of classification which structure formal school knowledge.

While the unequal distribution of material resources and quality teachers make an enormous difference to student learning, the greatest obstacle to equity in any schooling system is the differential access to formal knowledge open to children of different social classes. This problem has been widely recognised since the seventies. Over the intervening three decades, a variety of strategies have been proposed for addressing this issue.

For the proponents of performance models, everyday knowledge is a private matter which has no place in the school curriculum, the principal

task of which is to teach the principles of formal knowledge through its various manifestations in school subjects and canonical texts. The main criticism of performance approaches is that, under the guise of propagating universal truths which transcend individual differences, the culture of the dominant class is elevated to the status of absolute truth. This results in the devaluing and repression of subordinate groups along ethnic, culture, class and gender lines.

The competence approach, in all its varieties, recognises the value of everyday knowledge, first and foremost, because it is crucial to defining the identity of individuals and hence to building the self-confidence of citizens who not only value their own heritage, but also respect the differences exhibited by others. In addition, the two-way relationship between everyday and school knowledge provides important pedagogical tools for inducting learners into the art of formal discourse, and for the practical application of formal knowledge to problems in the real world. However, a major disjuncture occurs within the competence field regarding the details of these relationships, marking the difference between progressive and radical competence modes, between the international progressive movement and Curriculum 2005, between what we have elsewhere called soft and hard constructivism (Muller & Taylor 1995).

Progressive and radical competence modes

The progressive position is perhaps best articulated by Walkerdine (1982), whose starting point is the qualitative difference between contextual (everyday) and abstract reasoning. The former is learnt at a very young age through adopting positions in discourses in relation to familiar practices. Abstract reasoning, on the other hand, requires conscious reflection on the linguistic structure of the discourse itself. For Walkerdine, familiar contexts provide essential starting points for teaching young children to reason formally, but she warns that this is by no means an easy or natural process.

The first difficulty is that not all everyday contexts provide suitable entry points into school knowledge. Indeed, some contexts may be misleading and even counterproductive. For example, the opposite of 'more' in the context of a family dinner is likely to be 'no more', whereas in mathematics the opposite of 'more' is 'less'. Furthermore, the term 'no more food' may have quite different meanings for working-class and middle-class children (Walkerdine 1988). Walkerdine's conclusion is that contexts must be chosen with extreme care if they are to provide fruitful bridges into abstract reasoning.

In one class observed by Walkerdine (1982), involving a discussion of odd and even numbers, the children cheered every time an even number was mentioned and booed the odd numbers - the result of an inappropriate game used to introduce the distinction between odd and even, in which the former were labeled 'bad' and the latter 'good'. The approach adopted by this teacher in attempting to make the school knowledge more accessible to her pupils, obscures an important conceptual distinction.

The second step in the process of bridging everyday and school knowledges is to strip away the context, or metaphor, in order to reveal the logical principles underlying the everyday example:

In practical reasoning we determine the truth or validity of a statement in terms of its correspondence to the rules of a practice, whereas in formal reasoning truth is determined in terms of the internal relations of the statement itself. To reflect on the internal relations alone we have to ignore the metaphoric content of a statement (Walkerdine 1982: 138).

Walkerdine insists that it is incorrect to assume that practical and formal reasoning are in some essential sense the same. Whereas the former involves drawing inferences on the basis of familiar situations, the latter is an act performed upon language, on the relations between signs and not on their metaphoric content.

Most discussions of competence models assume that all formal knowledge is derived, through abstraction, from real world knowledge. But this represents only one kind of logical process, that of inductive reasoning. Another (perhaps more common) logic is that of deduction, where propositions and conclusions have no necessary relation to the real world. Perhaps the clearest examples of purely deductive systems are given by the non-Euclidean geometries constructed in the late nineteenth century, whose propositions violate common sense understanding of concepts such as parallel lines. Most mathematical systems do have real world application - and indeed the use by Einstein of non-Euclidean geometry to describe the behaviour of light in deep space is one of the foundations of the revolution he effected in twentieth century mathematics. In general terms, however, mathematics is a collection of deductive systems. Leading children to believe that all knowledge is derivable from the real world, or that all formal knowledge has practical application, is therefore not only bad pedagogy, but wrong epistemology. Chapter 6 provides examples in disciplines other than mathematics where this is equally true.

It follows from this discussion that, from the perspective of the progressive competence position, pedagogy is fraught with three kinds of danger:

- ✍ that of using inappropriate everyday metaphors, namely those whose logical principles are not the same as those of the formal structure they purport to illustrate.
- ✍ that of real world examples, even where they are appropriate illustrations of formal knowledge, which obscure an understanding of the logical relations which constitute the ultimate goal of school knowledge.
- ✍ that of assuming that all school learning can be derived from or has direct application in the everyday world.

Darling-Hammond advises us to use the everyday judiciously and not to regard it as the major focus of learning (and certainly not as an end in itself). This involves keeping the main purpose of learning in view at all times: a deep understanding of school knowledge.

Active learning aimed at genuine understanding begins with disciplines, not with whimsical activities detached from core subject matter concepts ... and it treats disciplines as alive not inert - (Darling-Hammond, 1997.197-8),

While competence pedagogies of whatever kind require that teachers play a more covert role than they would in teacher-centred performance models, they nevertheless make far greater demands on the teacher. Progressive modes require that teachers recognise the difficult and subtle relations between everyday and formal knowledges, and that they coax their charges through these tricky waters. Thus, for Gardner (1991), one of the main obstacles to the successful implementation of progressive education since the time of Dewey, has been the extreme demands it places on teachers.

Similarly, Bernstein (1996) predicts that a competence curriculum is likely to require high teacher training costs because of the sophisticated theoretical base of competence pedagogies. In addition, there is a range of hidden costs involved in the successful implementation of any competence model. These hidden costs are generally time-based: time is needed to prepare and construct classroom resources, to evaluate and track the profile of each learner, to discuss projects with groups of learners - and a lot of time is needed for cooperation between teachers. According to Bernstein, these hidden costs are rarely explicitly recognised and budgeted for. They are nevertheless paid for in terms of teacher commitment. Proponents of radical competence modes have a different set of epistemological and pedagogical considerations. From this perspective, any failure to promote deep understanding amongst students is at base a

political issue: high status knowledge is jealously guarded by the ruling class who control the education system in such a way that it serves as a principal mechanism for perpetuating existing relations of privilege and exclusion.

The problem with the radical approach is not so much its central premise - that knowledge is socially constructed and has political effects - but that it essentialises this one important insight into a very complex interplay of influences, and elevates it into a universal explanation for all the problems of education.

The radical position is achieved in two steps. First, school knowledge is characterised as positivist in purporting to encapsulate objective, absolute truth (Floury 1998), and claiming to be transmittable in a transparent and unproblematic manner through language (Von Glasersfeld 1998). As Muller argues in Chapter 3 above, this characterisation is something of a straw man: few, if any, hold this simplified conception of knowledge, and it is doubtful whether it has ever been a dominant view.

The second step in constructing the radical position follows from the first: liberation consists of discrediting traditional school knowledge and recognising the constructions of individuals as equally valid starting points for negotiating a shared meaning. This is captured in the term 'epistemological democracy' (Cobb et al. 1998). It follows that competence curricula in the radical mode will take an extreme approach to the integration of everyday and school knowledges. The starting point is the everyday, and learners are encouraged to use their own methods for solving problems, and to develop their own generalisations. Canonical rules, generalisations and algorithms are never revealed directly by the teacher; textbooks are generally viewed with some suspicion because they present knowledge in a packaged form.

While the radical mode differs from its progressive counterpart in its conception of knowledge and in the priorities it sets teachers, it is nevertheless equally demanding for teachers in terms of skills, commitment and attention to the detailed characteristics of individual pupils.

As we have said, in reality, curriculum models generally consist of amalgams of these ideal types, and we would not want to ignore the important insights generated by many researchers (including Cobb and his colleagues) working the wide terrain between the radical and progressive competence modes, and indeed, between competence and performance approaches. What our analysis does highlight, however, is the danger inherent in adopting the radical approach in its pure form.

The progressive competence mode recognises the political nature of knowledge and the difficult boundary between school and everyday knowledges. It develops a careful set of strategies for negotiating this boundary which is especially difficult for children not located in the middleclass of the culturally dominant group. In contrast, the radical approach is to wish away the boundary and to demand that all knowledges be equal. While admiring the political intentions of the radicals, our contention is that the effects of this approach will be exactly the opposite of that intended: by ignoring the boundary between school and everyday knowledges, radical modes increase the difficulties that working-class children will have in trying to acquire formal discourse (see Muller & Taylor 1995).

Curriculum 2005

We have noted that the goals for all learning programmes in South Africa strike a nice balance between radical and progressive competence modes. But on the question of integration, Curriculum 2005 exhibits the most extreme form of radicalism. Thus:

South Africa has embarked on transformational ODE. This involves the most radical form of an integrated curriculum. ... This... implies that not only are we integrating across disciplines into Learning Areas but we are integrating across 8118 Learning Areas in all Educational activities. ... The outcome of this form of integration will be a profound transferability of knowledge in real life (Department of Education 1997c:19).

The scheme for effecting this integration is enormously complex. For the Foundation Phase (Grades 1-3) the starting point is a set of 66 specific outcomes across 8 learning areas (Department of Education 1997c). Each specific outcome is further specified by a number of assessment criteria, each of which in turn is elaborated by means of a number of range statements and performance indicators.

Learning programmes are the practical tools teachers use to guide their daily classroom activities. Each learning programme consists of a cluster of specific outcomes across all 8 learning areas, and a list of activities through which the outcomes will be explored. This clustering is grouped within one of 6 phase organisers (e.g. Personal Development, Health and Safety). In addition, each learning programme has a programme organiser, which is consonant with the chosen phase organiser (e.g. Myself would fit with Personal Development). Teachers have wide latitude in constructing learning programmes - as long as each contains an organised cluster of specific outcomes across all learning areas, and as long as all 66 specific outcomes are covered during each phase of schooling.

In the development of a learning programme for the Foundation Phase the teacher proceeds as follows:

- ✍ One of three learning area groupings is chosen (Literacy, Numeracy or Life Skills).
- ✍ A suitable phase organiser and complementary programme organiser are chosen.
- ✍ A number of specific outcomes are identified which may be suitably expressed through the organisers. These must cover all learning areas.
- ✍ Some of the assessment criteria from these outcomes are chosen.
- ✍ Activities are constructed to bring out the chosen outcomes and their assessment criteria.

The Department of Education has constructed a number of illustrative learning programmes for each of the three learning area groupings. Table 5.1 shows the first page of one of these. LLC refers to the learning area Language, Literacy and Communication; SO stands for specific outcome, and AC for assessment criteria. These are chosen from the Policy Document for the Foundation Phase (Department of Education 1997c) which lists the SOs and their associated ACS by learning area.

Table 5.1: Extract from Illustrative Learning Programme (Department of Education, no data a)

FOUNDATION PHASE

ILLUSTRATIVE LEARNING PROGRAMME: NUMERACY PHASE
ORGANISER: PERSONAL DEVELOPMENT PROGRAMME ORGANISER:
MYSELF

LLC: SO1: Learners make and negotiate meaning.

AC 1&2

- ✍ Tell/write about yourself to team/class.
- ✍ Listen to/read about the others.
- ✍ Retell someone else's story, using the same data and retell the story purposely by increasing or decreasing the numerical information.
- ✍ Create a family tree. Do numerical calculations based on the different family trees.

LLC: S04: Learners access, process and use information from a variety of sources and situations.

AC 1,2&3

- ✍ Identify name, address, age, birthday.
- ✍ Compare age, mass, height of learners in group.
- ✍ Identify and count all the people that share the learner's house.
- ✍ Investigate all important information about themselves.
- ✍ Collect information about languages which learners speak.

This extract illustrates the overwhelming predominance of everyday knowledge, which sweeps across a bewildering mix of concepts: time, age, mass, height, number, arithmetic operations, the organisation of data, to mention but a few. It would seem most unlikely that learners will develop a systematic understanding of any of these ideas under such conditions. Indeed, this learning programme seems designed to encourage the most superficial approach to hundreds of activities, most of which could be related to the personal experiences of the learners, but few if any of which are likely to result in solid conceptual development.

This is not to say that the very best teachers will not pause when a concept like number is encountered and spend a few days systematically investigating the meaning of the base ten number system, deriving these concepts from real life situations where appropriate, illustrating the investigation with other examples drawn from the experience of the learners, and applying the principles to contextual problems. But the structure of the learning programme is hardly designed to encourage or facilitate this kind of systematic conceptual development. In the hands of teachers whose own conceptual frames are not strong, the results are likely to be disastrous where school knowledge is totally submerged in an unorganised confusion of contrived realism.

Depth versus breadth

Should the curriculum attempt to sample a wide range of topics or should it confine its attention to an in-depth study of fewer topics? The progressive view is unambiguous in its response to this question:

(O)nce individuals are comfortable in the crucial symbol systems of reading, writing, and reckoning, we discern no necessity to place a special premium on one subject as opposed to another. ... Far more important, in our view, is the experience of approaching with depth some key topics of themes in the broadest disciplinary areas - math and science, history and philosophy, literature and the arts. Students need to

learn how to learn and how to probe deeply into one or another topic. Once they have achieved these precious insights, they are in a position to continue their own education indefinitely. And if they have not mastered these lessons, all the facts, factoids, and mandated tests will not save their souls (Gardner, Torff & Hatch 1996: 59).

Sizer (1996) uses the term 'less is more' to indicate the same idea: students should master in depth a limited number of essential skills and areas of knowledge, and all curricular decisions should be guided by the aim of thorough student mastery and achievement rather than by an effort merely to cover a broad range of content.

The progressive approach bases these arguments for depth rather than breadth on the premise that the traditional curriculum, particularly in the United States, is characterised by attempts to cover a large number of topics, all at a very superficial level and that this results in students knowing very little about many things and not developing high-level thinking skills. These intuitions are supported by the TIMSS findings. One dimension of TIMSS was to examine the breadth versus depth question through a comparative analysis of the curriculum frameworks of its 41 participating countries. The study concluded by describing the American curriculum as 'a mile wide and an inch deep' (Schmidt et al. 1997b: 122) and concludes that this breadth is achieved at the cost of depth.

In her PEI follow-up of the Focus on Four project, Long has subjected the Curriculum 2005 specific outcomes for the Mathematical Literacy, Mathematics and Mathematical Sciences learning area to a TIMSS-type analysis. Her conclusion is that Curriculum 2005 covers at least as diverse a range of topics as the American curriculum.

Specific versus general

In calling for 'standards without standardization', Darling-Hammond argues that standards need to outline the content that students should know, together with criteria for evaluating good performance, and that they need to provide illustrations of such content and performance standards.

These standards are clear enough to help teachers develop curricula pointed in a common direction, but they are not so voluminous and prescriptive as to require superficial content coverage or to limit teachers' inventiveness in bringing ideas to life for their students (Darling-Hammond 1997. 227).

In other words, curriculum frameworks should be specific enough to ensure that teachers cover the same conceptual ground, but should not consist of lists of content to the extent that they restrain teachers from pursuing activities which embody the knowledge, skills and attitudes to be learnt in interesting and creative ways. For Darling-Hammond, this involves finding a medium grain between curricula consisting of 'laundry lists' of hundreds of facts to be identified, described and defined, and those consisting of statements so vague as to be meaningless - such as 'students will learn to think critically'. Again, while these principles find broad acceptance within the progressive consensus, embodying them in curriculum frameworks which appropriately tread the fine line between specifying sufficient detail to ensure common learning and to illustrate the subtle concepts involved in higher order learning, and providing sufficient space for teacher interpretation, is very difficult to achieve.

A second dimension of the TIMSS analysis was to assess the degree to which subject content knowledge was specified in the curricula of participating countries. Thus, for example, mathematical knowledge was classified into three levels of specificity (Schmidt et al 1997a). The first level identifies the content by broad topic: for example, in mathematics, the level 1 topics are

listed in general terms (Numbers, Measurement, Geometry (position, visualisation and shape), Geometry (symmetry, congruence and similarity), etc). The second level specifies subtopics: thus, Numbers is broken down into Whole numbers; Fractions and decimals; Integers, rational and real numbers; and Estimation and number sense. At the third level each subtopic is further specified: for example, Whole numbers may be studied through an investigation of the meaning of these numbers, operations on them, and properties of these operations.

The TIMSS analysis concluded that mathematical topic areas were presented very specifically in most countries: only seven of the 41 participating countries had fewer than 90% of their content coded at any level other than the most specific one. For TIMSS the majority of curriculum guides are highly directive in their specification of mathematical content and they therefore reflect a high degree of micromanagement in the communication of curricular intentions and guidance of implementation.

But it is not only in the area of content knowledge that curricula may be more or less specific. The TIMSS analysis recognises at least three further categories, or types of units contained in curriculum frameworks: units which refer to policy, objectives or pedagogy. It was found that the majority of countries are also highly prescriptive in this regard, devoting more than 80% of their curriculum guides to units which cover content, policy or objectives. By contrast, few countries adopt what the TIMSS authors consider to be a more facilitative approach, including a higher proportion of pedagogical suggestions in their curriculum frameworks. Pedagogical units may be subdivided into those containing pedagogical suggestions, those which give examples, and those which contain assessment suggestions.

When looked at within the TIMSS framework, the Curriculum 2005 Policy Document for the Foundation Phase (Department of Education 1997c) is a curious mixture. Firstly, it is high on policy and objectives (31 introductory pages out of a total of 227, or 14%), thus exhibiting a high level of prescription at the policy level. The balance between content and pedagogical units is illustrated by examining an extract from the specific outcomes listed under Mathematical

Literacy, Mathematics and Mathematical Sciences (MLMMS), one of the learning areas around which the curriculum is structured. The first two statements under the first of 10 specific outcomes are detailed in Table 5.2.

Table 5.2: Extract from Curriculum 2005 (Department of Education 1997c, MLMMS: 4). Specific Outcome: Demonstrate understanding about working with number

Assessment Criteria	Range Statement	Key Performance Indicators
1. Evidence of heuristics to understand number concept	1.1 Use personal experience to show significance of number	<p><i>This will be evident when learners:</i></p> <ul style="list-style-type: none"> • Identify situations where numbers are used • Count a collection of objects, maintaining order in numbers • Write number symbols and number names
	1.2 Express numbers in words and symbols	<ul style="list-style-type: none"> • Skip count forwards and backwards from a given number • Use number knowledge to develop strategies to solve problems involving numbers
2. Evidence of knowledge of number history	2.1 Understand counting as an historical activity	<ul style="list-style-type: none"> • Represent numbers in different cultures, in different epochs • Tell stories about the development of counting practices in their own communities • Recognise, read and write Roman numerals • Perform operations where place value is used
	2.2 Show knowledge of the history of counting in their own communities, history of Roman numerals and the history of Arabic numerals.	
	2.3 Understand importance of place value	

Of the sixteen statements listed in this extract, only five (31 %) are solely and unambiguously about mathematical content (express numbers in words and symbols; write number symbols and number names; understand importance of place value; recognise, read and write Roman numerals; and perform operations where place value is used). The remainder are concerned with pedagogy (for example, tell stories about the development of counting practices in their own communities), or some combination of content, pedagogy and skill (use number knowledge to develop strategies to solve problems involving number).

The content statements very rarely proceed beyond the highest level of generality identified by TIMSS. Thus, nowhere does the document state the level of complexity at which whole numbers should be studied: when should hundreds be introduced? Thousands? Ten thousands? etc. How far should the study of the difficult Roman number system proceed? What is the point behind the study of this system, and how will the teacher know when this objective has been achieved?

The pedagogical and performance statements are also characterised by high levels of generality. We might have expected, for example, illustrations of the kinds of problem-solving strategies appropriate at the Foundation Phase, and examples of problems in which the performance of operations using place value are brought into play.

These observations stand in very stark contrast to the TIMSS findings quoted above in terms of both the proportion of content knowledge and the level of specificity with which content and pedagogical units are described in the large majority of mathematics curricula around the world. Whether TIMSS would approve of such a radical shift in the direction of generality, is open to question; and it is doubtful whether Curriculum 2005 has achieved the medium grain advocated by the progressive consensus. In short, Curriculum 2005 is highly prescriptive in terms of policy and pedagogy, and vague in the extreme in the area of content.

But what is clear is that the Policy Document is a success in its own terms. To any criticism that it does not provide guidance which is specific enough, its opponents would no doubt reply:

This document should be viewed as an attempt to offer direction to the macro level curriculum design process. The document provides a framework around which provinces and schools may build their learning programmes. It identifies important components of education for South African learners. It is descriptive rather than prescriptive, it does not provide a syllabus, and should not be used as such (Department of Education 1997c. 2).

Yet, at the time of writing, well into the second year of the implementation of Curriculum 2005, there is very little by way of specific guidance for teachers - even though curriculum guides in a variety of forms abound and seem to multiply at an alarming rate. Thus, the national Department of Education has developed a set of Illustrative Learning Programmes for the Foundation Phase (104 pages in all)(Department of Education no date a) , as well as Expected Levels of Performance for each of the eight learning areas (approximately 165 pages)(Department of Education no date b) - while the Gauteng Institute for Curriculum Development (GICD) has issued Planning and Implementation Guidelines for the Foundation Phase (231 pages)(Gauteng Provincial Government 1998), Guidelines for Learning Programmes for the Foundation Phase (122 pages)(Gauteng Provincial Government 1997), and a set of Progress Maps for each learning area (164 for MLMMS alone, giving an estimate of at least 500 pages in total)(GDE and GICD 1999). Only the last of these, the GICD's Progress Maps, contain more specific guidance than the Policy Document (231 pages) analysed above. We will return to the Progress Maps in Chapter 8. The Western Cape Department of Education has also produced some guidance materials, while the North West and Northern Provinces have enlisted the support of the Dutch agency SLO (Specialisten in Leerplanontwikkeling) to assist in interpreting the national Policy Document.

The problem with all this material is not in its paucity: a Grade 1 teacher in Gauteng for example, could have received a total of at least 1348 pages, if the provincial distribution system was working efficiently. And these are just guidance materials, designed to assist the teacher in interpreting the

curriculum. However, the overwhelming bulk, wonderfully creative as much of it is, assumes that teachers will bring to bear high levels of subject knowledge and pedagogical expertise in translating the broad statements of Curriculum 2005 into meaningful learning activities. Chapter 6 will examine how realistic these expectations are.

Conclusion

In foregrounding the everyday at the expense of conceptual knowledge, and in expressing the latter in the most general terms at the expense of a deep study of key concepts, Curriculum 2005 seems designed to promote superficiality at the expense of systematic and grounded conceptual development. In terms of SAQA's critical learning outcomes, the new curriculum has overbalanced in the direction of context and attitude at the expense of knowledge and skills. It may be described as undisciplined in two senses of the word: it is unsystematic and it does not promote conceptual knowledge, focusing instead on the endless variety of unruly personal experience. In addition, the scheme for applying the curriculum in the classroom is quite bewildering in its complexity. It would seem likely that only the most dedicated, knowledgeable and skilled teachers are likely to achieve SAQA's learning goals using this curriculum.

But these predictions are based on a theoretical and comparative analysis. We cannot preclude the possibility of their refutation by teachers in the field. Theory shows us where we might expect to find important indicators, and what we may expect to find. In other words, it orients empirical research and tends to structure it, but care must be exercised that theoretical considerations do not preempt research findings. However, in the final analysis, empirical confirmation or otherwise will be decisive.

A systematic research programme is needed to investigate the implementation of Curriculum 2005. The broader purpose of such a programme would be to determine the factors required to improve the teaching and learning conditions

so as to better implement the new curriculum. Such factors could include teacher training, the systemic and institutional context of teaching and learning, particularly at the school level, the provision, deployment and use of classroom resources, and a change in the curriculum itself.

A research programme directed towards this goal would examine at least six kinds of issues:

- ✍ Dissemination: Did teachers receive the curriculum documents? Did they attend Curriculum 2005 training? How do they understand the intentions of the new curriculum?
- ✍ Epistemology: Are teachers using an integrated curriculum? This investigation must go beyond merely looking at the forms of classroom activities: it must examine the quality of the knowledge transactions occurring amongst pupils and between pupils and teachers.
- ✍ Learning outcomes: The ultimate measure of teaching and learning lies in the quality of the knowledge, skills and attitudes displayed by the learners. Do the classroom activities result in systematic conceptual development? Are the students able to apply these concepts to new problems? Are they able to extend the concepts by conjecture, testing and generalisation?
- ✍ Pedagogy: Do teachers make use of learner-centred methods? If so, are they merely going through the motions or do these pedagogies promote a deeper understanding of conceptual knowledge, more positive attitudes, and more skilled performance?
- ✍ Resources: Are textbooks and stationary available? If so, how are they used? What other resources are used?
- ✍ Institutional conditions: How do conditions in the school facilitate or inhibit learning?

We make a start on investigating some of these issues in Chapters 6 to 9. This is not a study of how Curriculum 2005 is being implemented, as few PEI projects looked at Grade 1 classes (the level at which the new curriculum was

introduced in 1998). Rather, the PEI research describes teaching and learning practices prevalent in South African schools as a basis for speculating about the kinds of teacher development and support mechanisms required for successful curriculum renewal.

CHAPTER 6

TEACHING AND LEARNING IN SOUTH AFRICAN SCHOOLS

Nick Taylor and Penny Vinjevoold

There is broad consensus that teaching and learning in the majority of South African schools leaves much to be desired. The problems are generally described in terms of teacher-centredness, pupil passivity, rote learning, and the like. A better understanding of these problems is a requisite first step to finding solutions. This chapter synthesises the findings of those PEI research projects which describe conditions in South African classrooms, and puts these findings in conversation with related empirical research on classroom practices. This synthesis is preceded by an analysis of two competing theories, which attempt to explain the perceived problems of teaching and learning in the majority of our classrooms. Finally, we speculate on what the PEI findings might mean for teacher development and support, and identify areas requiring further research.

Explanations for teacher-centred classroom practices Explanations which focus on ideology

Hofmeyr (1993), Enslin (1990), Hartshorne (1992), Chisholm (1993), the NEPI Teacher Education Report (NEPI 1992a) and the ANC's Policy Framework for Education and Training (ANC 1994) all suggest that the doctrine of fundamental pedagogics has had profoundly detrimental effects on teachers' thinking and practice. Fundamental pedagogics is an indigenous product which, drawing on Dutch phenomenological philosophy, claims to have developed a science of education. During the apartheid years it was prominently associated with the Department of Education at the University of South Africa, by far the largest provider of both pre- and inservice education for teachers, and supported by a number of Afrikaans and homeland campuses. Fundamental pedagogics is based on premises which can be interpreted as authoritarian (for example, the teacher, as knowing adult, leads the child to maturity), but it was more the way in which it was taught - through a series of propositions which brooked no analysis or critique - that was chiefly responsible for its dismal reputation in liberal and progressive circles.

Fundamental pedagogics, it has been widely asserted, was the dominant theoretical discourse in education departments at South Africa's black universities and colleges. Those who taught at these institutions were said to be steeped in the tradition of fundamental pedagogics, which also infused the curricula for the professional subjects. Policy-makers in opposition to apartheid saw the uprooting and replacement of this philosophy of education as one of the primary tasks to be undertaken when restructuring teacher education.

The NEPI report claims that fundamental pedagogics has 'debilitating effects' and prevents teachers from 'developing an understanding of the relationship between education and the context in which knowledge and understanding are created and shared' (NEPI 1992a :17). For Hartshorne the effect of the 'closed, narrow, ideological approach to teacher training was that it failed to produce teachers of the quality and commitment of [an] earlier dispensation' (Hartshorne 1992: 36). Enslin argues that the restrictions placed on students by fundamental pedagogics are considerable. Fundamental pedagogics, in her view, 'heads off the possibility of critical reflection on that system by making reflection illegitimate' (Enslin 1990: 83). In addition, Enslin asserts that fundamental pedagogics justified authoritarian practices and silenced teachers as only those with the science are qualified to speak. Finally, she describes fundamental pedagogics as 'an ontology which produces useful and docile teachers' (Enslin 1990: 100). Chisholm asserts that the values and approaches of fundamental pedagogics 'block and hinder the development of critical and innovative teaching strategies' (Chisholm 1993: 3), while Hofmeyr contends that the 'philosophy of CNE and its offspring fundamental pedagogics entrench authoritarian teaching methods' (Hofmeyr 1993: 3).

From this perspective, solutions to the legacy of fundamental pedagogics are seen to involve two steps: the propagation of a liberatory ideology, and the institution of systems which encourage teachers to follow learner centred classroom practices. These are the premises underlying Curriculum 2005, as we have argued in Chapter 5.

Explanations which focus on language and knowledge

There has been little empirical research in education in South Africa, from an opposition perspective, over the last few decades. Important exceptions are the studies in language and conceptual development undertaken by Macdonald (1990a, 1990b, 1991) and Langham (1993).

Macdonald's research was undertaken in primary schools in then Bophuthatswana in the mid- to late eighties, where the Primary Education Upgrading Programme (PEUP) was working on the reform of lower primary schooling throughout the region. She found that black children spent most of their time in class listening to their teachers and that the dominant pattern of classroom interaction was oral input by teachers with pupils occasionally chanting in response. Teachers did ask questions but these were aimed at data recall or checking whether pupils were listening to the lesson rather than eliciting more challenging responses. Classroom tasks in general were oriented towards the acquisition of information rather than higher cognitive skills. Teachers appeared unable to communicate the attitudes (curiosity, respect for evidence, critical reflection) necessary to the development of higher-order cognitive skills (making observations, asking questions, deriving hypotheses, conducting investigations). In the first three grades, pupils' listening, speaking, reading and writing skills were poorly developed in both their first language and in English; in particular, they spent very little time reading or writing. Since all further progress at school depends on these four skills, black children, generally from the most disadvantaged homes, were further handicapped by the practices prevalent in their classrooms.

Macdonald proposed three kinds of reasons for the adoption by teachers of these practices. Firstly, pupils did not have the language skills required to process abstract concepts. This situation was greatly aggravated when they changed medium of instruction from mother tongue to English in the fourth grade. English language tuition did not prepare them for instruction in English in a wide range of subjects. Secondly, Macdonald's examination of textbooks showed that at the levels of both lexus and syntax, pupils were likely to encounter serious difficulties, given the state of their language development. In addition, pupils were also not being taught the conventions of expository text, and that this further hindered their ability to read. The third kind of difficulty identified by Macdonald lay in the area of conceptual development. She found that new ideas were not being systematically introduced by teachers and that, by the time pupils reached

the fifth grade, they had great difficulty coping with the deluge of new ideas expected of them.

To complete this distressing picture, Macdonald found that rote learning had built up a self-sustaining momentum: teachers explained that drilling was an effective way of teaching since children could not read. Yet, rather than teaching them more reading, they resorted to memorisation. Furthermore, her diagnosis was that teachers' own lack of conceptual knowledge and reading skills were the foundation on which these practices rested. Thus, teachers remained within their own very confined comfort zones, and resorted to pedagogies which enabled them strictly to control pupil access to knowledge. Unsure of their own knowledge base, and either unable or unwilling to expand it, their teaching - by instinct or design - ensured that there was no danger of pupils venturing further and threatening the shaky foundations of their teachers.

Langham (1993) confirmed these conclusions. He found that the pupils' level of language competence was so poor that the textbooks were too difficult for them to read, and that the tasks and exercises were beyond the competence of the pupils because they were conceptually too advanced. This led to a heavy reliance on rote learning and made pupils dependent on teachers for what they learnt.

The PEI research findings

Three important classroom issues are not discussed in any detail in the present chapter: the use of textbooks and other materials in the classroom, the assessment of pupil achievement, and the role of language in learning. These topics are treated separately in Chapters 7, 8 and 9. Apart from these three topics, our analysis of the PEI research reports identified five main issues in teaching and learning: institutional conditions, the attitudes of teachers, teacher knowledge, classroom practices and student learning. It is difficult to separate these issues as they are interdependent and so influence and

determine each other. However, in order to clarify and understand the parts that make up this process we present them separately below.

Institutional conditions

In Chapter 2 we noted the dearth of empirical research into the systemic and institutional conditions which promote quality schooling, and we identified work in this area as an urgent priority. Although very few of the PEI projects worked directly at this level, most reports had something to say about conditions in the schools in which they worked. We will not dwell on this issue as the projects did little more than confirm two principles of what has by now become established knowledge about South African schools:

- ✍ Teaching and learning cannot occur in an environment which is lackadaisical, unpredictable and not directed towards optimising quality classroom time.
- ✍ Conditions in the schools in which the PEI studies were conducted stray far from those conducive to learning for substantial periods of time.

We illustrate the point through two examples from the PEI research projects, the first of which illustrates the kind of internal causes of the low levels of teaching and learning in our schools, while the second illustrates the sorts of external factors which inhibit effective schooling. Schollar describes the results of an exercise undertaken with principals during a time management course, in a region which shall remain nameless (not the area in which he conducted his PEI work). Principals were asked to examine the timetable at their respective schools over the past year. The conclusion of the exercise was that, on average, of the 191 possible tuition days, 170 were lost through registration at the beginning of the year (9 days); a slow start to the subsequent terms (11); examination preparation (9), writing (22) and marking (36); union meetings (10) and strikes (7); paydays (10); memorial services (12); athletics (8) and music competitions (8); district and regional meetings (5); and sundry other causes.

In their research in two former DIET high schools on the Cape Flats, Guzula and Hoadley problematise the high proportions of over-age students in both schools (53% and 71 %, with 32% of all learners in both schools older than the norm by two years or more). This phenomenon is accompanied by high drop-out and failure rates. The study concludes that high levels of student mobility are the likely causes of these indicators of school inefficiency. Immigration into these schools is predominantly from the Transkei, while emigration is largely the result of middle-class children moving to former Model C schools. Some of the effects of these movements on student learning are examined in Chapter 9.

Attitudes of teachers

It has frequently been noted that some teachers have a disposition to their job which rests on an internalised professional conscience, on a notion of personal responsibility for pupil welfare and outcomes, whilst others have a disposition of a more civil servant cast, a disposition toward teaching that lays far greater stress on the responsibility of the state for pupil welfare and outcomes, and hence does not rest on any notion of internalised personal responsibility.

These divergent dispositions have been explained in terms of social or psychological factors. Social explanations attribute teacher attitudes to different notions of the state - to a more decentralised laissez-faire state for the former disposition, and a more centralised, custodial state for the latter, and to differing ideals of citizenship (independence and individualism for the former; beholdenness to the *civitas* for the latter).

Psychological explanations attribute these dispositions to differently internalised psychological orientations, to internal versus external loci of control. The first - characterised by personal responsibility - refers to a general orientation towards explaining the world as a product of individual will and effort; the second - which looks to the state to take responsibility - towards explaining the world as a product of external forces beyond the control of the individual.

As outlined in Chapter 2, one of the principal pillars of the policy framework established by South Africa's first democratic government involves a shift in responsibility from a centralised, authoritarian state towards greater autonomy at lower levels of the system. Ultimately, the success of this framework depends on parents, principals and teachers taking the initiative and assuming responsibility for the optimal functioning of their schools and classrooms.

The PEI research undertaken by Ewing and Setsabi illustrates the distance which school-level actors need to travel before this vision becomes reality. They investigated the attitudes of principals, teachers and students towards problems in their schools and classrooms, and their likely causes and solutions. The vast majority of responses indicate that all three constituents blame forces outside their own control for their problems, and, similarly, look to outside intervention for solutions. Of course there is a great deal of justification for these views: discriminatory and authoritarian practices by the previous government resulted in the under-resourcing of most schools and the disempowerment of most school communities. However, people driven by an internal locus of control look to their own resources, in addition to what may be available from the outside, to contribute to improving their own condition. Thus improved pupil results do need external resources such as textbooks and laboratories, but, with or without additional resources, better school management and teaching practices are also required, and there are many examples that demonstrate how these factors can make a significant difference on their own.

Ewing and Setsabi's findings are confirmed by Gilmour. In his interviews with teachers in eight successful schools in the Western Cape, respondents ascribed the success of their school results overwhelmingly to staff factors (77.2%), but when asked why they thought students might fail, 80.5% put this down to student factors, and only 1.2% thought it might be due to poor teaching.

Teachers' conceptual knowledge

One of the most consistent findings of a number of PEI projects pointed to teachers' low levels of conceptual knowledge, their poor grasp of their subjects and the range of errors made in the content and concepts presented in their lessons.

Pile and Smythe's study of Grade 4 and 7 Geography teachers confirmed Langham's (1993) hypothesis that one of the reasons why teachers are unable to process their Geography texts is because they lacked background in the discipline. Pile and Smythe found that teachers' knowledge of Geography is weak. They do not have a holistic understanding of what they are teaching and are therefore unable to perceive links between different parts of the curriculum. This poor understanding of the subject causes teachers to make a number of factual errors. Teachers were not receptive to these errors being pointed out to them. Yet this did not act as a spur to researching the topics more fully. The researchers suggest that teachers' low level of reading skills is a very large part of the problem.

Two studies of Grade 4 mathematics teaching, by Reeves and Long in townships around Cape Town and Setati in Mamelodi, both found that teachers used mathematically incorrect or inappropriate language. Setati reports that teachers frequently committed significant systematic errors in the ways in which they used the formal mathematical register. For example, in demonstrating an expanded method for division, the teacher made the same error a number of times. When the researcher pointed this out to her in private, the teacher corrected the error, but did not explain the change to the class. In Reeves and Long's study one teacher told learners that expanded notation is 'when the number gets bigger'. Another used the number 302 to explain place value but did not provide an explanation of 0 as a placeholder. Another did not explain the carrying in subtraction correctly, and a fourth did not explain place value accurately. Reeves and Long also found that Grade 7 science teachers did not have the conceptual knowledge to teach science at the levels required.

The above examples emerged from classroom observations of teachers. Webb et al's study of the impact of an accredited INSET programme for under-qualified science and mathematics teachers used written tests and observations to investigate teachers' conceptual knowledge. The tests were designed to gather data on skills and understandings of scientific and mathematical concepts in the areas of fractions, electricity and measurement. The researchers used misconceptions identified in the literature, the curriculum followed in South African schools in Grades 5, 6 and 7, and their own experience in working with teachers and pupils to design the test.

All first and second year teachers participating in this two-year part-time FOE based at UPE were tested on fractions, electricity and measurement. The first year teachers formed the pre-treatment sample, that is, they had not been taught the three topics tested. The second year teachers formed the post-treatment sample as they had completed courses on the topics. In other words two different cohorts of teachers, with similar qualification and experience, formed the pre-test and post-test samples. (The second year teachers were both pre- and post-tested on measurement.)

Pupils of 19 first year teachers and 18 second year teachers were also tested using the same test before and after their teachers taught the topic. The numbers of teachers and pupils who participated in the pre and post-tests are provided in table 6.1.

Table 6.1: Number of teachers and pupils tested in Webb et al's study

Teachers			Pupils		
Topic	1 st	2 nd	1 st Year	2 nd Year	Grade
Fractions	71	49	376	173	Grade
Electricity	65	55	172	228	Grade
Measurement	97	49	340	101	Grade

A question-by-question analysis of teachers' test results shows that there are a number of practising teachers who cannot successfully complete tests on fractions, electricity and measurement at Grade 5 to Grade 7 level. Furthermore:

- ✍ in questions on fractions, teachers and pupils both had difficulty with fractions other than halves and quarters, and with decimal fractions.
- ✍ in questions on electricity, teachers and pupils experienced difficulties with charges, lightning, electric current and circuits.
- ✍ in questions on measurement, both teachers and pupils experienced difficulty with reading a scale not demarcated in units of one, converting km from a decimal fraction to a whole number of centimetres, and visualising the number of cubes in a two-dimensional stack. Pupils performed badly when taking simple measurements, struggled to relate the concepts of volume and displacement, and could not calculate perimeter, or area of a rectangle or circle.

The results of the tests are set out in table 6.2 and indicate that teachers' knowledge of key mathematics and science topics at the Grade 5 to 7 levels is little better than that of their pupils, and that teacher knowledge is distressingly low in some topics. Overall, teachers did not score any better on the Grade 6 electricity tests than their pupils, and only slightly better on the measurement tests.

Table 6.2 Scores of teachers and learners in Webb et al's study

	Teachers			Pupils of 1 st year teachers		Pupils of 2 nd year teachers	
	1 st year pre-test sample	2 nd year pre-test sample	2 nd year post-test sample	Pre-test	Post-Test	Pre-test	Post-test
Fractions	67		85	14	31	26	43
Electricity	37		65	34	41	33	63
Measurement	54	61	79	33	57	29	53

(Note: The first year teachers formed the pre-test sample and the second year teachers the post-test sample. The second year teachers were both pre- and post-tested on measurement)

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.

Classroom Practices

Some researchers observed significant contradictions between what individual teachers said about how they thought children learn, and the classroom practices of those same teachers. Pile and Smythe for example found in pre-lesson interviews that teachers quoted discovery, building on prior knowledge, working in groups etc. as the way children learn. However, the methods these teachers pursued in the classroom were quite the opposite of this: pupils were never given the opportunity to discover, there was no evidence of building on prior knowledge, and exclusive whole class teaching occurred. All indications are that these teachers have accepted the desirability of learner-centred pedagogy, but are unable to practise it.

The SAIDE observations of classrooms were framed by the abilities, knowledge, and values and attitudes being promoted by the Wits FOE programme. During the pre-observation interviews all teachers could articulate the purpose and structure of their lessons, and describe the materials and assessment strategies they were going to use. When they spoke of the purpose, content and structure of the lesson they drew on key concepts such as learner-centred approaches and the variety of techniques that could be used to ensure maximum pupil participation, recognition and integration of learners' experiences in learning, multilingual approaches to English language teaching, gender sensitivity and the development of integrated language skills. Teachers were aware of the

various elements of a lesson and the interrelationship between them. However, the implementation of these ideas in the classroom according to the researchers showed some discrepancy between intent and what actually happens. At best the students attempted to implement the concepts somewhat superficially.

Many of the PEI research projects explicitly or implicitly link teachers' knowledge of the discipline they are teaching to their pedagogic knowledge and practices. In other words poor conceptual (propositional) knowledge is accompanied by a superficial understanding of what makes for good teaching and learning. The result is teacher-centred practices and very superficial engagement with pupils' conceptual development.

The following practices were commonly observed:

- ✍ Lessons are dominated by teacher talk and low-level questions.
- ✍ Lessons are generally characterised by a lack of structure, and the absence of activities which promote higher order skills such as investigation, understanding relationships, and curiosity.
- ✍ Real world examples are often used, but at a very superficial level.
- ✍ Little group work or other interaction occurs between pupils.
- ✍ Little reading and writing is done by pupils. When it is, it is of a very rudimentary kind.

The PEI findings in these areas are described in more detail below.

Teacher talk dominates classroom interaction

A number of studies reported that teacher talk dominates classroom interactions. Dachs, for example, found that 80% of time in English classes is spent in this way. This in itself is not necessarily a problem. Whole class teaching in which the teacher dominates the interactions can be a most effective way of engaging learners in conceptual development. In his study of eight Western Cape secondary schools - exhibiting the full range of socio-economic status - which have consistently achieved good

matriculation results, Gilmour noted that, overall, the teachers are competent and know their subject, despite the fact that they use traditional methods. This conclusion is based on the following kind of evidence:

Despite the fact that there was little teacher-learner interaction in most of the lessons, and that the learners were mainly cast into the role of listeners, learners were engaged' and attentive. There was evidence of active listening. The most fascinating and powerful example of this occurred in an Accountancy lesson in Windsor, which by and large was a teacher monologue. But the teacher's humour, his skill in 'story telling', his ability to pitch and relate the content of his lesson to real life, and his technique of 'stringing' his class along through chorusing; all combined into 'oratory' of a high order. The learners sat enraptured, probably heard his every word and evidently understood what he was teaching.(54)

However, far from valorising one or other form of pedagogy, the PEI research emphasises that what is important is the content and nature of this interaction. In most cases it was of a low quality, although many interesting and effective techniques were observed.

Setati was interested in the extent to which code-switching (changing from one language - generally the language of instruction, English - to another), chanting, and chorusing occurred in the classroom exchanges, the conditions under which these strategies were used, and their effects on learning. In mathematics classes code-switching can be used either for explanation - where the teacher may use the pupils' home language to rephrase, illustrate, exemplify, elaborate, or relate concepts and procedures to learners' experience - or regulation, where the teacher may call the attention of the pupils, issue reprimands, and the like. Setati found that code-switching was commonly used by all six teachers she observed, and was particularly useful in introducing and explaining the formal mathematical register - the majority of the terms of which do not exist in African languages - to students not greatly proficient in English. While code-switching is a very effective method for introducing English second language speakers to the formal mathematical register, it is no help in

progressing into the conceptual domain if the teachers themselves are unsure of this ground. Such conditions effectively block learner access to the concepts of mathematics.

The PEI researchers found that the majority of questions posed by teachers involved simple data recall, or were merely used to test whether the pupils were listening. In Pile and Smythe's study of Grade 4 and 7 Geography classrooms in the Free State there were instances of more difficult questions (e.g. What are the factors of settlement?) being answered in a sing-song chorus, indicating that they were learnt by heart. In some classes an enormous number of questions were asked. It was clear that pupils often did not understand the question and were unable to express themselves in English. Most correct answers were provided by a few members of the class. An analysis of errors indicates fundamental weaknesses in pupil understanding. Another frequently observed practice was that incorrect answers were not corrected. Nor did teachers use correct responses to questions to further develop conceptual understanding.

Lack of structure to lessons and development of higher order skills

The researchers found that the content and structure of lessons did not aid the incremental development of concepts. In most cases, as we have seen above, teacher talk dominated lessons. But even when teachers provided learners with a mix of activities these were generally not integrated or organised sequentially in ways that assisted the learners to practise the necessary concepts and skills incrementally.

In many classes teacher expectations of their learners are very low. Most researchers found that teachers confine the content of their presentation to simple information often well below the level required. The Webb study found for example that all the teachers observed teaching fractions to Grade 5 pupils were using examples much easier than those which should

be taught in this grade. Pile and Smythe found that teachers focused on the transfer of long lists of place names in their teaching of Geography but did not link these to the possible reasons for the development of towns or settlements in particular areas.

Reeves and Long noted that the Grade 4 mathematics teachers they observed confined the calculations they posed their pupils to one-digit numbers (units), when at this level learners should be working confidently with at least four-digit numbers (thousands). Furthermore, in these classes learners spent a large proportion of time revising work they should have covered in the Foundation Phase. In all the lessons except two, learners did not practise using increasingly complex examples that would have assisted in the development of their understanding of mathematical concepts, principles or strategies. Teachers taught those aspects that learners found easiest (procedural issues such as arranging digits in the correct place or basic operations such as addition and subtraction) rather than on more complex operations such as division and multiplication, or on deeper conceptual structures. Learners who had completed the work were not encouraged to continue on their own or given the option of continuing with additional activities. This meant that the pace and direction of the class tended to be determined by the weakest in the class. As a consequence teachers spent more time on topics than intended and were unable to complete the intended curriculum.

Setati's study of mathematics teaching in Grade 4 classes examined the language used by teachers. Mathematical language was categorised as informal and formal, and the latter further subdivided into three kinds of discourse: procedural (involving conversations that focus on the procedural manipulation of conventional symbols that do not necessarily signify anything to the speakers), calculational (where the primary topic of conversation is any type of calculational process), and conceptual (in which the reasons for proceeding or calculating in particular ways become explicit in the conversation). Setati found that teachers' use of conceptual discourse was very limited. Of the six teachers observed, formal

conceptual discourse was only evident in the practices of one teacher and this was only seen in one of her five observed lessons. Because procedural discourse dominates teacher explanations, this is modelled by the children. Here is an example of a pupil describing how to multiply 444 by 19:

P.- Let us say 9×4 is 36.

We write 6 and carry 3.

Then again we say 9×4 36 plus 3 is 39,

We write 9 and carry 3.

We say 9×4 again is 36 plus 3, 39 and cover the units.

We say 1×4 is 4 and then we underline and then 6 plus nought is 6.

9 plus 4 is 13, carry 1.

9 plus 4 is 13 plus 1 is 14 carry 1.

3 plus 1 plus 4 is 8.

T.: Hm, that's good.

This is pure procedural discourse, in which no conceptual understanding of the manipulations is revealed. The Primary Maths Project (PMP) also found a preponderance of procedural discourse among the eight Grade 3 teachers in their study. It could be argued that adopting a procedural approach to routine calculations is only sensible as it is inefficient to derive every calculation from first principles (like calling up one's understanding of the internal combustion engine every time one changes gears in a car). However, the exclusive use of procedural discourse is highly problematic, severely inhibiting the development of conceptual understanding and the enquiring, curious frame of mind so essential to the solving of non-routine problems.

In their evaluation of the Primary Science Programme, Reeves and Long noted that teachers did not pay attention to ensuring that learners understood the relationship between the representations (models used and the science concepts they were supposed to learn. The conceptual goal in one activity was for learners to understand that all matter and energy in the universe originated from a huge explosion. The teacher used a gas burner and popcorn to demonstrate this. The pupils were asked to draw

what happened. In the majority of cases the learners drew and labelled the pot, hot oil, gas stove and corn, rather than an impression of the Big Bang which the popcorn demonstration was supposed to illustrate. The teacher did not provide assistance to the learners to move beyond their naive, realist conception of the model or to understand the relationship and difference between the model and the concept of the Big Bang. As a result the model rather than the Big Bang became the learning goal. The analysis suggests that teachers need assistance in providing learners with more direct support in reformulating expressions or realist models of scientific concepts into the symbolic scientific modes of representation.

The use of real world examples

Setati found that real world examples were frequently used by teachers in an attempt to mediate between informal discourse and the formal mathematical register. But in the overwhelming majority of cases they did not serve as an entry into higher level conceptual thinking. For example, in her teaching of money, one teacher followed an exemplary sequence, starting by talking about money and its use, followed by simple calculations with cents, the introduction of rands, and ending with shopping problems. At no stage, however, were the principles of the decimal system used to convert between rands and cents, to solve problems, or to understand how to position the decimal. Teacher discourse remains stolidly in the procedural. Thus, in deciding how to place the decimal comma, learners are led to believe that it invariably has two figures to its right. It need hardly be pointed out what a threat such a conception is to a proper understanding of the number system in general, and of decimals in particular. The larger point is that real world examples can just as well be a hindrance as a stepping stone to conceptual understanding, depending on how the teacher structures the discussion. A strong conclusion of Setati's research is that, with only one exception, of a total of 30 lessons observed, mathematical discourse never progressed beyond the procedural into an exploration and understanding of mathematical concepts. For these learners mathematics is a set of rules

with no underlying logic. This practice is almost certainly a function of the teachers' own weak conceptual base. It occurs whether real world or formal mathematical examples are used, and within all kinds of teacher-and learner-centred classroom strategies.

The Focus on Four study by Reeves and Long, and the research conducted by PMP both confirm Setati's finding on the use of learners' everyday experiences. The focus was on the forms of practices such as shopping rather than on how these embody mathematical principles. The application of mathematical concepts, principles or strategies to problems in the everyday lives of the children was never addressed.

In their Focus on Seven project, Reeves and Long found that most of the Grade 7 science teachers needed assistance in making the difference between learners' everyday and scientific conceptions explicit. For example one teacher, by not making explicit the differences between learners' everyday knowledge of travel, and the more scientific conception of 'space travel' blocked understanding rather than assisting learners to understand the differences between their everyday conceptions and the science concepts to be learnt. In this regard, the researchers suggest that teachers need to pay attention to how concepts are presented and developed in the language used in their teaching. In particular, they should pay attention to the conceptual confusion which can result when everyday metaphors are used in an effort to illustrate or model scientific concepts. With respect to scientific language, teachers need assistance in providing learners with appropriate, correct and clearly defined science vocabulary, terms and definitions.

In his study of integrative approaches to science teaching in six Grade 1 classes in KwaZulu/Natal, Jita found that very little science entered the lessons and, where it did, it was of a very rudimentary nature and did not come close to engaging with the underlying concepts.

Promoting participation through group work

The PEI researchers found that although learners in most classes were seated in pairs or groups, there was little learner-learner discussion. Bell, for example, reports that teachers' understanding of group work does not go beyond the superficial level of physical arrangements, or what he calls 'cluster work'. In this new physical organisation of classrooms, the dominant interaction remains the teacher talking to the learners with very little learner talk of any kind. Webb et al. and the Western Cape College of Education both found that even after teacher in-service intervention aimed at introducing group work, the only change was in the arrangement of desks with little or no evidence that this resulted in a change in classroom behaviour.

The SAIDE study found that the rationale for group work commonly shared by the teachers is that it promoted pupil participation. However, group work was understood to be the only way in which participation could be promoted. The role of the teachers during group work confirmed this view. No mediation or meaningful support was provided. Some did not monitor progress and others repeated the same instruction even though learners were clearly having problems with the set tasks. The teachers seem to assume that once learners are in a group, participation and learning will occur automatically. Bell found in his observation of English second-language classes in which cluster work was used that the majority of learner-learner interaction was not constructive but consisted of joking, playing, etc.

Reeves and Long report that eight of the 12 teachers in their Focus on Four study did not provide learners with opportunities to discuss the mathematics concepts, principles and processes. In the few lessons where teachers encourage learners to work together they did not organise the activities or discussion in ways that ensured that learners shared ideas, explained their thinking or solved problems collaboratively.

The Reeves and Long study of Natural Science classes highlighted a number of dangers inherent in classroom activities involving group work and other forms of learner-learner interaction. The analysis suggests that for these methods to be beneficial (to contribute to improvement in learners' understandings, knowledge and skills) learners need meaningful subject content to talk about or work with. Much time can be passed in superficial or irrelevant discussion. Successful group work was observed when learners were set a clearly defined task, had the essential foundational knowledge and understanding of the subject matter gained from preceding activities, and possessed the reading skills and other communication skills, strategies and attitudes required for working together. Finally, group work takes time and where used without very careful planning and guidance from the teacher, is an extremely inefficient pedagogical tool.

Opportunities for reading and writing

Classroom observations by PEI researchers revealed that pupils are given little opportunity to read. Schollar found that only 4% of time was spent in reading. Pile and Smythe's study of Geography classes noted that pupils have no opportunities for reading. While all 8 schools had sets of textbooks, the teachers never used these with the children. They said they were inferior and too difficult for the children to read. Some teachers used photocopied material, consisting largely of diagrams or pictures. Because of the absence of pupil reading materials in the classroom and the dominance of teacher talk, it was not possible to assess pupil reading competence. But it must be assumed that under such conditions, it would be poor.

Duncan's study of initial reading programmes found that the amount of time spent on reading was limited in many classes. He argues that the integration of the four language skills into every language lesson, which has been the trend in teacher training courses over the last ten years, has meant that a discrete reading lesson no longer exists. In many schools

reading episodes - planned and unplanned - occur at intervals throughout the lesson. 'These episodes which, may or may not, include formal instruction are heavily subordinated to the overall content of the whole lesson (23).' Teaching of reading is therefore often haphazard. While the integration of the four skills is an international trend, South African schools have 'submerged initial reading instruction in the general melee of Foundation Phase activities' (23). According to Duncan this may have more to do with teacher competence and classroom management than pedagogical theory. In any event, the teaching of reading in these classes seems to be incidental and sporadic rather than a principal focus and outcome of the lessons.

Even where development programmes are aimed specifically at improving reading, progress is slow. Thus, Dachs's study in which English reading materials were provided by NGOs found that 15% of pupil time was spent reading, with 3% of this on silent reading. Reeves and Long's analysis of teachers' engagement of learners in using texts revealed that teachers struggled to engage learners in interpreting extended texts because of the low reading levels of learners. Learners had not developed strategies for reading independently. They also found that many learners had difficulty in reading and understanding the language and information provided in the TIMSS items and their efforts to engage with test questions were severely hampered by their low reading levels and inadequate second language skills.

Pile and Smythe found that written work comprised a very small proportion of most lessons. It was largely confined to simple exercises at the end of a lesson. Often only one-word answers were required. Notes were very few and far between: these were written on the board for pupils to copy, and functioned most often as vocabulary exercises. Often it appeared that pupils copied these exercises with little comprehension, and that this was exacerbated by the fact that the information was often decontextualised. Pupils were never required to write extended pieces; even whole sentences were rare. As a result, pupil exercise books contained very little, and what

content there is usually consists of isolated words, showing little or no logic. Not only are their reading and writing abilities severely stunted by these practices, but pupils are left with no written record of the year's work. Marking of books occurred regularly, but this was also very superficial: wrong answers were not infrequently marked correct, and corrections often consisted of a single word.

Student learning

It is not surprising, given the above teaching practices, that the researchers found that learners' levels of reading and writing were very poor and that they performed badly on mathematical and science tests. Reeves and Long's assessment of learners through the TIMSS items indicated that the learners had little understanding of the mathematical skills and knowledge integral to the intended curriculum. Not only are they far behind their international counterparts in the 26 countries that participated in TIMSS, but they are also way below the expectations of Curriculum 2005.

In their Focus on Four project, Reeves and Long hoped that the TIMSS coding rubric would allow them to analyse learners' responses in ways that would provide information about the procedures used by the pupils to solve mathematical problems. However the learners' responses were so poor that this was not possible. The multiple choice questions elicited better responses than the free-response questions, with only 1 to 3% of pupils able to write appropriate responses to the latter. This suggests that receptive mathematical language precedes expressive language and that learners found it easier to recognise correct responses than to create their own answers.

A detailed analysis of the Focus on Four results, taken together with classroom observations of pupil performance, indicates that:

- ✍ the majority of learners have limited knowledge of how the number system works past two digits.

- ✍ understanding of place value and the application of this concept in standard algorithms such as addition, subtraction, and multiplication is lacking in at least 75% of learners.
- ✍ most learners had difficulty reading and understanding the language and information provided in the TIMSS test, particularly word problem questions.
- ✍ many pupils were unable to work efficiently because they did not know or lacked foundation competencies, especially in mental arithmetic (recalling number bonds and multiplication tables).
- ✍ the majority of learners in these classes were unable to work with complex procedures and processes such as multiplication and division, and to recognise and discover patterns.
- ✍ most were unable to justify or explain their reasoning.

These findings are consistent with those obtained by Maja in his investigation into mathematics teaching and learning at the Grade 8 level. Although he chose ten of the better performing schools in each of Mpumalanga and the Northern Provinces, student achievement on a mathematics test averaged only 33.27% across the 20 schools.

These included two private schools, four former Model C schools, with the remainder drawn from townships and rural areas. In the majority of schools (13) the results were so bad that 'no reliable deductions can be made for these schools based on the available data'. Performance on multiple choice items (average 43.85%) was nearly three times that on free response items (16.53%). This discrepancy confirms that it is easier to recognise the correct answer than to generate one. Part of the problem was that students needed far more time to complete the test than had been expected, and it would be interesting to investigate the roles that reading and writing play in generating the results. Students did close to twice as well on questions requiring routine procedures (41.5%) and knowing mathematical terms (36.44%) than they did on complex problems (22.0%) and problem-solving (24.56%).

Teacher knowledge, classroom practice and student achievement

A number of studies hypothesise on the link between teachers' knowledge, classroom activities and pupil achievement. In Chapter 4 we examined the strength of these claims and concluded that the majority failed to make their cases convincingly, due to greater or lesser degrees of methodological rigour. Nevertheless, their research results are indicative of the kinds of teaching practices that promote effective learning.

The strongest case is presented by Focus on Seven, in which Reeves and Long compare pupil test results and the assessment of teachers' classroom practices. They found evidence of a strong relationship between improved science learning and the extent to which teachers are able to promote learners' engagement with Natural Science knowledge (content, concepts, processes and language). Although the study confirmed that classrooms are subject to many outside influences and contextual variables, the study, after controlling for these, concludes that it is the quality of learners' engagement with Natural Science knowledge, and the teachers' skill in promoting this engagement, that is the most important factor in learner attainment. The Webb et al, study claims a correlation between teacher knowledge and pupil learning outcomes. The research used regression analyses of teacher and pupil scores on fractions, electricity and measurement to indicate that in each subject there was a correlation between teacher knowledge and student achievement. There was a statistically significant difference between first and second year teachers' understandings of concepts in electricity and measurement. It is not clear whether measures were taken to control for the fact that the pre- and post-tests were written by different teacher cohorts, and thus no reliable conclusions can be drawn from the differences in scores. 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 student learning.

Maja used the classroom observation schedule developed by Reeves and Long for their studies. After comparing classroom practices, teacher and student attitudes, and school conditions, with student achievement, Maja postulates links between student achievement and:

- ✍ teacher practices which actively sought to develop student understanding, as opposed to those which did not attempt to take students beyond existing understandings. Successful practices tended to focus on meaning and the relationship between mathematical concepts and processes rather than merely on form and procedure.
- ✍ classroom interactions in which learners are active in asking questions, as opposed to being confined to answering teacher questions. In only one of the 18 lessons observed did any kind of groupwork and discussion between students take place.
- ✍ schools which exhibit higher degrees of discipline, order and productivity. Teachers in better performing schools spend more than twice as much time preparing lessons than their counterparts in the relatively poorer performing schools, and also tend to be more at ease with the subject matter.

Maja concludes that:

The key finding of this study is that method does not seem to be as important as meaning during a lesson. As to whether the teacher's lesson is learner-centred' of 'teacher-centred' does not seem to relate in any way to performance - what seems critical is whether the lesson promotes understanding of the subject being taught, do learners attach meaning to what is being taught, and most importantly, are learners able to engage with the lesson (126).

Related research studies

In addition to the above PEI projects, a number of evaluation studies, at present in various stages of execution, promise to throw important light on teaching and learning in South African schools. Evaluations of the implementation of Curriculum 2005 are happening at both national and provincial levels. In Gauteng, interim reports of two such studies became available at the time of writing.

The evaluation commissioned by the Gauteng Institute for Curriculum Development (GICD) notes that there is widespread support for Curriculum 2005 (Khulisa 1999). However, the report notes enormous problems, particularly in poorer schools, in implementation. Thus, while almost 80% of primary teachers believe they are practising OBE (with 90% believing that it allows educators to be more creative and flexible), the researchers observed very little change in schools and classrooms. Despite strong support for Curriculum 2005 and the evident good will by the overwhelming majority of teachers, principals and students towards making it a success, teachers feel very insecure. Fully two-thirds believe that the architecture is too complex, and half believe that they are not equipped to conduct lessons and assess learning. Two-thirds of teachers believe that Curriculum 2005 materials assist them to integrate subjects and promote experiential learning, but when requested to demonstrate an OBE lesson, most teachers produced mediocre replications of the 'Four Seasons' lesson which featured on their training programme.

Clearly, positive attitudes towards Curriculum 2005 - even where they are supported by materials - have not yet been accompanied by the development of the skills required to foster active learning, promote meaningful engagement with concepts, or integrate the various learning areas with each other or with everyday knowledge.

In a written test undertaken by the GICD evaluation pupils performed moderately well on low-level skills, such as verbal and story comprehension, the use of words in communication, and size, but below average in areas like reasoning, written comprehension, shape, and meaning and language structure in communication. These results are intended to be used as a baseline in measuring the progress of Curriculum 2005 in the province.

The study undertaken for the Gauteng Education and Training Council (GETC 1999) is a survey of the opinions of various constituencies, and hence suffers all the disadvantages of any report based purely on the perspectives of interested parties (see Chapter 4). However, some of these perspectives are so disturbing as to warrant urgent further investigation. The most alarming opinion expressed in the report reflects a deep confusion amongst teachers as to exactly what they should be teaching:

A very worrying observation that has been made is the schools over the last few months is that teachers keep on asking whether they need to be teaching reading and writing. By the end of the Foundation Phase, many children have still not been taught how to read. This is partly because teachers themselves do not know how to teach reading and this is being exacerbated by the fact that teachers think they do not have to teach reading (GETC 1999: 20).

The GETC study indicates that many schools are failing to teach reading at the lowest levels of the system. The Ministerial Committee appointed to investigate the Senior Certificate Examination (Ministerial Committee 1998) not only corroborates these suspicions but indicates that, after 12 years of schooling, reading progress has been painfully slow. Here too, it must be emphasised that the Ministerial Report was not a research exercise and the evidence it presents is largely of an anecdotal nature. Nevertheless, like the GETC report, it identifies issues which should be accorded the highest research priority. For example, one examiner interviewed by the Committee commented that:

It came across many scripts where students claimed that they met books for the first time in the examination room. As a result of this a number of candidates handed in their answer books without anything written on them. Most of the candidates wrote little notes at the end of their answers to say that they did not read the books, they did not understand, they were not taught and that they read books that were not prescribed (Minestral Committee 1998.20).

Conclusion

The research studies reviewed above constitute a very small and, scientifically speaking, unrepresentative sample of the South African school population. Yet the PEI researchers chose their teachers, schools and pupils so as to approximate as closely as possible typical conditions in township and farm schools (see table 4.1). The majority of projects were undertaken in primary schools, generally at the Foundation (Grades 1-3) or Intermediary (4-6) phases. It would be surprising, therefore, if the findings outlined above are not very commonly encountered across the country.

The material resource needs of many schools have been well documented and this aspect is, by and large, not dealt with in the present report. Learning is inevitably affected by the material conditions under which it occurs and these are discussed where they are implicated directly in learning, but this is not the primary focus of the PEI studies. We focus instead on the ways in which knowledge, skills and attitudes are cultivated in our classrooms.

The PEI research projects converge on a number of characteristics of classroom life in South Africa. 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. The absence of a culture of reading amongst teachers appears to be a concomitant problem. Low knowledge resources amongst teachers is accompanied by a number of features:

- ✍ Learning topics are dealt with at low levels of conceptual knowledge. For example, in a Grade 4 mathematics class, the teacher never strays beyond the addition of single-digit numbers (units), when at this level children could be expected to perform operations on 4-digit numbers (thousands).
- ✍ Tasks are set at low levels of challenge. Thus, the overwhelming majority of teacher questions require no more than the recall of simple information; inferences are never called for.

- ✍ Children hardly ever read, and books are little in evidence.
- ✍ Children hardly ever write, and when they do it is more often in the form of single words or phrases: sentences are rare and extended passages were never seen by the PEI researchers.

This learning profile remains largely constant whatever classroom strategies are employed, be they groupwork, whole class teaching, or real life simulations. In essence, learning seldom goes beyond a superficial engagement with either the technologies or substance of conceptual knowledge.

Thus, whatever the role of authoritarian systems of teacher education and management may have been in initiating the vicious circle of rote learning and creating the climate for its perpetuation, the fundamental mechanism for its propagation is the lack of conceptual knowledge, reading skills and spirit of enquiry amongst teachers. It follows, therefore, that reform initiatives aimed at revitalising teacher education and classroom practices must not only create a new ideological orientation consonant with the goals of the new South Africa. They also 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. This is a prerequisite for the widespread adoption of active learning methods in classrooms, and the development of higher order knowledge, skills and attitudes on the part of pupils. Rote learning is learning which fails to engage with the conceptual knowledge underlying the topic. At best it is characterised by the blind following of procedures without understanding why and how these work. Curiosity and an enquiring mind are the enemies of rote learning, but our research indicates that these attitudes are themselves only developed with increasing teacher self-confidence and the growth of knowledge skills.

To date - and it is very early in the new curriculum cycle - Curriculum 2005 is succeeding well in the ideological domain, with teachers eagerly embracing its intentions. However, amongst many teachers, particularly those working in poorly resourced schools, there is a vast gap between positive attitudes towards these new ideas and the ability to give effect to them in the classroom. Few teachers are able to translate the very complex logic underlying Curriculum 2005 and its

vaguely stated outcomes into appropriate learning programmes, and to effectively mobilise student-centred learning.

Furthermore, agreement with the goals of the new curriculum is not the only attitude required for success. The essence of Curriculum 2005 is to nurture entrepreneurial, proactive citizens, indeed, its implementation is dependent on teachers exhibiting these characteristics. The PEI research indicates that teachers have a long way to go in this regard and that they tend to abdicate responsibility and expect initiative to come from elsewhere.

The PEI research projects show that teachers are not clear about the levels of conceptual knowledge appropriate to their pupils. A first step to giving clearer guidance to teachers would be to set out knowledge frameworks in all the different learning areas, at each grade level. This requires a far more detailed explication of the specific outcomes. The Progress Maps being produced by the GICD are a step in this direction.

Sets of graded assessment items, which cover the full range of knowledge and tasks are needed to embody the expectations of our curriculum architects. These will serve two important and related purposes. Firstly, they will provide a set of exemplars of the standards required by the new curriculum. Secondly, they will enable teachers to assess their own progress and that of their pupils in working towards the goals of Curriculum 2005. This topic is taken further in Chapter 8. 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.

Above all, our children need books if they are to read and write. The paucity of books, and the inability of teachers to use them constructively are the greatest sources of illiteracy in our schools. These issues are taken further in Chapter 7. The systematic assessment of learning outcomes at all levels of schooling is indispensable for:

- ✍ establishing the extent of the learning difficulties identified by the PEI research projects.
- ✍ tracking progress of the system in nurturing more knowledgeable, skilful and aware citizens. Well designed longitudinal tracking will be important here.

In order to have generalisable validity, these studies must be carried out on samples which represent the population, and be amenable to disaggregation into clearly defined subpopulations. Perhaps the most urgent place to start with such a programme is to examine the levels of reading, writing and numeracy at the end of the Foundation Phase. If basic literacy and numeracy have not taken root around the age of 9 or 10, then the prognosis for further schooling is poor.

A parallel task would be to undertake careful case studies in order to elucidate the conditions, teaching strategies and materials which optimise learning.

CHAPTER 7

LEARNING MATERIALS

Penny Vinjevold

Current policy and provision of learning materials

The Department of Education (DOE) regards adequate learning support materials as essential to the effective running of an education system and asserts that these materials are an 'integral part of curriculum development and a means of promoting both good teaching and learning' (Department of Education 1996g. 1).

The DOE includes a wide range of texts, resources and equipment in its definition of learning support materials. These encompass 'more than just textbooks' and may be created from a variety of sources. They may also be 'print-based, electronic, physical, combinative, human and organisational'. The lists of materials under each source are extensive. For example, print sources include notes, documents, published textbooks, workbooks, reading schemes, newspapers, magazines, supplementary readers, teacher guides and reference books, while electronic resources include transparency series, slide or sound presentations, filmstrips, video and audiotapes and computer software. Although the DOE calls all these 'learning support materials', we draw a distinction in this chapter between materials which provide a systematic learning framework and supplementary materials which are used in support of the systematic learning framework.

The DOE has also developed basic principles which should inform the development of learning materials. Learning support materials should:

- ✍ promote a love for lifelong learning.
- ✍ promote critical thinking, logical reasoning and problem solving skills as essential life skills.
- ✍ promote emotional, intellectual, personal, physical, spiritual, moral and social development, gender appropriateness and sensitivity, an integrated approach to learning and encourage 'hands on' experiences. promote awareness and respect for the environment and the diverse cultural heritage of society at large.
- ✍ provide for a continuous progression of opportunities for development, allowing learners opportunities for gradual refinement of perception.
- ✍ take cognisance of individual differences and promote learner-paced learning.
- ✍ Link content/concepts/knowledge/understanding to skills and to values/dispositions/attitudes/norms (Department of Education 1998g).

In addition to these principles, the DOE provides 14 sets of guidelines for consideration by materials developers under headings such as assessment, language, layout, accessible language /register and so on.

The DOE intimates that responsibility for the development of learning support materials lies not only with commercial publishers, but also with NGOs, parents, learners and particularly classroom educators. 'Educators previously separated by the need to cover discrete syllabus material will now begin to work collaboratively in the preparation of materials' (Department of Education 1995). As we saw in Chapter 5, this is one of the tasks that has devolved to the classroom educator with the advent of Curriculum 2005.

Despite this ambitious commitment to the provision of high quality and progressive learning materials, it is widely felt that schools are not receiving the materials they need. This perception is underscored by the figures which reflect spending on textbooks in South Africa. Table 7.1 below provides an

estimate of total expenditure and per capita expenditure over the last four years, as well as projected expenditure for 1999/2000.

Table 7.1: Estimated expenditure on books and materials, 1995 - 2000 (McCallum 1999)

	1995/6	1996/7	1997/8	1998/9	1999/2000
Total Expenditure (R)	895 m	372 m	80 m	264 m	133 m
Per capita costs (R)	76,21	31,68	6,87	22,48	11,48

The figures provided by Crouch and Mabogoane (1997) in Table 7.2 show how spending varied from province to province

Table 7.2: Spending on books and stationery (Rands/learner) for 1995/6 and 1996/7

	Year	Books		Stationery	
		Primary	Secondary	Primary	Secondary
EC	95/96	48	187	22	57
	96/97	25	46	38	70
FS	95/96	17	45	3	8
	96/97	30	53	35	39
GT	95/96	45	50	14	17
	96/97	31	64	24	45
KZN	95/96	54	206	13	32
	96/97	19	32	25	37
MP	95/96	69	55	27	17
	96/97	42	68	27	38
NW	95/96	36	86	9	17
	96/97	3	22	0	0
NC	95/96	31	27	2	2
	96/97	3	15	0	2
NP	95/96	26	69	16	35
	96/97	6	90	21	52
WC	95/96	23	35	35	55
	96/97	30	79	27	44
National	95/96	26	56	25	43
	96/97	42	105	17	42

Problems connected with the procurement and distribution processes for textbooks and stationery motivated the DOE to set up a task team in 1998 to investigate and suggest solutions to these problems. This task team found that some provinces had not purchased any new material for 1998 because of the shortfall in their budgets.

The media focused considerable attention on the inadequate provision of textbooks at the beginning of 1998. In February of that year, President Mandela promised that all children would receive textbooks within the first seven days of schools' opening in 1999. Although government increased the amounts set aside for the delivery of textbooks and stationery, hitches in the planned provision are now well known and serve to demonstrate the difficulties of textbook provision in a vastly expanded education system.

International research on the effects of learning materials

International research on learning materials has focused on the role and use of (textbooks in improving the quality of education in schools. According to Crouch and Mabogoane (1997), this literature suggests that some of the most important predictors or precursors of cognitive development as opposed to access to schooling is the access of learners to learning materials such as books and stationery. The Third International Mathematics and Science Study (TIMSS), which compared the mathematics and science performance of pupils in 41 countries, has shown how decisive are the effects of textbooks on pupil learning. The study found that one of the most important ways of improving the quality of mathematics and science learning is through the provision of standard teaching manuals.

Learners in developing countries, particularly those in rural areas, appear to have been the greatest beneficiaries of textbook provision. The Philippines Textbook Project, for example, reported that 'students who used textbooks achieved more than those who did not' and those who used the project

textbook 'performed generally better than the nonusers did on test items that measured higher and more complex learning'.(DeGuzman 1993: 168) The results also show that the children in rural areas benefited more than children in the semi-urban central school and the cities. In short, consistent evidence has accumulated over the last twenty years to support the role of textbooks in complex learning.

Local studies on the effects of learning materials

No large scale studies of the effects of textbooks or other learning materials on pupil learning have been conducted in South Africa. Schollar and Le Roux have together and separately undertaken a number of evaluations for the READ Trust, which examine the impact of that organisation's reading programmes on primary school pupils' reading and writing skills. One study, conducted in 49 (29 READ and 20 control) schools across six of the nine provinces found 'very significant differences between the READ and control schools' (Le Roux and Schollar 1996). In the multiple choice English Reading Comprehension Test, the READ schools outperformed the control schools by 24,1% in Grade 5; by 28,8% in Grade 6 and by 29,8% in Grade 7. The results of a Stimulus Response Writing Test showed even greater differences. The READ schools' results were 190,6% higher than the control schools at the Grade 5 level, 138% at the Grade 6 level and 111,9% in Grade 7. The report concludes that the READ pupils are approximately 18 months ahead of the control schools in terms of reading and two years ahead in terms of writing. A study of 14 READ schools and 4 control schools in the Umtata area showed similar findings, with READ pupils 'having gained at least 2 years (in terms of Reading Age) on their control school counterparts' (Le Roux 1997).

In 1996 Vinjevold conducted an investigation into the provision of cross-curricular workbooks to Grade 4, 5 and 6 pupils in the Northern Cape (Vinjevold 1996). The first part of the impact study examined the extent and nature of the use of the workbook. The following pupil activities and habits

were reported: increased individual work, increased group work, increase in educational activity at home, work which was both voluntary and eager, use of the book for a wide variety of subjects, a particular interest in the puzzles, crosswords and games, and less interest in extended pieces of reading and writing.

The results of the seven-item test conducted as part of the study revealed that the mean scores of pupils in the experimental group improved between the February pre-test and the October post-test on each item and that these improvements were all statistically significant. The study also found that pupils in the more disadvantaged schools benefited most from the intervention. In other words, pupils in Department of Education and Training and House of Representative schools, comparative to their point of entry in the intervention, benefited more from the introduction of the supplementary materials than House of Assembly pupils did. In addition, the degree to which the books were used affected the results in the post-tests. The more the workbook, was used the greater was the increase in the post-test scores.

The report concludes that the intervention has the potential to contribute to greater equity in the school system: pupils in disadvantaged schools benefit most from this intervention - especially if there is a high incidence of usage.

PEI research projects and their findings

Many of the PEI projects included a discussion of learning materials in their analyses of teachers' practices and pupil learning. In some of these studies, learning materials is only one of a number of areas of investigation of teachers' practices and pupil learning. For example, Maja's study included learning materials as one of five areas for investigation of good mathematics practice in Grade 8 classes. In other studies the use of learning materials is the main focus of analysis of these activities. These studies included all types of materials - textbooks, reading books, toys, apparatus, equipment, charts; maps, worksheets - in their investigations.

Baxen and Green's study examined the availability and use of learning materials in Grade 1 and Grade 7 classrooms in the Western Cape. The Research Institute for Education Policy (RIEP) at the University of the Free State looked at the availability and use of materials in ten multi-grade classes in the Free State.

Wickham and Versfeld investigated the role of texts in establishing good practices in the teaching of English in under-resourced multi-lingual junior secondary classes in the Western Cape.

Onwu investigated the availability and use of learning materials in Grade 12 science classes in the Northern Province.

Pile and Smythe tested the hypothesis that Sotho-speaking teachers would teach in different ways if they had accessible texts in Sotho and English. They provided such texts and asked teachers to choose from these texts and use them in a series of three lessons.

None of the PEI studies attempted to measure the impact of materials on learning through pupil testing. However, two studies used existing indicators of pupil attainment to correlate the role of materials to pupil learning. Dachs uses the studies conducted by Le Roux and Schollar (1996) as part of his examination of the use of English-learning materials in large Grade 5 classes in KwaZulu Natal, and Onwu uses results in the 1997 matriculation science examination to infer the role of learning materials in student achievement in science in the Northern Province.

Availability and use of textbooks

In general PEI researchers have found that textbooks were available at the schools in their studies although not always in sufficient quantity for all learners. For example, in Schollar's study of four EQUIP schools in Mamelodi, all pupils had received textbooks and stationery from the Gauteng Department of Education in the last two years although principals reported that there had been insufficient books for all learners. Schollar's study does not describe whether the textbooks provided are used in the classroom.

In the study of the teaching of Geography in eight schools in the Free State, Pile and Smythe found that all the schools had sets of classroom textbooks but that teachers had not issued them or did not use them with their pupils. In their investigation into the teaching and learning materials in multi-grade classes in the Free State, RIEP found that Grades 4 to 7 pupils had mathematics and English textbooks. In only one school was there a shortage of these textbooks. These schools are all located in the Bloemfontein area. In another study of Free State multi-grade schools located in remote areas of the province, the HSRC found that two to five of the 12 schools did not have textbooks in some subjects for a particular grade. However, the majority of Grades 4, 5, 6 and 7 classes in this study had some (but not enough) mathematics, science and language textbooks. Neither of the two studies of multi-grade classes described how these books were used or whether they were used at all.

The study by Wickham and Versveld of teachers in four under-resourced schools found that all four schools had copies of the setwork books but that pupils used a textbook for English in only one of the schools. It was unclear whether or not the schools had received textbooks and had opted not to distribute them. In only three of the 32 lessons observed in this study were textbooks used. In more than 30% of the lessons, no learning support materials were used by the teacher. Table 7.3 below indicates the type of material used in each of the 32 lessons.

Table 7.3: Materials used in classes observed in Wickham and Versveld PEI study

Nature of materials	No. of lessons observed
No materials used by teacher	11
Setbooks	6
Textbooks	3
Worksheet	1
Cartoons	5
Newspaper article*	4
Past examination paper	1
Photocopied poem	1

* the same article used by the same teacher in all 4 lessons.

Wickham and Versveld's classroom observations were directed at the use of materials provided in classrooms. The main finding of the research is that 'the individual teacher rather than the materials used, is the significant determinant in the materials/practice relationship'(40). The report also claims that evidence from the study is that teachers use 'textbooks in terms of their established or coded practices rather than according to the material developers' vision'(42). It is quite possible that this is the way in which teachers use textbooks and other developed materials but the data provided in the study does not describe this practice in any detail. As can be seen from Table 3, only three of the lessons observed used textbooks.

Baxen and Green examined the amount and nature of learning resources available in Grades 1 and 7 in the Western Cape, the process by which they were selected, the ways in which they are used in schools, and teachers' perceptions of their specific needs for materials. In Grade 1 the focus was on materials for Language and Literacy and Mathematics, and in Grade 7 it was on Natural Science, Language and Literacy and Human and Social Sciences.

The data for the study was obtained from questionnaires from 44 Grade 1 teachers and 26 Grade 7 teachers in 19 schools. Four of these were described as well-resourced schools in urban and rural settings and the rest were under-resourced classrooms in urban and rural settings. In the Grade 1 classes they found that over half the classrooms sampled lacked ten or more basic learning materials. Where these materials were present, they were perceived by teachers in all schools to be insufficient and in poor condition. Urban under-resourced schools were significantly short of reading materials and had very little in terms of blocks, plastic cubes, crayons, puzzles and games. Rural classrooms had no learning materials in sufficient quantity.

Baxen and Green report that their observations of classes suggest that teachers made assumptions about the way in which materials mediate learning. They assume that learners know how to use the material to develop new knowledge after demonstration. In other words, the pupils were provided with procedural rather than conceptual support. Green and Baxen also found that the emphasis when using materials was on 'getting things right' and completing the task rather than on understanding. There were no observed instances of teachers engaging learners on how or why they were using materials. In many cases teachers did not have a sense of the relationship between learning goals and learning materials. Finally, the researchers comment that discovery learning was not encouraged and learners were seldom left to experiment with materials.

In Grade 7 classes, Baxen and Green found that urban resourced classes had more learning materials in all three learning areas than the urban under-resourced schools while they, in turn, had more than the under-resourced rural classrooms. However, this pattern is not found in the availability of history, geography and science textbooks. Table 7.4 below indicates how few classes have textbooks for all learners, including classrooms thought to be well-resourced. Several teachers in well-resourced schools said they did not consider it 'desirable to work in a way that requires one text per learner'. Instead they preferred to direct learners to textual and other resources.

Table 7.4: Availability of textbooks in classes surveyed by Baxen and Green

Subject	Well-resourced classes	Under-resourced (urban) classes	Under-resourced rural classes	Total classes
Total classes surveyed	9	13	4	26
History				
Textbook for each	0	1	0	1
Textbook to share	1	4	1	6
Geography				
Textbook for each	1	2	0	3
Textbook to share	1	3	1	5
Shared atlases	4	4	2	10
Globe	9	9	1	19
Science				
Textbook for each	5	3	0	8
Textbook to share	0	4	2	6

As with Grade 1 teachers, Grade 7 teachers used learning materials primarily by handling or manipulating them themselves while learners watched. In some cases learners were given materials and then general instructions on how to interact with these. Only in one case were materials and guidance given before learners were left to solve a problem. In general, Baxen and Green found that learners were seldom encouraged to use materials as a resource for independent learning or reading. In contrast to Grade 1 teachers, the Grade 7 teachers had an understanding of the relationship between lesson outcomes and learning materials used. The researchers suggest that this may be because they were subject specialists and had a better conceptual understanding of the subject. Although the materials used were generally appropriate to the lesson, they were only used to access existing knowledge on a topic and not to develop deeper conceptual understanding.

In his study of large classes in KwaZulu Natal, Dachs kept a record of whether the materials supplied by the READ Trust or St. Mary's Interactive Learning Experience (SMILE) were used. The data shows a heavy reliance on materials. He also found that the materials played a significant role in the different types of interactions observed, such as discussing, explaining, questioning, reading and writing. The researcher postulates that it is the existence and employment of these materials which enables the teachers to engage in this degree of variety of interaction whilst maintaining control over the large class environment.

Onwu examined the availability and use of science materials in ten Grade 12 classes in the Northern Province. The matriculation science results in the ten schools ranged from a 5,6% pass rate to a 100% pass rate. All the schools in the study except one were former DET public schools which were dependent on the provincial government for the bulk of their funding. Despite this, there were great variations in the resources and facilities available for the teaching and learning of science. Table 7.5 below shows the availability of materials and equipment at the 10 schools.

Table 7.5: Availability of science textbooks and equipment in science classes surveyed by Onwu

School	Science pass rate in 1997	Textbooks	Writing books	Teaching aids	Laboratory	Science kit	Lab equipment
	1 = adequate; 2 = fairly adequate; 3 = poor; 4 = none.				y = yes; n = no		
A	100%	1	1	1	y	y	y
B	75%	1	1	1	y	y	y
C	66,7%	2	2	2	y	y	y
D	63,2%	2	2	2	y	y	y
E	47,3%	2	2	2	n	y	n
F	36,5%	2	1	4	n	y	n
G	26,5%	2	1	2	y	y	y
H	20,9%	2	2	4	n	y	y
I	6,1%	3	3	4	n	n	n
J	5,6%	3	3	4	n	n	n

In his analysis of the use of learning materials in Grade 12 science classes, Onwu concentrated on patterns of classroom interactions/activities and homework tasks. The first was assessed by recording the time spent on six kinds of activities:

- ✍ group and individual activity: These take place when pupils
- ✍ work by themselves with materials on problems set by the teacher or when they are involved in discussions in small groups that may include the teacher.
- ✍ whole class discussion: This is a question-and-answer session involving the teacher and the whole class - regardless of whether every student is participating or not.
- ✍ transition activity: These are periods when the teacher is handing out materials or re-arranging students, etc.
- ✍ teacher lecture: This takes place when a teacher is talking to a class i.e. not when the teacher is responding to a question or requiring verbal answers from them.
- ✍ teacher writes notes on the board and pupils copy what is being written
- ✍ other: These are kinds of interactions that do not fit into any of the above categories.

The researchers found that only classes in schools A and B used group or individual activity - in one case for two-thirds of the class time, and in the other, for just under half of the class time. In the other classes, the lessons are dominated by whole-class discussion and note-taking. Unfortunately Onwu does not provide any detailed analysis of the time spent on activities for all ten schools. However, his interpretation of the data is that the extent to which methods were teacher-centred or pupil-centred was strongly influenced by the existence of textbooks, writing materials, writing books and teaching aids. Where learning materials and facilities are inadequate, the teaching approach is inevitably teacher-centred.

The availability of textbooks and materials also resulted in an increase in the number of distinct activities in the lesson. When there were no textbooks, there were only two major activities: whole class discussion and taking notes. Onwu also found that homework tasks were determined by textbooks and exercise books. Observation of lessons and pupils' exercise books suggests that it is only when there are adequate textbooks for all pupils that homework tasks are set.

Onwu cautions however that textbooks and science equipment are a necessary but not sufficient condition for pupil-centred teaching and learning and that the existence of textbooks and science materials did not necessarily result in learner-centred activities or pupil achievement. It was only when there was 'a qualified and motivated teacher' that this happened. Onwu does not elaborate on this.

There are a number of possible reasons why teachers are not using textbooks even when these are available. Teachers participating in the Pile and Smythe study said the Geography textbooks were not used because they were outdated and too difficult for pupils to read on their own. Macdonald and Langan's research in the 1980s and early 1990s supports this. They found that the low level of language competence among pupils meant that they found textbooks too difficult to read. But Macdonald and Langan also found that teachers could not always access textbooks themselves. Langan found that teachers had a limited knowledge of Geography and that this prevented them meaningfully interacting with textbooks. He also found, however, that teachers had poor levels of reading competence and that this caused a misunderstanding of texts and an inability to interpret maps and diagrams.

Pile and Smythe tested the hypothesis that Sotho-speaking teachers would teach in different ways if they had accessible texts in Sotho and English. They provided such texts and asked teachers to choose from these texts and use them in a series of three lessons. In interviews after the lessons, teachers said they liked the materials, pictures and stories provided. In spite of this the researchers found that in general they did not use them in class.

Pile and Smythe conclude from this that teachers' geographical knowledge does not allow them to select appropriate material to include in their teaching or to structure the material into suitable learning experiences, even when the material is in Sotho. This supports the hypothesis in Chapter 6 that teachers' language competence, reading levels and subject knowledge might not allow them to access textbooks.

A second possible reason for teachers not using available textbooks and learning materials is that they are thought not to be aligned to Curriculum 2005. A District Director in Gauteng, Dr Brehm Fleisch, reports that in some schools teachers stopped using tried and tested materials because they did not cover the themes suggested for the Foundation Phase learning areas. This may account for the fact that teachers reported in a number of PEI studies that they did not use textbooks because they were outdated.

It is also possible that teachers do not use available textbooks because teacher educators have, wittingly or unwittingly, undermined their value. This was partly because of the poor quality and inappropriateness of many textbooks provided to DET schools in the 1970s and 1980s. But textbooks were also disparagingly referred to in teacher education circles as 'packaged information' - not something with which the self-reflective practitioner would want to be associated.

For all the above reasons, a large number of teacher development projects linked their activities to alternative learning materials. The Primary Science Project (PSPL Science Education Project (SEP), English Language Education Trust (ELET), the Education Support Services Trust (ESST), among others, have, over the years, provided teachers and pupils with learning materials, usually unrelated to textbooks in use.

The absence or perceived low quality of textbooks available in schools prompted NGOs, teacher colleges and university education departments to introduce materials development components into their programmes in the

1980s and early 1990s. Teachers' responsibility for the design and development of materials and learning programmes is now widely assumed. DOE documents express an expectation that teachers will develop their own learning materials. One of the six key roles identified for teachers in the Norms and Standards for Educators /Department of Education 1998b) document is the teacher's role as 'Designer of Learning Programme'. The six competences teachers are expected to possess and practice in this role are:

- ✍ understanding and interpreting provided learning programmes. designing original learning programmes.
- ✍ analysing ways in which barriers to learning may be overcome through the design and creation, or selection of innovative learning programmes. preparing lessons that take into account learners' needs as well as new approaches to learning/teaching.
- ✍ understanding how learning materials can be used to construct learning environments that are more flexible and individualised. evaluating and adapting learning programmes and resources through learner assessment and feedback from learners.

The existence and use of materials designed and developed by teachers and NGOs

Teachers developing their own materials

EI researchers found little evidence of teachers designing and making learning materials. Even teachers who have attended courses that include materials development components do not appear to develop their own materials. The SAIDE PEI study reports that teachers who participated in the University of the Witwatersrand FDE seem aware of the importance of materials in learning. They also expressed an understanding of these in learning and said they were keen to make their own materials. But despite this awareness and expressed desire to make materials, few teachers did so. A number said they 'lacked the creativity to identify resources that could be turned into learning materials' (97). Lack of secure storage was also given as a reason for not developing materials.

Baxen and Green's study of Grade 1 classrooms in the Western Cape found that 75% of teachers reported using home-made materials in the classroom such as puzzles, charts, number games, language games and activity cards. Visits to these teachers' classrooms did not support these claims,

The study undertaken by the School of Education, Training and Development at the University of Natal (Pietermaritzburg) aimed to 'construct a representation of the roles and competencies being demonstrated in the practice of successful educators'(8). The study found that 'most teachers are engaged in the implementation of provided programmes but not the design of original ones'(59). Although most teachers 'acknowledged the importance of developing original and adaptive learning programmes, they either lacked the necessary skills; saw it as a corporate rather than individual responsibility; or argued that such an activity would constitute a deviation from the syllabus and therefore defaulting from their primary responsibility, which is getting learners through the exams'(59). The report states that teachers' understanding of the importance of learning materials in addressing barriers to learning 'was remarkable'. However, except for two teachers, this awareness was not translated into practical competence through the design and use of appropriate learning resources. The report concludes that among the six roles set out in the Norms and Standards document, teachers' competence as Designer of Learning Programmes is the weakest,

Makhosi Sigabi's study of Grade 1 classrooms in Gauteng claims that one of the major inhibitors to teachers' developing their own materials is the lack of support resources like libraries, duplicating facilities and so on. He concludes that it is unfair in these circumstances to expect teachers to develop their own learning support materials.

Emilia Potenza, who has extensive materials development experience, believes it is unrealistic to expect teachers to develop sufficient materials for their learning programmes (Interview 1998). Her experience as a teacher who has developed materials over four years with a team of highly motivated, highly skilled

teachers with ample resources at their disposal and a supportive principal, was that the process was difficult and time-consuming and in the end not sustainable. Examples of outcomes-based materials in Potenza's Upbeat series and The Integrated Approach Series illustrate the point. These materials contain carefully selected comprehension or reading passages, questions on the passages, a variety of activities, essay topics, discussion topics, assessment strategies and so on. Each set of lessons involved at least ten to twelve hours' preparation by an experienced writer with access to a wide range of resources. Potenza concedes that teachers can produce worksheets but claims that even this is complex and time-consuming - especially if one hopes to provide coherent and meaningful learning activities. Potenza goes as far as to question whether the new curriculum will be implemented if teachers are left to develop their own learning support materials.

We may conclude from this that a serious question mark hangs over the assumption that teachers can and will develop their own learning support materials.

Use of materials provided by NGOs

PEI researchers found that in classes in which NGOs provided materials, there were high levels of use of these materials. Reeves and Long studied eleven teachers who had been involved in the design and development of activities for use in the teaching of Grade 7 Natural Science classes. The researchers found that in all eleven classes in this study the Primary Science Programme (PSP) Learning Programme was the curriculum that guided the teachers' Natural Science teaching and the PSP activities and curriculum material were, in the main, the only resources used by the teachers in their Grade 7 science lessons. Each of the teachers in the study was observed twice. In 15 of the 22 lessons, PSP material was available for each group of learners and, in two lessons, it was available for every learner. Only in three lessons were no materials available. In Dachs's study of classes in KwaZulu Natal, he observed teachers who had received English language material from either READ or SMILE. The teachers were observed three times each and in each lesson, Dachs found that all the teaching in these classrooms was facilitated by the materials made - available to the teacher'(25).

The PEI studies as well as other evaluations of NGO programmes claim that these materials increase pupil participation in the classroom. An evaluation of the Sakhisizwe In-service Teacher Training programme by Thulisile Dlamini in 1996, for example, concludes that 'the provision of instructional materials brought about major shifts in the participation of learners in the classroom'(Dlamini 1996: 68).

In the Northern Cape Workbook Project, Vinjevd (1996) found that the provision of two workbooks led to much greater participation and involvement of learners with learning material. This was manifest in increased individual work, increased group work, increased homework and unprecedented voluntary engagement with reading material. Caution must, however, be exercised in linking pupil participation and involvement to conceptual development or pupil learning gains.

Beeves and Long found that despite the pupils' involvement in the activities developed by PSP, the conceptual goals of the activities were not always achieved. An example of this was the demonstration of corn popping to explain the Big Bang described in Chapter 6. In many cases the researchers found that the teachers completed the activities recommended, but did not use them in ways that assisted the learners to achieve the stated conceptual goals. The reasons for this were that the teachers themselves were not always clear about the conceptual goals of some of the activities: they did not maintain a focus on the concepts to be taught and so did not achieve the conceptual goal of the activities.

This finding is supported by Baxen and Green's observations of Grade 1 and 7 classes in the Western Cape. A number of teachers used learning materials in their lessons but these did not convey the concept the teacher aimed to teach. For example, in one lesson the teacher introduced a lesson on division by instructing learners to thread Unifix cubes and find the matching numbers. This activity did not provide the teacher with an understanding of the learners' prior knowledge or experience of division and at no time in the lesson did the

teacher demonstrate the relationship between the activity and division. This led the researchers to conclude that in 'many cases teachers did not seem to have a good sense of the relationship between the learning goals, outcomes and the learning materials'(58).

In their study of science teaching in Grade 7, Reeves and Long suggest that if the conceptual goals of the learning programmes are to be achieved, the following should happen:

- ✍ Learning material should focus on a few key conceptual goals and should address concepts, processes and skills in terms of incremental cognitive complexity. For example, the information provided on one poster of the water cycle was very detailed and elaborate but was too crowded and unfocused for the content needs of the learners. For this reason the essential components of the water cycle were lost to the learners.
- ✍ Curriculum material should take into account the depth and breadth of teachers' current subject knowledge and should help bridge the gap between their existing knowledge and the needs of the curriculum.
- ✍ Texts should mediate scientific language through the provision of clear definitions and explanations of scientific terms/concepts such as gravity. Learners' incorrect responses revealed conceptual confusion between topics in the learning programme. For example, 'ozone' is a solar system; 'ozone' is the force of gravity. Reeves and Long suggest that one reason for this is that the core natural science knowledge to be learnt through the materials or activities is embedded in the curriculum material and is not made explicit. In other words, it assumes the very knowledge it ought to be teaching.

All the above indicates that the development of learning materials, which effectively develop pupils' conceptual skills and reading and writing levels, is a complex and highly skilled process. The international and local research suggests that learning materials which are not structured into a comprehensive learning programme are severely limited. For example, teachers who

participated in the Northern Cape Workbook Project indicated that the books would have been more effective if they had been graded by language and concepts and arranged more systematically. The results of the pupil tests, which formed part of the evaluation of this project, support this. The tests were designed to assess two types of activities: the ability to engage in the kinds of games and puzzles contained in the workbook, on the one hand, and the ability to read and write with understanding on the other. The study found that pupils who used the workbooks showed considerable improvement on the first kind of task in comparison to pupils who did not use the book but who did worse on the second set of tasks which required systematic development and practice of reading and writing skills.

This suggests that worksheets and activities, such as those developed by NGOs and teachers, have a place in the classroom but cannot replace a systematic learning programme. These materials have a supplementary role to the kind of step-by-step coherence that is provided by a good textbook or learning programme. Systematic learning programmes provide 'lesson material in graded sequence, they help to structure and organise the learning experience of the class, assist the teacher in the daily tasks of preparing lesson plans, and they provide recapitulatory material and exercises to test progress' (Fering, McDougal & Ohlman 1993: 197).

Conclusion

The PEI research studies found that very few teachers are using textbooks in their classes in any systematic way. This was even the case when textbooks were available at schools. The researchers suggest that teachers avoid using textbooks because they do not have the content knowledge or reading skills to use these books. Teachers on the other hand indicate that the reason they do not use the books is that they are out-of-date and inappropriate and that pupils cannot read them.

In some lessons researchers found that no learning materials were used and, in others, cartoons, newspaper articles, activities, worksheets and so on are

used. In the vast majority of cases, the latter are not used to supplement textbooks, nor are they part of a carefully designed learning programme that systematically develops cognitive skills and conceptual knowledge. Rather they provide pupils with ad hoc activities which may or may not be at the correct conceptual and content level for the pupils involved. In most cases the tasks do not demand higher order skills and knowledge and learners spent time practising skills they had or should have acquired in previous grades. These learning support materials also often do not engage learners in progressively more demanding activities aimed at developing reading, writing and numeracy skills.

The findings of the PEI research projects suggest that teacher development programmes should assist teachers to use textbooks or a systematic learning programme. In addition, teacher development courses should make clear the differences between the role played by textbooks (those which frame the learning programme) and workbooks, worksheets and activity manuals (those which provide supplementary and revision material in support of the learning programme).

Further research is required to understand why teachers do not use textbooks when they are available. There is also an urgent need to establish the extent of textbook availability and teachers' ability to read and use these textbooks. Given the present restraints on budgets, it is important to establish priorities in the provision of learning materials that most effectively develop learners' conceptual knowledge structures. However, all indications are that the availability of sufficient textbooks and stationery is one of the most important factors in improving learning. It is imperative therefore, that provincial deficits be eliminated and the balance between salary and the other costs be restored so as to free up funds for the provision of books and stationery.

CHAPTER 8

LEARNING OUTCOMES: HOW WILL WE KNOW THEM?

Nick Taylor

The policy introduces a shift from a system which is dominated by public examinations, which are 'high stakes' end [sic] whose main function has always been to rank, grade, select and certificate learners, to a new system that informs and improves the curriculum and assessment practices of educators and the leadership, governance and management of learning sites. For that reason, diversification of modes of assessment and improved expertise among educators in designing, developing and using appropriate assessment instruments, must be given priority (Department of Education 1998e: 3).

Types and purposes of assessment schemes

Greaney and Kellaghan (1996) distinguish between national assessments and public examinations. National assessments are a feature of many industrial countries. Their principal function is to measure the health of the system as a whole and the health of designated sub-sectors. They are

generally based on a sample of the population, and its defined sub-populations. National assessments differ from public examinations in a number of important respects. The primary function of the latter is to assess the capabilities of individual students for the purposes of certification and selection into the job market or more advanced educational programmes. Hence, the entire population wishing to be considered for selection will sit the public examination. All assessments have a formative function, and the higher the stakes, the stronger will be the influence on teaching and learning. However, public examinations are primarily summative in their intent. They test what students know and can do, while national assessments serve a mainly formative purpose -they test the state of the system for the purpose of improving it.

A third type of assessment is conducted at the classroom and school levels. While national assessments and public examinations are more restricted in the kinds of instruments employed, at the classroom level a wide range of options is at the disposal of the teacher to enable him or her to monitor the progress of student learning and his or her own teaching. The primary purposes of most classroom-level assessments are diagnostic and formative: to identify and specify strengths and weaknesses with respect to the products and processes of teaching and learning in order to improve teaching practices and learning outcomes. However, in judging fitness for progression at the end of a grade or phase, classroom-level assessment also serves an important summative function.

Two additional tools are available for increasing the usefulness of all assessment data for improving teaching and learning. Firstly, the collection of contextual data such as parent socioeconomic status, teacher qualifications, class size, and the like, provides for the establishment of correlations between these variables and learner achievement. Such correlation studies are not easy to undertake. They involve multiple levels of analysis (Riddell 1997) which disaggregate the complex relationships between variables in order to distinguish the effects of different contextual influences and filter out the value added by the school (Sammons et al. 1997). Correlation studies are important

tools in assisting policy makers to improve the impact of schooling through a more rational allocation of resources. Secondly, classroom observation studies can provide information about the relationship between learner achievement and classroom- or school-level variables. In Chapter 4 we discussed how a number of PEI researchers used contextual and classroom data in their analyses.

While the three kinds of assessment schemes have many features in common, and while any particular scheme invariably serves more than one function, it is important to distinguish them according to their primary purposes because attempts to collapse them may lead to schemes which serve none of the functions very well. A good case in point is the system instituted in England and Wales to monitor the implementation of the National Curriculum in the early nineties. The educational goals were exemplary: the intention was that teachers would be closely involved in the collection of both summative and diagnostic information in order to have a formative influence on their own practice. This was an ambitious and complex scheme which was based on four key stages (at ages 7, 11, 14 and 16), a number of attainment targets in three subjects - English, mathematics and science - for each key stage, each divided into 10 levels of difficulty defined according to what pupils know, understand and are able to do. Teachers were expected to determine whether their students had achieved the level of response specified in the statement of attainment, to record the achievement levels reached, to indicate level of progress in relation to attainment targets, to provide evidence to support levels of attainment reached, and to give information about student achievement and progress to parents, other teachers and schools. Moderation was done by other teachers.

In the end, the British national assessment system proved to be unworkable. It placed too heavy a burden on teachers and provided inadequate training and support. Following an extensive review of the National Curriculum (Dearing 1993) the system shifted towards greater emphasis on simpler written tests which had a higher summative component and which were administered centrally. Greaney and Kellaghan (1996) draw two lessons from this experience. Firstly, the use of complex assessment tasks leads to problems of

standardisation and comparability. This limited the use of the scheme as a tool for comparability and hence for systemic assessment. Secondly, it is difficult if not impossible to devise assessment tasks which simultaneously serve diagnostic, formative and summative purposes. We would add that only at the classroom level does sufficient flexibility exist to systematically combine the summative and formative purposes of assessment.

In South Africa the assessment policy of the Department of Education (Department of Education 1998e) makes a broad distinction between the three kinds of schemes outlined above. Thus, it is intended firstly that a full external assessment will be conducted at the end of the General Education and Training Phase (Grade 9), administered by the provinces. This is envisaged as a public examination-type assessment. Secondly, national systemic evaluations will be conducted at the Grade 3, 6 and 9 levels. These will take the form of sample summative and formative assessments which will be aimed at monitoring the degree to which the outcomes specified for Curriculum 2005 are achieved, with a view to improving the system. Finally, teachers will be expected to use a range of formative and summative techniques throughout the year to track the progress of learners.

The format, content and logic of assessment instruments

The high levels of learning to which progressive curricula such as Curriculum 2005 aspire pose special challenges for assessment. From this perspective, the construction of assessment instruments must take account of at least four dimensions:

- ✍ Content. Any assessment instrument will target a specific set of content topics at a level of complexity appropriate to the learners. For example, performing arithmetic operations on single-digit numbers ($2 + 3$) is considerably less challenging than the same operation performed on five-digit numbers ($15032 + 9817$).

- ✍ Task. Most students, for example, find it easier to answer questions regarding the literal understanding of a written passage than to make inferences or give a critical analysis of the same passage. This category constitutes one of the most slippery concepts in the debate on curriculum and assessment and the difficulty is reflected by the absence of a common term for the concept. In the TIMSS study, it is called 'performance expectations', which describe the kinds of performance that students will be expected to demonstrate while engaged with the content. In mathematics, the TIMSS scheme recognised five main categories of performance expectations: knowing mathematical terms, using routine procedures, investigating and problem solving, mathematical reasoning, and communicating.
- ✍ Experience of the learner. The learner who has exhibited facility in the manipulation of four-digit numbers (thousands) is likely to cope with problems involving five-digit numbers (ten thousands) far more easily than one who has barely learnt to count.
- ✍ Context. We use the term 'context' to include the range of variables which characterise the background of learners, such as socioeconomic status, language and ethnicity. The kinds of standardised tests used in the past in South Africa have been criticised for cultural bias (Department of Education 1998f). For example, many test items locate their problems within the life experiences of middle class, white students, thus prejudicing the majority.

The kinds of knowledge, skills and attitudes called up by any assessment item is determined by a combination of these four dimensions. Thus, simple recall questions following a reading of Ndebele's fools may prove more complex to many students than, say, questions requiring inferential reasoning applied to a passage from Enid Blyton's Noddy's New Car, whatever the cultural background of the student. What this example illustrates is that knowledge and skills are never generic or hierarchical: they are always located within particular content, and it is the interaction between the content and task which determines the level of challenge to the student.

Working in four dimensions is a very difficult thing to do, and most assessment schemes simplify the task by attempting to hold one, or more usually two, of the variables constant. Our Ndebele/Blyton example above illustrates how content and task combine to pose questions of differing levels of complexity: these are the two dimensions most commonly taken into account in composing assessment instruments.

Culture is perhaps the most slippery dimension, and is most often ignored. The construction of tests which 'give a reasonable guarantee that no learners subjected to the assessment will be disadvantaged in any way' (Department of Education, 1998f: 23) constitutes a considerable challenge to all South African assessors of learning. Perhaps the best we will be able to achieve is to construct test items so as to include examples which incorporate the cultural experiences of a wide range of South Africans. In South Africa there is a high correlation between language and socioeconomic status, which cuts across racial lines. Thus, black middle-class children rapidly develop English language skills on a par with those of their white counterparts. We return to this issue in Chapter 9.

Learner experience is a second problematic dimension. Most public schooling systems assume a good correlation between the age of learners and their knowledge experiences. This enables standard assessments to be set at each grade level. The South African Department of Education, for example, states that, in the main, learners will progress with their age cohort (Department of Education 1998e). The British National Curriculum Assessment system described earlier deals with this issue in an interesting way which provides room for the assessment of different degrees of experience at the same age. It also makes allowance for the influence of context on achievement. The scheme is directed towards assessing the proportion of students in any age cohort who fall into each of the levels of difficulty, in each key stage, on each of the attainment targets. Key stage 1 (7 year olds), for example, concentrates on levels 1-3, and by the end of the stage a high proportion of pupils are expected

to reach level 2. In setting their own targets for the proportion of a given cohort who should attain a particular level, schools are given guidelines which enable them to take account of the degree of disadvantage of their student population (Qualifications and Curriculum Authority 1998)

The closest that Curriculum 2005 has come to grappling with these issues is in the Progress Maps currently under production in the Gauteng Institute for Curriculum Development (GDE and GICD 1999). Despite the emphasis placed on the expected levels of performance (ELPs) in national policy (Department of Education 1998e), the draft ELPs are coded in terms which are too general to give guidance to teachers on the complex interaction between content and task in assessing their learners. The Progress Maps, on the other hand, are intended to delineate the progress of learners as their conceptual understanding, knowledge and skills develop along a continuum, from lower orders to higher levels of achievement. The MLMMS for example has six levels, starting with incomplete understandings, lower level skills and rudimentary knowledge, and moving towards deeper understandings, more sophisticated skills and advanced knowledge. There is a map for each of the eight learning areas.

The map for the MLMMS learning area is essentially a two-dimensional scheme based on content and task. Mathematical content is divided into four strands (number, shape and space, measurement, and data). Strands may consist of a number of substrands. Content and task are combined in Level Descriptors for each of the six levels for each of the four strands. Each Level descriptor is elaborated on by a list of the kinds of evidence which indicate attainment of the level. For example, for the Number strand of the MLMMS Progress Map, the Level 1 Descriptor reads:

Learners can work concretely with small numbers to establish basic number concepts. They use appropriate language and simple symbols to communicate their ideas about numbers and to record their ideas informally (GDE and GICD 1999: 29).

This Progress Map represents a major advance in terms of specifying more clearly what it is that teachers and pupils should focus their attention on. The most striking feature is that the map is structured around conceptual knowledge, with everyday knowledge assuming a subsidiary profile. Thus, of the 11 items listed as possible evidence for the attainment of the Level 1 Descriptor quoted above, only one is explicitly about the everyday:

Understand contexts where number problems arise in their daily lives, pose simple number problems discover different ways to solve various types of problems and describe their problem-solving methods (GDE and GIDC 1,999, 29).

Nevertheless, the broad generalities used to describe both the Level Descriptors and the evidence by which they will be recognised is probably still too vague to be of optimal use to the kinds of teachers we describe in Chapter 6. Teachers who are as unsure of the conceptual fields in which they work as those observed by the PEI researchers, require guidance that spells out the appropriate content and task standards at a relatively high degree of specificity. From this perspective, perhaps the most useful part of the MLMMS Progress Map is the 103 page Supplement, which further elaborates the evidence statements and gives mathematical examples of most of these. However, these are likely to be even more useful to teachers if they provide benchmark standards at the end of each grade rather than dividing each phase (3 grades) into two levels, as they presently do.

The format in which any assessment instrument is cast has a critical relationship to the purpose, content and logic of the instrument. The progressive consensus described in Chapter 2 is concerned with the way in which standardised assessment tests have come to dominate teaching and learning, particularly in the US. According to Darling-Hammond (1997) the multiple-choice format of these instruments has much to do with this situation: because of the ease with which multiple-choice items are answered, scored and analysed, they dominate national assessment schemes as well as the

burgeoning publishing industry designed to assist students to prepare for the national tests. Consequently, teachers focus their classroom efforts on the kinds of knowledge and skills called up by these tests. Teaching to the test in this way would not necessarily constitute a problem if a broad range of learning outcomes were tested. The problem with multiple-choice items is that, by their nature, they assess a limited range of competencies: those requiring short answers which are generally based on low-level conceptual tasks. Extended reading and writing, and higher order tasks such as analysis, conjecture and problem-solving assume secondary importance, if any at all. Teachers will inevitably teach to the test: indeed, one of the purposes of national assessments and public examinations is to make explicit the required learning outcomes. It is very important, therefore, that these assessment schemes measure as broad a range of knowledge, skills and attitudes as possible, and that written tests be complemented by verbal and observational forms of assessment, wherever feasible. These injunctions are not easy to fulfil: the experience of the British National Curriculum Assessment warns against the dangers of too complex a system. TIMSS attempts to assess both lower and higher level knowledge and skills by:

- ✍ ensuring that the multiple-choice items cover a range of both content knowledge and student tasks.
- ✍ including a section of free response items, which involve more complex reading, reasoning and writing tasks.

Before moving on to a discussion of how the PEI researchers addressed the question of learning outcome assessment, we wish to mention one final important debate in the assessment terrain, the distinction between criterion- and norm-referenced tests.

Criterion-referenced items attempt to capture a particular competence, defined in terms of a specified standard. In contrast, a norm-referenced test is defined in terms of how a particular population responds to it, and its standard adjusted so that the scores of the population show a normal distribution (i.e.

their frequency distribution exhibits a bell-shaped curve, symmetrically spread on either side of a specified mean). These are theoretical constructs which, in relation to the kind of complex knowledge comprising the school curriculum, are inseparable in practice, no matter how closely any standard may be specified. Consider the following standard:

Students must be able to subtract 2 three-digit numbers.

The following three examples all encapsulate this standard, but are likely to elicit three very different levels of response from the same Grade 3 class, with success falling sharply between the first and third problems:

789- 123

784- 125

704- 125

If standards are difficult to set on such a simple task, how much more so in a more complex field like literature, where the interplay between content and task is almost infinite, as illustrated by our Ndebele/Enid Blyton example above. It is from this perspective that Kraak (1998) notes that all assessment involves a large subjective element, and criterion-referenced assessment is no exception. This is not to say that assessment schemes should not attempt to build greater commensurability of judgement by specifying performance indicators. However, the centrality of expert judgement cannot be avoided, and the success of school-level assessment depends on building the capacity of teachers to distinguish different levels of performance on complex tasks. The achievement of this goal, in turn, is dependent on a sound conceptual knowledge base on the part of teachers.

Furthermore, the variation within any regional or national population is generally very large, greatly complicating the problem of setting standards appropriate to the whole population. For example, even in a single large school in which the pupils are relatively homogenous with respect to home background, there is likely to be a wide range of scores on the above three subtraction problems. Inevitably, therefore, any test will commence with the standard it wishes to assess, across a range of tasks, in a particular content

area. A greater or lesser degree of norming is then likely to follow, depending on the purpose of the test. For example, a national assessment aimed at establishing whether a basic level of numeracy has been achieved by the South African Grade 3 population will tend to keep norming to a minimum. The more complex the knowledge being assessed, the greater the degree of norming is likely to be, to ensure that the test provides an adequate map of the terrain being assessed (validity), and that all members of the target population are on the map (standardisation). Norming is the dual process of adjusting the map. Consultation with subject experts, and piloting the test with a sample of the target population are the two most important norming tools.

The PEI research

Written tests

Eleven of the PEI projects used written tests to assess the state of pupil learning. Most adapted existing tests rather than formulating their own instrument from scratch. Only two projects - St Barnabas/Khulisa and Webb et al. - constructed tests specifically for the PEI study. Two others - Duncan and Wright - used tests they had themselves developed and standardised prior to the PEI.

In their Focus on Four project, Reeves and Long selected items from the appropriate TIMSS test to match the mathematics topics which the teachers intended teaching during the research period. The test contained both multiple choice and extended response items. The test results were almost off the map: responses of the Grade 4 pupils participating in the study, on both the pre- and post-tests, were too low to serve any practical purpose. Because South African pupils are so far behind many of their counterparts in other countries their achievements barely register on the TIMSS scale. Here is a classic example of the kinds of problems which arise when a test is not adequately normed for the population in question.

This experience led Long to undertake a follow-up PEI study aimed at devising a test which would provide a better map of the status of mathematics learning of South African Grade 4 pupils. The first difficulty she encountered was the fact that, since the Curriculum 2005 documents are not specific enough with respect to the mathematics knowledge intended for Grade 4 pupils, she had to draw up a curriculum framework within which to locate her assessment instrument. Starting with the very broad outcomes of Curriculum 2005, she filled in the detail by drawing on the TIMSS framework, and a number of other initiatives in the US, Australia, Britain and Holland. Her test took one topic area - whole numbers - and devised a range of graded items intended to assess pupil performance across a number of tasks. At the time of writing this work was still in progress. The next step is to pilot the test in a representative sample of schools in the Western Cape.

Maja also used TIMSS as a basis for his investigation into the mathematical knowledge of Grade 8 students. TIMSS multiple choice and extended response items were supplemented by standardised HSRC multiple choice questions. As we pointed out in Chapter 6, although Maja chose 20 of the best performing schools in the Northern and Mpumalanga Provinces, average scores were low (33.27%). The entire range of schools was assessed (former Model C, private, township and rural), with school means ranging from 68.7% to 15.07%. Also discussed in Chapter 6 was the fact that both Maja, and Reeves and Long found that students scored far better on multiple choice questions than on the free response items, and on simpler tasks - such as routine procedures - than on more complex problem-solving tasks.

The Khulisa/St Barnabas project set out to devise a set of diagnostic tests to assess the literacy and numeracy outcomes of Curriculum 2005 at Grade 7 level. Test items were formulated so as to assess the knowledge and tasks specified in the C2005 Specific Outcomes and the SAGA Critical Outcomes. The tests were piloted in four 'high performing' schools in the Northern Province. Mean scores were high, leading the researchers to conclude that the standard of the tests was too low. A fundamental problem with this project is that the researchers did not derive a sample which is representative of the South African school population, or some subset thereof. We therefore have no

reference point for the results: is the fact that the mean scores were high due to the four schools being located towards the top end of the South African spectrum, or because the items are not challenging enough for Grade 7 students? A complicating factor in this project is the fact that the Curriculum 2005 and SAGA outcomes are so broad that they provide for a very wide degree of latitude in setting standards for any assessment instrument. Duncan's project illustrates some of the complexities involved in constructing tests to assess high-level competencies. Having reviewed the range of instruments available, he could find no suitable test for measuring communicative English second language (ESL) reading proficiency at the Foundation Phase level. One of the tests rejected by Duncan is the instrument developed by Elly, on behalf of READ, to test the effectiveness of a READ reading programme in Grades 2 and 3 classes (See Chapter 7). Duncan argues that their 'content-validity is problematic in that they consist entirely of items which the testee must match: one of four simple words to a given picture or one of four pictures to a given word: The words are all common nouns or verbs which are usually monosyllabic and phonetically regular. For Duncan the reading skills required by such items fall far short of curriculum requirements for the Foundation Phase. Working from the premise that reading is a holistic process, Duncan's test presents pupils with a range of tasks involving the simultaneous and variable use of differing and overlapping skills. The tasks included:

- ✍ pairing words with minimal difference. matching sentences with minimal differences.
- ✍ matching words and pictures.
- ✍ comparing and contrasting sentences and pictures.
- ✍ organising jumbled sentences and paragraphs in the correct order. matching words and defining phrases.
- ✍ completing unfinished sentences with defining phrases or clauses.

Duncan posits the validity of the test on three grounds. The construct and content validity of items used were judged satisfactory by acknowledged experts in the field of ESL reading pedagogy. The face and washback validity

were established by the fact that educators frequently requested permission to use the tests as teaching exercises, and a comparison of learners' discourse and performance on the tests provided evidence of concurrent validity. The reliability was also established through a random grouping of learners and the resulting closeness in the mean scores of the groups. Most of the test items had been used in a large research project involving some 6 000 pupils.

In Chapter 4 we argued that pencil and paper tests are relatively independent measures of student performance, and hence give data on what students know and are able to do which is relatively more valid and reliable than information from other sources. This is not because written tests do not involve a subjective element, but because their interpretative elements are subjected to two forms of control. Firstly, standardised tests represent a consensus: they are a distillation of a range of expert judgements. Secondly, piloting the tests against the target population is a measure of the extent to which they fulfil the predictions of the experts, allowing for adjustments to provide for a better fit. However, written tests are not appropriate for assessing many competencies, and other measures are required to produce a fuller picture of student progress, particularly at the classroom level.

Other forms of assessment

Teachers observe and probe the performance of their students on a continuous basis, both in and out of the classroom. They pose questions to individuals, assess the quality of student questions, observe learners interacting with each other, and set practical, written and verbal assignments. All these forms of assessment require the teacher to make hundreds of snap judgements in every lesson. Furthermore, the continuous assessment envisaged by Curriculum 2005 does not mean merely assessing continuously, but using the results to diagnose the strengths and weaknesses of individual students, and of the teacher's own classroom practices. This process requires yet a further level of expert judgement on the part of teachers.

What renders all these judgements less reliable and less amenable to comparison, across different teachers, with the same teacher across different classes, and over time, is that they are made on the spur of the moment and, by their nature, cannot be subjected to anywhere near the same kind of controls as those applied to written tests. They are entirely dependent on the judgement of individual teachers, generally without any form of comparison or review. And, as we have argued above, the greater the complexity of the task, the more difficult the judgement and the greater the degree of unreliability. Obviously, there will be a correlation between the reliability of these assessment procedures and the quality of the knowledge base and the experience of the teachers in exercising these judgements.

In Chapter 4 we outlined at length the schemes which PEI researchers developed for observing classroom interactions. Of particular interest in that discussion was how our researchers constructed their instruments so as to:

- ✍ probe the depth of the knowledge transactions occurring in the classes they observed.
- ✍ ensure the comparability of observations from one class to the next.

In Chapter 6 we described the results of the PEI classroom observations, as well as both the processes and products of other forms of assessment employed by our researchers, such as teacher and student questions, other forms of interaction between learners, and the analysis of student workbooks.

Priorities for South Africa National assessment

Instituting the systemic assessments at Grades 3, 6 and 9 as envisaged by the Department of Education's Assessment Policy, must constitute one of the most urgent priorities for South African education. In terms of learning outcomes, there is at present only one quality assurance mechanism in place in

the entire system - the matriculation examination at the end of Grade 12. In the absence of benchmarks at regular intervals, schools and teachers are left with no measures of accountability and no standards to aim for. Given the gross inefficiency of the system, it is imperative that the status of pupil learning be established at all levels, but particularly at the Foundation Phase where there are signs that literacy and numeracy are not being adequately taught. It may be wise to commence with simple tests - later to be followed by measures of more complex competencies once a fundamental benchmark has been established.

Public examinations

he matriculation examination can be relied on to generate a heated debate every year, characterised by starkly polarised positions and generally low levels of analysis. On the one hand, there are those who call for the scrapping of matriculation on the grounds that it merely acts as a selection mechanism (Chisholm 1999), or that it encourages rote learning (Jansen 1999) and does not promote authentic forms of assessment (Potterton 1999) or 'critically-thinking, socially conscious learners' (Pope 1999) On the other hand, there are those who celebrate the fact that increasing numbers of students are now beginning to pass matriculation (Zille 1999) because it provides the only national benchmark against which to measure the performance of the system as a whole and that of individual schools (Vinjevold 1999).

The first camp misses the point on the issue of selection. Matriculation, like all public examinations, is a selection mechanism for both the job market and higher education. While the universities may be looking for ways of improving this function, and while a few businesses may require job applicants to write aptitude tests, all accept matriculation exemption at B or C grade or higher (depending on the institution and faculty) as a good indicator of success at the tertiary level and in the workplace. (Mitchell et al 1997).

On the issue of whether matriculation assesses only low order skills and hence promotes rote learning, the two camps talk past each other, asserting their

respective positions without any supporting evidence. The report of the recent Ministerial Committee on the Senior Certificate Examination (Ministerial Committee 1998) does not throw much additional light on the issue, except indirectly. Thus, the Committee reports that:

...there is evidence that a large proportion of our schools do not give students enough practice in reading - that is to say, in developing critical, selective, analytical and interpretive reading skills - and writing - in developing critical, creative, interpretive, reflective, analytical and transactional writing skills. This lack of opportunity for practice appears to be particularly prevalent in the African Languages. As a result, questions involving these skills (in all subjects) often account for a large proportion of Senior Certificate failures (Ministerial Committee 1998.12).

The implication is that, except for African Languages which are singled out as special case, the matriculation exam does test higher order knowledge and skills. The reader is thus left wondering about the nature and extent of the evidence used by the Committee to conclude that a number of institutions are introducing additional access tests and entrance examinations.

This is not to deny that the matriculation exam would not benefit from reform, but that reform should proceed from a much sounder information base than the mix of anecdotes, polemic, and sweeping generalisations, often by vested interests, which characterises the current debate. A two-step process is required to improve the system. Firstly, an analysis of present practices, including a thorough examination of the kinds of tasks and content levels demanded by papers in the different matriculation subjects, will provide the basis for an informed debate. Secondly, a more desirable mix of content and skills must be established through an analysis of other national systems and a debate between the interested parties, principally employers, professional bodies, and higher education institutions. In this regard we would do well to heed the British experience which warns against instituting sophisticated non-written forms of assessment at the national level: at best, these are only possible at the classroom level, and then only in the hands of teachers with a very firm grasp of their subject and high levels of assessment knowledge.

The anti-matriculation lobby is on firmer ground when it wonders why all students need a matriculation in order to obtain any kind of qualification from the schooling system. The extent to which the planned General Education and Training Certificate will alleviate this problem will depend on the credibility it generates amongst employers, the wider education and training system and, most importantly, students and their parents. In the meantime, any reform of the matriculation examination will occur within the broader debate around the diversification of the Further Education and Training (FET) band. The Ministerial Committee recommends that a number of sectoral learning programmes and qualifications be piloted, through collaboration between the Department of Education, SAGA and the relevant Sectoral Education and Training Authorities (SETAs) by the year 2000. While this time frame may be somewhat optimistic, the development of new programmes at this level will be an important but difficult task, and piloting will be essential for ensuring that they are relevant, deliverable and, above all, credible.

Classroom level assessment

he PEI studies indicate that the assessment skills of many teachers are rudimentary - to say the least. Thus, the teacher questions observed by our researchers never move beyond simple recall; pupils are seldom encouraged to ask questions themselves; peer interactions which focus on conceptual knowledge are rare; individual reading is almost nonexistent, and written work is sparse and hardly ever goes beyond single words. Our research results indicate that the more sophisticated forms of assessment advocated in the new curriculum are well beyond the reach of the majority of South African teachers at this stage. Clearly, teachers need explicit guidelines and assistance in assessing even the most basic levels of competence.

Two strategies present themselves for developing teacher capacity in the field of assessment. We argued in Chapter 6 that, in the short term, assistance to teachers in the field of assessment should begin with the development of sets of graded items which model the kinds of knowledge, skills and attitudes

demanding by Curriculum 2005. In the long term, improving the knowledge resources of teachers is a prerequisite to exercising the complex judgements involved in assessing all forms of learner achievement.

Conclusion

The PEI research studies indicate that student achievements are far below what should be expected at all levels of schooling. Thus, the most urgent priority facing South African education is to establish present levels of student achievement. This is necessary for three reasons, namely:

- ✍ to identify priorities for reform.
- ✍ to ascertain the conditions into which reforms are launched.
- ✍ to establish benchmarks against which the progress of reforms can be measured.

The systemic assessments at Grades 3, 6 and 9 envisaged by the Department of Education should therefore be instituted as a matter of urgency.

In the sphere of public examinations, reform and elaboration of the present matriculation examination, and the establishment of relevant and credible qualifications at the Further Education and Training level must be based on thorough research, piloting and evaluation.

At the classroom level a great deal of development and support is required to build teacher capacity to undertake the assessment of even the most basic learning achievements. It has been a consistent theme of the present report that improving the quality of all aspects of teaching and learning ultimately depends on building the knowledge base of teachers required to make informed professional judgements. This process should begin with a new approach to both initial and inservice 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 resources to undertake learner- and,

more specifically, learning-centred classroom practices. Without a secure knowledge base to build on, free-standing inservice courses on assessment are unlikely to have any purchase on classroom change.

Chapter 9

Language Issues in South African classrooms

Penny Vinjevold

Introduction

Classroom-based research commissioned for the PEI suggests that few schools are implementing the Department of Education's language-in-education policy. Although the reasons for this are complex, perhaps the most important reason is that although the Department provides guidelines for language policy, the development and implementation of this policy has been devolved to school level. In this situation, the existing practices and realities of schools and classrooms tend to militate against the implementation of the policy advocated by government. This chapter explores the tensions in education policies which have caused many schools not to implement the government's language-in-education policy. It also describes some of the factors which impact on language policies and practices in schools.

The chapter begins with a brief history of language-in-education policies in South Africa. These policies have had an important impact on South African schooling. The second section of the chapter describes PEI research findings on school and classroom language policies and practices. The differences between former House of Assembly, House of Delegates, House of Representatives and Department of Education and Training schools will be

explored. The third section of the chapter will describe problems faced by teachers in applying the new language policy and in teaching in multilingual classes. The section will also examine the ways in which schools and teachers are attempting to deal with the changes in the language profile of their pupils.

History of language-in-education policies

It is widely argued that language-in-education policies, like all education policies, are framed and driven by political ideologies and economic interests rather than education theory and practice. While this view largely explains the history of language-in-education policy in South Africa, it obscures the influence of educators, pupils and parents on the construction and implementation of language policies. From the mid-nineteenth century to present post-apartheid South Africa, resistance to government language policies has taken many forms - boycotts and riots, memoranda and deputations, and the quiet disregard of official policy.

As is the case with much of South Africa's social and education history, different policies have applied to different race groups. The language policy in previously white, Coloured and Indian schools has remained fairly constant since Union in 1910 when English and Dutch (later Afrikaans) were declared the official languages of the Union of South Africa. The medium of instruction in schools was either English or Afrikaans, and the other language was taught as a compulsory subject. After the Second World War, political leaders such as Smuts hoped to foster unity and South African nationalism through dual medium of instruction in white schools. However, the National Party, which came to power in 1948, favoured exclusive Afrikaans mother tongue instruction and separate schools for English- and Afrikaans-speakers. This policy of separate English and Afrikaans schools has remained in place to the present, with the majority of schools adopting one or other of the languages as a medium of instruction, and teaching the other as a subject. A minority of former House of Assembly schools have introduced an African language as a subject but this has not become a widespread phenomenon in post-apartheid South Africa.

The language policy for Indian and Coloured schools after Union was very much the same as for white schools. Schools for Indian pupils generally used English as the medium of instruction and taught Afrikaans as a subject. Some Indian children learnt their home languages and/or religion in lessons organised after school by parents and community leaders. In the 1980s some schools began to offer vernacular Indian languages as part of the school curriculum. Coloured schools have, since 1910, used either English or Afrikaans as medium of instruction although there were, and are, a number of schools that offer both English and Afrikaans streams.

At the time of Union English was the dominant language in the limited number of African schools that existed. The early British missionaries used English as the medium of instruction and this approach was supported by the British colonial government policy of making education grants only to English-medium schools. Although English had become firmly entrenched in African schools by the time of Union, a growing number of missionaries and teachers began to lobby for the introduction of African languages as subject and medium of instruction.

From 1885 Zulu was introduced into African schools in Natal, and in the Cape an African language became compulsory in 1922. The other two provinces followed suit shortly thereafter so that by 1935, when the Welsh Commission began its investigation, vernacular language was a compulsory subject in all primary schools and teacher training colleges. The medium of instruction in all four provinces was, by this time, also the pupils' mother tongue. The duration of mother tongue instruction varied from province to province. In Natal it was to be used for the first six years of school, in the Cape and Free State for the first four years, and in the Transvaal the first two years. After these initial years of schooling, one of the official languages was to be used as medium of instruction. The vast majority of schools opted for English.

After the National Party came to power, African schools were removed from provincial administrations and placed under the jurisdiction of the Department of Bantu Education. The Bantu Education Act of 1953 changed the language policy

of these schools. The main concerns of the new policy were to extend the use of the mother tongue and Afrikaans. Mother tongue instruction was extended year by year from Std 3 to Std 6. This ensured that, by 1959, all eight years of primary education were conducted in the mother tongue. Afrikaans and English became compulsory subjects from the first grade. As well as being compulsory subjects at secondary schools, English and Afrikaans were both to be used as the media of instruction from the first year of high school. This 50-50 medium policy for secondary schools was particularly disastrous for the Cape and Natal. Afrikaans had not been taught at all in Natal up to this time and had been an optional subject in the Cape. In order to implement this new policy all teachers in African schools were given five years to become competent in Afrikaans and to this end intensive language courses were offered.

According to Hartshorne (1992), the medium of instruction issue was at the centre of opposition to the system of Bantu Education. 'Black opinion never became reconciled to the extension of mother tongue medium beyond Std 2, nor to the dual medium policy in the secondary schools'(Hartshorne 1992: 198). Although the Soweto uprising of 1976 is the best known manifestation of the resistance to the language policies which were introduced by the Nationalist government in 1953, it is worth noting that the language policy sparked immediate opposition. In the Cape many black teachers 'resigned or were dismissed because they would not implement the new language policy'. In the Eastern Cape and on the Witwatersrand parents boycotted Bantu Education schools and attempted to set up schools in which English was the medium of instruction. School boards and the African Teachers' Association of South Africa (ATASA) drafted petitions and organised deputations against the language policy on education grounds. The Department remained inflexible in the face of this resistance - especially with regard to primary school mother tongue instruction. At the secondary school level there was greater flexibility as the Department authorised 'numerous exceptions to the dual medium, policy especially in the secondary schools at the Std 9-10 level' (Hartshorne, 1992: 199).

Ironically the government's rigid and unpopular language policy for African schools began to be undermined by its own policy of separate development.

From the 1960s the homelands and self-governing territories opted for mother tongue instruction in the first four years of schooling only and English thereafter. By 1974 all the homelands, with the exception of Qwagwa, had decided on the use of one official language medium, generally from Std 3 on, and stipulated that this language should be English.

These changes to the language-in-education policy of the Bantu Education Act created a divide in policy between African schools in the homelands and those under the Department of Bantu Education. In March 1971 the Bantu Education Advisory Board began an investigation into the medium of instruction in African schools. The findings of the investigation strongly rejected the 50-50 medium of instruction policy as contrary to good education principles, and recommended mother tongue instruction up to Std 4 and then either English or Afrikaans. In 1972 the Secretary of the Department proposed three alternative medium of instruction options for secondary schools: the existing 50-50 approach or English only or Afrikaans only. In the homelands the decision on the alternatives was to be taken by the homeland governments but in the Department of Bantu Education schools, the decision was to be taken by the Secretary on the recommendation of the school boards, and the circuit and regional officials. There was considerable division in the responses of regional directors and finally the Secretary decided to retain the dual medium requirement. Hartshorne provides this explanation for the Secretary's fateful decision to retain this unpopular policy. 'Faced with this general tendency on the part of his officials to cling to the status quo, and under pressure from the Ministry to protect the position of Afrikaans, in the event the Secretary of the Department decided to withdraw the options as far as his department was concerned and to return to the dual medium policy (Hartshorne, 1992: 201). This decision came at the same time as the government's decision to bring the number of years of schooling for Africans into line with other race groups. This meant that primary schooling was reduced from eight years to seven years and the school-leaving certificate was written in Std 5 and not Std 6. This examination was to be written in English or Afrikaans after pupils had received only one year of instruction in these languages. Despite widespread

opposition to this policy, the government countenanced no flexibility in the 5050 dual medium approach.

It is not surprising then that in 1976 resistance to the language policy came from the junior secondary and senior primary schools. This resistance resulted in violent confrontations between pupils and the police, first in Soweto and then in other parts of the country. By July of 1976 the minister had reluctantly agreed to change the dual medium policy to a single medium of instruction to be decided by the school. Although this only became official policy in 1979, the overwhelming majority of African secondary schools adopted English as medium of instruction from mid-1976.

The Education and Training Act of 1979 stated that the medium of instruction should be mother tongue at primary school but that the wishes of parents should be considered after Grade 4. The mother tongue requirement in the primary schools was opposed by many African parents and the Be Lange Commission included the language of instruction issue in its investigation into education provision. Although the Commission proposed three options as acceptable alternatives, including English instruction from the first grade, the implementation of these recommendations was delayed until 1990 when the department accepted an amendment to Act 90 of 1979. This amendment gave parents the right to choose the medium of instruction at each school. The options open to parents at BET schools were:

- ✍ to go straight for the long-term medium.
- ✍ a sudden transfer from the mother tongue to a second language medium.
- ✍ a graduated transfer from the mother tongue to a second language medium (NEPI 1992b).

There has been no systematic survey of the options chosen by parent bodies in the early 1990s but anecdotal evidence suggests that many schools adopted English as the language of learning from Grade 1.

Present language-in-education policy

Widespread consultation and debate has accompanied language policy development in South Africa in the last decade. The debates were informed, and confused, by international studies on education policy in bilingual and multilingual countries, by Pan Africanist views of language policy emerging from African countries, and by the limited amount of South African research undertaken in schools. The debates were invigorated by the promise of a democratic government and the 1990s saw a plethora of policy documents on language and language in education.

The policy documents, have, in line with the progressive consensus described in Chapters 2 and 5, promoted the concepts of multilingualism and the need to develop and respect all South Africa's languages. With respect to schools, the policy documents have promoted multilingualism (pupils should learn two and preferably three languages) and the use of learners' primary languages as languages of teaching and learning. The previous section of this chapter showed that there was, for many years, a policy of learning through the primary language in the first years of schooling and then tuition through one of the official languages. The policy documents of the 1990s regard this as a deficit model of language education. In opposition to this model the new government's policy documents advocate additive bilingual models as a 'central feature of education policy'. Such models

recognise learners' home languages as powerful tools of cognitive development. These languages, in fully bilingual systems are maintained as languages of learning at all levels of the education system. Further languages are added at no loss to the home language(s). Two or more languages are perceived and used as languages of learning throughout the learner's career (Department of Education 1995.13).

The language policies outlined in the documents of the 1990s have to a large extent been adopted in education legislation. The White Paper on Education and Training of 1995 and the DOE Language in Education Policy of 1997 support the Constitutional principle of 'creating conditions for the development and for the promotion of the equal use of all official South African languages'. The White Paper further asserts that 'language in education policy must accommodate the right to be instructed in a language chosen by the learner, where this is reasonably practicable'. However, the White Paper and subsequent legislation places no obligation on schools to offer particular languages but encourages schools which are 'willing and able to offer more than one language medium in order to accommodate parental or learners' preferences'. The decision on languages of learning and languages offered as subjects has been left to the School Governing Body (Department of Education 1996). The act stipulates that school governing bodies are required to 'announce the school's language policy, and to state how it will promote multilingualism through a variety of measures'.

The DOE sees the monitoring of the implementation of its language-in-education policy as a 'constitutional obligation' and has proposed an implementation plan to 'monitor the implementation of policy by the provinces' (Department of Education 1998g). This plan includes obtaining relevant information from provincial officials and schools, appointing provincial language managers, promoting inter-provincial cooperation with these managers, initiating collaboration with the Pan South African Language Board, the redress and development of previously marginalised indigenous languages and establishing national committees for each of the official languages.

A number of PEI researchers, writing at the time of the development of the above plan, recommend that government supports its language policy with a definite implementation strategy. Without such a strategy, they argue, past practices will continue and the vision of a multilingual society in which all languages are accorded equal status will fade. For Murray, unless government's policy of 'encouragement' of multilingualism is 'given some concrete form by the state in terms of inducements and sanctions, and a

process is put in place to educate schools and their governing bodies about this issue, it seems likely the status quo will be maintained'(4). PRAESA puts the responsibility for an implementation strategy at the door of the provincial education departments. 'It is safe to assume however, that in the absence of a concerted implementation strategy on the part of the provincial education authorities together with NGOs, to empower governing bodies, the latter will go the way of least resistance and delay taking difficult decisions on the language of teaching and learning and teacher appointments'(10).

Current language-in-education practices

School language policies

One of the requirements of the South African Schools Act is that governing bodies develop formal language policies that describe the strategies that will be employed to promote multilingualism. The PEI researchers found that, in general, schools have not developed language policies in these terms. The PRAESA study, for example, found that none of the ten Western Cape schools in their study 'had consciously aligned their language plans, policies and practices with the Language in Education Policy (LiEP), which by that stage had been made public for more than a year'(32).

Brown's (1998) study of schools in KwaZulu Natal (not a PEI study) found that schools had made recent ad hoc decisions on language policy, but that none of these decisions constituted a formal school level language policy as stipulated in the new legislation.

Pile and Smythe's study in Free State schools indicates that in seven of the eight schools in their study, there was no language policy in line with government requirements but that parents had voted on the language of learning, usually by a show of hands at a specially convened meeting. Four schools voted for English as medium of instruction from Grade 1 and the other

three for Sotho in the Foundation Phase and then English. In the eighth school the principal reported that he had received a directive from the education department saying the junior phase should be taught in Sotho and the senior phase in English.

In the six schools in Setati's study, there are policies but none of these have taken the national language policy into account. In three cases the policies 'have just evolved'. In other words no official decision was taken or recorded but the practice of English as the language of learning has become the accepted norm. In one school the school management team decided on the language policy and informed the teachers who accepted this decision; in another school all the teachers were involved in negotiating the school language policy. In only one school was the language policy negotiated with the governing body or parents as required by the Schools Act. However, these negotiations were not underpinned by the national language policy 'but what the teachers and parents perceive to be in the interests of the learners and the school, hence their choice of English as language of learning'(92).

In her work on language in education, Murray found that many schools have not changed their language policies even when there is a change in the language profile of pupils. For example, two high schools in her PEI study do not offer an African language despite the fact that more than 50% of pupils are African. In fact one governing body banned the use of African languages in classrooms because teachers found that this led to discipline problems. In other schools African languages are introduced as subjects but not as media of instruction. A primary school in Murray's study, which changed from an entirely Indian pupil population to a school with a large proportion of African pupils, introduced Zulu as a third language but not as a language of teaching and learning. Brown's study of schools in three heterogeneous language areas of KwaZulu Natal found much the same in former Model C schools which had a large and increasing number of African pupils. In fact some schools reported trying to introduce isiZulu from as early as 1994 but 'as a result of resistance from African parents, it was dropped' (Brown 1998: 15).

The above indicates that although schools have not developed new language policies in line with the requirements of the South African Schools Act, they have de facto policies. The PRAESA report claims that school language policies have evolved from realities on the ground such as staff language proficiency and parental preference for high status languages. This view is supported by other PEI studies. Sigabi, for example, found evidence of staff language proficiency determining language policy in a school situated in a peri-urban area. Children from at least five language groups - Zulu, Setswana, Tsonga, North Sotho, Ndebele and South Sotho - were accommodated in a particular grade. These learners were divided into two main language groups , Zulu and Tswana - because the teaching staff 'do not command the other languages'(67).

Staff language proficiency also determines the language policy at former white, Indian and Coloured schools. Very few of these schools offer instruction in an African language. The PRAESA report encapsulates the situation: 'this inflow of learners was not accompanied by a redeployment of appropriately qualified Xhosa-speaking teachers, especially to those schools where Xhosa-speaking learners became the majority or a sizeable minority of the school population(3). Teachers feel guilty or angry about their inability to communicate with learners in their primary language but know that public admission of this threatens their positions.

The de facto policies and practices of schools are also influenced by perceptions of the value of English as a language of socio-economic power and mobility. Many PEI reports indicate that schools are increasingly offering English at lower levels. PRAESA visits to township primary schools in the Western Cape confirm a widely reported drift towards the use of English - the 'earlier the better'. Setati's study found that all six primary schools in her study in Gauteng have adopted English as the language of learning throughout the school. Sigabi's study of Grade 1 classes in the same province found that teachers used one of the African languages as the language of learning and teaching, but English was extensively used and encouraged.

Classroom practices

The PEI researchers note two main features of classroom language practices: the decrease in mother tongue or primary language instruction in the junior classes and consequent increase in English language instruction, and the mismatch between the languages spoken by pupils and teachers. In some cases the PEI researchers treat this as one and the same problem and use the mismatch to point out the problems of not using the primary language in the early years of schooling. The PEI research suggests these are two connected but distinct problems that should be examined separately.

Mother tongue instruction

South African policy makers and researchers unequivocally support mother tongue instruction for the early years. PRAESA, for example, claims that in local and international literature on bilingual and multilingual schooling there is substantial agreement on the following:

- the overriding value of the educational use of the primary or home language.
- the pernicious effects of a too-early abandoning of the home language as a language of learning and teaching in favour of a language of higher status.
- the cognitive, linguistic and affective and social benefits of bilingual education especially through the additive bilingual model. According to Rodseth (1995), it is not only European and American research which supports mother tongue instruction. He quotes the following African examples in support of early learning in the mother tongue:
 - ✍ an experiment in south Nigeria continued mother tongue instruction until secondary school and better results were produced in these schools than with early-exit bilingualism.

- ✍ studies in Zambia have shown that too early an emphasis on learning through English impairs children's subsequent learning.
- ✍ Poth's survey of African countries shows 'no success on the entire continent for the submersion programmes' (NEPI 1992b).

Although the PEI researchers found that many children in all types of schools are not taught in their mother tongue in the first years of schooling, none systematically investigated the impact of this on pupil learning. According to the PRAESA report, 'Indications are that the increasing use of English as the language of learning and teaching (LDLT) in the Foundation Phase at the expense of learners' primary languages negatively affects teaching and learning in many township schools'(3). This is not, however, derived from systematic observations or pupil assessment. In contrast, Duncan's examination of reading levels in six schools on the East Rand found that the schools, which introduced pupils to literacy in English, outperformed pupils which adopted mother tongue literacy instruction. There were too many variables which might have influenced these results to make claims about the medium of instruction.

The PEI researchers suggest that further research is required to resolve the debate. Makoni for example writes that 'what is required is a systematic experimental study into the whole debate' (e-mail, February 1999). Heugh of PRAESA agrees. 'The new language in education policy cannot be implemented with any measure of success until it is accepted that experiments in a few carefully selected and designed additive bilingual models are trialed under domestic conditions alongside a longitudinal research project which monitors these as well as other models typically already in place' (e-mail, February 1999).

Research of this kind will certainly inform language-in-education policy, but future researchers and policy makers need to take account of the decrease in primary language instruction in the first years of schooling. There appear to be three main reasons for this.

The rapidly and constantly shifting demography of learners

The scrapping of apartheid legislation saw the rapid diversification of formerly linguistically homogenous schools. The movement of African pupils to previously white, Coloured and Indian schools is widely reported. According to PRAESA, 'One of the most dramatic but unplanned consequences of the political changes that took place after the general elections in 1994 as far as the education sector was concerned was the sudden inflow of African-language speakers into schools that had previously been open only to people Classified white or Coloured in the Western Cape'(3). In addition to the movement of African pupils, there has also been a steady flow of Coloured and Indian pupils to schools from which they were previously excluded. It is difficult to quantify this movement as data according to race is not available for all provinces. The Gauteng Department of Education, for example, reports that 25% of learners in former white schools are African. In the other provinces it is safe to assume that the bigger cosmopolitan centres are the most affected by the changing race and language profile of their pupils. PRAESA's study of six former House of Representatives and House of Assembly schools in the Cape Town area found that the Xhosa-speaking learners were the majority or a sizeable minority. The Sunday Times Top Schools Survey of 1997 and 1998 found that in many former House of Assembly schools in cities and towns from Pietersburg to Pietermaritzburg, 30 to 80% of the pupils are African. The Khulisa PEI report indicates the extent of the language diversity. In a school in Johannesburg which formed part of their study the first languages of pupils were reported to be Sesotho, Setswana, Venda, Xhosa, Pedi, Zulu, Afrikaans and English.

It is not only Coloured, Indian and white schools which have experienced change in the language profile of their pupils. Urban, and even peri-urban, African schools are also experiencing changes in language profile. This is especially true of schools in the townships and squatter camps near big towns and cities. Sigabi's study of six Grade 1 classrooms in schools to the north and south of Johannesburg, and Pile and Smythe's study of

schools in the Free State, found that in all these classrooms pupils spoke a wide range of languages. The PEI researchers also found that pupils are travelling long distances (with or without their families) to seek employment and education opportunities. In the Western Cape, the Director General of Education has consistently argued that 25% of the pupils in Western Cape schools have migrated from the Eastern Cape. Hoadleys' study of four schools in Khayelitsha confirms widespread migration of pupils. Brown concludes from the changing demographics that 'a significant proportion of South Africa's learners will face a situation where their home language is not on offer the schools they attended' (Brown 1998:9).

Many learners do not have an obvious primary language

Since 1984 when Pirie published his article 'Ethno-linguistic zoning in South African black townships', researchers and teachers have commented on the fact that many learners do not have a single primary language or mother tongue. Children, born through inter-marriage, are fluent in a number of languages, and according to Brown, have no 'specific desire to consolidate an identity in any one linguistic group'(Brown 1998). Makoni argues these children cannot be said to be multi-lingual in the sense that they speak three, four or five different languages. He claims that this view of multi-lingualism, and that used in policy documents in South Africa, is constructed through 'monolingual lenses' and so 'constructed as a series of discrete boxes' or as 'plural monolingualism'. It is this 'singular' approach to multi-lingualism which makes it 'relatively easy for researchers to ask unanswerable questions to Africans such as 'How many languages do you speak?'. Such a question is 'based on the assumption that the singularity which operates in some reified languages also operates in different communities' (e-mail communication, 1999) The reality according to Makoni, is that the language spoken by these children is an amalgam of Southern African languages with regional and community variations. This situation, which requires children to learn through the medium of a single, defined African language, means that they will not be learning through their primary language.

Many parents want English language instruction from as early as possible

Earlier in this chapter we saw how parents have, over the years, opposed mother tongue instruction. Since the 1950s this was because of its association with apartheid. Mother tongue policy was 'seen as a strategy by the government to prevent African upward mobility and thereby to ensure a perpetual reservoir of cheap labour' (NEPI 1992b:29). But it was also because of the low status of African languages and the obvious social and economic benefits of being fluent in English. Brown, Makoni, PRAESA and Murray report the drift to former white, Indian and Coloured schools as a desire for English language instruction which parents see as a means to social and economic advancement. The NLP's PEI research report indicates that, for these parents, English is not seen as a language but as a resource. Delaying acquisition of the resource is incomprehensible to parents.

This is also the reason that teachers in former DET and homeland schools are using English at earlier and earlier stages. Setati's study suggests that township schools are interpreting the exodus of pupils to former Model C schools as parents' desire for teaching in English. This is a teacher's explanation of the school's decision to adopt English as the language of learning in the school:

Ah most children they go to these schools, amamultiracial because you know they think they are doing everything in English. But then here in our school, then we are doing it in Zulu and it means we are killing these children. So we decided to meet and change. Actually to apply it practically in the class, not to just say we are doing English we are teaching in English yet in class we are using Zulu. So we tried to emphasis to speaking English more in the class (52),

Setati's study also suggests that it is not only parents but teachers who perceive English as a language of power and socio-economic advancement in South Africa. Therefore, in their view, using English as the language of learning is in the interests of their learners. The six

Grade 4 teachers in her study had a number of different reasons for regarding English as important. One teacher referred to English as an international language, another as the language of assessment, a third as a language of empowerment, and the fourth described English as a universal language. The fifth and sixth teachers saw English being important for learners' progress in education, and for communication with people from other cultures.

The above three sections have shown that the demise of apartheid and the accompanying elimination of the restrictions on mobility, has led to linguistically complex classes and schools. In addition, because of the perceived benefits of English language proficiency, parents and teachers are opting for English language instruction. In these circumstances the ideal of mother tongue instruction appears to be receding and increasingly difficult to achieve.

Mismatch in language competences of teachers and pupils

As we have seen above, the rapid changes in the linguistic profile of schools were not accompanied by changes in the language policies of the schools nor by changes in teaching staff. This has meant that in many classes teachers do not speak the languages of a majority or significant minority of their pupils. This is particularly problematic at the Foundation Phase. As the PRAESA report comments: %n a situation in which the teacher understands perhaps half a dozen words or phrases in Xhosa, and the learner knows only enough English or Afrikaans to follow the basic instructions and to answer in monosyllables, interaction between teacher and learner is necessarily stunted'(15).

High schools also experience the mismatch in languages between pupils and teachers. In a dual medium (English / Afrikaans) school in Murray's study, the African language speakers have been placed in the English medium classes in the school while the Afrikaans medium classes consist entirely of mother tongue Afrikaans-speakers with Afrikaans-speaking teachers. Progress through the learning programmes in various subjects

has been affected by the language difficulties experienced in the English medium classes and these classes have begun to fall behind the Afrikaans medium classes.

PEI research studies at primary schools and high schools have found that discipline and control problems arise from the communication breakdown between teachers and pupils who speak different languages. In the PRAESA schools discipline problems were very much in evidence in several of the schools and researchers reported that teachers are forced to spend an inordinate amount of time controlling the children. In this situation teachers become 'little more than crowd-controllers'(16). In one school in the PRAESA study the teacher spent one-quarter of the time reprimanding the children. Even when Xhosa-speaking assistants are present both teacher and assistant are involved in reprimanding the pupils and the researchers report that the effect is one of 'constant interruption to the lesson flow requiring a special type of concentration to overcome'(17). According to PRAESA, these problems derive from the teacher's diminished authority over her charges at a time when they literally do not speak the same language.

The desire to overcome discipline problems motivated teachers at the two high schools in Murray's study to participate in an African languages course. These teachers felt that because they do not understand what is being said by learners they feel they lose control over what happens in the classroom. One teacher described the African language-speaking pupils as using their language 'as a weapon against us'(14). African pupils from the school also participated in the course as tutor assistants as they wanted to help their teachers overcome the discipline problems they faced. One learner expressed her reason for participating in the TALK course this way: 'I don't like it when pupils are swearing in Zulu because she doesn't understand what is going on. It's a shame (14).' In contrast in the class of a teacher who does speak Zulu: 'There's better discipline. They won't swear.'

The PRAESA research has found that the mismatch situation also affects teachers' methodology. Teachers faced with pupils who understand very little of what they say, try to keep control at all costs and 'resort to teacher-centred lessons in which children are seldom given the chance to initiate something' (16).

Some schools are adopting a variety of strategies to assist African children to learn English and to adjust to this language as a medium of instruction. Some schools have introduced bridging classes for non-English speakers while others have employed African-speakers as assistant teachers. PRAESA reports that the presence of an assistant has improved communication between teachers and learners and has 'taken the edge off discipline problems resulting from the communication breakdown'(21). The assistants have also introduced the home language of the majority of learners into the classroom on a daily basis. One teacher also claimed that the presence of an assistant who provides translation enabled her to distinguish between language problems and learning problems.

An alternative approach to using teacher assistants is for teachers to learn an African language which is dominant in their area. Murray found that teachers who participated in an African language course experienced an improvement in teacher-pupil relationships and improved communication and cognition in the classroom. Despite these benefits, very few learnt to speak the African language taught on the course and many dropped out. The most commonly quoted reason for this was a lack of time. However, many of these same teachers were involved in studies to improve their professional qualifications. Clearly incentives need to be put in place to encourage teachers in multilingual classes to learn an African language. Murray suggests that pre-service teachers should be required to have some level of competency in an African language. In addition, she suggests that incentives should be provided for in-service teachers to learn an African language. In her view the recently produced norms and standards for teacher education are inadequate when it comes to requirements for the language competences of teachers. The document makes reference to

the importance of respect for learners, the need to be able to mediate learning in multilingual classes and the need to understand and take account of socio-cultural, racial, language and gender differences in classrooms. In Murray's view, without official requirement of specific language competences, the current language practices in schools will continue.

Conclusion

The PEI research reports suggest that few schools have developed formal language policies in line with the specifications of the South African Schools Act and the language-in-education policy. The reasons for this are complex. The following reasons are suggested by the PEI reports:

- ✍ lack of knowledge of the new language policy.
- ✍ schools' lack of experience and expertise in developing their own policies.
- ✍ lack of an implementation plan and resources and mechanisms for monitoring of new language policy.
- ✍ perceptions of the advantages of English.
- ✍ staff language competencies. socio-economic needs of clients.

Murray neatly summarises these factors and their interrelationship as 'the result of tensions between a humanistic ideology, the actualities of schools and classrooms, and a society in which values are increasingly those of the market place'(2)

The PEI researchers found that learning through the primary language in the early years of schooling is on the decrease. The rapidly changing demography of South Africa is one of the main reasons for this but so are the aspirations of parents, manifested in their choice of English as language of instruction from as early as possible.

In these circumstances it seems that government is faced with one of two alternatives:

Allocating substantial resources to promoting added bilingualism The following steps would be needed to promote this course:

- ✍ advocating the advantages of additive bilingualism.
- ✍ the provision of books and materials in the indigenous languages of South Africa and ensuring that teachers in the lower primary are fluent in the primary languages of the pupils in their classes.
- ✍ the establishment of linguistically homogenous schools.

Accepting the growing use of English as language of instruction at all levels of the schools system and promoting the conditions requisite for effective teaching and learning through English.

The following conditions are most frequently quoted in the international research as important for instruction in a second language:

- ✍ teachers' language proficiency in the target language.
- ✍ teachers' competence as language teachers with an understanding of problems of learning in a second language and how to overcome these.
- ✍ exposure to the target language outside the classroom .
- ✍ the provision of graded language textbooks especially in the content subjects in the early phases of learning (Duncan, 1993)

It would seem that modernisation in South Africa and, the inexorable urbanisation in particular, is undermining the possibilities for the first alternative and that the more realistic option is a straight for English approach, except in linguistically homogenous classes where there is little exposure to English outside the classroom or where parents expressly request an alternative.

Under these conditions, a research priority could be to examine the minimum requirements for successful teaching in English in South African schools - the teachers' English language competence, the books and materials required, the most effective ways of bridging the learners' language and English and other possible forms of support.

CHAPTER 10.

CONCLUSION

Nick Taylor and Penny VinjevoId

During the five years of South Africa's first democratic government the Department of Education restructured the administration of schooling at the highest levels and established a coherent progressive policy framework. These are impressive achievements, given the extent to which apartheid education had become entrenched, not only in the spheres of administration and policy, but at all levels of practice as well. The new policy vision strikes a balance between developing excellence for competing in the global society, on the one hand, and expanding real educational opportunity, on the other. The devolution of responsibility to provinces and schools and high-skill curriculum goals are directed towards promoting excellence, while the drive to equity is promoted by compensatory funding formulas, affirmative staffing practices, and multi-cultural language policies and curriculum processes.

Progress towards both kinds of educational goals has to date been severely constrained by institutional malfunction in all parts of the system. Improving systemic efficiency will undoubtedly be a major objective during the second term of the new government. And the extent to which this is achieved is likely to depend in large measure on finding the right balance in four areas: between authoritative and devolutionary management practices, between operating and staff costs, between performance and competence curriculum and assessment activities, and between market and multicultural considerations in language usage.

Three categories of malfunction are discernible in the education system. The first was the subject of the concerted attack on corruption in the civil service led by Deputy President Mbeki in September 1998, when teachers and other officials were identified as abusing public trust and misappropriating state funds. While a very small proportion of educators fall into this category, their actions have a profound effect on morale and efficiency throughout the schooling system. A second type is far more widespread and debilitating. This arises from the kind of work ethic that has become endemic in large parts of the sector, characterised, for example, by widespread absenteeism on monthly pay days and teachers' habits of not working after school hours using instead up to two months of the teaching year to prepare and mark examination papers. These first two categories of systemic malfunction can only be addressed through greatly improved management practices, including the performance management of teachers. While government has demonstrated a clear commitment to building better management systems, developing the culture and capacity to implement these will not occur overnight.

Tightening up on corruption and institutional inefficiency will certainly have profound effects on student throughput and learning outcomes. However, the efficiency gains attained through improved management will reach a limit which still leaves the system operating well below optimal capacity if a third category of malfunction is not simultaneously addressed. This third category comprises those activities which collectively make up the curriculum process, and which the international experience tells us will prove even more intractable to improvement than those arising from corruption and poor institutional practice. It is this set of activities which, by and large, constituted the subjects of the PEI research projects.

Before moving on to a discussion of some of the specific findings of the PEI studies and their implications for teacher development and support, we will make two more general points about research process and practice in South Africa. Firstly, while empirical research has gained enormously in sophistication over the last five years, there is considerable room for improvement in both case study and quasi-experimental methodologies. Although a number of PEI

quasi-experimental studies came close to attaining acceptable levels of design rigour, further refinement of their sampling and control techniques are required before generalizable conclusions can be drawn. Rigorous longitudinal studies which attempt to track changes in the system must constitute an important research priority for the future.

Case studies have begun to be both more systematic in their collection of evidence, and relatively more objective and less reliant on perspectival data which depend on the interpretations of interested parties. Furthermore, case studies have become more penetrating in their assessment of the quality of teaching and learning and have moved beyond mere observation of surface forms of classroom practice. These developments, too, require refinement if attempts to link classroom level processes with general improvements in learning outcomes are to be successful.

Secondly, the PEI has provided considerable impetus to the development of these research methods. Moreover, it has provided a vehicle for coordinating the research efforts of universities, NGOs, parastatals and consultants around a common goal. The role of the Department of Education was crucial in providing the leadership and resources necessary to directing and supporting this enterprise.

Collectively the 35 individual studies investigated the teaching and learning of reading, mathematics, science, geography and English; the use of progressive pedagogies; the deployment of materials; assessment practices; school management; and language issues in over 300 schools of all types in most regions of the country. Because of the scale and nature of the individual studies, their findings, separately or severally, can in no scientific sense be said to represent what happens in the schooling sector as a whole. The comments which follow should be read with this caveat firmly in mind. However, given the convergence of many of the findings, it would be surprising if further research did not establish that they are widely indicative of conditions in schools across the country.

The most definite point of convergence across the PEI studies is the conclusion that teachers' poor conceptual knowledge of the subjects they are teaching is a fundamental constraint on the quality of teaching and learning activities, and consequently on the quality of learning outcomes. Implementing classroom practices which result in learning which is more effective and intelligent is not a question of ideology or will on the part of teachers. Teachers by and large support the intentions of the new curriculum, but lack the knowledge resources to give effect to these in the classroom. No amount of exhortation by politicians or pedagogical guidance by curriculum planners, university and college academics or NGOs is likely to change this situation unless the knowledge base of teachers is simultaneously strengthened. This is a fundamental systemic problem which affects and limits interventions aimed at improving all aspects of teaching and learning.

In the area of curriculum development, teachers observed by the PEI studies do not have the knowledge base either to interpret the broad guidelines of Curriculum 2005 or to ensure that the every-day approach prescribed by the new curriculum will result in learners developing sound conceptual frameworks. These frameworks are the foundations of the knowledge, skills and values envisioned by the new curriculum policies. Under these circumstances, the development and distribution of learning programmes which specify the knowledge required by subject and grade, within a systematic framework, would seem to be an urgent priority. Such knowledge frameworks are essential, not only for devising daily teaching and assessment activities, but also for guiding developers of learning materials and for constructing standard assessment instruments.

On the issue of pedagogy, many teachers model the surface forms of learner-centred activities, without apparently understanding the learning theories underlying them, and certainly without using them as a medium for enabling learners to engage with substantive knowledge and skills. These methods frequently interfere with student learning by providing distractions from the core conceptual issues. Consequently little is learnt. The principal pedagogical

question is not whether group work or discussion between learners is taking place, but whether all forms of classroom activity are centred on learning, and result in students consolidating their knowledge and developing new understandings.

Our researchers found that what students know and can do is dismal. At all levels investigated by PEI projects, the conceptual knowledge of students is well below that expected at the respective grades. Furthermore, because students are infrequently required to engage with tasks at any but the most elementary cognitive level, the development of higher order skills is stunted. Books are very little in evidence and reading is rare. Writing is also infrequent and, when practised by students, it hardly ever progresses beyond single words or short phrases. The single most worrying observation is the evidence suggesting that many teachers are unsure as to whether reading is specified as an outcome of Curriculum 2005. Because of this uncertainty and confusion, some teachers are not teaching reading as an explicit activity.

Teaching, learning and assessment are so closely related in the classroom that they are often not separable into distinct activities. It follows that, if teachers do not possess the knowledge frameworks required to construct learning activities appropriate to their students, then they will also not be competent in exercising the kinds of professional judgements on which all assessments rest. Under these conditions, the immediate development of sets of graded assessment items, in all learning areas and grade levels, is likely to be the most valuable assistance that can be provided to teachers in the short term. Such item banks will provide exemplars on the levels of conceptual knowledge and cognitive tasks appropriate to the different grades.

One of the most urgent priorities must be the establishment of quality assurance mechanisms at all levels of schooling - particularly the systemic assessments envisaged by the Department of Education for Grades 3, 6 and 9. Given the evidence indicating a failure of schooling to impart basic skills in the foundation phase, a simple assessment of literacy and numeracy performance

at the Grade 3 level is probably the single most important step required to diagnose the extent of this problem, set standards for teachers, and establish a benchmark against which the impact of the new curriculum can be measured. Similarly, research into factors which inhibit or promote the learning of basic literacy and numeracy in the Foundation Phase must rate as one of the highest research priorities in the schooling sector.

In the longer term, the quality of teaching and learning can only be improved if the knowledge foundations of teachers are systematically built. Pre- and in-service programmes must teach and deepen conceptual knowledge and higher order skills in all learning areas for both primary and high school teachers. It would appear that, without this foundation, teacher development programmes on curriculum development, pedagogy, assessment, and the construction and/or use of learning materials will find little ground for purchase.

At the same time, in the domain of research, the generalisability of the link between teachers' knowledge, classroom practices and learning outcomes should be systematically explored. One of the research questions in this regard is: Are there cognitive thresholds below which teachers are not able to provide formal cognitive development for learners? A related area for investigation is the relationship between teachers' conceptual knowledge and their ability to perform other roles set out in the Norms and Standards for Educators framework (designer of learning programmes, developer of assessment strategies and instruments, designer of learning materials, etc.).

On the question of learning materials, the idea that teachers are capable of constructing materials and that these can replace textbooks has gained ground in recent years. This thinking has led to teachers concluding that textbooks are not important. It would appear that there are a variety of reasons for this, including the fact that the presence of books is likely to dilute teacher control over the knowledge circulating in the classroom. Few textbooks were used in the classes observed, even when these were present in the school.

The majority of other learning materials used in the classes observed generally provide for ad hoc activities, which may or may not be connected to the level of learning required. Even the best of these worksheets and activities do not contribute to systematic conceptual development unless they are connected to and supplement a systematically organised learning programme. These learning materials can provide interesting activities but if these are not woven together into a systematic learning programme, it is unlikely that learners will develop the higher order thinking skills required by the new curriculum.

The PEI researchers found that teachers do not develop their own materials because of time and conceptual knowledge constraints. It is important that the value of textbooks be re-established in the minds of teachers, teacher educators and school managers. Without books to read and write in, schooling as cognitive development cannot happen. All subsequent learning depends on the development of progressively higher and more differentiated forms of literacy.

Further research is required into the extent of and reasons for teachers not using textbooks. There is an urgent need to understand the relationship between teachers' cognitive levels and the optimal use of textbooks. At what threshold of cognitive grasp of a subject are teachers able to use a textbook and how are books best constructed to aid teachers in their development of learners' cognitive frameworks?

The present constraints on the provincial education budgets suggests that priorities for the provision of textbook and stationery should be established in the short term. This means determining which basic books and writing materials will best support learning.

The positive effects of mother tongue instruction have become conventional wisdom in education circles. Mother tongue instruction has been tried over many years in South Africa and particularly by the apartheid government. The apartheid state made significant efforts to create optimal conditions for mother tongue instruction - ethnically homogenous homelands, neighbourhood

schools, and single-language teacher colleges. All these attempts at mother tongue instruction were undermined and resisted in various ways.

The demise of apartheid and the accompanying elimination of the restrictions on mobility, has led to increasingly heterogeneous neighbourhoods, schools and classes. In these circumstances the ideal of mother tongue instruction is becoming increasingly difficult to achieve. The PEI research shows that, with few exceptions, teachers and parents are uniformly desirous of English as medium of instruction, chiefly because they regard English as a means to gaining access to mainstream national and global society.

Competence on the part of both teachers and learners in the language of instruction is crucial for effective teaching and learning. It follows that initial teacher development programmes must have, as a central component, the development of linguistic competence in the language of teaching. As an overwhelming number of South African classrooms are moving towards English as medium of instruction, the English language component of initial teacher training courses should be a central feature of all pre- and in-service courses. Furthermore, a knowledge by teachers of learners' primary language facilitates learning and improves relationships between teachers and learners. For this reason teacher education courses should include a compulsory component of a major language of the region in addition to the language of instruction.

As it seems likely that there will be low levels of English linguistic competence amongst teachers for the foreseeable future, it is important to investigate the factors that will optimise teaching and learning under these conditions. The following factors, for example, should be considered:

- ✍ ways of mediating knowledge between teachers and learners through teacher assistants that speak the language of pupils.
- ✍ bridging classes in the language of instruction.
- ✍ use of storybooks and other textbooks and learning materials.

The right to learn has to a considerable extent been achieved and the large majority of South African children now have access to schooling. The immediate priority must be to get learning right so that the progress of students through the system is substantially improved. This report of the PEI research project makes a number of recommendations towards this end. These recommendations include short- and long-term measures for the development and support of educators, the promotion of research which will even further illuminate those factors which inhibit effective learning, and the monitoring of progress towards removing these obstacles.

BIBLIOGRAPHY

ANC (African National Congress) (1994) A policy framework for education and training. Johannesburg, ANC.

Alexander, J.C. (1995) *fin de siecle social theory.- relativism, reduction, and the problem of reason.* London, Verso.

American Association for the Advancement of Science (1998) *Blueprints for reform: science, mathematics, and technology for education.* New York, Oxford University Press.

Archer, S. (1995) *Quality and efficiency indicators in education: a survey.* Research report prepared for Edupol. Mimeographed.

Bassey, M. (1995) *Creating education through research: a global perspective of educational research for the 21st century.* Newark, Kirklington Moor Press IBERA.

Beard, P., Enslin P. and Morrow W. (1981) *The significance of pedagogics in South Africa,* in P. Beard, P. Enslin and W. Morrow (eds *Problems of pedagogics;-pedagogics and the study of education in South Africa.* Durban-Pretoria, Butterworths.

Bernstein, B. (1996) *Pedagogy symbolic control and identity.- theory, research, critique.* London, Taylor & Francis.

Bertaux, D. (1996) *A response to Thierry Kochuyt's' Biographical and empiricist illusions: a reply to recent criticism'.* *Biography and Society Newsletter,* Dec. 1996, 2-6.

Black, H., Govinda, R., Kragu, F. & Devine M. (1993) *School improvement in the developing world an evaluation of the Aga Khan foundation programme.* Glasgow, GNP Booth.

Black, L. & Solomos J.(1993) Doing research, writing politics: the dilemmas of political intervention in research on racism. *Economy and Society*, 22, 2, 178-199.

Bourdieu, P. (1996) *Understanding. Theory, Culture & Society*, 13, 2, 17-37.

Bourdieu, P. (1998) *Practical reason*. Cambridge, Polity Press.

Brown, D. (1998) Educational policy and the choice of language in linguistically complex South African schools. Durban, Education Policy Unit, University of Natal.

Brown, P., Halsey, A., Lauder, H. & Wells, A.S. (1997) The transformation of education and society: an introduction, in A. Halsey, H. Lauder, P. Brown & A.S. Wells (eds) *Education: culture, economy, society*. Oxford, OUP.

Business Day (1999a) Provinces are starting to make headway on debt: but rising staff costs are hampering capital expenditure and service provision plans. 21 January.

Business Day (1999b) Manuel slays SA's provincial beasts. 15 February.

Business Day (1999c) Provinces seem to have finances in hand. 21 January.

Carnoy, M.(1998) *Globalization and educational reform*. Mimeographed.

CEPD (Centre for Education Policy Development) (1995) *National Teacher Education Audit*. Johannesburg, CEPD.

Chisholm, L. (1993) Education policy in South Africa. Speech presented to South African Society of Education. Soweto. 6 February 1993.

Chisholm, L. (1999) Why we don't need matric exams. *Mail & Guardian*. January 8-14.

Christie, P. (1997) Stability against the odds: resilient schools in South Africa. Paper presented at the Oxford International Conference on Education and Development. 1115 September.

Christie, P. (1998) Schools as (Dis) Organisations; the 'breakdown of the culture of learning and teaching' in south African schools. *Cambridge Journal of Education*, Vol. 28, 3.

Christie P. & Potterton M. (1997) School development in South Africa: strategic interventions for quality improvement in South African schools. Johannesburg. JET.

Cobb, P. (1998) Individual construction, mathematical acculturation, and the classroom community, in Marie Larochele, Nadine Bednarz, Jim Garrison (eds) *Constructivism and education*. Cambridge, The Press Syndicate of the University of Cambridge.

Cohen, D.K. and Spillane, J.P. (1992) Policy and practice: the relations between governance and instruction, in G. Grant (ad) *The review of research in education*. Washington D.C., American Educational Research Association.

Collings, J. (1999) Poor returns from the lion's share of funding. *Financial Mail*. 19 September.

Constitution of the Republic of South Africa (1993) Act 200 Of 1993. Pretoria, Government Printers.

Combleth, K. (1990) *Curriculum in context*. United Kingdom, The Falmer Press.

Couzzens, S. & Woodhouse, E. (1995) Science, government, and the politics of knowledge, in Jasanoff, S. et al. (ads) *Handbook of science and technology studies*. London, Sage Publications.

Crouch, L & Mabogoane, T. (1997) *Key numerical indicators 1991-1996*. Johannesburg, Centre for Education Policy Development, Evaluation & Management.

Cuban, L. (1997) School reform: the riddle of change and stability, in Barry S. Kogan (ad) Common schools, uncommon futures. New York, Teachers College Press.

Darling-Hammond, L. (1991) Instructional policy into practice: the power of the bottom over the top. *Educational Evaluation and Policy Analysis*, Vol. 12, 3.

Darling-Hammond, L. (1997) The right to learn. San Francisco, Jossey-Bass Inc.

Davis, K. (1997) 'Imagined communities?' Some reflections on biographical research. *Biography and Society Newsletter*, Dec. 1997, 2-5.

Dearing, R. (1993) The national curriculum and its assessment: final report. York, National Curriculum Council.

De Guzman, A. (1993) The Philippines: a textbook case, in J.P. Farrell and S.P. Heynemann (1993) (eds) Textbooks in the developing world. economic and educational choices. Washington DC, The World Bank.

Denzin, N.K. & Lincoln, Y.S. (eds) (1994) Handbook of qualitative research. London, Sage Publications.

Department of Education (1995) White Paper on Education and Training. Government Gazette, Vol. 357, No. 16312. Pretoria, Government Printer.

Department of Education (1996) The South African Schools Act, Act 84 of 1996. Pretoria, Government Printer.

Department of Education (1997x) Medium-term Expenditure framework. Report of the Education Sectoral Team. Pretoria, Department of Education.

Department of Education (1997b) Language in Education Policy. Government Gazette, Vol. 17997, No. 383. Pretoria, Government Printer.

Department of Education (1997c) foundation Phase (Grades R to 3);: Policy Document. Pretoria, Department of Education.

Department of Education (1998a) National Norms and Standards for School Funding. Pretoria, Department of Education.

Department of Education (1998h) Norms and Standards for Educators. Pretoria, Department of Education.

Department of Education (1998c) Employment of Educators Act, Act 1245 of 1998. Pretoria, Government Printers.

Department of Education (1998d) Duties and Responsibilities of Educators. Pretoria, Department of Education.

Department of Education (1998e) Assessment Policy in the general Education and Training Bond. Grades R to 9 and ABET Government Gazette, Vol. 402, No. 19640. Pretoria, Government Printer.

Department of Education (1998f) Draft Assessment Policy in the General Education and Training Phase. Grade R to 9 and ABET Pretoria, Department of Education.

Department of Education (1998g) Language-in-education Implementation Plan. Pretoria, Department of Education.

Department of Education (no date a) Illustrative Learning Programmes for Literacy, Numeracy and Life Skills. Pretoria, Department of Education.

Department of Education, (no date b) Draft Expected Levels of Performance. Mimeographed.

Department of Public Service and Administration (1995) White Paper on the Transformation of the Public Service. Government Gazette, Vol. 365, No. 16838. Pretoria, Government Printer.

Dlamini, T. (1996) An evaluation of the Sakhisizwe In-Service Teacher Training Programme. Durban, Improving Education Quality (IEQ).

Duncan, K. (1993) Notes on mother tongue vs second language literacy. Johannesburg, Molteno Project.

Edwards, D., Ashmore, M., & Potter, J. (1995) Death and furniture: the rhetoric, politics and theology of bottom-line arguments against relativism. *History of the Human Sciences*, 8, 2, 25-49.

ELRC (Education Labour Relations Council) (1998) Development appraisal of teachers. Pretoria, Department of Education.

Enslin, P. (1990) Science and doctrine: theoretical discourse in South African teacher education, in M. Nkomo (ed) *Pedagogy of domination. toward a democratic education in South Africa*. New Jersey, African World Press.

Farrell, F.B. (1996) *Subjectivity, realism and postmodernism: the recovery of the world in recent philosophy*. Cambridge, Cambridge University Press.

Farrell, J.P. & Heyneman, S.P. (1993) (ads) *Textbooks in the developing world: economic and educational choices*. Washington DC, The World Bank.

Faring, L.R., McDougal, J.F. & Ohlman, H. (1993), Will textbooks be replaced by new information technologies?, in J.P Farrell & S.P. Heyneman (eds) *Textbooks in the developing world: economic and educational choices*. Washington DC, The World Bank.

Fleury, S.C. (1998) Social studies, trivial constructivism, and the politics of social knowledge, in Marie Larochelle, Nadine Bednarz, Jim Garrison (ads) *Constructivism and education*. Cambridge, The Press Syndicate of the University of Cambridge.

Foucault, M.(1995) *Remarks on Marx: conversations with Duccio Trombadori* New York, Semiotext(e).

Fuchs, S. (1995) The new wars of truth: conflicts over science studies as differentiated modes of observation. *Social Science Information*, 35, 2, 307326.

Fullan, M. (1991) Causes/processes of implementation and continuation, in Understanding educational change.

Fullan, M.G. & Miles, M.B. (1992) Getting reform right. what works and what doesn't. Phi Delta Kappan, June.

Fuller, S. (1995a) Is our faith in science superstitious?: an argument for the secularisation of science policy. < <http://www.dur.ac.uk/~dss0www/dept/fuller.htm> >

Fuller, S. (1995b) Does science put an end to history, or history to science? < <http://www.dur.ac.uk/~dss0www/dept/sfmcl.htm> >

Gardner, H. (1991) The unschooled mind: how children think and how schools should teach. New York, Basic Books.

Gardner, H., Torff, B. & Hatch, T. (1998) The age of innocence reconsidered: preserving the best of the progressive tradition in psychology and education, in D.R. Olson and N. Torrance (eds) Handbook of education and human development.- new models of learning, teaching, and schooling. Cambridge MA, Blackwell.

Gauteng Provincial Government (1997) Curriculum 2005. Guidelines for Learning Programmes for the Foundation Phase Grade One (+- First Term). Johannesburg, Gauteng Department of Education, Print & Copy Centre.

Gauteng Provincial Government (1998) Curriculum 2005: Foundation Phase Learning Programmes: Planning and Implementation Guidelines. Johannesburg, Gauteng Institute for Curriculum Development.

GDE (Gauteng Department of Education) and GICD (Gauteng Institute for Curriculum Development) (1999) Mathematical Literacy, Mathematics and Mathematical Sciences. Draft Progress Map. Foundation, Intermediate and Senior Phases Levels 1 to 6 (for Grades 1 to 9i). Johannesburg, Gauteng Institute for Curriculum Development.

GETC (Gauteng Education and Training Council) (1999) Preliminary Report on the Implementation and Development of Curriculum 2005 during 1998 Mimeographed.

Gitlin, A. (1994) (ed.) Power and method: political activism and educational research. London, Routledge.

Goodlad, J.I. (1997) Reprise and a look ahead, in John I. Goodlad & Timothy J. McMannon (eds) The public purpose of education and schooling. San Francisco, Jossey-Bass Publishers.

Grant, G. & Murray, C. (1996) The second academic revolution, in Robert L. Crowson, William Lowe Boyd & Hanne B. Mawhinney (eds) The politics of education and the new institutionalism: reinventing the American school. Washington DC, The Falmer Press.

Greaney, T. & Kellaghan, T. (1996) Monitoring the learning outcomes of educational systems. Washington DC, The World Bank.

Guba, E. & Lincoln, Y., in Denzin, N.K. and Lincoln, Y. (1994) Handbook of qualitative research. London, Sage Publications.

Haack, S. (1992) Science 'from a feminist perspective'. *Philosophy*, 67, 5-18.

Haack, S. (1993) Evidence and inquiry: towards reconstruction in epistemology. Oxford, Blackwells Publishers.

Hammersley, M. (1995) The politics of social research. London, Sage.

Hammersley, M. & Gomm, R. (1997a) Bias in social research. *Sociological Research Online*, 2, 1, < <http://www.socresonline.org.uk/socresonline/2/1/2.html>>

Hammersley, M. & Gomm, R. (1997b) A response to Romm. *Sociological Research Online*, 2, 4, <<http://www.socresonline.org.uk/socresonline/2/4/12.html>>

Harding, S. (1991) *Whose science? Whose knowledge?* Ithaca NY, Cornell University Press.

Hartshorne, K. (1992) *Crisis and challenge: black education 1910-1990*. Cape Town, Oxford University Press.

Henneveld, E. (1994) *Planning and monitoring the quality of primary education in Sob-Saharan Africa*. Washington DC, The World Bank.

Henning, E. (1995) *Qualitative educational research: soft or solid option?* *South African Journal of Education*, 15, 1, 2934.

Hobsbawm, E. (1997) *On history*. New York, The Free Press.

Hofmeyr, J. (1993) *Policy change in teacher development* Mimeographed.

Hofmeyr, J. and Lewin, J. (1982) *Teacher education and the De Lange Committee*.

Perspectives in Education, Vol. 6, No. 1, July.

Hopkins, D., Ainscow, M. & West, M. (1996) *Unravelling the complexities of school improvement. - a case study of the 'Improving the Quality of Education for all' (IQEA) Project*. Milton Keynes, The Open University.

Hopkins, D. & MacGilchrist, 8.11998) *Development planning for pupil achievement*. *School Leadership & Management*, Vol. 18, 3.

HSRC (Human Sciences Research Council) (1981) *Provision of Education in the Republic of South Africa: Report of the Committee of the HSRC Investigation into Education*. Pretoria, Government Printer.

Huysamen, G.K. (1994). *Methodology for the social and behavioural sciences*. Halfway House, Johannesburg, International Thompson Publishing (Southern Africa) (Pty) Limited.

Jansen J.D. (1999) Pros and cons of matric: there are better alternatives. *The Teacher*, February.

Jasanoff, S., Markle, G.E., Petersen, J.C., & Pinch, T. (1995) (eds) *Handbook of science and technology studies*. London, Sage Publications.

Kerchner, C. & Koppich, J. (in press) Organizing the other half of teaching, in L. Darling Hammond and G. Sykes (eds) *The heart of the matter: teaching as the learning profession*. San Francisco, Jossey-Bass.

Khulisa (1999) *Evaluation of OBE/Curriculum 2005 in Gauteng Province*. Johannesburg, Khulisa Management Services cc.

Kraak, A. (1998) *Competing education and training policies*. Pretoria, Human Sciences Research Council.

Landman, J.P. 09991 How big and how costly is the civil service? Policy Brief No. 4, July, Johannesburg, Centre for Policy Studies.

Langham, D.P. (1993) *The textbook as a source of difficulty in teaching and learning: Report E.D.-21*. Pretoria, HSRC Publishers.

Latour, B. (1993) *We have never been modern*. Hemel Hempstead, Harvester Wheatsheaf.

Laudan, L. (1990) *Science and relativism: some key controversies in the philosophy of science*. Chicago, University of Chicago Press.

Leithwood, K. (1996) *Education management development in North America*. International Conference on Education Management Development. Wilderness, Western Cape, South Africa, 18-20 September.

Le Roux, N. & Schollar, E. (1996) *A survey report on the reading and writing skills of pupils participating in READ programmes*. Johannesburg, READ Trust.

Le Roux, N. (1997) Summary of evaluation: results. Johannesburg, READ Organisation.

Lipsky, M. (1980) Street-level bureaucracy: dilemmas of the individual in public services. New York, Russell Sage Foundation.

Lusi, S.F. (1997) The role of state departments of education in complex school reform. New York, Teachers College Press.

Macdonald, C.A. (1990a) Crossing the threshold into Standard Three. Pretoria, Human Sciences Research Council.

Macdonald, C.A. (1990b) School-based learning experience. Pretoria, Human Sciences Research Council.

Macdonald, C.A. (1991) Eager to talk and learn and think: bilingual primary education in South Africa. Cape Town, Maskew Miller Longman.

Mc Lennan, A. (1997) Into the future: restructuring the public service, in Patrick FitzGerald, Anne McLennan & Barry Munslow (eds) Managing sustainable development in South Africa. Cape Town, Oxford University Press.

Martin, J. & Sugarman, J. (1993) Beyond methodology: two conceptions of relations between theory and research in research on teaching. *Educational Researcher*, 22, 8, 17-24.

Mawhinney, H.B. (1996) The new focus on institutions and the reinvention of schooling, in Robert L. Crowson, William Lowe Boyd & Hanne B. Mawhinney (eds) The politics of education and the new institutionalism. reinventing the American school. Washington DC, The Falmer Press

Mbeki, T. (1998) Teachers who live by the rules of criminals. *Sunday Times*. 13 September.

McCallum, K. (1999) Presentation to conference on learning materials. Department for International Development. Muldersdrift, March.

Maier, D. (1997) Habits of mind: democratic values and the creation of effective learning communities, in Barry S. Kogan (ed) Common schools, uncommon futures. New York, Teachers College Press.

Ministerial Committee (1998) Report: Investigation into the Senior Certificate Examination. Pretoria, Department of Education.

Ministry of the Public Service and Administration (1995) White Paper on the Transformation of the Public Service. Government Gazette, Vol. 365, No. 16838. Pretoria, Government Printer.

Mitchell, G., Fridihon, P. and Haupt, J (1997) On the relationship between the matriculation examination and university performance. South African Journal of Science, Vol. 93, 382-7.

Moore, R. & Mullet, J. (forthcoming) The discourse of 'voice' and the problem of knowledge and identity in the sociology of education. British Journal of the Sociology of Education.

Muller, J. & Taylor, N. (1995) Schooling and everyday life: knowledges sacred and profane. Social Epistemology, Vol. 9, 3, 257-275.

Munslow, B., FitzGerald, P. & Mc Lennan A. (1997) Sustainable development: visions and realities, in Patrick FitzGerald, Anne Mc Lennan & Barry Munslow (eds) Managing sustainable development in South Africa. Cape Town, Oxford University Press.

Murray, S. (forthcoming) Language issues in South African education: an overview, in Mesthrie, R. (ed) Language in South Africa. Cambridge, Cambridge University Press.

NEPI (National Education Policy Investigation) (1992a) Teacher Education. Cape Town, NECC/Oxford University Press.

NEPI (1992b) Language. Cape Town, NECC/Oxford University Press.

NEPI (1993) The Framework Report and Final Report Summaries. Cape Town, NECC/Oxford University Press.

Norris, C. (1997a) *Against relativism: philosophy of science, deconstruction, and critical theory*. London, Blackwells.

Norris, C. (1997h) *New idols of the cave. on the limits of anti-realism*. Manchester, Manchester University Press.

O'Neill, J. (1995). 'I gotta use words when I talk to you': a response to death and furniture. *History of the Human Sciences*, 8, 4, 99-106.

Palmer, R. (1998) *Impact assessment and perception audit of National Communication Directorate materials. final report Johannesburg, Palmer Development Group/University of Natal*.

Pape, J. (1999) Letter to Mail & Guardian. January 15-21.

Patai, D. (1994) *When method becomes power*, in Gitlin, A. (ed.) *Power and method.- political activism and educational research*. London, Routledge.

Pixie, G.H. (1984) *Ethno-linguistic zoning in South African black townships*. *AREA* (19) 4.

Pottertan, M. (1999) Letter to Mail & Guardian. January 15-21.

Presidential Review Commission (1998) *Developing a Culture of Good Governance. Report of the Presidential Review Commission on the Reform and Transformation of the Public Service in South Africa*. Pretoria, Government Printer.

Qualifications and Curriculum Authority (1998) *1997 Benchmark information for Key Stages I & 2*. London, DCA.

Redder, H. (1998) *The politics of STS*. *Social Studies of Science*, 28, 2, 325-331.

Review of Educational Research (1993) Vol. 63, 3.

Riddell, A.R. (1997) School effectiveness and school improvement. *Comparative Education Review*. Vol. 41, 2, 178-204.

Robitaille, D.F., Schmidt, W.H., Raven, S., Mc Knight, C., Britton, E. & Nicol, C. (1993) Curriculum Frameworks for Mathematics and Science. The Third International Mathematics and Science Study, TIMSS Monograph No. 1. Vancouver, Canada, Specific Educational Press.

Rodseth, V. (1995) Bilingualism and multilingualism in education. Johannesburg, Centre for Continuing Development.

Romm, N. (1997) Becoming more accountable: a comment on Hammersley and Gomm. *Sociological Research Online*, 2, 3.

< <http://www.socresonline.org.uk/socresonline/2/312.html> >

Forty, R. (1991) Objectivity, relativism, and truth. Cambridge, Cambridge University Press.

SAIRR (South African Institute of Race Relations) (1970-1996/7) Annual Surveys.

SAGA (South African Qualifications Authority) (1995) Act No. 58 of 1995. Pretoria, Government Printer.

SAGA (1997) Bulletin, Vol. 1,1.

Sammons, P. (1994) Findings from school effectiveness research: some implications for improving the quality of schools, in P. Ribbins and E. Burrige (eds) *Improving education. promoting quality in schools*. London, Cassell.

Sammons, P, Thomas, S. & Mortimore, P. (1997) *Forging links: effective schools and effective departments*. London, Paul Chapman Publishing Limited.

Schmidt, W.H., McKnight, C.C., Valverde, G.A., Houang, R.T. & Wiley, D.E. (1997a) Many visions, many aims, Volume 7: A cross-national investigation of curriculum

intentions in school mathematics. Dordrecht, Boston, London, Kluwer Academic Publishers.

Schmidt, W.H., McKnight, C.C. & Raizen, S.A. (1997b) A splintered vision: an investigation of U.S. science and mathematics education. Dordrecht, Boston, London, Kluwer Academic Publishers.

Schwandt, T.A. (1994) Constructivist, interpretivist approaches to human inquiry, in Denzin, N.K. & Lincoln, Y.S. (eds.) Handbook of qualitative research. London, Sage Publications.

Sclove, R.E. (1998) For U.S. science policy, it's time for a reality check. The Chronicle of Higher Education, 23 October, B1, B4-B5.

Sizer, T.R. (1996) Horace's hope. what works for the American high school. Boston, New York, Houghton Mifflin Company.

Sokal Affair < <http://weber.u.washington.edu/jwalsh/sokall> >

Sykes, x.11998) The 'new professionalism "in education: an appraisal. Teacher Education Conference, University of Durban-Westville, South Africa, 20-22 July.

Taylor, C. (1995) Philosophical arguments Cambridge, Mass., Harvard University Press.

Taylor, N. (1996) Quality and validity in INSET evaluations. Johannesburg, JET Conference Proceedings, 27 February.

Usher, R. & Edwards, R. (1994) Postmodernism and education. London, Routledge.

Vinjevold, P. (1996) Evaluation report of the Northern Cape Primary School Workbook Pilot Project. Johannesburg, Joint Education Trust.

Vinjevold, P. (1999) Pros and cons of matric: imperfect, but a necessary exercise. The Teacher, February 1999.

Von Glasersfeld, E. (1998) Why constructivism must be radical, in Marie Larochelle, Nadine Bednarz, Jim Garrison (ads) *Constructivism and education*. Cambridge, The Press Syndicate of the University of Cambridge.

Walkerdine, V. (1982) From context to text: a psychosemiotic approach to abstract thought, in Michael Beveridge (ed) *Children thinking through language*. London, Edward Arnold Publishers.

Walkerdine, V. (1988) *The mastery of reason: cognitive development and the production of rationality*. London and New York, Routledge.

Wallis, M. (1997) The problem of bureaucratic administration in Patrick FitzGerald, Anne Me Lerman & Barry Munslow (eds) *Managing sustainable development in South Africa*. Cape Town, Oxford University Press.

Weeres J.G. & Kerchner, C.T. (1996) This time it's serious: post-industrialism and the coming institutional change in education, in Robert L. Crowson, William Lowe Boyd & Hanne B. Mawhinney (eds) *The politics of education and the new institutionalism: reinventing the American school*. Washington DC, The Falmer Press,

Weinberg, S. (1998) The revolution that didn't happen. *The New York Review of Books*, XLV, 15, 48-52.

Weingart, P. (1998) Scientific expertise and politico/accountability.' paradoxes of science in politics. Mimeographed.

Wolpe, A., Guinlan, G. & Martinez, L. (1997) *Gender equity in education: report of the Gender Equity Task Team*. Pretoria, Department of Education, Cape and Transvaal Printers (Pty) Limited.

Woolgar, S. & Pawluch, D. (1985) Ontological gerrymandering: the anatomy of social problems explanations. *Social Problems*, 32, 3, 214-227.

Worsley, P. (1997) *Know/edges: what different people make of the world*. London, Profile Books.

Zille, H. (1999) The darker side of matric results. *Sunday Times*. 13 January

LIST OF RESEARCH PROJECTS

RESEARCHERS/INSTITUTION	PROJECT TITLE
Baxen, J. & Green, L. School of Education, University of Cape Town	Primary teachers' use of learning materials
Bayona, E.L.M.and Sadiki, N. University of Venda	An investigation into appropriate ways of implementing institutional development (Whole School Development)
Bell, B., Chauke, T., Malatsi, A., & Maponya, A. University of the North	Implementing good group work in ESL classrooms
Centre for Education Research, Evaluation and Policy University of Durban-Westville	A very noisy OBE: A report of the implementation of OBE inside Grade 1 classrooms
Janson, J.D., Maqutu, T., Sookrajh, R. Dachs, T. Human Performance Systems	Large class teaching: A pilot study of eight Grade 5 classes in Kwazulu/Natal

Drost, A.W. Magau, L.T Mdekazi, I. & Ural, I. Human Sciences Research Council

An investigation of multi-grade classroom practices in the Free State province of South Africa

Duncan, K.
Ken Duncan and Associates

Initial reading research project

Ewing, D. & Setsubi, M.
Centre for Research and Community Development

Seeking lessons for teacher professional development

Jacklin, H., Hoadley, V., Guzula, X
School of Education
University of Cape Town

The learner progress and achievement study

Jita, Loyiso
Education Policy Unit (Natal)

Report on the development of a protocol for profiling progress towards best practices in Science

Khulisa Management Services & St Barnabas College
De Groot, M., Selvaggio, M.P., Ferreira, A., Kelly, G., & Virtue, J.

The development of diagnostic tests for Grade 7 literacy and numeracy skills

Maja, B.
Human Sciences Research Council

The enabling conditions for successful learning environments: A quantitative/qualitative synthesis of mathematics teaching and learning

Mitchell, G. in association with the Catholic Institute for Education

Change management: Best practice in Whole School Development

Murray, S.
Rhodes University

Seeking the possible: An evaluation of an intervention which seeks to help teachers learn African languages using an approach which integrates language and culture

National Language Project (NLP)
Makoni, S., Ngwata, W., Mgudlwa, N.

Investigation into Teaching Styles and Cognitive Processes in language learning

Onwu, G.O.M.
University of Venda

An investigation of the availability and use of learning materials in Grade 12 science classes in some selected schools in the Northern Province

Ota, C.
Education Policy Unit
University of Fort Hare

Assessing the impact of the Quality Schools Project (OSP) in selected schools in the Eastern Cape Province

Pile, K. & Smythe, A.
University of the Witwatersrand

Language in the human and social science classroom project

PRAESA
Pluddemann, P.Mati, X., Mahlalela-Thusi, B.

Problems and possibilities in multilingual classrooms in the Western Cape

Primary Maths Project, University of the Western Cape
Rossouw, L., Rhodes, S., & Christiansen,

Teachers' view on mathematics, mathematics teaching and their existing practices

Reeves, C. & Long, C.	Focus on Four: An investigation into Grade 4 mathematics teaching and learning.
Reeves, C. & Long, C.	Focus on Seven: A report on an investigation into language-sensitive activity-based methodology in primary science teaching at the Grade 7 level
Research Institute for Education Planning (RIEP) (Strauss, J.)	The evaluation of teaching and learning materials for multi-grade classes (an OBE approach)
Schollar, E. Eric Schollar and Associates in association with the National Business Institute	A case study of four schools participating in the EQUIP project of the National Business Initiative
School of Education, Training and Development	The real and the ideal: Field analysis of roles and competences of educators
University of Natal, Harley, K., & Timm, H	Innovative language practices in multilingual mathematics classrooms
Setati, M.	
Sigabi, M. & Mphuti, E. RADMASTE Centre University of Witwatersrand	A descriptive study of the nature and effectiveness of in-service teacher training and support in the implementation of OBE

South African Institute for Distance Education (SAIDE)
Morojele, M., Selikow, T -A., Welch, T.

Webb, P., Bolt, G., Austin, P., Cloete, M., England, V., Feza, N., Ilesley, J., Kurup, R., Meires, M-L., and Wessels, K.
University of Port Elizabeth

Western Cape College of Education (WCCE)
Kohler, B. Smith, E. & Koopman, R.

Wickham, S. & Versfeld, R.
TLRC University of Cape Town

Wright, J. & Johannesburg College of Education

Strategies for the design and delivery of quality teacher education at a distance: A case study of the Further Diploma in Education (English Language Teaching) University of the Witwatersrand
The nature and impact of accredited in-service education of under-qualified science and mathematics teachers: Which factors generate best practice in the classroom?

Teachers' knowledge of their practices

Investigating and establishing best practices in the teaching of English as a second language in under-resourced and multilingual contexts

Phonological training and metacognitive strategy instruction for children with reading difficulties in multilingual classroom contexts: A one-year follow-up study

Summaries of the PEI research reports

Summaries of the PEI research reports which follow were supplied by the researchers themselves. The main report is a selective synthesis of some of the findings of the individual research projects. The original research reports are available on request from the Joint Education Trust (info@jet.org.za).

Title: Primary teachers' use of learning materials

Researcher/s: Jean Baxen, Lena Green

Institutions: School of Education, University of Cape Town

Introduction:

The introduction of an Outcomes-Based approach to education, implemented through Curriculum 2005, seeks to change education in South Africa from a traditionally content-driven system to one which will ensure success for all children irrespective of their environment, ethnicity, economic status or disabling condition.

The shift in emphasis has had enormous implications for teachers. It requires, among other things, that they "... focus their attention and efforts on the desired end results of education ..." (Killer, 1996: 1). Teachers are now expected to be able to evaluate and select from curriculum materials in terms of their appropriacy in relation to particular outcomes and in terms of particular learners or groups of learners.

The Generic guidelines for the development of learning support materials for Outcomes Based Education (OBE) and Training document states that a key feature of any effective education and training system is the availability of adequate learning materials (1998:1). The document also postulates that learning materials are an integral part of curriculum development and a means of promoting both good teaching and learning.

This research was motivated by a concern about the current abilities of teachers to make optimal use of available learning materials and a wish to establish their perceived needs.

Our general goal therefore was to investigate current practices with regard to learning materials and establish perceived needs among primary teachers in Grades One and Seven. We aimed to investigate, in relation to particular learning areas and the overall critical outcomes of the new curriculum:

- ✍ the amount and nature of learning materials currently available in primary schools;
- ✍ the process by which they were selected;
- ✍ the ways in which they are used in schools; and
- ✍ teachers' perceptions of their specific needs for materials.

Permission to conduct the research was granted by the Curriculum Services Division of the Western Cape Education Department. Further contact to gain access and permission was done through the area offices in the region. Each office was asked to make available a list with the schools marked as either rural (R) or urban (U) and either well-resourced (WR) or under-resourced (UR). A letter was sent to the selected schools who were then contacted by the fieldworkers to make the final arrangements for administration of the questionnaires and later the observations and interviews.

The research framework included quantitative and qualitative dimensions. The quantitative dimension was concerned with accessing measurable information about the nature and amount of learning materials currently in schools and the processes of their selection and acquisition. For this purpose a questionnaire was considered an appropriate research tool. The qualitative dimension looked at teachers use of materials. Classroom observation and individual interviews appeared to be more appropriate means of gaining this type of information. The quantitative results highlighted the need in most schools in the sample. Most of the schools in the sample had less than half of the material considered basic in Grade 1 and Grade 7 classrooms. When classes had learning materials, they were often insufficient and not in a good condition.

The qualitative data focused on examining teachers' use of learning materials and revealed that teachers used materials most often to demonstrate in a controlled environment. Teachers seemed not only unwilling to let go and allow learners to make their own mistakes, they were even afraid to let learners respond, on their own, to what they (the teachers) had taught them. This was particularly evident in their need to demonstrate how to complete worksheets and tasks. Demonstration is not necessarily unfavourable but when it is used as the primary model, it does encourage a pattern of dependency which is difficult to break. Although the study did not investigate the implementation of the new curriculum, it was evident from the way teachers used materials that it will take considerable time and much intervention to establish the proposed curriculum as the norm.

The document analysis highlighted that eight of the nine provinces still operate through material selection committees who construct lists of approved materials. This approach worked well under a system with an inflexible syllabus. The new curriculum expects teachers to evaluate and select curriculum materials appropriate to contexts and outcomes. The study indicated that teachers in many schools were not currently involved in this process in a meaningful way. Decision making about materials at both Grade 1 and Grade 7 levels was largely in the hands of subject or grade groups. It was however, not clear whether any logical process or set of criteria were used when teachers as a group selected materials.

In addition, the range from which teachers in many provinces may make choices seems to have already been limited by the process explained above. This is problematic because there seem to exist discrepancies in the interpretation and key focus of criteria between provinces, and probably within selection committees. Having to work within approved lists only, tends to discourage teachers from knowing about and using possible valuable material that might not have been included in these lists. Moreover, the existence of lists encourages dependency rather than the development of independent judgement, which is directly in contrast to the main thrust of the new curriculum. Although teachers are represented on selection committees,

this does not mean that teachers voices are necessarily audible, nor does it empower individual teachers.

Integrally linked to the above is teacher confidence and competence. It was evident in the classrooms observed that confidence, either in the use of material or in the presentation of the content, was directly linked to the level of control in the classroom. If teachers are to change deeply entrenched practices and begin to explore more learner-centred forms of teaching and learning, then attention needs to be given to their levels of confidence and competence. This implies focusing on ways in which their confidence and competence can be developed. This might mean the development of in-service training courses that engage teachers in developing competence in the subjects they teach thereby indirectly building their confidence. While developing better and deeper understandings of subjects matter, care should be taken to break down misconceptions. What was insightful within the Grade 1 sample was the lack of conceptual understanding and the degree to which this made them either use the material inappropriately or give learners wrong information.

Most of the teachers in the study had attended materials development courses of three days and longer. Although the content, process and presentation of these courses is not known, it would seem critical that future courses pay special attention to developing a broad conceptual understanding of the role of materials as resources rather than sole sources of learning. Specific attention should be given to assisting teachers to reflect on the relationship between lesson outcomes and the choice of material. Focusing teachers' attention on the relevancy of materials for particular contexts, and on flexibility to accommodate diversity of learning styles is important. The teachers in this study did not seem aware of their own power, ability and responsibility to match materials to their aims and classroom contexts. Therefore it is crucial to develop to teachers confidence in selecting, adapting and creating learning materials.

This study has implications for curriculum developers, trainers and materials selection committees who need to take seriously the outcomes of this report if meaningful change in the provision and quality is to occur.

Title: An investigation into appropriate ways of implementing institutional development (whole school development)

Researcher/s: Prof E.L.M. Bayona Mr B. Sadiki

Institution: University of Venda Introduction:

Several countries, including South Africa are now undertaking, or are committed to undertaking, specific steps to bring about whole school development. To do this effectively, research suggests that it is imperative that they, first of all, critically review their existing educational policies, programmes and implementation strategies to determine their impact on institutional development.

In the case of South Africa, there is a wide gap between educational policy and the curriculum, and what is actually happening in schools to achieve whole school development. This is especially visible in schools within highly disadvantaged communities. It is the nature and reasons for this gap that was the focus of investigation in this study.

Research Objectives: Specifically, the study aimed at:

1. Examining policy and trends towards institutional development.
2. Examining scholarly views about whole school development across

the globe.

3. Examining the nature and extent of institutional development in the Northern Province.
4. Investigating the culture of teaching and learning and school governance in both functional and dysfunctional high schools within Thohoyandou
5. Advancing recommendations which might be considered in enhancing whole school development.

Research methodology:

The study was both qualitative and quantitative in nature. Extensive literature review, questionnaires, interview and observation schedules were its main sources of data. Participants in the study represented high school students, teachers and principals, as well as community members. The total group comprised of 180 respondents.

Main Findings:

Several constraints to whole school development were revealed pertaining to principals, teachers, students, curriculum decision-making, teaching styles, learning obstacles, matric examinations, infrastructure, resources, community involvement, and so on.

To overcome these whole school development gaps and problems the study advances several recommendations. The key ones are summarised below:

1. Academic and Professional Growth of Educators: The problem of underqualified and unqualified teachers in Thohoyandou High Schools makes it impossible to achieve whole school development. It is strongly recommended that a permanent and deliberately designed "on-the-job" (locally based/school based/field based) training programme for these teachers be considered urgently.
2. Professional growth in School Management and Administration: Strong and effective school management teams should be developed. Principals, Vice-Principals, Heads of Departments and Senior teachers

should be motivated to undertake studies in this area.

3. Participatory curriculum decision-making and development: Teachers should enjoy equal access to ownership and control of the school curriculum. School-based curriculum development supported by Curriculum Facilitating Teams at all levels of the education system should be established. Each school or group of schools should have a Curriculum Development Facilitating Team with a permanent Curriculum Development expert to facilitate participatory curriculum development activities.
4. Building and Providing the necessary resources: Most high schools are under-resourced and operating in very poor and unpleasant conditions. A special redress fund for these schools should be set aside immediately. Also, much potential for building resources locally is unrealised. Introduction of self-reliance projects, use of indigenous technology, mobilisation of locally available traditional skills and crafts for teaching and learning are essential ingredients towards whole school development.
5. Mass mobilisation towards educational development: Public orientation to the campaign for restoring the culture of teaching and learning should be intensified. There is urgent need for the Provincial and regional Task Force to initiate effective strategies for educating parents and the community, on matters of fund raising, building and maintenance of schools, etc.
6. Guidance and Counselling: There is need for guidance and counselling for all students and teachers to improve their personal preparedness in choice of subjects, study habits, teaching professionalism, morale, accountability and so on.
7. Monitoring of standards: The supervision of school programmes and instruction, the inspection of school buildings, grounds and equipment, the disciplining of students and teachers must be done more strictly, systematically and often than today. Most principals have lost authority and power over students and teachers. The current code of conduct in schools must be revisited by the government.
8. Language: An intensive course on the use of English as a medium of

learning and instruction by non-English citizens is highly recommended for Thohoyandou High Schoolteachers.

9. Educational Supplies: Inability of government to supply books, chemicals, etc on time affects schools negatively. the distribution of books and other materials should be privatised.
10. Equity in the distribution of teachers: There is serious imbalance in staffing between schools in Thohoyandou. This must be attended to by the government as soon as possible.

Title: Implementing Good Group Work in ESL Classrooms

Researcher/s: Brad Bell

Research Assistants: Tom Chauke, Anna Malatsi, Abner Maponya

Institution: University of the North

1. Introduction

For the last two decades, group work has been considered a valuable teaching and learning strategy in English Second Language (ESL) classrooms, and, in some respects, superior to teacher-centred methods. Group work increases language practice opportunities, improves the quality of student talk, helps to individualise instruction, promotes a positive affective climate, and motivates learners to learn. It is for reasons such as these that group work is a cornerstone of Curriculum 2005.

2. Objectives

Good group work does not happen naturally, however, and some teachers feel that special resources are required. This project

investigated the impact of training learners in turn-taking and peer-tutoring skills, the equality of interaction between boys and girls, the effectiveness of group work for the acquisition of grammatical accuracy, and whether or not group work can be productive in 'difficult' schools.

3. Methodology

An intervention study was conducted in the Grade 7 ESL classes of three schools in the Northern Province. The first was a rural farm school with a mixed Grade 7 and 8 ESL class, the second was a former Model C school with a multilingual English class, and the third was a township school with an overcrowded ESL class. To begin with, we observed and videotaped the regular teachers conducting group work with their classes for a month. We then conducted a pre-test of the learners' gender attitudes, their theoretical understanding of turn-taking and peer-tutoring, and their proficiency in selected grammatical forms. After this, a series of intervention lessons were conducted over the following two months, during which group work skills and selected grammatical items were taught to the learners while they worked in mixed-ability groups with peer-tutoring. Gender-related stimulus materials were used to support common language learning activities. All intervention lessons were also videotaped, and, together with the tapes of the observation phase, category analysed by external consultants. Finally, an equivalent form post-test was conducted. 65 learners completed and submitted both their pre- and post-tests.

4. Findings

Our analysis of the video tapes from the observation phase indicated that the regular teachers managed their group work by physically arranging the learners into small groups, but then continuing to teach in a traditional teacher-fronted manner. We called this 'cluster work'. In the intervention phase, the learners' practical implementation of turn-taking and peer-tutoring skills as recorded on video tape improved

significantly. The pre- and post-test scores showed that the learners' theoretical understanding of these skills also improved. At the same time, the amount of teacher-learner interaction and negative interaction between learners remained the same for cluster work and mixed-ability group work with peer-tutoring, while chorsing decreased markedly.

In terms of the acquisition of grammar, the learners' scores on the selected grammatical forms, for both the tutors and non-tutors, improved significantly.

In terms of gender, the attitudes and stereotypes that the learners brought into the classroom with them remained largely unchanged by the gender-related stimulus materials. The girls' theoretical understanding of turn-taking and peer-tutoring improved much more than that of the boys, while the improvement in grammatical accuracy was almost equal. Finally, it appears that the equality of interaction in single-sex groups is better for both boys and girls than the interaction in mixed-sex groups.

5. Summary and Conclusion

Good group work can be implemented effectively in most types of schools. It can best be achieved by training learners in specific group work skills, such as turn-taking and peer-tutoring. A change in teaching approach, from teacher-fronted cluster work to teacher-facilitated co-operative work, is required. No special materials, tasks or resources are necessary.

Title: A very noisy OBE: A report of the implementation of OBE inside Grade 1 classrooms

Researcher/s: Jonathan D. Jansen: Tholang Maqutu-Senior Reshma Sookrajh

Research Assistants: Brian Khumalo Gabriel Cele Thutukani Ngubane Thembisile Timber Mrs. Nkosi

Institution . The Centre for Education Research, Evaluation and Policy, Faculty of Education, University of Durban Westville

Research Objectives

- ✍ to determine how Grade 1 teachers understand the concept "Outcomes Based Education."
- ✍ to understand how teachers implement OBE within their Grade 1 classrooms.
- ✍ to compare teacher understandings and implementation of OBE in a variety of different resource contexts.
- ✍ to document specific formative requirements for the improvement of OBE implementation as articulated by Grade 1 teachers.

Research Design

The study initially targeted 32 Grade 1 classrooms for study from KwaZulu Natal and Mpumalanga provinces. The 16 schools (2 classrooms per school) were selected on the basis of a hierarchy of needs or resource profile i.e., a well-resourced white school, a working class/urban Indian school, an established township school, an informal settlement school, a rural/under-resourced school. The assumption of the investigation was that resources mattered i.e., that once could reasonably expect different implementation strategies and understandings of OBE based on the extent to which supporting material resources were available to the school.

The impact component of the study consisted of two classroom observation periods of 5 days each separated by about 5-7 months. That is, each Grade 1 classroom (using the same teacher) was intensively observed for 5 days early in the 1998 implementation year, and 5 days towards the end of the 1998 academic year. The structured observations were complemented by in-depth interviews with the affected teachers; and teacher, school and classroom questionnaire profiles. To enable a baseline assessment of change in teaching and learning in Grade 1 classrooms, teachers were asked to complete a retrospective questionnaire comparing their teaching before (1997) and since the introduction of OBE (1998)

The case study component involved two schools (that is, two classrooms) per province which were studied in-depth for a period of 10 consecutive school days to develop a comprehensive account of how teachers understood and implemented OBE in their classrooms. The four schools were reputational samples: two schools with very positive reputations for OBE implementation and two schools struggling with the implementation of the new curriculum.

Main Findings

The extensive data for this study has been analysed and the following should be interpreted as initial and tentative findings ahead of the final synthesis of individual classroom and teacher reports:

1. that Grade 1 teachers have markedly different understandings of what constitutes 'outcomes based education.'
2. that Grade 1 teachers implement OBE in significantly different ways within their respective resource contexts.
3. that Grade 1 teachers are often uncertain as to whether their practices actually constitute "OBE" or not; in this respect, there is considerable ambiguity and uncertainty among teachers about their practices in relation to OBE.
4. that disruption to classroom teaching, and the under-utilisation of scheduled teaching time, is one of the most important factors distinguishing black schools (high disruption) from white schools (low disruption). It was rare to observe a Grade 1 teacher for 5 consecutive days without losing at least 1 day in the research process because of non-educational events.
5. that teacher:learner ratios make a significant difference to the available pedagogical options that Grade 1 teachers have in disadvantaged schools; however, in privileged schools these ratios have been managed in creative ways such that some of the basic principles of an OBE pedagogy were likely to be achieved.
6. that there is considerable support and enthusiasm for OBE among Grade 1 teachers, despite the difficulties of implementation encountered in many classrooms.
7. that in white schools, teachers see OBE as synonymous with existing practice, apart from the mode of assessment required in the new curriculum.
8. that most teachers continue to teach the way they did before OBE, the only difference being the recording of assessment under the new curriculum.

Title: Large class teaching

Sub-Title: A pilot study of eight Grade 5 classes in Kwazulu-Natal

Researcher/s: Dr Terry Dachs

Institution/s: Human Performance Systems Limited

Research objectives

The project was in the form of a pilot study of Eight Grade 5 Classes in KwaZulu-Natal to consider the following:

- ✍ How do teachers in large classes interact with their pupils?
- ✍ How effective is their teaching?
- ✍ What use is made of teaching and learning materials?
- ✍ How does the use of such material contribute to effective learning?
- ✍ What do teachers, principals and materials designers feel about large class teaching and the benefits of the materials available to them?

The sample

The classes were selected to represent a cross-section of urban, peri-urban and rural schools - all of whom were engaged in implementing either the READ or the SMILE programme for language development.

Research methodology

Observations were made at twenty-two lessons and the verbal interaction occurring recorded on specially designed schedules. Interviews were also conducted with the school principals and the teachers involved. Learning gains were established for both the programmes.

An analysis was made of the nature and degree of verbal interaction and of the

extent to which the teaching and learning materials supplied in the programmes were employed. The opinions of both principals and teachers on the appropriateness of the programmes and on the challenges presented by large class teaching were gathered and analysed.

Main findings

It is clear that the classrooms observed are dominated by teacher talk. An average of 81,82% of the observations made of the teacher indicated that he/she was talking. Whilst this is typical of many classrooms on most days throughout the country, other interesting behaviours were identified in the classrooms included in this study. Some 9,7°% of the time was spent in interacting with groups of learners (4,64% explaining things to them and 4,06% asking them questions). A further 10,25% of the time was spent interacting with individual learners (1,64% explaining something and 8,61 % in questioning). Both these trends are encouraging but are more especially so when one remembers that these teachers are dealing with large classes (including one of 90 learners). This group and individual interactions is, as is all the teaching in these classrooms, facilitated by the materials made available to the teacher.

In a similar way the 7,35% of time the teacher spent listening to or observing groups of learners and the 5,32% doing the same with a particular individual in the class is encouraging. Good use of the teaching and learning materials was made to facilitate this process.

In general, excellent use (and possibly even overuse) was made of the materials provided in the lessons observed. The study attributes much of the learning and other classroom management gains of the large classes studied to the use of the materials supplied by SMILE and READ. It endorses the belief that one of the most effective ways of improving teaching and learning, particularly in the area of language development is to be found in the developing, supplying, and supporting of such materials. These will, it is believed, do much to ensure that meaningful learning takes place in a well-managed classroom environment.

Titles An investigation of multi-grade classroom practises In the Free State Province of South Africa

Researcher/s: A.W. Drost, L.T. Magau, J.N.

Mdekazi, I. Ural

Institution/s: Human Sciences Research Council (HSRC)

Research objectives

In a multigrade classroom, learners in different year-grade levels receive instruction in the same class. This research project aims at investigating case studies of multigrade classes, in order to analyse multigrade classroom strategies in the current educational dispensation in South Africa. Research design and methodology

In order to establish trends in multigrade classroom implementation in South Africa, with special reference to remote rural areas and historically disadvantaged communities, selected schools in the Free State province were investigated on the basis of two questionnaires, two interview schedules and an observation schedule.

A letter of invitation to participate in this research project was posted in August 1998 to 31 appropriate schools on a list supplied by the Free State Department of Education (FSDoE). This letter included a response form for the schools to indicate their willingness to participate in the research and also an abbreviated version of the questionnaire for principals. Altogether 21 of the schools responded to this letter and returned the completed questionnaire.

On the basis of the telephonic contact, combined with the responses to the postal questionnaires a list of 24 willing schools was eventually compiled. This list was then divided among the team of five observers who had four cars at their disposal. The first car visited schools in the north-western region, the second car schools in the north-eastern region, the third took the south-western region and the fourth car the south-eastern region. The five observers each made appointments to visit three of the listed schools in their allocated region during the week of 14 to 18 September 1998. They succeeded in eventually visiting twelve schools.

Main findings

A two-roomed school building is typical of the multigrade class schools encountered in the Free State. In such a school there are usually two teachers, one taking the junior grades (Grades 1 to 4) and the other the senior grades (Grades 5 to 7). Revision and repetition are inherent elements of multigrade classroom teaching and learning. These two factors support the reinforcement of basic concepts, especially in the subjects of reading, writing and arithmetic.

Peer tutoring and delegation of responsibilities are standard practices in multigrade classroom teaching and learning. These two features have the added benefit of the development of social responsibility from a very early stage in the child's education.

Most of the teachers did not have any special training for multigrade teaching in rural environments. Their coping ability could largely be linked to their attitudes of accepting the challenge due to their dedication to education. More learning materials and in-service training programmes need to be developed for teachers of multigrade classes.

If the cultivation of responsible citizenship is seen to be the ultimate aim of education, then multigrade classroom teaching/learning indeed proves to be sound educational practice.

Title: Initial Reading Research Project

Researcher/s: Ken Duncan

Institution/s: Ken Duncan & Associates

Rationale and Objectives

This research examined the effectiveness and transferability of an innovative initial reading programme being implemented at Zama Centre, an independent, community-based school in Daveyton in eastern Gauteng. The programme is based upon the Montessori system, somewhat modified to suit the particular needs of disadvantaged South African schools. Particular emphasis is given to the development of the learners' English reading skills. This research, which was conducted by Mr Ken Duncan and Mesdames Tuli None and Rita Tandy of Duncan Education c.c. examined the effectiveness of the Zama approach to initial reading instruction and tested the hypothesis that it might serve as a model for ordinary public schools.

Research Design

The research incorporated two strands:

1. A quantitative strand, consisting of communicative reading tests and an analysis of learners' discourse in terms of the numbers of C-units, nouns, verbs and different tenses used.
2. A qualitative strand, comprising general school observation, classroom observation and structured interviews with teachers.

The research involved three experimental and three control schools. The language lessons of 14 educators were observed - eight at the experimental and six at the control schools. At each school, pre- and post-tests were administered early and late in the year respectively to representative samples of 10 learners from each of Grades 0-3.

Findings & Conclusions

The researchers found a significantly higher level of reading competence amongst learners in the experimental schools than in the control schools. Interviews with educators and direct classroom observation further indicated that the greater competence of the experimental-school groups was largely due to the instruction which they had received and not to any inherent differences in the resources or facilities of the schools, the educators or the learners themselves. Indeed, the more consistently Zama's Montessori-derived methodology was applied, the better were the results.

Learners in the experimental schools generally scored higher, in both the pre- and post-tests, than learners in the control schools. The tests also showed that reading progress was more marked in the experimental than in the control schools. The discourse analysis data likewise indicated that the experimental-school groups progressed farther and faster than their control-school counterparts.

The following factors appeared to be the most important contributors to the success of the experimental schools:

1. The amount of English used in the classroom.
2. The number of individual reading activities performed by the learners.
3. The degree of autonomy and independent learning fostered in the learners.
4. The systematic teaching of phonics.
5. The encouragement of peer teaching

The evidence produced by the research indicated that the success of the experimental schools could be attributed mainly to their rather than to their socio-economic environments or general school management. It also showed that ordinary educators in ordinary public schools and ECD centres can successfully adopt and implement these methods with minimal in-service training and support.

Title: Seeking lessons for teacher professional development

Researchers: Deborah Ewing, Mpumie Setsubi

Institution: Centre for Research & Community Development

Aim

The aim of this six-month pilot research project was to support the national Department of Education's plans to implement whole school development, in order to improve the quality of teaching in South African schools towards the realisation of Curriculum 2005.

The research was intended to help meet the need for a first-hand understanding of the obstacles to teaching and learning in South Africa's schools in order to support the professional development of teachers so that they can most effectively implement the curriculum.

Objectives

The objectives were twofold:

1. To provide reliable data, through action research, to identify difficulties faced by teachers and learners in large, multilingual, multicultural and otherwise diverse classes.
2. To suggest possible strategies for addressing the problems identified. The research was based on a questionnaire designed to be administered in seven selected primary schools in the lower South Coast region of KwaZulu Natal. The questionnaire was designed in three sections, to be completed through interviews in school with three target groups: Principals, Teachers and Pupils.

While the research topic was concerned with obstacles to teaching and learning related particularly to class size and diversity, the study avoided pre-empting the views of the target groups on the relative significance of these obstacles compared to other problems the respondents faced. Therefore, the range of obstacles to learning and teaching that were mentioned in the interviews are covered in the findings to show how issues of class size and diversity rank alongside them.

Research design and methodology

General

The study was designed to document the obstacles to teaching and learning as experienced directly and articulated by educators and learners in the classroom.

It was based on the assumption that there is a need for a first-hand understanding of obstacles to teaching and learning in our schools in order to support effectively the professional development of teachers.

The research was conducted in primary schools because these are the basic level of formal education, the most formative stage of the educational process.

Research instrument

The study was based on a detailed pre-tested questionnaire administered through standardised one-to-one interviews in schools.

The questionnaires were designed to elicit quantitative data about teaching and learning conditions in the target schools, and qualitative or attitudinal data about responses to those conditions among school managers, educators and learners.

Of prime concern was the need to keep questions open, so that respondents were not 'led' in their interpretation of the questions or in their answers.

For example, while our purpose was to identify obstacles to teaching and learning related to class size and diversity, we did not have an agenda to prove that these were in fact obstacles, or that they were the only or the biggest obstacles. Therefore, we formulated the questions in such a way that respondents were asked to identify for themselves the obstacles/challenges they faced and then asked to consider issues of class size and diversity in that context.

The questionnaires were administered by trained community-based researchers who were familiar with the target region, fluent in the home languages of the target population and aware of the educational issues affecting them.

Sampling

Target area: The target area was the lower South Coast region of KwaZulu Natal. This is part of the Port Shepstone Education Region. It is a mainly rural area, with one main urban centre (Port Shepstone) and several peri-urban/township settlements.

Method: the method of sampling used was representative targeting, based on the type and number of primary schools in the target area (broadly the area of operation of Practical Ministries, for purposes of access and prior knowledge of the conditions and whether the schools meet the criteria).

Criteria: in order to derive a reasonable sample, the following criteria were used:

- ✍ Diversity in the school population, for example, in terms of culture, language and so on
- ✍ Large class size, (in objective terms, classes with more pupils than the regional average; in subjective terms, classes that the teachers and pupils consider too large for effective teaching)
- ✍ Regional representivity in terms of urban, peri-urban/township and rural environments
- ✍ Regional representivity in terms of level of resources, services, etc. Geographic spread of the schools in the area.

Main findings

The main findings of the pilot project are that:

- ✍ The single greatest obstacle to teaching in the view of managers and educators is lack of resources
- ✍ Large classes and high pupil:teacher ratios are a major obstacle both to teaching and learning
- ✍ Diversity is a significant obstacle to learning and teaching but the key issues are: age, ability, behaviour and socio-economic background, rather than colour, culture or language.
- ✍ The major obstacles to learning experienced by learners are not related to resources and teaching methods but to the behaviour of fellow learners and educators.
- ✍ The glaring disparities of the apartheid education system still exist between the historically black and historically white schools, despite changes in policy.
- ✍ These disparities leave the most disadvantaged (rural) schools less able to absorb learning and teaching problems and with fewer options about how to address them.
- ✍ Therefore, the effects of problems of resources, large class size and diversity are more keenly felt in the poorest schools, both in terms of educational performance and teacher and pupil morale.

Title: The learner progress and achievement study

Researcher/s: Heather Jacklin, Ursula Hoadley Xolisa Guzula

Institution/s: School of Education University of Cape Town

Introduction

The Learner Progress and Achievement Study is based at the University of Cape Town. It aims to identify, describe and explain factors which promote or impede progress and achievement in historically disadvantaged urban schools in South Africa. It takes the form of a multiple case study of two primary and two high schools in the Khayelitsha area within Cape Town. It is a long term study incorporating two cohort studies and utilising qualitative as well as quantitative data collection strategies. It is envisaged that the project, which was established in August of 1997, will have a life span of seven years. Every year the study focuses on one or more selected issues as sub studies. PEI co-funded the following three sub-studies conducted in 1998, along with the Anglo-American de Beer's Chairman's Fund.

The relationship between school choice, school admission practices and media reporting of standard ten results. This sub-study sought to examine the interplay of media reporting of standard ten results, school admission practices and school choice practices and the effect of these on differential academic achievement in two geographically proximate secondary schools. Data was drawn from interviews with forty learners as well as observations within schools and interviews with school staff.

The sub-study concluded that the interplay of these three sets of factors contributes to the establishment of a status hierarchy of schools, even within an historically disadvantaged area. Schools that attain prestige due to relatively good results are better positioned to attract and select a student population more likely to succeed and also to establish conditions which support learner success.

The extent and causes of overage in grade eight.

This sub-study was based on a survey of the school histories of 669 grade eight learners in two secondary schools in Khayelitsha. The study concluded that:

- ✍ 60% of grade eight learners in the two schools were overage in 1998.
- ✍ In grades four to seven and nine to twelve an even greater proportion of learners were overage, peaking in grade twelve where 83% of learners were overage.
- ✍ A greater percentage of boys than girls were overage.
- ✍ Overage was more prevalent in one school than in the other. This difference could be related to the school's ability to select learners.
- ✍ The casual factors contributing to overage were repetition, drop out and late starting. Repetition was the strongest casual factor. Repetition and drop out rates were greatest in grade one.
- ✍ Disruption of schooling due to movement between regions (especially migration from the Eastern Cape to the Western Cape) was linked to overage. 33% of all drop out incidents were related to migration.
- ✍ Other factors that contributed to the disruption of learning included bad health, poverty and familial disruptions (such as deaths, divorce)

This sub-study suggested that out of school factors were important in explaining school disruptions and overage. It is a weakness of the study that the role of in school factors did not emerge. Subsequent sub-studies will supplement this sub-study by focusing more closely on in-school factors and on the articulation between in- and out- of school factors.

The extent, causes and management of underage in grade one.

This sub study was based on a survey of all grade ones in two Khayelitsha primary schools as well as interviews with primary care givers of forty of learners, interviews with school staff and observations of four grade one classes. Data analysis is not yet complete. A report on this sub study will be available later in 1999.

Title: Development of a protocol for profiling progress toward best practices in Science

Researcher/s: Jita, Loyiso Karlsson, Jenni

Institution/s: The Education Policy Unit (Natal)

Research objectives

The key objectives of the study were to:

1. Develop a protocol for profiling 'best practices' in science education across the range of public schools in South Africa.
2. Identify patterns of progress towards 'best practices' in a selected sample of practitioners - and therefore also institutions - and thereby help policy-makers identify preliminary points of intervention in facilitating the changes envisaged in the new curriculum 2005 learning area of Natural Sciences.
3. Study international experience of reforming instructional practices and gather evidence of best practice in Science education and its applicability to South Africa.

Research design and methodology A multiple case study approach was adopted. International experience

Curriculum innovations and teaching practices in Japan and the United States science education were investigated.

Classroom practices

Teachers who have attempted to reform their practice in line with the new vision for curriculum in South Africa were observed. Four teachers were identified through a process of nomination (including self-nomination) for piloting the PROTEP instrument. For this purpose qualitative methods were most appropriate since they are well suited to in-depth analysis of complex issues and allow for rich descriptions and understanding the processes of change within local contexts.

The research steps were as follows:

1. A draft Progress toward Excellence Profile (PROTEP) protocol was developed from an analysis of curriculum frameworks documents.
2. South African findings from the TIMSS data set were collected and reviewed.
3. An interview instrument for interviewing different role-players that participated in Outcomes Based Education pilots was developed.
4. Literature concerning best practices in science education in Japan and USA was reviewed,
5. The draft protocol (step 1) was modified as a hybrid PROTEP protocol in light of evidence concerning best practice in the USA, Japan, and South Africa.
6. Four teachers from KwaZulu-Natal were selected for observation and interviews using the hybrid PROTEP protocol to develop a profile of their classroom practice.
7. The final report focussing on the profiles and conditions of best practices was written.

8. Research report and findings were posted to major stakeholders, including officials of national and provincial departments of education, policy decision-makers, teachers and education managers.

Main findings

1. The PROTEP instrument to profile teaching practice is useful but its major weakness is that it creates a somewhat artificial distinction between parts of what is essentially a single whole. It is difficult, and sometimes not useful, to separate the different aspects of a teacher's practice in the classroom.
2. Initially the draft protocol risked fragmenting aspects of classroom practice. In applying the CBAIVI framework it became necessary to consider chunks of instructional practice within a lesson. From a teaching point of view, this makes much more sense. However, when identifying needs for professional development intervention, an examination of the components may be more useful.
3. Although there is complementarity between the qualitative indicators of the PROTEP instrument, some tensions were detected during the implementation. For instance, some categories are labour intensive and produce elaborate descriptions that require much time to analyse and interpret. For those concerned with obtaining quick information to guide staff development interventions, the PROTEP process may be too long.

Additional findings on the practices of the sampled teachers are important to consider:

1. Subject matter concerns are weak at this grade level. The specific learning area outcomes were not mentioned or recognised by any of the teachers.
2. There was little evidence of systematic reflection on practice by the teachers.
3. There is serious confusion among teachers about how to report on

assessment.

4. Further work on how to make the PROTEP instrument more accessible and manageable to classroom teachers is needed.
5. At present there is no place for contextual background issues in the PROTEP instrument e.g. subject matter preparation of the grade teacher. Such information would be required in order to design a flexible and appropriate course of intervention.

Title: The development of diagnostic tests for Grade 7 literacy and numeracy skills

Researcher/s: Moira De Groot, Mary Pat Selvaggio, Ana Ferreira, Gary Kelly, June Virtue

Institution/s: Khulisa Management Services, St. Barnabas College

Introduction:

St. Barnabas College set out to develop assessment tools in the key areas of literacy and numeracy which could be used to evaluate learner attainment at a Grade 7 level. Grade 7 was chosen because it constitutes the first year of the Senior phase of education. In the present context, the Grade 7 year is situation in primary schools and achievement in this year of school can be used to direct learners towards appropriate secondary school placements. The design of the Maths and English Language assessment tools was informed by Curriculum 2005 and Outcomes Based Education principles - thus criterion-referenced. A primary concern of the research was to determine optimal levels of performance of learners in disadvantaged schools, most of whom are English Second Language speakers.

A first prototype of the tests was developed and trialed at St. Barnabas College in Gauteng and Bophepha Primary in Wolmaranstad. Based on the learners' performance and the testers' observations, the tests were modified (as Prototype 2) and tested in four "high-performing" primary schools in the Northern Province and in Gauteng. Norm-referencing analysis was conducted on Prototype 2 in order to ascertain the relative ease or difficulty of the tests. Analysis of learner performance on Prototype 2 shows that the tests are fairly good discriminators of Maths skill and performance at the Grade 7 levels. On the other hand, neither the literacy or the numeracy test is challenging enough for higher achieving learners. Although there were significant differences in performance of Grade 6 and Grade 7 learners on the tests, the distribution of Grade 7 scores was generally clustered above the expected mean (the 50th percentile of possible scores) indicating that the tests were not sufficiently challenging or difficult enough for Grade 7 learners. This confirms the opinion of one expert who stated that the tests were not challenging or difficult enough.

The researchers conclude that while the tests require the inclusion of more difficult items, they are valid tools for assessing learner attainment of disadvantaged ESL learners at a Grade 7 level.

Title: The enabling conditions for successful learning environments: A quantitative/qualitative synthesis of mathematics teaching and learning

Researcher/s: Botshabelo Maja, Sylvia Shilubane, Tom Magau, Joe Lehutjo, Derek Gray, Colleen Huges, Gaba Moleko, Max Khuto, Semakaleng Moathlodi, Cheryl Reeves

Institution/s: Human Sciences Research Council

Research objectives

The project looked at the enabling conditions for best performance in mathematics. The intention was to identify those classroom factors that lead to "best performance" in mathematics in selected schools. Thus learning outcomes in mathematics - ascertained through achievement tests administered to pupils, are related to teaching and learning practices - which emanate from classroom observations, teacher profile and interviews. The learners' background - based on the learner questionnaire administered to all learners, and management questionnaire - which looks at a variety of school-based management issues, were some of the additional instruments employed. The project thus aimed at establishing links between classroom practice, learners' background, school environment and achievement in mathematics.

Research methodology

From the onset , the project attempted to merge both quantitative and qualitative methods of research: The mathematics achievement tests (see appendix section) used in twenty selected schools included a substantial bank

of tested questions that were drawn from the Standard 6 Item Bank and other standard 6 test banks in the HSRC. Population and standardisation data is available for all the Item Bank questions used. Useful free response and other items from the TIMSS test papers which are not under embargo (i.e. question clusters J to Z) were also incorporated into the question paper. For the TIMSS based questions, there are South African and International indices of difficulty and population data available. The test was for 1 hour ((4 45 questions), divided between Multiple Choice Questions and Free Response Items. The test was divided into two parts comprising 30 Multiple Choice Questions from the HSRC Item Bank and the TIMSS 1995 achievement tests, and 13 Free Response items from the TIMSS question pool.

The learners' questionnaire attempted to capture the learners' background by looking at factual information such as first language, availability of educationally oriented materials and other resources at home, educational activities at school, extra-mural activities, and parents' level of education. It also elicited opinions on issues such as the learners' career objectives, their attitudes towards math and science and the various sections within the disciplines, and education generally.

Structured observation and teacher interview schedules were used in the second phase of the project. The observation schedule was designed to collect data on teachers' instructional approaches to teaching math concepts and processes. The structured interview was designed to establish details on aspects of the lesson that are not evident through the observations of the teachers' lessons.

Performance of the twenty schools

The Test Scores:

Part A: Multiple Choice Questions (MCQ's)

On average all schools did relatively well in this part. The best school had an average of 73.78%. Only one school achieved an average of less than chance level, namely 24.07%. Chance level is 25% for this test.

Part B: Free Response Questions (FRO's)

On average only 4 schools performed relatively well in this part, all other schools (16 schools) did bad (28.59%) up to extremely bad (0.76%)- The best school had an average of 73.78%. An alarming factor is that so few learners attempted the Free Response Items. On average 26.64% of all learners did not even attempt the FRO's. (See Table 1.1.), whereas 96.12% of all learners attempted the MCO's. In a particular school (Makgoka), 67,69% of learners did not attempt the FRO's at all. There could be many reasons for the above situations of which only a few possibilities can be mentioned.

- ✍ Time was "wasted" on Part A, resulted in just not enough time to answer Part B.
- ✍ Because Part B involved more reading and writing than in part A, it might be that because of learner disabilities in this regard, the learner was not able to understand nor write down a meaningful answer.
- ✍ The questions had to be read, understood and an answer produced, which takes a fair amount of time, especially if taken into consideration that many of the learners were English second language speakers.

Total Score:

The total score varied from 68.70% (Capricorn) to 15.07% (Apple). Only the data from the first 7 schools is worth looking at, the other 13 schools performed so badly, no reliable deductions can be made for these schools based on the available data.

School Management Trends across school categories:

English, Mathematics, Afrikaans, General and physical science were given the most slots in the timetable.

- ✍ Teacher/learner ratios seemed to vary across schools and were not

related to achievement.

- ✍ Teacher qualifications varied across schools and thus could not be related to achievement.
- ✍ All schools have experienced major changes in their governing bodies in line with the Schools' Act, the results of which were positive all round.
- ✍ Familiarity with some of the principles entailed in Curriculum 2005 varied across schools, some of which had attended courses and seminars and some of which have not.

Trends per school category:

- ✍ The best achieving schools tended to have less discipline problems compared to the least achieving ones. This trend was most noticeable in relation to late coming and absenteeism.
- ✍ The best achieving schools tended to perform above 95% consistently in all the grades, whilst the least achieving schools on the other hand consistently performed below 50% in all the other grades. This further correlated with the dropout rates, which were significantly higher in the least achieving schools compared to the best achieving ones.
- ✍ Teachers in the best achieving schools spend more than double the time on lesson preparation compared to their counterparts in the least achieving ones.
- ✍ There was a disturbing trend in the least performing schools where learner/teacher ratios tended not to correlate with our calculations. Calculations provided by the schools were almost double our own, which are based on teacher and learner numbers per school.
- ✍ The attitudes towards the provincial departments of education in the best performing schools were generally negative, as against those in the least performing schools which tended to be positive.

Classroom processes

Trends across school categories:

- ✍ Most of the teachers made the mathematics concepts and processes to be learnt explicit.
- ✍ Most of the teachers failed to build on and move beyond learners' existing understandings.
- ✍ Teachers introduced learners to appropriate new mathematics language.
- ✍ Teachers used representations such as number lines and diagrams to demonstrate how unfamiliar mathematics concepts and processes work.
- ✍ Teachers provided individual learners with opportunities to practice using new mathematics concepts.
- ✍ In all lessons observed learners were provided with some form of written mathematical text.
- ✍ Teachers did not encourage learners to discuss new mathematics concepts and processes with each other.
- ✍ Teachers assessed whether learners have learnt the concepts and processes through tasks which formed part of the lessons and home/classwork at the end.

Trends per school category

- ✍ Teachers in the best performing schools not only made the concepts and processes to be learnt explicit, but further made the purpose for learning them clear. Some of the teachers even created a web of understanding by assisting learners to link familiar concepts with the new ones.
- ✍ Teachers in the best performing schools focussed only on form when introducing learners to new mathematics language, those in the best performing schools also focused on meaning and mad connections with learners existing understandings.
- ✍ Teachers in the best performing schools used multiple forms of mathematical imagery and representations to demonstrate how new

mathematics concepts and processes work

Whilst learners in the least achieving schools were simply given opportunities to respond to questions without reasoning or elaborating, those in the best performing schools on the other hand provided some reasoning for their answers. Teachers assisted those who struggled in an attempt to ensure that they know what they are talking about, and further assisted learners to develop greater levels of independent competence.

Teachers in the best performing schools assisted learners to develop strategies they need to engage with text representations, whilst those in the least performing schools simply provided learners with written text.

Teachers in the best performing schools used learners' answers to identify misconceptions and provide feedback about what they must do to improve their learning, whilst those in the least performing schools tended to mismanage the process mainly by ignoring such misconceptions and thus not providing the necessary feedback.

Title: Change Management : Best practice In Whole school development

Co-ordinator: Dr Gordon Mitchell (InterCultural Resources)

Researchers: Mr Andrew Schofield Ms Petra Jaaskelainen

Associates: Mr Mark Potterton (Catholic Institute of Education) Prof. Pam Christie (University of the Witwatersrand)

Research Objective

Formulate a competency profile for change management based on a role analysis of leadership in schools.

Method

In order to learn from best practice, nine exemplary schools were identified. Officials of the Northern Cape Education Department assisted in the formulation of appropriate selection criteria and research methodology. Interviews and focus groups were conducted with 14 principals and deputy principals, 56 educators, 3 parents, three school governors and 223 learners. Questionnaire responses were obtained from 9 school principals, 147 educators, 126 learners and 60 parents. A further 69 responses were obtained from principals in a postal survey of schools in the Northern Cape. The Human Resources methodologies of role analysis and competency formulation were utilised to interpret the information obtained.

Findings

1. Characteristic of the schools where change is well-managed is the presence of constructive leadership attitudes. Imaginative ways of implementing externally generated change are found. Furthermore, these schools have a relatively high incidence of internally generated change, such as fund-raising.
2. Principals are more positive about the future than educators who feel pessimistic about most of the recent changes that have taken place. The continuing prospect of rationalisation is by far the most mentioned cause of anxiety, which is understandable in a province such as the Northern Cape where educator: learner ratios are relatively low.
3. Policy changes, particularly the abolishment of corporal punishment and greater learner diversity, are experienced by educators as increased workload, contributing to low morale. Under these

circumstances school managers not only need to initiate alternative organisational systems, curriculum development and in-service training, they have to formulate strategies for improving staff performance. In contrast to several other provinces, Union activity in schools of the Northern Cape is generally not experienced as disruptive.

4. The personal values and integrity of leaders are seen to be the most important qualities by all stakeholders responding to the questionnaire. This confirms international research findings about the perceived importance of consistent leadership values during times of social and organisational change.
5. Interpersonal skills are always mentioned as a necessity. It is evident that there has been a significant shift towards a more democratic approach to school management. The principal is now part of a School Management Team, and needs to consult all stakeholders. The selected schools all had in place well-established structures and systems to facilitate decision making which is both participatory and efficient. Participatory management competence is therefore vital.
6. The introduction of Governing Bodies is a significant innovation. Principals in the exemplary schools all co-operate closely with the Governing Bodies and view their contribution as crucial to the smooth functioning of the school. In certain situations School Governing Bodies have more power than the principal in attaining 'unpopular objectives: for example, under-performing educators or parents not paying school-fees are reported to them. In one of the schools they led a successful protest action against the Education Department.
7. Two areas of competence ranked consistently last are:
 - ✍ Regular contact is maintained with officials from the Department of Education.
 - ✍ The educational vision of the new South Africa is understood and actively supported.

Educators, particularly white and coloured, are often scathing in their comments about the performance of departmental officials who are viewed as ANC appointees with little professional ability. A certain

amount of political frustration is evident, but this is not the only problem in the relationship between schools and the Department. Principals complain of the inefficiencies and vacillations caused by inadequate planning. This demands extraordinarily high levels of negotiation skills from the person in the middle. At the same time principals recognise that the new flexibility and willingness to listen creates opportunities for the determined negotiator.

8. Socio-economic inequalities continue to be a factor in schools. A principal of a former model-C school, charging fees of three to four thousand Rand per annum, is in a very different position to the principal of a former House of Representatives or DET school where it is a struggle to obtain fifteen Rand from the parents. The range of competencies appropriate in one setting could be very different to those in another.

Title: Seeking the possible: An evaluation of an intervention which seeks to help teachers learn African languages using an approach which integrates language and culture

Researcher/s: Sarah Murray

Institution/s: Rhodes University Goals of the research

The main goal was to understand the cultural approach to language learning used by the TALK (Transfer of African Language Knowledge) Project. I tried to ascertain what it could offer learners of African languages, especially teachers trying to learn these languages.

An additional goal was to explore the potential of the approach to realise some of the goals of the proposed new norms and standards in teacher education.
Research methodology

A social constructivist approach to evaluation was used (Guba & Lincoln 1989). Using this approach, an evaluator first identifies 'stakeholder groups', that is people who have an interest vested in the matter under investigation. She interviews members of each stakeholder group and asks them about claims, concerns and issues. Once these are established, the evaluator takes the claims, concerns and issues raised by each stakeholder to all other groups for comment, refutation or agreement. Those aspects which cannot be resolved become the focus of subsequent research.

Research procedures

Three TALK African language courses for teachers were selected as sites for the evaluation. They were selected to provide as much variety as possible in terms of:

- ✍ the nature of the school in which the course was held; the perceived success of the course;
- ✍ whether the principal was involved;
- ✍ whether they used their own or TALK helpers (i.e. teaching assistants);
- ✍ the year in which the courses were run.

The following stakeholders were identified with regard to each course: initiators, learners, facilitators and helpers. Four facilitators, five initiators, thirteen learners, five TALK helpers, eight student helpers and two teacher helpers were interviewed.

Constructions - written interpretations of the claims, concerns and issues - were drawn up for each group of stakeholders in each course and taken back to each interviewee for confirmation. These then provided the focus for three stakeholder group meetings. The purpose of the meetings was to establish

where consensus could be reached in each school regarding claims, concerns and issues and where differences of opinion still existed. Subsequently a complete report was drawn up for each school and sent to them for comment. This information was then synthesised to form an interim evaluation report of the TALK schools programmes, which provided the data for this report.

Results of the research

The main claims made for the TALK courses were:

- ✍ They developed cross-cultural understanding.
- ✍ They developed empathy in teachers for African students learning through the medium of English.
- ✍ Most teachers enjoyed the method of language learning and put it into practice for the duration of the course.
- ✍ Teachers' use of African languages - albeit limited - had positive affects on relationships both inside and outside the classroom.
- ✍ The courses raised consciousness about the value of African languages.

The main concerns expressed were:

- ✍ Most teachers did not continue using the method after completion of the course. Consequently they did not learn much language.
- ✍ Some learners were unhappy with some aspects of the method. There were context specific concerns.

The main issue raised was that of motivation for African language learning, which is linked to the sociolinguistic context of language use in South Africa. Other issues related to conflicting philosophies of language learning and to multiculturalism.

The approach was seen to be in accord with some of the goals of the new norms and standards for teacher education and proposals are made in this regard.

Title: An Investigation into Teaching Styles and Cognitive Processes in language learning

Researcher/s: Prof. Sinfree Makoni, Dept. of English and CALSSA, UCT.

Field workers: Gary Crawford, Nomvula Mbathani, Nceba Madubela, Pinky Makoe, Fusi Masaase.

NLP Staff: Wiseman Ngwata, Noxolo Mgudlwa.

Institution: National Language Project Research

Objectives

1. To identify ways in which grade 3 teachers tried to create an optimum learning environment and the ways learners responded it.
2. To examine the extent to which the construct of cognitive styles could account for differences in language learning outcome by learners from identical sociolinguistic backgrounds by comparing the performance of learners with identical cognitive styles and from the same backgrounds on two validated different tests.
3. Describe the learning styles used by individual learners using computerised Cognitive Styles Analysis Tests (CSA) developed by Riding and adapted to the South African context under the general auspices of the National Language Project.
4. To compare the performance of language learners with identical cognitive styles from different sociolinguistic background on the same language tests and items.

5. To identify problems and difficulties that prevent effective teaching and learning in multilingual/multicultural classes.
6. To document successful language learning strategies which minimise the adverse effects on language learning arising from a mismatch between teaching modes and learning orientations.
7. To describe the construct of teaching styles, differentiating it from learning methodologies, by observing lessons in a number of selected classrooms at grade 3 level.
8. To document successful language learning styles 'matching'. Research methodology

The following data collection methods were employed:

1. Lesson observations - data were collected through a mixture of audio and video recordings, and completion of an observation schedule complemented with detailed field work notes which included descriptions of the classroom environment.
2. Cognitive Styles Analysis (CSA) - approved local versions of Prof. Richard Riding's CSA computer based tests were used to measure cognitive processing and representation as separate dimensions along the Analytics | Wholistics and the Verbalisers | Imagers continuums. The Analytics and Wholistics continuum loosely corresponds with Field Dependence (FD) and Field Independence (FI) as measures of cognitive styles respectively. The Imager | Verbaliser continuum captures the representation of information.
3. The Michigan Language Tests on Grammar and Vocabulary - were used because they have already been validated. The aim of using a test with vocabulary and grammatical components was to see to what extent learners with the same cognitive styles would perform on identical and different parts of language.

Findings

1. The research demonstrated that there were comparable ways of language learning adopted by L1 and L2 learners who came from radically different schools. Subjects were adopting similar ways of language processing in spite of coming from diverse cultural backgrounds. The implication is that similarity cuts across cultural differences.
2. Although learners from different sociolinguistic backgrounds had comparable modes of processing, the performance of the subjects with the same Cognitive Style from different backgrounds was dissimilar. On the basis of empirical analysis the results demonstrated that the difference between the schools was statistically significant.
3. Age and gender did not have an effect on the Cognitive Style adopted by language learners, but only accounted for a limited variance between learner performance.
4. The analysis of the teaching styles reflected that there was a broad range of teaching orientations which were adopted in the different schools. In spite of the differences in teaching styles, the predominant mode of presentation was textual, with very few instances in which the dominant mode of presentation was visual. The teachers also used a wide range of different tasks. The tasks differed in terms of their complexity and on a number of dimensions. Interestingly enough, a relatively large number of the tasks were reflective and experientially real to the learners.
5. In some schools there was a systematic effort to reduce the degree of potential mismatch between teaching and learning styles. Unfortunately, all the teachers observed were women, thus there may have been an unintended gender factor which future research should seek to reverse.

Title: An Investigation of the availability and use of learning materials in Grade 12 science classes in some selected schools in the Northern Province.

Project Director: Professor Gilbert. O. M. Onwu

Institution/s: Department of Mathematics & Science Education, School of Education, University of Venda
Background

Many claims are made about the effect of different resources on student performance. Recent research reports suggest that in the South African context, there is inadequate empirical information on how the provision and effective use or otherwise of resources and facilities - however defined - are most significant in affecting student learning outcomes in science. If the effectiveness of each resource were known, it would simply be a matter for policy makers to define an optimal set of resources and decide on what policies that would most likely produce high levels of student achievement. The present study was an attempt to explore that relationship if any, one that focuses on the role of materials-school educational inputs in pupil achievement school outcomes. This preliminary investigation was intended to provide an insight into the ways in which the processes of teaching and learning science in grade 12 science classes are affected by the availability and quality of use of classroom support materials in the school. Through this understanding, it is hoped that the data provided will enable educational authorities to appreciate more the schools intrinsic deficiencies that inhibit academic performance in the Northern Province. The anticipated end product of this research is to make policy and reform decisions grounded in evidence rather than hunches.

Objectives

The objectives of this research project were:

- ✍ To identify representative schools in the Northern Province with grade 12 science classes and select 10 schools with a range of performance pass rate (0-100%/x) in the matriculation physical science examination;
- ✍ To undertake a survey of resources/facilities and materials checklist, in the respective schools and grade 12 science classes, and provide a description and data through school and teacher profiles;
- ✍ To observe the process of teaching and learning in the grade 12 science classes in relation to the availability and use of classroom support materials;
- ✍ To infer the role of learning materials in student achievement in science.

Methodology

The study used a survey design, questionnaire and observation schedule instrument in a multi-stage and purposive stratified sampling design. The study's research methodology was qualitative, inductive and case study based. Concerning the sample, the population of study comprised all grade 12 science classes in the Northern Province. The sample schools were selected from the Thohoyandou District Area, one of the 31 District areas that make up the Northern Province in a 3-stage purposeful stratified sampling procedure. The area was a suitable choice because it had as wide a range of matriculation examination performance in science, and as wide a range of quality in the physical conditions of its secondary schools as one is likely to find in any low-income District area in the Province. In drawing a representative sample of schools we considered the rural-urban divide, a range of school types based on matriculation examination performance in science and the highest-grade level. Altogether the ten sample schools represented high, medium and low (poorly) performing schools from urban, peri-urban, and rural areas.

Data collection was carried out in two main phases. The first was an audit phase that involved baseline survey of resources and facilities available for the teaching and learning of science in the selected schools. Data on resources and facilities (for school and teacher profiles) were obtained by a combination of site visits, self-completed questionnaires by grade 12 science teachers and headteachers as well as individual discussions and interview sessions with them.

The second phase consisted of classroom observations of grade 12 science lessons. This involved the use of a prepared schedule covering various aspects of classroom conditions, management, methods, use of materials, patterns of interactions and student behaviour. Three lessons of each grade 12-science teacher were observed. Analysis of data involved determining the effects of the availability, quality and use of materials on the processes of teaching and learning.

Summary of Major Findings Resource Availability

In general, in all ten schools, the study found great variations in the resources and facilities available for the teaching and learning of science at grade 12 level. Although all schools in the study with the exception of one were public schools, sitting for the same public examinations within a Province, and dependent on their governments for the bulk of their funding, the five poorly/ low performing schools were so impoverished, that they did not have the basic necessities such as sufficient desks per class, staff room, classroom space to sit and move around, sufficient textbooks, exercise books, not to mention facilities like laboratories, libraries, teaching aids (audio-visual teaching equipment), storage space, chemicals and other consumables, science practical kits, science equipment or apparatus.

With regard to the availability of most types of equipment and that of additional facilities, a pattern emerges in which the availability and quality of the resources varied almost exactly according to the schools performance

categories, from good/adequate in high performing schools to fair/poor/inadequate in low performing schools. Teaching aids, textbooks and exercise books for example were sufficient or fairly adequate in schools with a matriculation pass rate ranging from 100-60 % but insufficient in others, particularly the two schools with a pass rate ranging from 20 to 5 %. The four high performing schools (40%) had libraries and science laboratories and the rest- one high, and five low performing schools had none of these facilities. Interestingly enough the location of these schools were typical of their status categories, with most of the low performing schools being in more rural settings than the high performing schools.

Finance

A majority of the schools (100% of low performing schools and 60% of high performing schools) make little or no financial provision, less than R1000 per annum, for the teaching of science. If we think in terms of unit financial allocation per pupil the picture is pretty depressing-a low per capita expenditure. For the majority of schools the unit allocation ranges from 0,0cents to R1 per child. In the two high performing schools which allocate over R3000 per annum the unit allocation ranges between R10 and R9, 50 per student. In 80% of the sample schools, the vote or budget allocation for science is operated by the Heads of department. In only two schools (one low and one high performing) do headteachers operate such votes.

Staffing

There appears to be an over supply of non-science teachers at grade 12 in the schools examined. These non-science teachers may be viewed as contributing to a low teacher-pupil ratio at grade 12. The tendency to overstaffing is especially strong in the rural schools. Our finding of unit cost per child suggests that a more rational use of teachers would enable essential educational materials to be provided within existing constraints on expenditure. All the science teachers in the study sample commented on how very important it was for the students to have and use learning materials in their science lessons. Unfortunately this was not always the case.

The interviews held with the science teachers and headteachers confirm that their morale and teaching methods are influenced by the physical conditions (aesthetics) on ground and materials availability. Being aware that adequate resources and facilities are crucial for a qualified teacher to engage students in effective learning, the teachers strongly recommended that policies should be put in place which stipulate the minimum requirements of physical facilities and teaching resources in all schools at each grade level.

Teachers

The study revealed that most of the grade 12 science teachers in the study sample are inadequately trained or qualified, with 80% of the teachers in the low performing schools and 20% of teachers in the high performing schools having only a Diploma - Secondary Teachers Diploma qualification. Most of the teachers admitted that they would not improvise where there are no readymade visual aids. Teachers especially in the low performing schools lack innovativeness and have conveniently entrenched a culture of dictating or writing notes on blackboards.

Within the schools, we found that in the absence of instructional/learning materials or facilities, performance in school/classroom depends very much on the leadership and commitment of the headteacher, and the behaviour of the teacher. In this study, teacher behaviour/commitment was indirectly represented by measures of teaching experience, qualification and professionalism index - notably membership of professional organisation, attendance at in-service courses, subscription to journals and an assessment and feedback index derived from the following activities - giving homework assignments, marking assignments; involvement in co-curricular activities; frequency of classroom tests and main sources of classroom tests. This relationship between teacher commitment, school governance and student performance was clearly manifest in the two top performing schools with a 100 and 75% matric pass rates.

Teaching Methods

The most frequently used teaching method in grade 12 science classes in the high performing schools are: - lecturing- chalk and talk (20°10); guided inquiry method (20%); group laboratory work (20%); small group discussion (40%). For the low performing schools, 60% use the 'chalk and talk' lecturing method, and the remaining two schools claim to respectively use the inquiry method and large group discussion approach frequently.

Teaching methods least used. For the best performing schools these were individual laboratory work (20°10); independent study (20%); guided inquiry method (20%) and small group discussion (40%). For the low performing schools these were individual laboratory work (20%); guided inquiry method (20%); independent study (20%); small group discussion (20%); and large group discussion (20%). The most prevalent reasons given for the least use of those methods were a) unavailability of science materials and resources (80%); b) time consuming (60%); c) large class (40%).

Science Syllabus

In addition many of the teachers particularly in the low performing schools complain that the matriculation science syllabuses are inordinately long and that there is not sufficient time to cover the syllabus adequately. This is often the pretext for skipping practical work; even where equipment is available for teacher demonstration or group work, on the basis that practical work takes up too much class time. The unwillingness or reluctance to engage in practical activity is reinforced by memory-oriented matric examinations that test learned information and not practical skills (or problem solving skills in a practical context). As is the case here in the Northern Province where there are no practical examinations at the end of grade 12. It has to be pointed out once again that not a single one of the low performing schools has a standard all-purpose laboratory.

Title: Summary of the PEI Research Report on Assessing the impact of the Quality Schools Project (QSP) in selected schools in the Eastern Cape Province.

Author of the Report: Dr. Cleaver Ota Institution/s:

The University of Fort Hare Education Policy Unit

Research Objectives

Qualitative evaluation of the impact of QSP in the Eastern Cape using self report measures and a before and after project implementation design concluded that the project had a significant impact training materials, classroom practices, teacher motivation, and parental involvement in the governance of schools.

The objectives of the current research project were to determine whether the reported effects of the project translated into improved student learning, motivation and performance and increased stakeholder involvement and satisfaction.

Research Design

The research design was quasi experimental using an educational production function approach to determine whether the schools in the QSP outperformed matching non QSP schools in terms of the performance of learners in numeracy and literacy as well as on 50 selected indicators of effective schools.

The conceptual framework guiding the research design is shown in a diagrammatic form in Figure 1 below:

Figure 1:

Inputs (Implementation by the QSP project).
Provision of learning materials, teacher upgrading in language and mathematics, establishment of school governing councils, and training of principals and school governors in school governance



First Order Outcomes
Improved student learning, motivation and enjoyment

Direct Effects (implementation in the classroom)
▶ Improved classroom practice and teacher motivation.
More activities and practical learning.

▶ **Second Order Outcomes**
Less absenteeism, broader student performance. Parental awareness and satisfaction

Third Order Outcomes
Less drop-out. More enrolment
Better student performance



Key Findings

Data analysis is being further refined. The preliminary results show that the UP and non QSP schools are well matched in terms of the conditions of schooling. There are no significant differences in conditions of schooling between QSP and non QSP schools.

There are no significant differences in terms of student performance in literacy and numeracy at grade 4 level. These results need to be interpreted with care. First, an implementation evaluation of the thousand schools project which included DSP schools indicated that there were implementation and funding problems suggesting that the lack of impact may be due to implementation problems rather than the weakness of the QSP model. A related problem is that since there was no baseline study we could not establish the initial levels of achievement. We further could not establish whether the same teachers and students had participated over the length of the period of the project.

The data on stakeholder perceived stakeholder involvement and satisfaction do not show clear trends. Part of the problem is that the Eastern Cape of Department established new governing bodies which did not necessarily include members from the previous governing council. There was no continuity between the old governing councils and the new ones. What the study may have captured are the effects of this disruption rather than the relationships during the project.

Due to the limitations of the software used we were able to run simple regression analysis rather than the multi-level analysis which would have enabled us to separate individual effects from classroom, from school, from district, and other levels. While the design made it possible to quantitatively assess the impact of DSP more qualitative approaches are required to achieve an understanding of what is going on in the schools.

Title: Language in the Human and Social Science Classroom

Researcher/s: Kerry Pile and Anne Smythe

Institution/s: University of the Witwatersrand

Research Objectives

This project based itself on research conducted by Langan (1993). Langan demonstrated that teachers found it difficult to process Geography textbooks in use in the schools. Teachers' weak geographic knowledge, combined with their inability to use the textbooks, resulted in poor teaching practice and learners gained little in terms of geographic knowledge and skills. Langan's solution was to produce new Geography texts, sensitively constructed for English second language readers which took into account readers' limited geographic background.

This project set out to test a different solution to the problem identified by Langan. Two things were tested. These were:

- ✍ would teachers' classroom practice improve if they were supplied with texts in their primary language
- ✍ would teachers' practice improve if material for lesson preparation was provided in teachers' primary language and English.

Geography materials in Sotho, published in Bala O lithute, the educational supplement of Bona magazine, were collected. This material as it is widely available and cheap. The work needed to be completed in schools where Sotho is the primary language so permission was sought and given by the Free State Education Department and the research was conducted in the Viljoenskroon, Kroonstad, Sasolburg and Parys areas. Schools included two farm schools, two platoon schools and four ordinary township schools.

A literature survey helped to establish what was considered good Geography teaching practice. These included examining whether the teachers:

- ✍ made explicit the intention of their lessons
- ✍ encouraged children to make observations about the world around them
- ✍ linked the work they presented to other sections of the Geography syllabus and other areas of the school curriculum
- ✍ engaged the children actively in the process of constructing their own knowledge by providing opportunities for them to discover things for themselves.
- ✍ presented new skills and information progressively
- ✍ developed attitudes of curiosity, responsibility and empathy in learners
- ✍ that tasks set included a range of skills and covered what was presented in the classroom

Language usage in the classroom was included in the research. How teachers used language in the classroom was noted for later analysis i.e. in which language they preferred to teach and to what extent language presented difficulty in the teaching and learning process.

Children's performance in the classroom was also assessed in order to establish how effective the teachers were. This involved recording and analyzing their responses and examining their classwork books.

Profiles of the schools were undertaken in order to establish an understanding of the context in which the research was conducted. These covered aspects such as the socio-economic circumstances of the learners, the problems confronted by the school and the attitudes of the principal. Teacher profiles were used to record teacher understanding of the process of learning and teaching and attitudes towards Geography in particular. Teachers were asked to assess their own lessons, the preparation material and the performance of their learners after every lesson.

Research Findings

After an analysis of transcripts of observed lessons, it was found that some improvement in teaching practice according to the criteria laid down was evident. These included:

- ✍ teachers made explicit to learners the aim of the lessons
- ✍ organization of concepts and ideas became more logical the range of questions asked broadened
- ✍ some teachers showed a shift away from whole-class teaching

However, it was felt that this did not constitute enough evidence to claim that primary language or bilingual materials would significantly alter classroom praxis. Rather it was felt that the type of teaching methodology observed calls for urgent attention. It was found that:

- ✍ Teachers employed teaching methods which imply behaviourist notions made evident by the use of the rote-rhythm styles of interactions in the classroom. This was generally at variance with what teachers said about learning.
- ✍ Teachers placed far too great an emphasis on the transfer of information, resulting in learner overload.
- ✍ Linkage between Geography, the children's worlds, other sections of the syllabus and curriculum were superficial.
- ✍ No attempt was made to develop learner attitudes about the world around them.
- ✍ Map reading was the only skill to which teachers devoted any attention
- ✍ Language was a factor in making learning and teaching more difficult.

In terms of the learners it was found that:

- ✍ Learners were generally expected to simply regurgitate names and facts presented during the lesson thus higher level cognitive skills are

not being developed

- ✍ Exercises and tasks are generally set in such a way that children are left with lists of decontextualised words in their classwork books. No attempt is made to develop expository reading and writing skills and graphicacy is largely overlooked.

Thus children in these schools are still receiving an education which does not develop them fully. This will only change when teachers' practice in the classroom changes and ways need to be found to effect this.

Title: Problems and possibilities in multilingual classrooms in the Western Cape

Researcher/s: Peter Pluddemann, Xola Mati, Babazile Mahlalela-Thusi

Institution/s: Project for the Study of Alternative Education in South Africa (PRAESA) Research Objectives

1. To identify existing teaching and classroom management strategies used by Grade 1 teachers in multilingual classrooms in primary schools in the Western Cape, with a particular focus on township (former Department of Education and Training, or ex-DET) schools.
2. To identify the problems that arise in multilingual classrooms in primary schools in the Western Cape.
3. To propose, on the basis of preliminary trials, strategies that are likely to succeed in addressing these problems.

Research Design and Methodology

For purposes of the research, our definition of 'multilingual classrooms' as referring to linguistically diverse school classes - in practice former 'coloured' and 'white' English- and/or Afrikaans-medium schools with large recent enrolments of first-language (L1) Xhosa-speaking children - was expanded to include the linguistically more homogeneous contexts of township schools faced with the pressures of providing rapid access to English. We observed 11 Grade 1 teachers in 10 schools six times each over a six-month period. Schools (all public) were selected according to the following criteria:

1. Diversity across former education departments, with a majority of ex-DET schools
2. Range of geographic and demographic locations within the greater Cape Town area
3. The presence of significant numbers of L1 Xhosa-speaking learners in former House of Representatives (ex-HoR, for 'coloureds') schools and in former House of Assembly (ex-HoA, for 'whites') schools
4. Diversity with regard to language/s of learning and teaching (LoLT), including Xhosa (4 classes); English (4); Afrikaans, Sotho, and Tswana (1 class each).
5. None of the schools in which PRAESA has been working during the past two years could be considered.

We used the following research methods:

- ✍ classroom observation with the help of a classroom observation schedule and detailed field notes
- ✍ interviews with teachers
- ✍ a language profile questionnaire for the school video-recordings of teachers' lessons

Summary of Main Findings

1. The 'linguistic mismatch' between English/Afrikaans speaking teachers and Xhosa-speaking learners in former 'coloured' and 'white'

schools contributes to high levels of teacher frustration, a slow pace of learning, disciplinary problems, and teacher-centred lessons.

2. In order to ameliorate the linguistic mismatch, some schools utilise a number of language support strategies such as peer interpreting and the hiring of Xhosa-speaking teaching assistants.
3. Some ex-HoR and ex-HoA schools have begun appointing Xhosa-speaking staff, and have introduced Xhosa as a language subject.
4. In the ex-DET schools (for 'Africans'), a shared home language facilitates basic communication, although the pressure for English is already exerted and felt at Grade 1 level.
5. The Sotho-medium and Tswana-medium schools are particularly complex, as learners are exposed to three languages from early on (plus Xhosa and English).
6. The limited involvement of parents appears to be a feature of schools cross all contexts, a factor which negatively affects home-school cooperation on a number of levels, including learning.
7. Teachers are critical of the abrupt introduction of Curriculum 2005, and resentful towards the provincial education authorities for providing inadequate support and training.
8. Across the schools, approaches to literacy learning are heavily phonics-dominated, leaving little time for stories and individual reading.
9. There is a serious shortage of Curriculum 2005-related learning support materials, especially in the ex-DET schools where few suitable texts in the African languages exist.
10. With notable exceptions, classroom print environments generally reflect a bias towards English-language materials, insofar as such materials exist at all (bare walls in several ex-DET classrooms).
11. Innovative teaching approaches that utilise two languages in the classroom do exist, but they are few and far between.
12. By September 1998 none of the schools surveyed had developed a new language policy and implementation plan in line with the new official language-in-education policy.

Title: Teachers' views on mathematics, mathematics teaching, and their existing practises

Researcher/s: Lynn Rossouw, Steve Rhodes & Iben Christiansen

Institution/s: Primary Maths Project, School of Science and Mathematics Education, University of the Western Cape

This research project describes teachers' current views on school mathematics and classroom teaching in relation to the new curriculum requirements.

We address three main questions:

- ✍ What views on mathematics and mathematical activity appear to be prevalent among teachers?
- ✍ What views of teaching mathematics that would facilitate learning are used in classrooms? and
- ✍ What teaching strategies are employed by these teachers in their classroom?

To address and synthesise these questions we constructed a theoretical framework around teachers' views on mathematics and that of teaching, in relation to Curriculum 2005, using data from the eight grade 3 teachers, having between three and thirty years teaching experience.

An ethnographic research design is used, as its qualitative methods enabled the researchers' sufficient flexibility for describing, interpreting, exploring and explaining the views teachers have of mathematics and their teaching. The research data was gathered through

✍ direct observation and

✍ indepth interviews.

The combination of observation and interview data enabled a degree of objectivity in the assumptions and analysis. It helped to avoid oversimplification in the descriptions and analysis, because of its narrative nature. The combination also allowed us to understand the meanings teachers hold of everyday mathematics perspectives and teaching perspectives. The research analysis draws on twenty-four classroom observations and sixteen pre- and post- interviews.

Prime importance was placed upon the authority of each participating teacher, to account for their own classroom practice. Since there is always the possibility of speculating, every effort was made to authenticate the qualitative data collected from the classroom lesson observations. These observations were written first as individual episodes and then into a story reflecting the teachers' views of mathematics and teaching.

The views on mathematics and teaching held by the teachers can be categorized into three groups:

✍ transmission,

✍ empirical and

✍ connected.

They are by no means water tight categories, as there is some overlap in teachers' views however, it helps us to identify the dominant views held by a specific teacher.

The views of the teachers involved in this study about mathematics and mathematical activities are in direct conflict with a pedagogical practice articulated in Curriculum 2005 (C2095), which offers learners opportunities to engage in problem-solving, logical thinking, recognising patterns, and implementing a pedagogy that focuses on conjecture, conceptual exploration and reflective, critical discussion. The predominant views of mathematics and

mathematics teaching among the subjects of this study is that, of a system of algorithm transmitted by teachers to be committed to memory by their students.

Through a process of systematic observation of classroom interactions and interview it was possible to identify teaching styles that do not accord with the expectation of the C2005. The current views of the participants on mathematics and the teaching of mathematics do not foster the kind of conceptual understanding that is required. The predominant view of mathematics and mathematics teaching in this study is that of a system of rules which needs to be taught directly (transmission view) or camouflaged in practical activities (empirical view).

If teachers are expected to teach mathematics for understanding the world, to be experienced by learners as a human activity, to be developed and contested through language, symbols and social interaction, then teachers themselves must be helped to form qualitatively different views of all aspects that impact on their practices.

As long as there remains a clash of vision between what is proposed by Curriculum 2005, the OBE approach, and where teachers are now, no one-off INSET programme will address this.

This revelation calls for a degree of 'unlearning' the mathematics, teachers know thus enabling them to acquire a new way of thinking about mathematics and a new approach to learning it. In the final chapter of this report we allude to recommendations, which are by no means exhaustive for teacher transformation.

Title: Focus on Four

Sub-Title: An investigation into Grade 4 mathematics teaching and learning

Researcher/s: Cheryl Reeves, Caroline Long

Research objectives

The purpose of the study was to investigate mathematical achievement at the Grade 4 level, and to establish effective mathematics teaching practices. We followed the educational model used in the Third International Mathematics and Science Study (1996) which identified the distinct and interacting phases, the Intended Curriculum, the Implemented Curriculum and the Attained Curriculum.

Research methodology

Our research design involved an analysis of the Intended Curriculum to identify what aspects of mathematics was being taught at Grade 4 level and to establish what achievement could be expected. We selected items from the TIMSS tests, which matched the intended curriculum. We tested 450 students in twelve classes at the beginning of the first term, and then retested the same students at the end of the term. The approximate teaching time was seven weeks. The idea was to establish what learning had been achieved over that period. The Attained Curriculum was measured as successful mastery of the concepts and procedures as embodied in the TIMSS items.

In order to assess the Implemented Curriculum, we conducted classroom observations, using detailed observation schedules as well as questionnaires aimed at establishing different aspects of classroom practice.

Main findings

It was found that learners:

- ✍ Had little understanding of the mathematical knowledge and skills that were integral to the intended curriculum; and that they
- ✍ Lagged far behind their international counterparts

The test, validated across 26 countries, proved to be far above the standard of these learners (for results, see Reeves, 1998). Factors such as language difficulty and the unfamiliar format would certainly have affected the results, indicating that more focus on language and on written work is required at that level. However, the findings indicated that:

- ✍ The majority of learners had limited knowledge of how the number system works past two digits, and
- ✍ That the understanding of place value and the application of this concept in standard algorithms such as addition, subtraction and multiplication was lacking in at least 75% of learners tested.

From detailed classroom observations it was found that teachers had fairly low expectations of the learners as a whole. The tasks were not cognitively demanding and in many cases were pitched at the level of the weakest learner. Links were found between incorrect explanations of algorithms and the results on the TIMSS items.

It was evident that teachers had little structural support in the form of official documents which spelled out clearly what the expectations of mathematics teaching were at Grade 4 level particularly in terms of the details of conceptual knowledge requirements (Reeves, 1998). The teachers on the whole were not able to teach the mathematical concepts underlying the execution of complex algorithms such as subtraction with trading.

Title: Focus on Seven: A Report on an investigation into language-sensitive activity-based methodology in primary science teaching at the Grade 7 level.

Authors/institution that conducted the research The Primary Science Programme (PSP), a non-governmental education organisation that provides in-service education and training to primary school Science teachers, obtained PEI funding for the research. The two senior researchers contracted by the PSP for the study were Cheryl Reeves and Caroline Long. The three post-graduate students contracted to conduct the fieldwork for the study were Liza Gangule, Lubabalo Ilzedze and Nosizwe Mgudlwa.

Research objectives

The primary objective of the study was to contribute to improvements in Grade 7 achievement in the Natural Sciences through an investigation into the teaching and learning in the Natural Sciences Learning Area at this level. The analytical objectives of the study were to focus on teachers' classroom practices, and growth in learner achievement and attitudes towards the Natural Sciences. The purpose of the study was to begin to develop explicit indicators of effective practices for Grade 7 Natural Sciences teaching.

The research design/methodology

The study took the form of a micro study of 11 teachers in the Western Cape teaching the Natural Sciences to Grade 7 in under-resourced schools.

The Third International Mathematics and Science Study (TIMSS), a research study sponsored by the International Association for the Evaluation of Educational Achievement (IEA) provides the research model for the study. The research questions for Focus on Seven were derived from the four research questions formulated for TIMSS. The adapted research questions for the study were:

1. What is the intended curriculum for Grade 7 Natural Sciences learners in 11 Grade 7 classes in the second term of 1998 (i.e. that which the teachers intend to teach)?
2. What are the variables in the social and educational contexts for learning between the 11 Grade 7 classes (i.e. the learners' home environments and the school environments)?
3. What is the implemented curriculum as is evident in the classroom practices of the Natural Sciences teachers of the Grade 7 classes (i.e. that which teachers actually teach);
4. What is the attained curriculum for each class as manifested in Grade 7 learner achievement in science tests designed by TIMSS and matched to the intended curriculum (i.e. that which learners actually learn)? and
5. What are the relationships, if any, between all of these?

The most important data sources for the study were:

- ✂ school and teacher survey questionnaires;
- ✂ pre-test/post-test items (designed by TIMSS);
- ✂ learner questionnaires;
- ✂ teacher and school questionnaires;
- ✂ lesson observations using an observation schedule, and video recordings of Natural Sciences teaching.
- ✂ structured interviews with teachers.

The research design included:

- ✂ a pre- and post-test design using identical selected items from TIMSS; testing eleven Grade 7 classes in ten schools;
- ✂ two observations of eleven Grade 7 Natural Sciences lessons in operation;
- ✂ eleven interviews with the sample of teachers;
- ✂ a comparison of the pre- and post-test results of the experimental group; and
- ✂ a comparison of the post-test results of the experimental sample with

the results of a control group of learners from the larger TIMSS;

- ✍ a comparison of the post-test results of the experimental group with the eleven teachers' assessment of individual learners in their classes;
- ✍ a comparison of the post-test results of a sub-sample of 65 learners from the experimental group with the assessment of the sub-sample through the use of a Performance Task;
- ✍ using SPSS to establish relationships between the implemented curriculum, the social and educational context for learning, and learner achievement.

Ten schools with similar social and educational contexts were selected for the study. This made it easier to attribute any differences in learner achievement to differences in the teaching methods used rather than to differences in socio-economic backgrounds. A sample of eleven Grade 7 Natural Sciences teachers and an overall sample of 416 Grade 7 learners was used. In addition sub-samples of the experimental group of learners within the eleven Grade 7 classes were used for performance assessment tasks (developed by the PSP and administered during the third term of 1998). The sub-sample consisted of 65 learners comprised of six learners in each class. The HSRC, the body responsible for conducting the Third International Mathematics and Science Study: South Africa (TIMSS:SA), provided item test results from the larger TIMSS of a control group whose socio-economic background and educational context closely matched that of the experimental group. These were used to compare the results of the experimental group with the results of the control group.

Main findings

No evidence of statistically significant differences between average percentage increases in learner achievement and the sets of data on key variables in the social and educational context emerged. However, statistical tests provided evidence of a strong relationship between learner achievement in the item tests and the researcher's assessment of the extent to which teachers were able to engage learners with the Natural Sciences content, concepts, processes and language to be learnt. Thus, although the study

supported the view that classrooms are subject to many outside influences and contextual variables, the findings indicated that it is the quality of learners' engagement with Natural Sciences knowledge that is central to learner attainment.

The findings revealed that, in spite of the support provided by the PSP, even the best teachers in the sample were constrained in their efforts to engage learners in the Learning Programme and its activities in the way that the new curriculum and the intervention intended, because:

1. disruptions at schools and other interruptions in the teaching programmes made it impossible for teachers
 - ✍ to organise their teaching so that they covered all the intended activities (On average teachers covered eight of the fourteen activities in the second term); and
 - ✍ to develop the Learning Programme theme, The Planet Earth and Beyond, coherently as an ongoing narrative or story (On average learners across the eleven classes had 71 minutes or 2,2 Natural Sciences lessons per week).
- 2 teachers struggled to engage learners with Natural Sciences content, concepts and processes at adequate levels because
 - ✍ teachers themselves were under-prepared in the discipline or subject knowledge they were trying to teach, and were therefore not entirely in control of the subject matter; and/or
 - ✍ many learners lacked both the necessary foundational understandings, processes and language in the Natural Sciences, and other foundational competencies (such as adequate reading levels) to meet the demands of the Learning Programme and the teachers' new teaching approach;
 - ✍ the information or guidance that appeared in the activities or texts used in the lessons was insufficient to overcome the effects of the above.

Title: The evaluation on teaching and learning materials for multi-grade classes (an OBE approach)

Researcher/s

Professor Japie Strauss

Institution/s:

RIEP, University of the Free State

Purpose of the project

The purpose of the project is to examine and analyse the availability of language and mathematics learning materials in ten multi-grade classes in the Free State.

Selection of schools

After permission was granted by the Free State Education Department (FSED), the Farm School Section at Head Office nominated ten schools.

General observations

The first visit to the schools should be seen as a reconnaissance and the findings to be used as a baseline for further research. Some findings were:

- ✍ Although the classrooms were in most cases not over-crowded, there was not enough space available for the learners to move around or to form groups for groupwork.
- ✍ The discipline at all these schools was good to excellent. In retrospect, it seemed that the discipline was in fact too strict. Reasoning by the learners with the educator was not allowed, with the result that correct answers by the learners were often not perceived by the educator as correct. The learners were not allowed to argue.
- ✍ Textbooks were used by most of the educators, but books were not

sufficiently available for the learners.

- ✍ Other teaching materials that were used by the educators consisted of wall charts and some work cards. At the end of the project it was observed that the wall charts on display in the classes were the same in almost all the schools.

Teaching methods

In one case, an effort was made to make use of groupwork, but actually it was a case of grouping the different grades in the class into separate groups. No learning materials to be used by the learners other than textbooks were available. (Photocopiers or duplicating machines are not available.) For the last visit some other learning/teaching materials to be used by the learners were supplied. It was used in an excellent way by the educator. Some of the problems described under 'General observations' (b) were observed during this lesson.

Because of the lack of materials to be used by the learners, educators were usually reading a phrase with the learners repeating it. In the absence of any other teaching equipment, educators made use of the black board only. A lot of work had to be copied from the board by the learners. Only one school had an OHP. The non-availability of electricity also played a role in not using electrical teaching aids.

Other issues that could have an influence on the use of teaching and learning materials

- ✍ Educators of farm schools are very isolated from other educators and do not have the opportunity to discuss matters.
- ✍ Absenteeism of learners can cause a problem to continuous learning, as textbooks are not at every learner's disposal.
- ✍ The purpose of visits by departmental officials to the schools was mainly of an administrative nature and not to inform educators on new developments in teaching. A number of educators have attended courses especially in the training of sports.

Recommendations

- ✍ Departmental officials (e.g. subject advisors) should visit the schools to support and develop the teachers. These officials can serve as conveyers of knowledge from the Department to the schools.
- ✍ Financial assistance should be rendered to farm schools to develop materials, as most of them do not have school funds to buy materials. On the other hand, the FSED can supply these schools with materials.
- ✍ Other agencies should also conduct in-service training courses to update educators on new didactical approaches and subject knowledge, and on how to handle multi-grade classes. Such courses could also serve to determine the standard of teaching in these schools.

Title.- A Case Study of Four Schools Participating in the Equip Project of the National Business Initiative

Research design & author:	Eric Schollar
Project Manager:	Glen Fisher, NBI
Project Coordinator:	Kholofelo Sedibe, NBI
Institution/s:	Eric Schollar and Associates c.c. Research Objectives

The objective of this research project was to undertake four case studies of schools participating in the Education Quality Improvement Project (EQUIP) of the National Business Initiative, with a view to describing and understanding the internal and external contextual processes of the programme and the

intended and unintended products of the NBI's development model in the schools.

In relation to this general objective, the research project identified three specific objectives:

- ✍ To understand the importance of context in determining conceptions of quality in the schools
- ✍ To understand how the School Development Plan is related to the contextual conceptions of the quality of the schools, and how it expresses their vision of the appropriate response to the problem of achieving quality
- ✍ To understand how the School Development Plan is implemented and integrated into the routines and classroom practices of the school.

The objectives outlined here derive from the need to test the central proposition of Equip, namely that its approach to the enhancement of school quality will facilitate an inclusive, locally based process of school development which is sustainable, which addresses the specific needs identified by programme participants, and which is directly relevant to the specific context of each school. This in turn is expected to impact on the 'core business' of the schools, improving the quality and the outcomes of the education provided to learners.

Design and methodology

The research adopted a case study approach, reflecting the objectives of the study and the concern to assess the relationship between specific school contexts and the development of effective strategies to improve school quality. The methodology included weekly visits to the four schools by a team of junior researchers, to systematically observe classroom lessons, tests and examinations, and to collect data on attendance, late-coming, school maintenance and progress with respect to the School Development Plan. Researchers also observed some staff and parent meetings.

Senior researchers visited the schools to conduct in-depth interviews with school principals, management teams and teachers, and to observe various aspects of the context and day to day operation of the school. A total of 96 school visits were undertaken, frequently without prior notice. Consequently, particularly towards the end of the research period, it was possible to assert that the schools were not 'on display' for an external observer, and that the research teams' observations fairly closely reflected what was going on most of the time.

Main Findings

There can be little doubt that the most evident, and most important impact of Equip in the four schools has been an increased alignment of staff with management, and with each other, around the development of the school. Without a greater degree of agreement, co-operation and accountability between the different members of a school community, too many South African schools can resemble rowing boats in which half the passengers are not rowing at all, and the other half are rowing in different directions. None of the schools would argue that alignment has been uniformly achieved in relation to all of the staff, but all of them do assert that they have made significant progress towards it, and that internal conflict has significantly declined in the schools as a result. Further, the levels of participation, alignment and motivation of all the different elements of the school community improve as the development plans themselves bear fruit; continued implementation of the development plans will further accelerate what is becoming a self-sustaining process.

In terms of locally-based development in relation to the context of the schools, the most important priorities have been the installation of school security and the acquisition of educational facilities like photocopy and video machines, computers and Science kits. No other development programme, of which we are aware, has ever improved school security as its first consequence. That this is the first choice of all four of the school communities involved is both an eloquent testament to the context they experience, and an example of the interaction between context and locally-based planning.

The partnership that delivers EQUIP has evolved from its inception; it has been fortunate in having MEC Mary Metcalfe, chair of its Provincial Board, involved from the very inception of the project. The production of School Development Plans by school-level committees has become provincial policy for the GDE, and EQUIP has trained GDE officials in District N2 to initiate the process in 68 schools.

Experience has shown that it is at District level that capacity to actually manage, monitor and support the process in schools is limited and, unless this capacity is increased, it is at this level that outcomes at larger scales may fail to match policies based on successful small-scale pilots, especially if the success of the small scale pilot was heavily dependent on an NGO to provide school and classroom level monitoring and support.

Title. The real end the ideal: Field analysis of roles and competences of educators

RESEARCHER/S:	Professor Ken Harley
INSTITUTION/S	School of Education, Training and Development University of Natal, Pietermaritzburg

Research questions

Since 1997, four key policy documents on teacher education, training and development have been produced. These are:

- ✍ COTEP Norms and Standards for Teacher Education
- ✍ SACE Code of Conduct
- ✍ ELRC Manual for Developmental Appraisal
- ✍ NDOE Duties and Responsibilities of Educators

Collectively, these documents define employer requirements, provide frameworks for professional development and appraisal, define professional conduct, and specify duties and responsibilities of educators.

In South Africa there is a dearth of knowledge about the details and texture of daily activity in schools and classrooms. There is thus a danger of policy development that takes place without a firm grounding in empirical school-based research. We accordingly posed three questions:

- 1 What does policy say that educators should be doing?
- 2 What are teachers actually doing?
- 3 What is the fit between policy and practice?

It was believed that the research would provide a view of:

- ✍ the internal coherence (or tensions) in the construction of teacher roles and competences in the four policy documents;
- ✍ consistencies (or inconsistencies) between policy and practice.

This grounded view of the interface between policy and practice had the potential to provide useful insights into:

- ✍ methods of conducting research in this very challenging and complex area;
- ✍ the design of programmes for teacher development.

Research design

Research instruments were developed concurrently with the analysis of the four policy documents. The result was the utilisation of the 6 major roles adapted from the Norms and Standards document:

- ✍ Mediator of Learning
- ✍ Administrator
- ✍ Pastoral Role
- ✍ Designer of Learning Programmes
- ✍ Lifelong Learner
- ✍ Community and Citizen Role

Synthesis of indicators of these roles resulted in a total of 48 competences, expressed as active verbs which could be observed or inferred. The first 3 roles were seen as largely observable and listed on a Classroom Observation Schedule. The last three roles were listed on a Descriptive Matrix which was completed on the basis of inference and discussion with educators.

Findings

In interpreting the findings, it is important to remember that the study was conducted in schools, and with teachers, that had been identified as effective. Policy

Our analysis of the four policy documents suggests that policy:

- ✍ is underpinned by liberal values
- ✍ adopts a consensus view of society
- ✍ views the teacher as an extended professional
- ✍ presents a democratic, developmental model of teacher accountability and policy implementation
- ✍ assumes that contexts in which policy will be implemented are homogeneous.

However, since policy resides in four different documents, it is fragmented. A consolidated view of policy would require that individuals interpret, analyse, and synthesise the four documents.

The Policy/ Practice fit:

At a general level, we conclude that:

with respect to the teacher in the role of Mediator of Learning, the fit was good. Conceptually, there was thus a good fit in the Foundational and Practical competences. As restricted professionals, teachers mirrored in their practice most of the roles outlined in policy.

The fit was least apparent in the Reflexive competence where policy expectations are that teachers function as Lifelong Learners and Designers of Learning Programmes.

Policy assumptions about the context in which policy is to be implemented are problematic. Teacher roles were clearly affected very substantially by different school contexts. While differing levels of resourcing was a major factor, differing value systems appeared to be a crucial factor. Different value systems were evident at the levels of the individual teacher, the culture of the school, and community (although we also found the concept of community to be problematic). Some of the value systems we encountered were in accord with policy; others were not. These differences were manifested most clearly in disciplinary practices (in which regard schooling appears to be in a state of near crisis) and in broader beliefs about human rights issues, such as gender equality.

At an individual level, we argue that:

teacher effectiveness cannot be disaggregated into discrete roles effective teachers had something extra over and above competence in the defined roles, a classroom presence embodied in achieved status (Bernstein, 1996) which enabled them to exercise interpersonal control

policy roles better capture the work of schools than of the individual teachers working in them.

Major Implications

- ✍ The schooling system would be best served if a consolidated view of policy were provided, which clarified and operationalised key issues. It is also argued that these be presented in teacher discourse so that teachers recognise their tacit knowledge in policy pronouncements.
- ✍ Appraisal measures should be implemented in a flexible and holistic way in order to facilitate the developmental function of appraisal. Professional development should focus not only on skills and competences, but should be based on the ways in which teachers construct their own professional identities.
- ✍ Development and appraisal should be sited within a whole school context.

Title: Innovative language practices in multi-lingual mathematics classrooms

Researcher/s: Mamokgheti Setati

Research Objectives

To establish and describe language practices in multilingual intermediate phase mathematics classrooms. The research focussed on the following key questions:

- ✍ what is the teachers' understanding of the new language policy?
- ✍ what language practices do these teachers use?
- ✍ how does their understanding of the language policy impact on their language practices?
- ✍ how do these teachers' language practices facilitate or block
 - communicating mathematics during teaching and
 - learner access to mathematics?

Research Design

This is a qualitative study that focuses on six carefully selected grade 4 teachers together with their learners. The study is both descriptive and interpretative. It is descriptive because it provides a detailed description of language practices of these teachers. It however goes beyond mere description since it gives an interpretation of how the practices used, facilitate or block learners communication of and access to mathematics.

The Sample

A sample of six mathematics teachers were selected for the study. The following criteria was used to identify teachers:

- ✍ Grade 4 mathematics teachers with a 'good reputation'
- ✍ teachers needed to be experienced (at least 2 years) and qualified (at least M+3)
- ✍ teachers also had to be multilingual and teachers of second language learners.

These criteria were used to diminish the possibility that the teachers' language practices were due to lack of teaching experience or recognised qualification. The grade 4 class was preferred because according to the new curriculum it is the entry level to intermediate mathematics learning.

Each of the teachers was requested to select six learners (2 'good'; 2 'average'; 2 'weak') who would be interviewed and whose books (class/homework books) could be studied.

Methods

A minimum of five lessons per teacher were observed over a week in the same class. An observation schedule which provided a means for standardising observations across the six classrooms was used. The schedule also ensured that the researcher maintains focus on use of languages in classroom mathematics practice.

A structured pre-observation interview provided information on the language policies in the schools and the teachers' views on use of languages in mathematics classrooms.

A pupils' book observation schedule provided data on the learners' level of understanding/ mathematical problem solving attained/enabled. This schedule also ensured that the same things are looked at in different books in relation to what is been observed.

A semi-structured teacher reflective interview provided qualitative data on teachers' awareness of and understanding of their language practices. They were probed about their views of the success of their lessons and the role that language played.

The interviews with students after the lessons provided data on access to mathematics and how language practices used in their class enabled communicating mathematics. They were asked mathematical questions related to the lessons observed. These were organised to enable verbal responses in English and in their main language, as well as written responses. The questions focused on pupils verbalising their thoughts, providing explanations of what they were doing and why, as well as demonstrating their mathematical writing ability.

Main Findings of the Research Project Policy issues

Three out of the six teachers in the study were aware of the national language policy, however, their interpretations were very different. For teacher 1 the policy meant that the learners' main languages should not be ignored, for teacher 5 it meant that different languages should be used for teaching and for teacher 6 it meant that children should learn all the 11 official languages at school.

The reality that English is still a language of power and socio-economic advancement in South Africa also played a major role in the teachers' language practices. During the pre-observation interviews, each of the teachers alluded to the importance of English. Teacher 1 referred to English as an international language, teacher 2 as the language of assessment, teacher 3 talked about using English to empower the learners and teacher 4 referred to English as the universal language. Teachers 5 and 6 talked about English as being important for higher education and communication with people from other cultures. Teachers' own learning experiences also impacted on their language practices, even though most of them did not talk about this explicitly. All the teachers in the study learned mathematics in their main languages at primary schools. Their pre-service training was, however, in English and one can assume that all of them (in one way or another) experienced the disadvantage of not being very fluent in English. Teacher 3 is the only one who explicitly talked about how her inability to communicate fluently in English disadvantaged her while studying at college.

Language practices

The study shows code-switching as a common practice in all the classrooms. Four out of the six teachers in the study used code-switching in the public domain and three of these teachers (teacher 2, 4 and 5) used switching mainly for rephrasing and social control. This limited use of switching produced formal procedural mathematical discourses. These discourses also dominated in the classrooms where code-switching was not used at all. It seems, therefore, that the absence or limited use of code-switching constrained the mathematical discourses and therefore lead to limited use of mathematical discourses.

Teacher f is the only one of the four code-switching teachers above who used a range of discourses (procedural, calculational and conceptual) in her teaching and this enabled the learners' communication of mathematics. The movement between one discourse to another was facilitated by the use of the learners' main language. This is particularly important because while Teacher

1's learners were relatively fluent in English, it was not their first language and as the data shows, some of the learners could not engage in calculational and conceptual discourses without using their main language, Tswana. It is therefore possible that if Teacher 1 did not allow them to use Tswana, the discourses could have remained formal and procedural. While at this stage it is not possible to claim that use of code-switching enabled learners' communication of mathematics, it is feasible to conclude that use of code-switching facilitated the learners' engagement in both calculational and conceptual discourses.

It seems therefore that while code-switching is now valued and encouraged by policy, not all teachers use it and the majority of those who use it, do so in limited ways. Given the power of English, rephrasing seems to be the most automatic or commonsense use of code-switching. As this study has shown, most teachers would like to have their learners communicating in English. This wish therefore pushes them to use mainly English when teaching and only switch if learners are not responding to an English utterance. Recommending code-switching is therefore not straight-forward and unproblematic.

Title- Descriptive study of the nature and effectiveness of in-service teacher training and support of the implementation of OBE

Researcher/s: Makhosi Sigabi, Elizabeth Mphuthi

Institution/s: RADMASTE Centre, University of The Witwatersrand, COUNT

Objectives of the research

The research was done at the Grade 1, the level in which Curriculum 2005 was implemented in 1998.

The principal research questions for this study are:

1. How does the provision of INSET impact on the implementation?
2. What progress is made by the learners toward achieving outcomes in the Numeracy Learning Area?
3. Does the provision of INSET inspire teachers to develop OBE related material relevant to the context in which they are teaching?
4. Is existing OBE material used effectively?
5. What range of assessment techniques is used by teachers in judging learners' progress towards the attainment of selected outcomes?

Research Design

Two areas were chosen for the study, the urban Sebokeng near Van der Bijl Park and the peri-urban Lanseria/Diepsloot area. In each of the areas mentioned above two experimental schools and one control school have been chosen. The experimental schools received INSET from an NGO whereas the control schools did not. The selection criterion for the control schools was that they should not at present be receiving INSET of any kind bar the compulsory INSET from the Department of Education. The experimental as well as the control schools receive the same amount of INSET from the Gauteng Education Department (GDE) in support of the implementation of OBE. The data was collected using questionnaires, classroom observation, post observation semi-structured interviews, and attendance at COUNT workshops. Some of the lessons were captured on tape for later re-evaluation. The semi-structured interviews were used after each lesson to reflect on the practices of the teacher during the lesson.

Summary of Findings

INSET Provision and The Effectiveness of The Implementation of OBE

The gains made by INSET that happens without classroom support are questionable as teachers are often left to deal with daunting conditions including overcrowded classrooms, lack of basic resources including manipulative material and lack of textbooks. The latterly mentioned conditions cause frustration among teachers.

Teachers are encouraged if workshop facilitators visit schools to face these conditions with them. Taking teachers from under resourced schools on tours of more resourced schools does not help either. After one such tour, a teacher from an under resourced school complained that she felt discouraged about the situation of her class after seeing what her class was denied. Our conclusion is that INSET that is followed up by classroom support for facilitators to face the same conditions that teachers have to face is probably better than when there is no classroom visit at all.

Learners Achievement of Outcomes in The Numeracy Learning Area

Though most teachers were aware of what transformational OBE entailed they preferred to implement traditional OBE as we inferred from their heavily content bound description of learning outcomes in the Numeracy Learning Area. Teachers also struggled with the new OBE terminology. Teachers also confused OBE with learner centredness, e.g., group based teaching methods. Teaching Resources

The development and use of material developed by teachers themselves is not as concerted and systematised as official documents lead us to expect. Besides teacher confidence, one of the major inhibitors in the attainment of this goal is the lack of support resources like libraries, duplicating facilities and so on. In the experimental schools teachers still relied on the NGO to help them develop material they can use in class. NGO facilitators indicated that

from their perspective, it will take some time for teachers to be fully independent in terms of production of their own material. In some schools, teachers relied heavily on the textbook and used it even though learners could not read the language the book was written in, namely English.

Compared with countries like New Zealand where most teachers hold at least one degree it would appear that the expectation that teachers develop their own material is unfair particularly in view of the fact that OBE had to be withdrawn in New Zealand because of the administrative burden it placed on teachers.

Effective Use of Existing OBE Material

Material sent to the schools by the GDE was not adequate (in numerical terms) and was not used at all by learners though teachers referred to it when they prepared lessons. Teachers had very constrained budgets, which did not allow them to purchase everything they wanted. Other material arrived late or was not delivered at all, e.g., material on the Life Skills learning programme.

Range of Assessment Techniques Used By Teachers

All schools in the research indicated that they assessed learners through oral discussion, individually, and by continuous assessment. Paradoxically, only the control schools indicated that they admitted practical demonstration as a form of assessment. Assessment is one of the crucial areas in OBE as OBE claims that outcomes are 'final demonstrations at the culmination of the learning experience'.

Conditions of Learning

OBE has put an administrative burden on teachers in economically advantaged countries where teacher : learner ratios, resources, management, teacher qualifications, etc., were more favourable than South Africa's to such an extent that in New Zealand OBE had to be abandoned. The research finds that unless the following conditions are improved considerably OBE will probably not be implemented properly in South African Schools:

- ✍ Impoverished families are materially unable to provide for their children's school needs, e.g., basic equipment.
- ✍ The high illiteracy rates in SA makes the majority of families unable to support children with their school work. Teachers and educational planners need to take the latter factor into account in their plans.
- ✍ Management in the majority of our schools is unable to support changes that are taking place in our schools. It appears to us that successful change will only happen when schools are less chaotic than some of them currently are.
- ✍ Lack of (or a shortage) of basic teaching and learning materials is an area that needs to be addressed.
- ✍ Lack of proper classroom space for learners is another critical inhibiting factor. Frequently, teacher : learner ratios were way above the nationally stipulated ratio of 1 : 40.

Title: Strategies for the Design and Delivery of Quality Teacher Education at a Distance: A case study of the Further Diploma in Education (English Language Teaching), University of Witwatersrand

Researcher/s: Makano Marojele, Terry-Ann Selikow, Tessa Welch

Institution/s: South African Institute for Distance Education (SAIDE)

Research Objective

The research aimed to identify strategies for the design and delivery of teacher education at a distance that could lead to improved teaching in the classroom. This was done on the basis of an in-depth case study analysis of the teaching and learning practices in the Further Diploma in Education (English Language Teaching) offered by the University of the Witwatersrand,

Research Methodology

Since an in-depth analysis of the programme was required, it was decided to focus on the opinions, experiences, and classroom practice of a sample of six students in the 1997 cohort of the two year diploma. There was a balance in the sample between male and female students, primary and secondary school teachers, rural and urban, and low and high academic achievement.

Data was collected in the following ways :

- ✍ brief literature review intended mainly to identify lessons from national and international experience about effective teacher education at a distance;
- ✍ interviews with course coordinators for English and Education Studies;
- ✍ observation of selected sessions at the April 1998 Residential School;
- ✍ two rounds of classroom observations at the schools of each of the six students in May and August 1998;
- ✍ interviews with the six students on impact of the programme on their classroom practice, their opinion of the assessment strategy, and their use of the course materials and assessment;
- ✍ survey of student opinion of the programme (1997 cohort).

The report examined the teaching and learning practices in this programme under the following headings: Programme design; Course materials; The teaching in the residential sessions; Assessment design, support and quality assurance; Student support.

From the investigation of the teaching and learning practices, a list of the outcomes (knowledge, abilities and values) of the programme as a whole was drawn up. This helped in the construction of a classroom observation schedule (based on the schedule used by the Wits Education Faculty for their own baseline study of the impact of the programme). The list of outcomes was also used as a basis for the analysis of the effect of the programme on the students' classroom practice.

The final chapter of the report summarized the preceding chapters in an effort to draw out helpful strategies for the design and delivery of effective teacher development programmes using distance education methods.

Main Findings of the Research

The research found that the main outcomes of the programme could be categorized into abilities related to:

- ✍ design of teaching, learning and assessment strategies,
- ✍ implementation of these strategies, and
- ✍ reflection on the degree of success of these strategies with a view to future improvement.

In addition, certain values (such as gender awareness) were identified as key values modelled and discussed in the programme, and a list was constructed of the main areas of English language, and English teaching knowledge dealt with in the programme.

The overall finding regarding the effect of the programme on students was that there was consonance between the abilities that the programme set out to develop, what the students said about those abilities, and what they did to translate them into practice. The extent to which the transfer of learning took place was, however, different for different students. The ability to reflect varied across the students. Some students demonstrated a full grasp of the reflective process. Others seemed to be able to think about their own practice but were unable to make new discoveries which they could apply to improve their own practice. Generally the students appeared to display the values and attitudes being promoted by the programme.

From the background research done for this report the following general insights were gained about the design and delivery of teacher development programmes using distance education methods:

- ✍ It is important to integrate school-based activities into teacher development.
- ✍ High quality course materials should be complemented with peer and school-based interaction.
- ✍ Courses, activities and assessment must be linked with classroom practice.
- ✍ It is important to integrate theory and practice.

It was found that the programme operates within these general guidelines, but it has also developed specific teaching and learning practices to give substance to these general points.

In addition, the programme illustrates the importance of:

- ✍ regular residential sessions as means of support as well as an opportunity for modelling good teaching practice;
- ✍ effective support for individual students, mainly through teaching on assignments.

Title: The nature and impact of accredited in-service education of under-qualified science and mathematics teachers: Which factors generate best practise in the classroom

Researcher/s:

Paul Webb, Gill Bolt* , Pam Austin, Marilyn Cloete, Viv England**, Nosisi Feza, Jeff Ilsley, Raj Kurup***, Mary-Louise Peires and Keith Wessels

Institution/s: Department of Science, Mathematics and Technology Education, University of Port Elizabeth, * Faculty of Education, Rhodes University, **L-MAP Port Elizabeth and ***All Saints Development Centre, KingWilliam'sTown.

The problems surrounding Science and Mathematics Education contribute greatly to the current national crisis in education in South Africa. At present there are a large number of under-qualified teachers who lack the knowledge and skills to teach these subjects competently. This need underpinned the development of a course at the University of Port Elizabeth which provides both a thorough understanding of the concepts, and mastery of those methodological, language and classroom management skills which are fundamental to the successful teaching of Science and Mathematics. Teachers registered for this in-service professional teacher education initiative are taught in Port Elizabeth, Queenstown and KingWilliam'sTown and comprise of teachers in a range of teaching situations, i.e. from urban to deep-rural farm school classrooms.

The specific purpose of the study was to investigate which factors in the teacher development process generate best practice in primary Science and Mathematics classrooms. This was done within a theoretical framework of INSET outcomes that describes the impact on classroom practice. Areas of investigation were teachers' knowledge and understandings of Science and Mathematics as regards basic concepts and processes; pupil outcomes (i.e., what do pupils know and what can they do with their knowledge and understandings of Science and Mathematics); and which other outcomes of the INSET process have enabled the teachers to be more effective in their classrooms.

It is clear that the teachers who have participated in this in-service professional teacher development initiative, i.e. the Diploma in Education focusing on Science and Mathematics Education (DE), for more than a year have significantly better understandings in Science and Mathematics than their peers who have not been exposed to this type of intervention. This has been translated into significantly better pupil outcomes in these subjects in the classroom. Also, where difficulty is experienced with aspects of Science or Mathematics, misconceptions may be shared - sometimes by teachers, sometimes by pupils and, in some cases, by both pupils and teachers. Diagnosis of these shared misconceptions is potentially of great value in informing better practice,, both for teachers when teaching their pupils and for the developers of INSET courses.

One of the first INSET outcomes to manifest itself in the classroom is the use of practical teaching aids by teachers in their teaching. Another is the physical re-arrangement of classrooms to allow pupils to sit in groups. It appears that the most difficult aspect of teaching to change is teachers' desire and ability to ask questions of their pupils and, in turn, to get their pupils to ask questions of them. It is suggested that this reluctance may be linked to teachers' lack of conceptual understanding of the topic being taught. There are clear indications that a number of outcomes were met to varying degrees by the DE course and that these outcomes had differing effects on teachers, despite the same intervention. It is also clear that the dominant outcomes generating 'best practice' are improved knowledge and skills and a high degree of value congruence.

The classroom evaluations, interviews and testing of teachers and pupils support the notion that the impact of the above outcomes on change in classroom practice can be evaluated against a number of indicators. It appears important that the specific outcomes that could be expected from any particular teacher development programme need to be made explicit when developing the course. Only then can the intervention be expected to successfully generate 'best practice'

Title: Teachers' knowledge of their practices

Sub Title: The impact of an intervention and support programme

Researcher/s: Bunita Kohler, Eddie Smith and Robert Koopman

Institution/s: Teaching Intervention and Support Programme -
Western Cape College of Education

Research objectives

The main aim of the research was to study changes in teachers' knowledge of their practices as they progressed from existing teaching practices to ones more in line with the ideals of Outcomes Based Education (OBE). It specifically looked at the changes that occurred in teachers' knowledge of curriculum, assessment and classroom management in mathematics, science and English. Research methodology

Twenty six primary school teachers participated in the Teaching Intervention and Support Programme (TISP). From this pool, a sample of six were drawn from four different schools to participate in the research programme. A qualitative approach was used. This meant that information was drawn from two interviews and four observations of each participant. The same semi-structured interview was conducted before and after a TISP Programme. Additionally, two lessons of each teacher were video-recorded before and after the intervention. All the information was critically analysed to arrive at the findings.

Main findings

1. Colleges of Education should be seen as viable sites for the delivery of lifelong learning for teachers. They have both the capacity and the infrastructure to achieve this goal. Lecturers at colleges are involved with teacher education while the college buildings are under-utilised during practice teaching.
2. Both intervention and support are powerful elements in helping teachers to reconceptualise their practices. The structure of TISP can be used to facilitate such change.
3. The teachers' knowledge of their practices can be expanded through a programme like TISP. Their knowledge of curriculum showed the highest degree of change while their knowledge of assessment changed the least.
4. Some of the features of the OBE programme are inherent in TISP. For example, the participants learned to emphasise cross-curricular links, the use of real life situations in teaching, continuous assessment and materials development.
5. The teachers need to own the process of change. In this programme, it was achieved by allowing teachers to produce their own materials, to experiment with the new approach and to share their experiences with colleagues.
6. Teachers expressed a definite need for a follow-up intervention.

Analysis of the data led to the identification of three broad repertoires of practices. The table below provides examples of each of these.

Table 1:

<p>"BEST" PRACTICES <i>View underlying 'progressive' educational theory and policy</i></p>	<p>"GOOD ENOUGH" PRACTICES <i>Many project teachers' aims and objectives</i></p>	<p>"COMMON PRACTISES" Most frequently observed practices in this project</p>
<p>Lessons are introduced within a <i>context and linkages</i> are made between the materials used and the content to be learned.</p>	<p>The lesson content is well-presented and follow-up exercises are <i>related</i>, i.e. the practice is in context.</p>	<p>Content is presented as <i>isolated and decontextualised</i>. Follow-up exercises are sometimes unrelated to the lesson content.</p>
<p>Classroom materials are selected and used to encourage the development of <i>broad knowledge and conceptual skills</i> such as analytical skills.</p>	<p>Classroom materials are selected and used to develop <i>technical skills</i> such as summarising.</p>	<p>Classroom materials are used to develop <i>surface understanding of the content</i> such as the vocabulary.</p>
<p>Materials provide learners with <i>challenges</i> as they <i>develop new concepts and skills</i>.</p>	<p>Materials provide <i>new content and exercises for practice</i>.</p>	<p>Materials are used primarily to <i>drill</i> learners and to <i>keep them busy</i> for the timetabled lesson</p>

Although teachers' 'good enough' lesson objectives did not always translate into their classroom practices, they were familiar with both these repertoires.

The repertoire of 'best' practices, however, appears to represent and require a

significant leap in thinking as well as in practice.

This study also highlighted a range of contextual and personal factors which influence teachers' work. The predictability of time-tables, security for the storage of books, collegial relationships, qualifications and exposure to in-service courses were identified as especially important in this study. Recommendations were made for the development and provision of textbooks alongside in-service courses. It was suggested that rather than a number of different textbooks, one or two textbooks which provide a range of learning activities would be preferable. In-service courses on the use of these should also aim to help teachers close the gaps between their current practices and 'good enough' practices, and then to move on to 'best' practices. Based on an incremental view of change rather than that of 'workshop conversion' or change through materials provision, these recommendations also reflect the idea that teachers need to make discretionary judgements in order to move appropriately between the different repertoires.

Of particular interest to materials developers - some of whom have described this study as "a reality check" - is the suggestion that teaching materials need to be recognisable to teachers and reflect at least some of the practices with which they are familiar. For example, any of the teachers participating in this project would have been comfortable with a comprehension passage followed by questions on that passage. A 'best' practices materials developer may be tempted to provide a passage followed by an activity where learners set the questions themselves. It is unlikely that many of the project teachers would have felt sufficiently comfortable with this approach. It is too new and alienating. They would, however, be open to using a comprehension where the questions had been printed above the text, introducing the idea that learners need to know what they are reading a passage for before they begin. Teachers' notes could explain the theory underlying the idea of reading for meaning.

Title: Phonological training and metacognitive strategy instruction for children with reading difficulties in multilingual classroom contexts.

Researcher/s: Judith Wright and Penny Tyawa

Institution/s : Johannesburg College of Education, Edge Hill, University College, Lancashire, England

Introduction

The major goals of this research were to develop theoretical and practical applications in relation to the components and processes of instruction that facilitate improvement in the phonological abilities and reading development of children with difficulties in learning to read in English as a first, second, (or additional) language. Central to this process, was an exploration of the metalinguistic ability of phonological awareness, and metacognition, through an investigation into the comparative effects of two instructional methods on the reading performance of failing readers in multilingual classroom contexts in which English was the language of instruction. The study was conducted over a period of ten months in seven primary schools comprising three suburban schools (formerly categorised as Model C schools) located in Johannesburg, and four township schools in Soweto.

A subject sample of 110 children (aged 7-10 years) with reading disabilities was selected from within the schools for participation in the study. Criteria for selection were a reading age/chronological age discrepancy of approximately two years as measured by performance on standardised reading tests and teacher concerns in relation to poor pupil progress in reading development. The children were divided into two experimental groups (EXP1 and EXP11) and a control group. Forty-six children were assigned to EXP1 (19 females; 26 males) and received instruction in instructional Method 1; 48 children were

assigned to EXP11 (21 females, 27 males) and were taught in instructional Method 2 and 16 children (7 females, 9 males) were designated as controls. Instructional Method 1 provided direct instruction in procedural knowledge of phonological awareness and the alphabetic principle. The skills trained were rhyme, alliteration, blending and segmentation into onset-rime constituents and individual phonemes, together with the recognition that common sound - letter sequences recur from one word to another within English word structure. Instructional Method 2 provided the same direct instruction in conjunction with a sequence of specific metalinguistic concepts which included direct explanations about the nature (declarative knowledge), value and purpose (conditional knowledge) of phonological awareness in reading and spelling and explicit instruction in the metacognitive strategies of planning and self-monitoring. Teaching in each instructional method was conducted within the context of cooperative teaching and learning involving interactive problem -solving, guided practice and, in the case of instructional Method 2, teacher modelling and direct explanations as well. Each experimental group received instruction in small groups of 37 children in twice weekly, 40-minute teaching sessions over a period of approximately 17 weeks. The control group continued within the conventional reading programmes of the schools. Teaching was conducted by the researcher and a participant team of 17 teachers recruited from within the schools who were trained to implement the instructional methods.

Pupil progress from baseline was measured within a pre-test, post-test, delayed post-test experimental design. Quantitative measures included three standardised tests of word recognition, reading comprehension and spelling knowledge respectively. Criterion-referenced measures consisted of two beginning reading tests of letter identification and metalinguistic concepts developed by Clay (1979) and three measures of phonological awareness in English. Pre-test were administered in February/March 1998 and the first post-test was conducted nine months later in October/November 1999. Qualitative data included informal observations of pupil learning within the experimental teaching sessions and teacher ratings of classroom performance in reading and spelling of the experimental subject sample.

Analysis of data and results from pre-test to post-test showed that training in phonological awareness and alphabetic principle produced significant improvements in the reading performance of children with reading difficulties in English as a first, second or additional language. However, phonological training that included in addition, explicit instruction in metalinguistic concepts and metacognition was shown to be more advantageous. Mean improvements in performance of the experimental groups were significantly superior to the control group on a majority of measures. While results on some tests showed comparable performance between the two experimental groups, where differences occurred either significantly or as trends, these were consistently in favour of EXP11. Experimental outcomes in reading improvement were not confined to enhancements in performance on standardized and criterion-referenced measures of reading and spelling. Analysis of teacher ratings indicated observable changes in motivation and approaches to reading in the experimental groups, and in EXP11 these were observed in the strategic organisation of reading behaviour. Moreover, substantial improvements in ability to engage in independent, self-regulated performance on classroom literacy tasks were observed in both experimental groups. Informal observational data revealed the critical observation that the behaviour of children in multilingual contexts conforms with the behaviours of children in English monolingual contexts. Patterns of performance and learning in the experimental groups were comparable to findings from experimental research on developmental processes in reading and spelling acquisition in young, monolingual speakers of English, and to observations from previous work conducted by J. Wright with monolingual failing readers in primary schools in the North-West of England.

Finally, although the instructional methods were effective for the majority of children in both experimental groups and made significant differences at the level of group means, analysis of minimum and maximum individual performance within the means revealed a minority of children in whom progress remained relatively weak. Further research is necessary, for example a longer period of intervention, to determine the variables which may account

for this result. Findings

The results of this comparative instructional study show that training in phonological awareness and the alphabetic principle produced significant improvements in the reading performance of children with English first and second language reading disabilities. However, phonological training that included in addition, explicit instruction in metalinguistic concepts and metacognition was shown to be more advantageous.

Analysis of data and results at post-test, revealed that the performance of the experimental groups was significantly superior to controls on a majority of measures. Moreover, while results showed comparability in performance between EXP1 and EXP11, where there were differences, either significantly or as trends, these were consistently in favour of EXP11. Experimental outcomes in reading improvement were not just in relation to enhancements in performance on standardised and criterion-reference measures of reading. There were, in addition, observable changes in children's motivation and approach to reading, and in the case of EXP11 these were observed in the strategic organisation of their reading behaviour. Moreover, substantial improvements in ability to engage in independent, self-regulated performance on classroom tasks in reading and writing were observed in both experimental groups.

Analysis of qualitative data revealed that in many respects, the behaviour of children in multilingual contexts conforms with the behaviours of children in English monolingual contexts. Patterns of performance and learning observed in the experimental groups were comparable to findings from experimental research on developmental processes in reading and spelling acquisition in young monolingual speakers of English, and to observations from previous work conducted by the present researcher with monolingual failing readers in primary schools in the North-West of England. Given that alphabetic orthographies are common to both the second and primary languages of the experimental subject sample, it may be that cross-language transfer of phonological awareness is

indicated. It should be noted, however, that the dimension of first language phonological awareness was not addressed in this study. As stated in the Interim Report, the unavailability of materials for the assessment of phonological awareness in pupils' home language did not permit a comparative analysis of the implications of phonological development in the primary language of reading acquisition (and failure) in the second language. Such comparisons would have rounded out the analysis of pupil learning within the programme and may in addition, have provided concrete and significant data on the role of cross-language transfer of phonological processing in learning to read in two languages in the specific context of South Africa. The development of procedures for the assessment of phonological awareness in African home languages should, therefore, be an issue for further classroom-based instructional research in reading development and reading disabilities.