# What makes education work?

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# What makes education work?

## A literature review:
## Report 1 of the Provincial Treasury study on improving the quality of education in KwaZulu-Natal

**PROVINCIAL TREASURY**
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**Presented by**
**the School of Education and Development,**
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# Executive summary

What are the key factors enabling quality education for all? This review answers the question by exploring research within both developed and developing countries. An emerging consensus is providing surprisingly clear answers that can be expressed in two lists.

Firstly, within the already developed world three factors have been identified as crucial variables:

1. Getting the right people to become teachers: '*the quality of an education system cannot exceed the quality of its teachers*'
2. Developing them into effective instructors: '*the only way to improve outcomes is to improve instruction*'
3. Ensuring that the system is able to deliver the best possible instruction for every child: '*high performance requires every child to succeed*'

These variables revolve very noticeably around the quality of teachers and their teaching. One can hardly help asking: Is this statement of the obvious really all there is to it? The irony is that confident statements about the impact of teachers and teaching on the quality of learner performance have only recently become possible, through comparative standardized testing across both the developed and developing world. We know which countries have the highest performing educational systems and we are able to explore the reasons for their success. Notably, excellent leadership is second only to classroom instruction among the school related factors that contribute to quality learning.

Moving to the developing world, again there is increasing clarity on variables that impact directly on the quality of education. Here is a list for this context:

1. Supporting children's brain development and health
2. Making effective use of available instructional time
3. Ensuring that all have textbooks to take home
4. Teaching fluent reading and calculation in the early grades
5. Teaching basic skills in the home language
6. Grounding teacher training in a few well researched learning principles that work in developing countries
7. Ensuring effective teacher incentives, goals and oversight.

This is a strikingly different list. It does not assume that all the learners are healthy and well fed; that teachers and learners are in the classroom teaching and learning; that textbooks are available; that learners can read, write and calculate at the appropriate level; that teaching

happens in the child's home language; that teachers are able to work with complex pedagogies and curricula; that they receive a basic wage or are subject to professional evaluation. All of these factors, already in place in developed countries, allow the full impact of good teaching to come forward as the key variable.

Thus developing countries need to work with different criteria when engaging with the meaning of quality in education. Again, the full import of this seemingly obvious statement has only recently come home. When systematic attempts to introduce educational reforms taken from the already developed world have failed across various developing countries, the blame has fallen on poor implementation or lack of understanding. It is now clear that learners from impoverished environments who attend inadequately resourced schools with inadequately trained teachers need very different interventions. Learner-centered, time intensive approaches that demand high resources and high teacher skills are inappropriate.

South African educational reform interestingly illustrates this problem in the attempt to mirror outcomes based practices that are followed in the already developed world. We have now come full circle as education minister Motshekga calls strongly for a 'back to basics' campaign targeting literacy, numeracy and a streamlined curriculum, along with systematic testing (to give learners feedback on progress) and 'inspections' to ensure that teachers are doing their jobs. It is thus now recognized that reform must take clear account of the prevailing conditions and adapt accordingly. Recent research on factors contributing to quality education within a South African context resonates strongly with this. Here is one list of such factors, identified in successful schools:

1. A safe, orderly, positive learning environment. Locked gates, barbed wire, alarm systems, good fences, night watchmen all provided a sense of external safety, whilst internally there was order, discipline and a sense of purpose.
2. Strong leaders. Principals showed pro-active abilities in financial, organizational and learning management, had effective and established community relationships and consulted with their staff democratically.
3. Excellent teachers. Qualified, dedicated teachers ensured rich and stimulating classroom environments where learners engaged with texts. Teachers worked at improving their own practice, taught from the heart and collaborated well with each other.
4. A shared sense of pride in the school. Schools were clean and well maintained with relatively comfortable facilities for both staff and learners. Learners were confident and keen to demonstrate what they had learnt. Many were fluent in English.
5. High levels of school-community involvement. The schools had strong relationships with the community and strong reputations of quality within the community, were proud of their status and affirmed local culture and practices.

These elements must be combined with the kinds of curriculum structure and pedagogy that are currently known to work effectively within a South African context. Research has pointed to an explicit curriculum that is plain, detailed and simple, working from basic skills and concepts upwards in complexity, using unambiguous progression paths and combined with clear and explicit summative forms of assessment. Strong external pacing of the curriculum by the national and provincial departments is needed, with simple, clear outcomes explicitly given at specific end points of the school calendar and rigorous evaluation across the system to ensure these basic outcomes have been reached. The distinction between learner-centered and teacher-centered pedagogy must be replaced with a focus on a learning centered classroom where the teacher teaches and the learner learns by reading, writing, questioning, practicing and discussing.

Strong political, financial and cultural will is needed to push through improvement of home language instruction and educational resources in the home language throughout the foundation and intermediate phases, along with the teaching of English as both a second language and as an additional language of instruction. Dual medium instruction must be encouraged but with an emphasis on home language as the first and most important language to be developed. There should be heavy investment in high quality isiZulu textbooks and teaching resources throughout the primary school grades. Polarized debate on home language vs. English as language of instruction needs to be avoided by working to improve learners' mastery of both languages from grade 1.

Numeracy and literacy must be a priority in the foundation phase. Failure to ensure that learners master these skills results in inefficiencies reverberating throughout the system as learners increasingly fall back in progress over the years.

That said, there is no single sweeping measure that will miraculously improve the quality of education in KZN. Systematic attention to how the system works and articulates with other parts is crucial. The education system is only as strong as its weakest link. With this in mind the second paper uses the principles embodied in this paper to explore how to improve the quality of education in KZN as a whole.

# 1. What is quality in education?

The notion of quality in education is highly charged terrain. Competing definitions stem from ideological positions and interest groups that have varied historically over time and across countries. Supporters of humanism, behaviorism, critical theory/post modernism, radical adult education and indigenous tradition all offer intelligent and coherent accounts of what quality in education is (EFA 2005, pp. 32-34). Education at its deepest heart is about producing a decent and capable human being who can contribute towards maintaining and improving the world we live in. This is beyond measure, as it entails a complex combination of ethical, civic, emotional and epistemic factors. While an approximate definition of quality in education (along with quantitative indicators) can certainly be achieved, this necessarily involves a rather sterilized account of what good education is and does.

This review will take a pragmatic line through these debates by looking at how quality education has been defined within education policy and planning, as well as examining empirical research into variables that have a direct and strong impact on learner performance and attitude at school. Most notably, the ability to measure quality in education has increased exponentially over the last fifteen years, particularly as systematic global comparative testing has opened out performance levels of educational systems across various countries. Research has moved far beyond simple input-output models in which spending and resources are poured into education, academic results and skills pour out, and events in the classroom are the 'black box' in the middle. It has also moved beyond ideologically motivated pedagogies that insist they are automatically right and others automatically wrong. Sophisticated and ambitious research programmes now combine quantitative and qualitative analyses of what is happening inside the classroom across different countries. These have begun to give us insight into what affects levels of educational performance, why it does so and how.

The approach to quality in education adopted in this review can be traced back to the foundation of the International Association for the Evaluation of Educational Achievement (IEA) in 1958 (Benjamin Bloom was one of the members). Their idea was that cross-national comparison of excellence in education could encourage a shift away from acceptance of what is culturally given towards what is humanly possible. It would also reveal key factors contributing to quality education and allow for cross- fertilization. Cross-national testing has since undergone an explosion, with whole nations going into either angst or ecstasy based on their comparative performance. The enormous interest has led to countries forming networks that allow for detailed testing and comparison in key areas such as mathematics, science and language. These tests have not stopped at measuring learner performance; they have also gathered variables on socio-economic status and schooling conditions. This has allowed for exploration of issues of equity both within and between countries (TIMMS, PISA, SACMEQ, PASEQ, LLECE, OREALC) (see Postlethwaite 2004). Political interest has increased: ministers of education from across the world now attend conferences exploring international comparisons in educational quality based on the outcomes of the tests. Insights gathered are turned into national policy drivers and become part of civic debate on the state of the nation. This paper is one such instance.
International testing was only the thin edge of the wedge: with it came the question of how to improve education in developing countries systematically. Beeby's *The quality of education*

*in developing countries* (1966) is the founding book on this aspect and Beeby's *Stages in the Growth of a Primary Education System* (1962) the founding article. Beeby identifies two main drivers affecting the ability of an education system to improve in quality: the level of general education of the teachers in the system, and the amount and quality of the teacher training that they have received (Beeby 1962, p.6). Focusing on primary education, Beeby proposed four stages of growth in the qualitative development of schools. He provides the following account of the first stage:

> "The bulk of teachers are ill educated…the syllabus is vague…teachers fall back on the very narrow subject content they remember from their own school days. It consists of little but the completely mechanical drill of the 3 R's and memorizing of relatively meaningless symbols occupies most of the time…all except the brightest children cease to make progress." (Beeby 1962, p.6).

This account resonates with what our current research is telling us about the state of education in most of South Africa's primary schools.

Beeby then goes on to make a crucial recommendation that these kinds of schools should not jump straight into constructivist pedagogies. What is needed initially is more formalism. It might seem ideal to take teachers at this level and introduce them to teaching practically and directly from the world they know so well, so that they use learners' own context to make the curriculum meaningful to them. However, this kind of learner-centered teaching is based on complex and sophisticated ideas of learning and pedagogy. It is impossible to take the whole teaching cadre and educate them fully into teaching with this richness and depth. Teachers are marked by how they themselves were taught; a teacher needs to be both well educated and well trained to perform at this level. What can be done, however, is to intervene at a training level and accept that training can only do so much.

Beeby suggests that the problem with the school at stage one level is that it is "confusedly and inefficiently formal. *It has all the defects of formalism and none of its virtues"* (Beeby 1962, p.6). More (albeit better) formalism is what is initially needed, not less. Thus at stage two, poorly educated but trained teachers work with rigid methods using a 'one best way' approach, and with one textbook. It is a bridge too far to expect teachers at this level to mesh specialized knowledge forms with everyday life experiences. Basic mastery of the knowledge is needed; otherwise teachers fall into everyday life discussions that are poorly related to knowledge forms. Basic but crucial knowledge forms and strategies need to become embedded in practice. External examinations and inspections need to be carried out to ensure that these key basic forms are taught and learned.

In the third stage, with teachers better educated and trained, there can be more focus on meaning, but with little variation from the syllabus and textbooks. There is the beginning of experimentation, debate and engagement. In 1966 Beeby added a fourth stage (not included in Figure 1) in which well educated and well trained teachers work towards meaning and

understanding within a wider curriculum that has a variety of content and caters for individual differences. Creativity, activity methods and problem solving are emphasized along with emotional and aesthetic wellbeing (Beeby 1966, p.72).

This model has been much critiqued for its evolutionary character and placing of learner-centered, constructivist education as the final attractor or endpoint of educational development (Guthrie 1980). Beeby has accepted some of the criticisms and partly reworked the model into a more neutral description (Beeby 1980). His major point, however, was that these stages were hierarchical. It was impossible to jump from stage one to stage four without moving through stages two and three. Interventions must be directed specifically at the type of school and teacher involved and tailored accordingly.

Retrospectively, this model speaks powerfully to South African education where we attempted to jump from levels one and two straight into the learner-centered OBE of stage four.

Foundational texts like Beeby's thus drive us to circle around them and come back to them, no matter how profound the critique. Many of the current suggestions from the developing world and South Africa for improving quality in education resonate strongly with level two – get a quality textbook and a specific method that works with poor learners and then examine externally and inspect. In addition, in South Africa we are beginning to understand that we have a bimodal schooling system with a massive chasm between stages one and two (historically black and impoverished schools) and stages three and four (historically white and enriched schools). Policy makers and school development experts are beginning to argue that schools located at different levels need very different kinds of interventions and the attempt to treat all schools equally is resulting in a massive drainage of resources and waste of human endeavor (Taylor 2008).

Beeby's stage model serves as the first key insight informing this review. It indicates what specifics must be aimed at to get schools that are functioning at level 1 (narrow subject matter meaninglessly taught in rote memorization) on to level 2 (one best way, one textbook, strict examination and inspection) then to level 3 (more focus on meaning, some experiment with different methods) and finally to level 4 (creative and activity based learning in a wholesome classroom environment). The difficulty is that as the education system evolves it begins to have all of the stages within its ambit. The attempt to push it too quickly or slowly can result in failure as either the newer or older teachers become disillusioned or disheartened. There is an angle to reform: the art is to make it  neither too sharp or flat.

## Chart showing stages in the growth of a primary education system

| Stage | Teachers | Characteristics | Distribution of Teachers |
|---|---|---|---|
| 1. Dame School | Ill-Educated Untrained | • Unorganised<br>• Relatively meaningless symbols<br>• Very narrow subject content - 3 R's<br>• Very low standards<br>• Memorizing all important | |
| 2. Formalism | Ill-Educated Trained | • Highly organised<br>• Symbols with limited meaning<br>• Rigid syllabus<br>• Emphasis on 3 R's<br>• Rigid methods - "one best way"<br>• One textbook<br>• External examinations<br>• Inspection stressed<br>• Discipline tight and external<br>• Memorizing heavily stressed<br>• Emotional life largely ignored | |
| 3. Meaning | Educated Trained | • Meaning and under-standing stressed<br>• Somewhat wider curiculum<br>• Variety of content and methods<br>• Individual differences catered for<br>• Activity methods<br>• Internal tests<br>• Relaxed and positive discipline<br>• Emotional and esthetic life, as well as intellectual<br>• Closer relation to community<br>• Better buildings and equipment essential | |

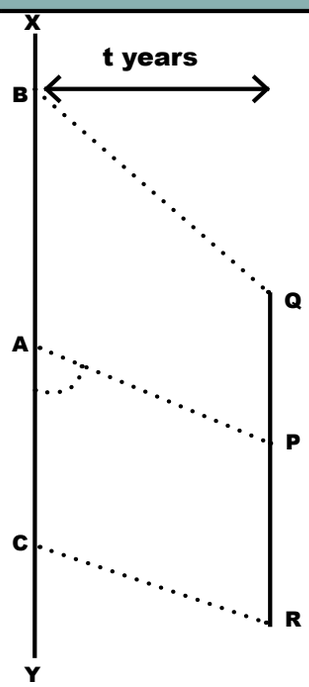



**Figure 1: Beeby's stages of development**

The angle of reform refers to the geometric figure on the right in Figure 1. Teachers at point A represent the average level of education and training of teachers within the system, with teachers at B being the most poorly educated and trained and teachers at C the best educated and trained. Over a set time period of reform, teachers at A, B and C can improve their teaching but only to a certain degree (P, Q, and R). To expect a teacher at point A and B to reach point R in the system is unrealistic. Teachers can improve but the steps must be gradual and focused on the level they are currently at.

Since this key point structures the thinking of the KZN project we will look at recent research that substantiates and develops Beeby's model. Verspoor elaborated on the model (Verspoor and Leno 1986; Verspoor and Wu 1990), usefully updating Beeby's stages with more modern names: 1. unskilled, 2. mechanical, 3. routine, 4. professional. Unskilled teachers (Level 1) have very poor content knowledge, are poorly motivated and mostly unguided. Pedagogy takes the form of rote learning with recitation, there is usually only one textbook and it is in the hands of the teacher. Learners mostly copy from the board. To intervene at this level, clearly structured teaching guides, explicit training in basic content, strict evaluation and extensive support are all needed.

At the mechanical level (2), teachers have limited subject knowledge, with some interest in professional development (albeit low effectiveness at this stage). Teachers might have more than one textbook and learners might have access to textbooks, but the text-book is still copied out and learnt by rote. The curriculum is also slavishly followed. Reform at this level should focus on explicit content training, teacher guides that support more than one teaching strategy, and examination reform that begins to shift learners away from pure rote learning. Head teachers and heads of department could be trained in the basics of managing learning.

At the routine level (3), teachers have both stable content knowledge and a number of teaching strategies but are not open to new experiments or developing new strategies on their own. It is at this point that peer feedback steps in, the core features of which were pointed out by both the McKinsey report (2007) and Hattie (2008) as crucial to reaching the highest level of professional practice.

Beeby was intensely aware of the irony in his recommendations:

> "I had some responsibility for the educational policies of two countries that were 2000 miles apart in space and more than half a century apart in time. It was a little disconcerting to find myself, without any sense of inconsistency…encouraging in Western Samoa the development of educational practices I spend half a lifetime trying to discourage in New Zealand." (Beeby 1966, p.51).

The formalist 'medicine' he recommended for Western Samoa was precisely what he urged New Zealand to outgrow and discard. The useful insight for us is that he could hold both solutions in his mind at the same time. There was no one solution for all, no generic cure. Recommendations were adapted to the level and needs of the particular education system: what was medicine for the first was poison for the second and vice versa. This basic set of diagnostic tools was needed 15 years ago in South Africa when we took the OBE 'medicine' of the developed West only to find it was poison for us. Unfortunately we adopted Spady as doctor rather than Beeby. (This was not without forewarning. In 2000, Johnson, Monk and Hodges published a paper in which they argued for the relevance of Beeby to South Africa. It fell on deaf ears.)

Beeby was worried about the attempt to introduce education for all without the necessary capacity in the system. Such a project, he maintained, would be 'infinitely harder' than anything the older Western nations had to deal with educationally (10). Yet the world is now engaged in exactly this project. A strong focus on improving education within developing countries has resulted in international agreements on achieving a quality education for all, organized by major international agencies and governments (Jomtien 1990, Dakar 2000). The call is out for a quality education for all by 2015.

Developing countries across the world have accordingly increased enrolments in primary education, often imposing major strain on their educational systems. While quantity might increase, maintaining or improving quality at the same time is exceptionally difficult for countries with limited resources. (South Africa has faced particularly harsh challenges through

its attempt to redress the structural discrimination of apartheid by improving both educational access and quality, while maintaining fiscal discipline). This has also forced international debate on exactly what quality in education is (especially within a developing context), how to measure it and how to facilitate its emergence and growth. The Education for All (EFA) global monitoring reports (especially from 2005 to 2009) are an invaluable resource for exploring the meaning of quality in education within a developing context. When these findings are combined with the sophisticated insights increasingly coming out of assessments within and across developing countries, a basic model of quality education emerges that takes issues of equity seriously into account.

Ross and Zuze (2004) provide an elegant framework for measuring quality of education in developing countries. Four factors are used to define quality, three of which take issues of equity very seriously. Firstly, quality is measured against an indicator of expected average student achievement in numeracy or literacy. This is the simple league table result whereby countries can be rated from best to worst based on average learner performance. Some countries perform above average against the norm, others below. This is the standard traditional measure used in major studies such as TIMSS and PISA, but it does not factor in some countries being richer or poorer than others. This is where the other three measures come in. *Adjusted quality* takes into account how students are performing in relation to their socio economic status. This will be discussed using two examples later in this paper; we note here however that it involves simply working out the average socio-economic level for all the students and then checking what students are scoring across the countries at this average socio-economic level. It compares how students at equivalent socio-economic levels are performing in different systems. Thirdly, the level of *social equity* is measured by assessing the impact of socio-economic background on reading scores – that is, the relationship between socio-economic status and learner performance. The lower the impact of poverty on performance the higher the social equity: poor learners are being effectively taught and provided with the chance to improve their lives through education. Fourthly, the level of *distributional equity* is measured by assessing the range of difference in the spread of student reading achievement. A high spread of marks ranging from weak to strong performance points to major gaps between more and less able students (Enos p.10, 45).

This elegant and simple set of indicators thus reveals how an educational system is performing in terms of quality, placing issues of poverty and equity in the foreground. It is one thing to measure and compare the average performance of different education systems, quite another to take into account the issues raised when some systems exist in contexts of serious poverty. A league table approach that does not factor in socio-economic factors can find itself comparing caviar to potatoes. Since we know that poverty impacts on educational performance, comparing rich and poor countries on the same league table is misleading. A far better comparative measure would assess how learners at similar socio-economic levels are performing across countries, how poor learners are performing in comparison to better off learners within the system, and what the range of marks actually is. This will be demonstrated later in this paper by comparing South African performance to other Southern and Eastern African countries as well as comparing how our nine provinces perform, using all four indicators as a guide.

EFA 2005 provides a systematic and comprehensive account of those factors impacting on educational quality that focus more on the internal functioning of the education system, but still relate education to the socio-economic, cultural and political context. This has been usefully captured in a framework (p7):

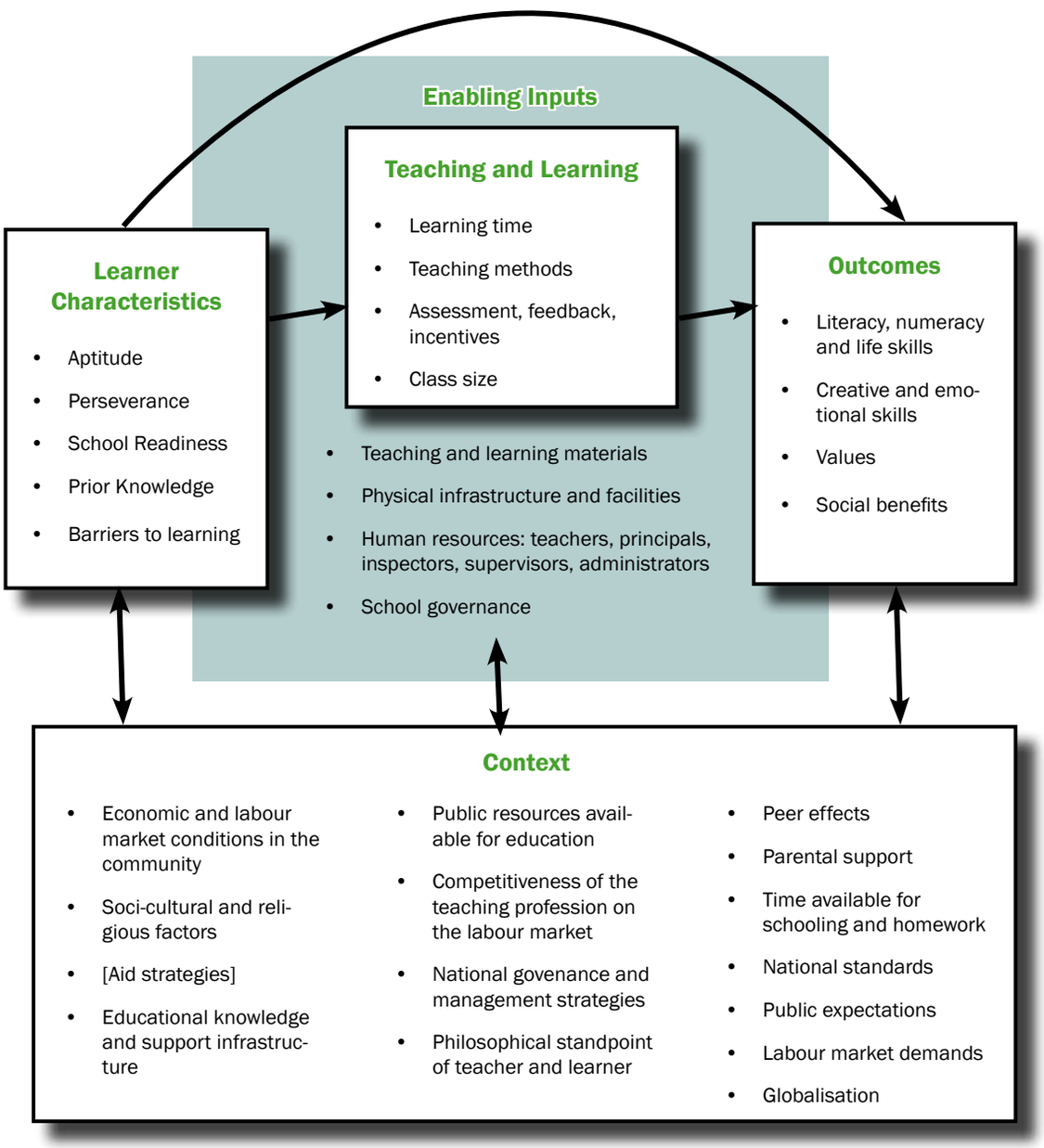



**Figure 2: EFA Indicators of quality**

Teaching and learning, as the core functions of schooling, are at the centre of the framework. Four key variables are identified inside the classroom (learning time, teaching methods, assessment/ feedback/incentives, class size). All the other variables are organized around this sanctum, ranging from learner characteristics (aptitude, school readiness, perseverance, prior knowledge and barriers to learning) to enabling conditions surrounding the classroom (school governance, human resources, infrastructure, materials) to outputs (literacy, numeracy, life skills, creative and emotional skills, values and social benefits). The learner, teacher, classroom and school are then placed within a context that frames what teachers and learners do. Learner characteristics occur within a social, cultural and economic climate. Schools operate in a context of national governance, public spending, policy, and expertise, teacher recruitment and competitiveness. Learning and teaching occur within particular approaches and philosophies of education, community and parental engagement and time officially made available for schooling. Learning outputs are contextually informed and influenced by national standards, public expectation, labor market demands and globalization.

The EFA framework is comprehensive and does an excellent job of showing how the variables relate to each other. Each variable is partly reducible to quality indicators that can be measured and worked with. Eventually this project should lead to a global educational quality index, much like the Human Development Index, but for the moment it is enough that we have a comprehensive working model with quantitative indicators of what quality in education consists of. How the model works in practice and can be translated into a numbered equation is still being investigated.

# 2. Quality education within a developed context

When discussing educational quality it is not enough to refer only to organizations involved in policy, planning and evaluation. There have also been major academic studies investigating this area and it is to these we now turn, focusing specifically on the developed world.

One place to start is with the largest meta-analysis ever to focus on what actually makes a difference in the classroom. John Hattie from the University of Auckland spent ten years gathering research on classroom innovation. His final data set consisted of around 50 million learners in 180,000 studies. Much of his time was spent working out how to combine all of these studies into a coherent set for analysis and his findings help to provide the first set of parameters for this review (Hattie 2008). It must be noted up front that most of the studies came from already developed countries and so the insights provide a guiding end point to aim for, a final attractor for educational practices to follow. These findings will have to be placed in relation to a second data set of research on what makes a difference within a developing context. Furthermore, Hattie provides an emergent list of what makes a difference without theorizing educational systems and practices. By the end of this review we will be able to place this global analysis within a context that not only takes poverty seriously but also theorizes educational systems and practices coherently.

The first key finding of Hattie is that almost all educational interventions that try to make a positive difference, do make a difference. This immediately begs the question: How much of a difference does any given intervention make? It should also be noted that this finding reflects a very different experience from that in developing countries where success rates with interventions are often far more limited, for good reasons as we shall see (Taylor 2008).

Below is a list of 39 factors, most of which are intervention strategies, ranked according to impact on quality of educational performance and grouped into three broad levels of impact:

| High to Medium Impact |
|---|

1. Feedback (information on how and why the child understands and/or misunderstands, and directions the learner must take to improve)
2. Student's prior cognitive ability (base intelligence level, IQ)
3. Instructional quality (identify essential representations of subject; guide learning through classroom interaction, monitor learning and provide feedback; attend to emotional attributes; impact on learner outcomes)
4. Instructional quantity (amount of time on task)
5. Direct instruction (teacher centered pedagogy)
6. Acceleration (pushing gifted learners ahead, providing them with additional, more difficult tasks)

7. Home factors (social class, language, parental attention to homework)
8. Remediation/feedback (specific advice on how to improve after assessment)
9. Student's disposition to learn (motivation)
10. Class environment (ordered, peaceful working environment)
11. Challenge of goals (challenging but partially achievable goals)
12. Bilingual programmes (teaching in home language and dominant language of society)
13. Peer tutoring (students explaining to each other, checking each others work)
14. Mastery learning (testing the basic knowledge needed for the topic and insisting on very high marks; learners who do not get the mark must do extra work and then be retested on areas they did poorly in)
15. Teacher in-service education (staff development and training)
16. Parent involvement
17. Homework
18. Questioning (appropriate range of questions from high order to low order)

## Medium to Low Impact

19. Peers (influence of friendship circle and other learners in the class)
20. Advance organizers (link content to what learner already knows and where learner will be going)
21. Simulation and games
22. Computer-assisted instruction (however this ranking is outdated as computer instruction has moved on rapidly and is probably more effective now)
23. Instructional media (video, DVD's)
24. Testing (not so effective if extensive feedback and diagnoses not given)
25. Aims and policy of the school
26. Affective attributes of students (attitudes, beliefs, feelings)
27. Calculators
28. Physical attributes of students
29. Learning hierarchies (lesson arranged from simple basics in steps upwards to complex outcome)
30. Ability grouping (placing learners into either high, middle or low performing classes)
31. Programmemed instruction (prescribed set tasks that go back to simpler set task if learner gets it wrong)

32. Audio-visual aids
33. Individualization (attempt to work out the individual learning styles of all the learners e.g. multiple intelligences, provide individual learning programmes)
34. Finances/money (either higher salaries or incentives)
35. Behavioral objectives (rigid account of behaviors you must show at the end of the lesson or module)
36. Team teaching

**Negative Impact**

37. Physical attributes of the school
38. Mass media (TV)
39. Retention (failing students and keeping them behind)

So what do these 39 factors and their ranking according to impact tell us?

Firstly, that "a constant and deliberate attempt to improve the quality of learning on behalf of the system, principal and teacher typically relates to improved achievement" (Hattie Inaugural p9). Innovation and experiment towards improving the quality of education within the schooling system results in actual improvement. This is a powerful insight that must be considered in relation to the driving need for post-apartheid education (PAE) to get a basically efficient and effective educational system operating in 80% of schools. If experimental improvement works in a developed context, the issue is whether experimental variation works in a developing context. Beeby would argue that experimentation is poison in a developing context where teachers are not well educated and need basic structured interventions that show them one effective way rather than hundreds of possibilities.
Secondly, the most powerful single moderator resulting in improved educational quality is what Hattie calls "feedback". He is referring to the most fundamental three-step action sequence in teaching and learning. This involves the act of imparting information to students, evaluating their understanding of what has been taught and then "matching the next teaching act to the present understandings of the student" (p9). This is the essential rhythm of quality education: it continually works from where the learner is towards where the learner needs to go, with accurate guidance on how to get there. Simple as it is, its enactment is a highly specialized act. Three corollary points follow:

- Mastery learning rather than "doing one's best" is demanded. The learner gets to a point where she can properly do what is asked for and she can then move forward by building on this foundation. (Examples of mastery learning in poor South African schools will be discussed further on; see Makgamatha 1999 and Schollar 2008).

- Teaching and learning programmes that do not optimize feedback will not be overly successful as they will not be able to build upwards in complexity. Again, we have to ask how to optimize feedback principles within post-apartheid education. Here we deal with a history that reflects rote learning of oversimplified content, minimal evaluation of learners and therefore minimal response to where they actually are, with tragically minimal progression occurring.

- Clear, specific and challenging goals are crucial in showing the learner where and how to proceed. Feedback and goals are mutually supportive: feedback works more precisely with a goal in mind, and goals are more achievable when feedback is given. The key is in how you actually go about achieving the standards, not just in setting them up and expecting compliance.

Thirdly, the teacher plays a key role in improving the quality of education within the classroom. This is blindingly obvious, unfortunately to the point where it has blinded. Teachers play a major role in almost all of the 18 high impact factors. It is teachers who provide feedback and reinforcement, teachers who provide high quality instruction, teachers who set and adapt working goals in the classroom, give direct instruction, question learners, set homework, evaluate where the learners are and actively intervene to get them to the point of mastery. Underlying this 'celebration' of the teacher is the reality that some teachers do this while other teachers do not. Put differently, it is not enough for teachers to turn up and do the basics: they need to identify and develop the good methods, actions and processes that really count in terms of quality. Teacher education institutions should be teaching these practices and the Department of Education should be evaluating and rewarding teacher performance in them. However, the question must continuously be asked – which of these practices are valuable and applicable to a developing context?

Fourthly, and finally, all other schooling interventions (financial restructuring; physical improvement of schools; organizational leadership and management within the school; curriculum restructuring; interventions at district, provincial and national levels) should be seen as facilitating the core effect of classroom feedback where a teacher provides learners with knowledge, evaluates where learners are in terms of this knowledge and works out ways to ensure that the learners master the knowledge. The mantra of "the teacher as facilitator" can be reversed. The teacher is not the facilitator: rather, everything else within the educational system should facilitate the teacher doing her job effectively. Everything else is secondary to the primary effect of a teacher working with learners where they are and taking them beyond that point.

How does Hattie's research square up to other internationally recognized standards of quality in education? The McKinsey report *How the World's Best-Performing School Systems Come out on Top* (2007) provides a useful juxtaposition. This study was motivated by the recognition that extensive and expensive school reforms across the developed world mostly showed limited improvement in student performance. Its guiding insight was to study the best performing

systems and work out what they were doing right. Examining 25 national school systems across the world (including over ten of the most successful, seven of the most rapidly improving and five from developing countries with ambitious educational reform programmes), the study explored the factors that resulted in certain schooling systems performing better and improving faster. Three key factors were identified, usefully captured in pithy sayings:

1. Getting the right people to become teachers: "*the quality of an education system cannot exceed the quality of its teachers*"
2. Developing them into effective instructors: *"the only way to improve outcomes is to improve instruction"*
3. Ensuring that the system is able to deliver the best possible instruction for every child: "*high performance requires every child to succeed*"

The first key point is that high performing educational systems set high standards for those entering the teaching profession, including academic qualifications, strong literacy and numeracy skills as well as relevant human qualities - generosity, care, love of children and inspiration. Quality teaching is a complex activity and demands a certain level of intellectual ability, emotional insight and ethics of caring. Teachers are the key leverage point in any educational system; they have the most impact on educational excellence. Beeby made the same point almost half a century ago. In Sanders and Rivers' classic study (1996), eight year olds were given either a high performing or a low performing teacher for one year. Within three years there was a 50% difference in student performance. Another study looking at which teacher attributes most affected student performance found that the teacher's level of literacy was the most significant (McKinsey 2007).

The converse of factor 1 is that schooling systems that draw their teaching cadre from lower performing students land up with teachers who struggle to deliver because 'one cannot give what one does not have' as a Middle Eastern Manager memorably put it. The effects of allowing such teachers into the system are dire – each teacher brings potentially 40 years of bad teaching to thousands of students. Clearly teacher selection and recruitment – working at the source point - is vital to an educational system performing well. The McKinsey report goes on to point out that good starting pay and ensuring high status for the teaching profession also attract good candidates.

The second key factor revolved around an ethic of continuous improvement within high performing schools, with embedded professional development focused on classroom pedagogy. This involves a mentoring and coaching process: lessons are planned jointly; teachers then teach separately, review student work, and teach the lesson content again with suggested improvements. This clearly resonates with Hattie's meta-analysis. Systemic innovation that continually asks how to improve teaching and learning at school level is crucial to improved performance.

The McKinsey Report emphasizes that this is an integrated process: it must happen in context, in the situation, in the classroom. Having examples of best practice showcased at workshops has limited effect. Paying teachers for improved learner performance results in minimal improvements in marks but at the cost of teaching to the test; and these results do not carry forward into the following year. Working on improving teaching practice in the classroom with a peer recognized for excellence providing guidance has very powerful effects. England's highly successful National Literacy and Numeracy Campaign has managed to improve school performance noticeably for the first time in 50 years. It operates with trained literacy coaches in every school working with teachers on a daily basis. These coaches are trained and updated by national experts on best practices and strategies. Major improvements in school performance were noted in just three years.

The third key factor is an educational system that has high standards or expectations of all its learners, with clear mechanisms in place to assist those who have not reached understanding. Social class backgrounds and poverty are recognized as directly impacting on learning but the question then becomes how to work out ways of teaching and learning that result in success for all. This necessarily involves a detailed understanding of why and how the learner is under-performing, and then sustained feedback to move the learner to the next level, as well as systematic support structures to enable this.

Underlying these factors is a culture of professional learning within schools that fosters continuous self-questioning in the institution: How can we improve the quality of education for all our learners? How can we ensure that learners actually reach the levels set? Learners get ongoing feedback from their teachers; but the teachers also get systematic feedback on their own practices.

Both Hattie and the McKinsey report provide clear generic pointers to factors that result in excellence. Since both point to what happens inside the lesson as crucial, what do studies that focus in detail on classroom teaching and learning reveal? Very few research studies manage to enter significant numbers of classrooms across countries, video and interview the teachers and learners, analyze the curriculum, develop instruments of analysis and then provide clear reports on the findings. In the developed world, the TIMMS video study of grade 8 science classrooms provides useful insights into the actual practices of teaching and learning, especially as these can be correlated to assessed performance. Australia, Japan, the Czech Republic, the Netherlands and the United States participated in the study, which gathered, transcribed and analysed 439 video lessons across the school year. All the countries involved in the TIMMS evaluations did well, with the exception of the USA. The video study reveals the reasons why the USA performed poorly in comparison and these findings are particularly instructive for South Africa.

The focus of the analysis was on teacher actions, the structure of the science content and student actions in learning, with the emphasis falling on how students learn science. Certain similarities in approach become very apparent across all five countries. In terms of how instruction was organized, all the countries relied extensively on whole class seat work for at least a part of the

lesson, with the teacher presenting and discussion following the presentation. In 95% of the classrooms, new science knowledge was worked with for a part of the lesson. Some practical activity took place in 74% of the lessons, although the nature of this activity varied between objects being shown, models being built and experiments being carried out. In terms of the structure of science knowledge, 84% of the lessons focused on canonical science knowledge. There was very little focus (2% of the lessons) on issues like the values of science, the politics of science, the history of science, discussion of meta-cognitive learning strategies, or reflecting on the learning process. Put simply, essential science was the focus. In terms of student actions, 81% of the lessons showed some form of student discussion in whole class seat work. The dominant mode of working in practical activities was not model building or experiments or dissections: it was observation of phenomena taking place. Students seldom (i.e. in only10% of the lessons) produced their own research questions or designed their own practical investigations.

What then of the differences between the countries, and why did the USA perform relatively badly in comparison? Firstly, no "ideal" method worked better than any other. Each country had a distinct pedagogic style. Each used their own pedagogic palette to paint their picture, but crucially each picture resonated with essential science knowledge. This can be demonstrated by comparing the Czech Republic to Japan and the USA.

The Czech Republic devoted the highest amount of teacher talk time to getting science content right. Most of the lessons involved review of canonical science knowledge and development of new science knowledge with a strong focus on oral questioning of student understanding and direct feedback based on these responses. Little time was devoted to independent work or practical activities. The dominant mode in this highly successful country was teacher-centered. If students presented they did so in front of the whole class. Demonstrations mostly happened from the front with the teacher then quickly moving into the content. Strong visual representations capturing the core ideas were used. Expert analyses of the lessons judged that the lessons from the Czech Republic had the highest conceptual complexity and density of all the countries.
Japan had a very different pedagogic style. There was far less focus on complex content and much more emphasis on a few basic scientific concepts, but these concepts were extensively worked with, ensuring that students made strong connections between the concepts and evidence presented. The students worked inductively upwards from the evidence to the concepts, with varied pieces of evidence provided on the same topic. The various bits of data had to be coherently organized and always pointed to one main conclusion that was the focus of the lesson. The conclusions were not complex or theoretical; rather they were basic to science. Far less complex content was covered than in the lessons from the Czech Republic, but the key areas of science were dealt with in depth, with multiple pieces of evidence and multiple connections between them. High demands were made on the students, not in terms of the content, but rather in making connections.

The USA, in comparison, had some telling aspects in its pedagogic mix. There was a strong variety of activities, but these were not necessarily linked to learning key concepts in science.

Students were kept busy doing a variety of things. Some of these were directed at gaining student interest through games, activities, puzzles, role play, and discussion of real life issues. There was lots of variety in the science topics as well, with elements of earth science, life science, physics, chemistry, technology, cultural and social contextual issues etc. This focus on activities meant that much of the available class time was sucked up by organizing and carrying out the activities, rather than focusing on the actual science content or making links to it. One can ask what the teacher is telling learners about the subject when he provides stimulating games and activities at the beginning of a lesson – he is saying that the content is boring and needs some jazzing up.

The lessons from the above are clear. There are varieties in pedagogic styles; the art is to select one that suits your context and then to stay with it as your signature pedagogy, deepening your skills and resources within it. Japan and the Czech Republic have very different approaches to teaching and learning science. Both are very successful, and this comes from high expectations on the students to perform specifically in science, whether this be through understanding complex content or detailed connections. All the peripherals - entertaining activities, everyday discussions, metacognitive reflections, contextual and political issues - are stripped away. Science is the focus of the science lesson. That is what makes it interesting and worthwhile. (Highlights From the TIMSS 1999 Video Study of Eighth-Grade Science Teaching)

None of the above studies provide detailed insight into the structure of the curriculum itself. Comparative studies at a curriculum level between the USA and countries that have performed better than the USA in TIMSS are equally revealing. Schmidt et al (2005) provide an excellent and fairly current overview. The top performing countries in both Mathematics and Science show similar patterns in terms of working with the content structure of the subjects. Using content standards as the medium of analysis Schmidt defines curriculum coherence as the articulation over time of a sequence of topics consistent with the logical and, if appropriate, hierarchical nature of the disciplinary content from which the subject matter derives (p528). This should not be a “laundry list” where all the possible topics are done all the time; it should systematically progress from basic elements upwards into the deeper aspects of the subject. He notes that there is no magic sequence, or necessary hierarchy, but that systematic progression should be evident. The following figure illustrates the contrast between the breadth of topics offered by states in the USA and the systematic progression of the top performing TIMSS countries outlined within the black line.

In the USA there is no systematic articulation of content standards at national level. Democracy of choice prevails both at state and district levels. This has resulted in most states doing most things in most years, or as Schmidt puts it, a curriculum that is a mile wide and an inch deep. In comparison to this, learners from the high performing TIMSS schools systematically work from simple and basic concepts and performances into increasingly complex knowledge forms that include the basic operations but transcend them and leave them behind. A basic triangular shape is visible in the TIMMS group that goes from broad on top to narrow at the bottom. This is not because the basic operations are forgotten but because they are mastered and then included

within more complex operations that build on the foundation in ever higher and higher ways. The American states demonstrate a more rectangular shape, where most things are done every year.

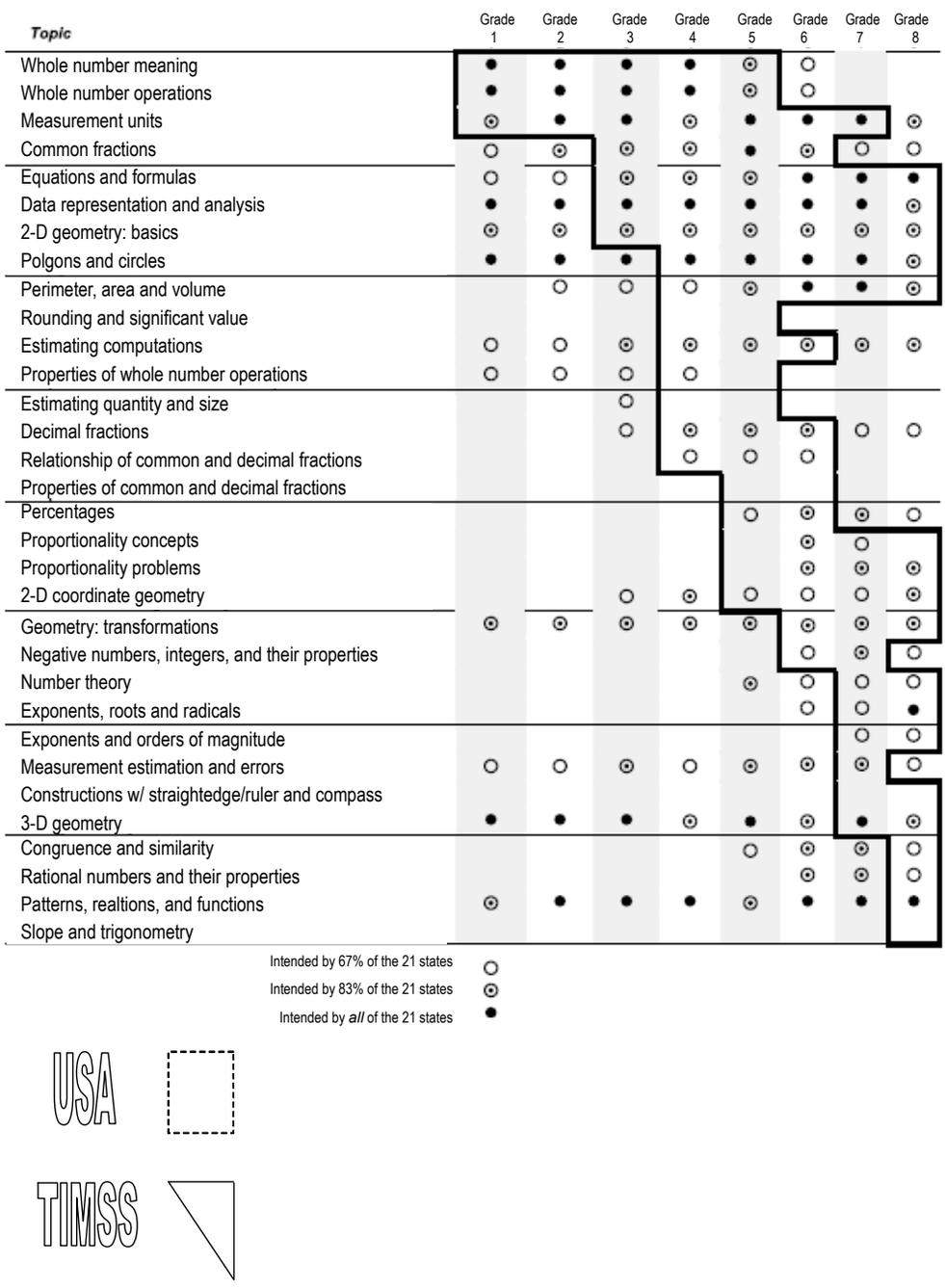



**Figure 3: Progression in USA mathematics curriculum compared to top performing TIMMS countries**

In effect, teachers and learners from the top performing TIMSS countries gain increasing focus and clarity about the deep structure of a specific knowledge form while the USA students do the same topics over and over again with incremental increases in complexity, not allowing for the essential forms and operations of the subject to emerge. South Africa resembles the 'mile wide, inch deep' curriculum structure of the USA rather than the triangular increase in focus and depth of the top performing TIMMS countries. We are currently working hard at correcting this through curriculum revision (Chisholm 2004, Dempster & Hugo 2006)

The essential ingredients of quality education in the already developed world can thus be summarized as high quality teachers demanding high standards and continually working on ways to improve their teaching and feedback within a well structured, coherent curriculum. However the sharp focus on pedagogy and curriculum in these findings did disconcert those researching the contribution of leadership and management within schools. In an influential recent summary of research findings on school leadership (in the developed world) Leithwood et al (2004) came out with guns blazing, making seven strong claims about successful school leadership. At the heart of their review lies the claim that school leadership is second only to classroom teaching as an influence on pupil learning. Leadership serves as a "catalyst for unleashing the potential capacities that already exist" in schools (Leithwood et.al 2004, p.5). Effective leaders improve their staff performance by influencing their beliefs, values, motivations, skills, knowledge and conditions of work. This is done through building the vision of the school and setting clear directions forward, through understanding and developing their staff, through building collaborative cultures with staff, parents and the community and through managing the teaching and learning programme. Crucially, good school leaders are sensitive to context and adapt their policies and strategies to suit the particular environment they are in. In addition, the most successful form of leadership is distributed leadership. As Leithwood puts it: "there is no loss of power and influence on the part of head teachers when, for example, the power and influence of many others in the school increase" (p.11). Leadership spread in a co-ordinated manner through the school structure thus increases beneficial outcomes. Finally, effective school leaders display a refusal to allow conditions to dictate how the school functions. They adapt to the conditions with flexibility, remain resilient and optimistic in challenging times, and - most importantly - they persist in pursuing high expectations.

# 3. Quality education within a developing context

The poorer the nation, the more profound the potential impact of education. Quality education in developing countries is a crucial resource that can help break the poverty cycle. The problem is that poorer nations tend to have poorer education systems in which those who can afford to pay for education get something acceptable, but the rest are 'warehoused' and emerge with only the most basic literacy and numeric skills. There are important issues of justice here. John Rawls addresses them in his *Theory of Justice* (1971), outlining a thought experiment that serves as a guiding device on what quality in education should look like. Rawls imagined a garment – a "veil of ignorance"- thrown over a particular society, allowing only the general and systemic functioning of the society to be known, but hiding the individuals and their location within the system. No-one would be able to see and consider their individual financial situation, intelligence level, physical health or emotional disposition. In such a situation people would be forced to ask what was best for society as a whole rather than just what was best for them. With regard to education in particular, if they could not see their specific place in the education system or (more importantly) where their children would go to school, they would look at a context torn between poverty and plenty in a new way. They would have to ask what kind of education would be best for all within it. In society as we know it, middle class parents are alert to their own children's best interests (as they see it) and will buy their way out of a poorly performing system.

Much of the research on improving quality in education outlined in the previous section has been drawn from countries already working with relatively well funded and functioning educational systems that enjoy both qualified teachers and high enrolment figures. Many of these industrialized countries also invest heavily in resources for disadvantaged children: measures commonly adopted include longer teaching hours, remedial reading, small classes, and teaching assistants. As we shift focus to the developing world a different set of challenges and constraints come into view. Many developing countries cannot pour the same amount of investment into education. If they do, much of the money has to go into infrastructure, teacher upgrading and training. Since financial and managerial control is lacking throughout the system, the returns on investment are often negligible and erratic; and those parts of the system that perform better tend to benefit. Furthermore, developing countries have to work with a far higher percentage of poor communities, families and students who come to the educational system needing much more initial educational investment. A central, telling issue is the child's level of experience and education when starting school. We know that one of the most revealing indicators of school performance is the amount of books at home. Children living within a rich educational setting in the family come to school already running as it were and perform very differently to children coming from an impoverished context. These latter have to start from scratch since they have not been habituated into a world of letters, numbers and other educational activities. This raises a fundamental, unavoidable question. Is there a 'pedagogy for the poor': a particular working approach (including educational principles, schooling systems and pedagogic methods) that considers what it means to be poor and works from that basis? If so, what would it involve?

Helen Abadzi has squared up to this issue in *Efficient learning for the poor* (2006). Her research provides evidence of the need for "seven pillars of basic skills for all" within developing

countries. The seven pillars involve the following: supporting children's brain development and health; effectively using available instructional time; ensuring that all have textbooks to take home; teaching fluent reading and calculation in the early grades; teaching basic skills in the home language; grounding teacher training in a few well researched learning principles that work in developing countries; and ensuring effective teacher incentives, goals and oversight. Finally she emphasizes that if fluent reading and mathematics skills are not taught and mastered early in grades 1 and 2, then "inefficiencies…reverberate all through the education system up to university years." (Abadzi 2006, p.xi)

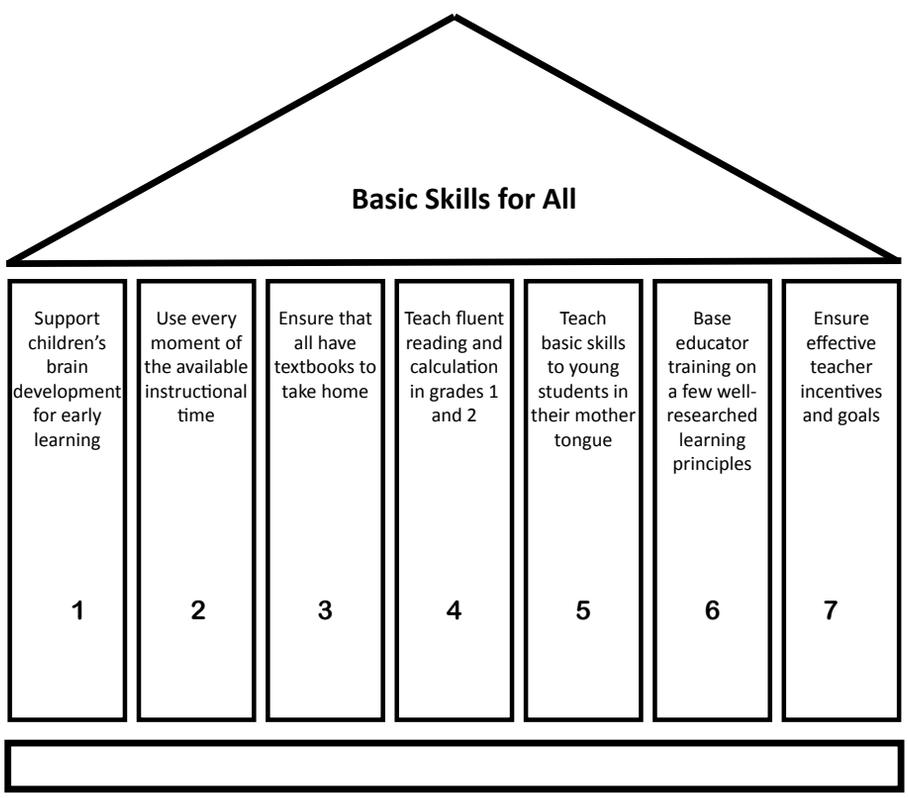



**Figure 4: Seven pillars of basic skills for all: Abadzi**

A complex set of issues is thrown up by her response. Does it imply that "the poor" are deficient in some way? Will this not result in the rich benefiting from an even more advantaged education, while the poor get a stripped down, impoverished pedagogy? It is suggested that emotive rhetoric should not be allowed to paralyse the drive for appropriate and effective measures.

Two steps should be taken before asking the question about what forms of pedagogy work within a developing context. The first is to step away from ideological positions that automatically privilege one form of education over another. The second is to search for evidence-based research pointing to interventions that work in relevant settings. There are numerous and recent

literature reviews that do precisely this. We will draw on four. The first is the already mentioned Abadzi's *Efficient Learning for the poor*. The second picks up on the Yearly Global Monitoring Reports of the Education for All (EFA) initiative. *Efficient learning for the poor* is a World Bank publication written by a World Bank employee and has a World Bank stamp. It seeks "efficient" methods of educating the poor; in other words, 'what gets you the most bang for your buck?' This immediately excludes pedagogic interventions that are very expensive and driven by idealistic visions. It also excludes radical forms of pedagogy with transformative agendas. Abadzi's concern is that many developing countries have attempted massive educational reforms based on untested hypotheses, often making the intervention on ideological grounds. This has resulted in wastage of resources and continued poor educational performance. EFA is a consortium of influential players and funders in education, ranging from national governments to development organizations such as UNESCO and the World Bank. EFA sits at the heart of a worldwide focus on attaining universal primary education.

The third source is a comparative study of all the PASEC and SACMEQ countries (West, East and Southern African countries). It asks what the largest determinants of quality are (Fehrler et al 2006). Finally, and most recently, we use data coming from the *Secondary Education in Africa* (SEIA) study. This is a massive project that picks up on research done across Africa towards identifying the most effective strategies for improving secondary education within a developing context.

It has become increasingly clear that the actual quality of education delivered in many developing countries is abysmal, with high percentages of children leaving primary education unable to read, write or calculate. Poor children in developing countries are mostly being 'warehoused' rather than taught. Reviews of existing interventions designed to break warehousing indicate two key leverage points that do produce improvements. The first revolves around improving the core function of teaching and learning inside the classroom; the second around improving the quality of teacher performance and educational systems as a whole.

Improving learning inside the classroom is dependent on two key variables – how much time is spent learning and what the quality of that learning is. Wastage of instructional time is a systemic issue across many developing countries. A simple model shown over the page illustrates the problem.

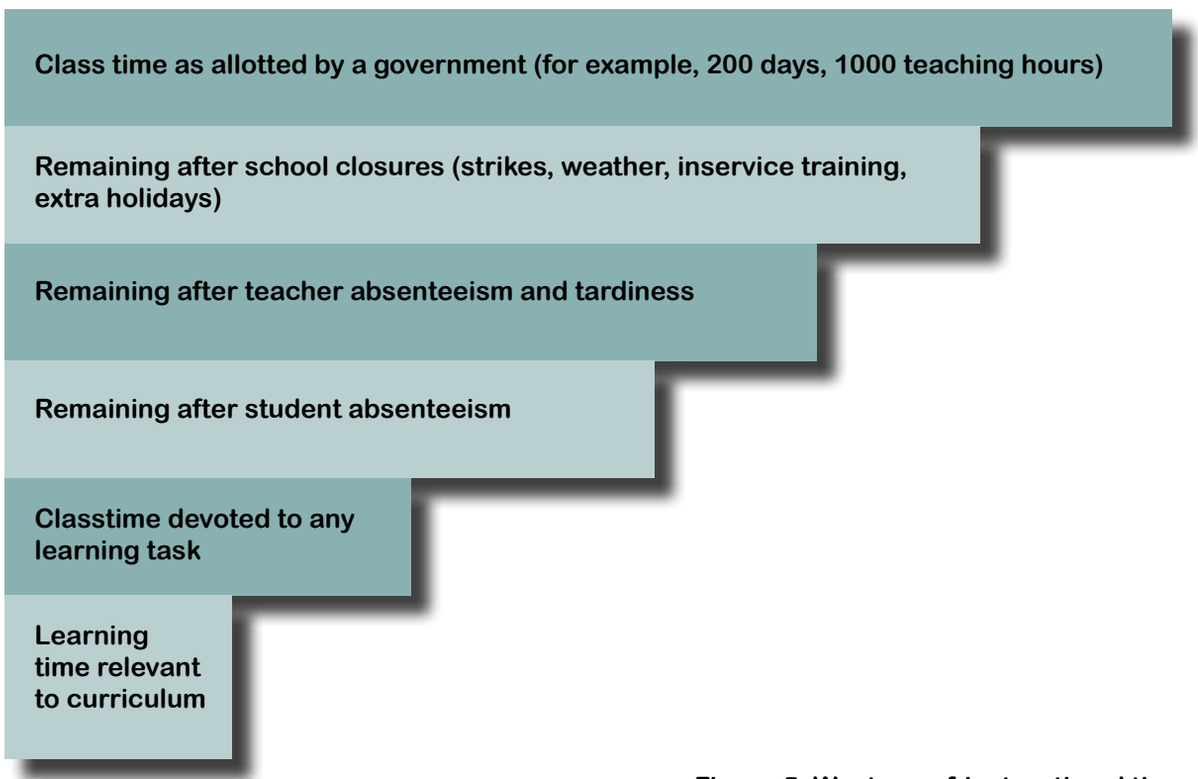



**Figure 5: Wastage of instructional time**

Chaudhury et al (2006) report results on teacher absenteeism from unannounced visits done in primary schools in Bangladesh, Ecuador, India, Indonesia, Peru and Uganda. Around 19% of teachers were absent on average. The study notes frequent situations where only around half of the teachers present were in their classrooms. Other tendencies noted were that absence rates increased in poorer regions; that absence was not limited to a few abusers of the system but was widespread across teachers at school; and that the higher the rank the higher the absenteeism, with principals - especially male principals - the most frequently absent.

The study goes on to observe that "while official rules provide for the possibility of punitive action in the case of repeated absence, disciplinary action for absences is rare. Teachers…are almost never fired."(Chaudhury et al 2006, p.93). The rates of absence observed were higher than those of other kinds of workers (excluding health care workers) in developing countries and far higher than in developed countries, where around 5% was average. It is interesting that there was a strong correlation between the level of development of the region and attendance. The more developed the region or province, the better the attendance; the poorer the region the poorer the attendance. Also interesting is the finding that although teacher salaries are relatively 'higher' than average in poorer regions this does not prevent absenteeism. The following factors were found to reduce absenteeism: teachers coming from the local area; improved

school infrastructure; increased monitoring by (and presence of) ministry officials; and a high parental literacy rate in the surrounding community. The paper ends tersely with the following observation "quality starts with attendance." (Chaudhury et al 2006, p.114).

It might start there, but the presence of teachers in the classroom only provides necessary conditions for quality education, not sufficient ones. The crucial issue is what happens inside the classroom when teachers and learners are there. Practices such as mindlessly copying the teacher writing on the board and chanting or repeating simple learned behaviors over and over again do not result in quality educational performances. The difficulty is that we do not know that much about what is happening inside classrooms in developing countries, certainly not in comparison to developed countries where hundreds of meta-analyses of thousands of evidence-based studies of millions of students enable detailed discussion.

The issue is further complicated by the ideological nature of the terrain. Certain types of pedagogy are held by definition to be worthwhile in any context and are blindly applied to all. In particular, those within the broad ambit of constructivism or progressivism – involving learner-centered, process oriented, active learning based on principles of discovery – are hard to gainsay when a romantic image is evoked of a creative child in a stimulating, sociable environment happily experimenting and exploring puzzling problems. This offers a seductive counter picture to that in which rote lessons are recited over and over again in drab classrooms. That said, one cannot fall into a mirror image reversal and condemn constructivism out of hand. It is a rich and valuable form of pedagogy, but it is not the only one, and in certain contexts it can be less effective than other methods. What is needed above all is a good dose of pragmatism – a recognition that educational systems must work with pedagogies they are capable of handling. Mixed forms of pedagogy that combine direct instruction with clear learner feedback and participation within a structured curriculum show strong indications of success. The Education for All report on improving the quality of education in developing countries puts this as follows:

> "On the spectrum running from traditional 'chalk-and talk' teaching to 'open-ended' instruction, many educators advocate structured teaching – a combination of direct instruction, guided practice and independent learning. Typically, teachers present small amounts of material (pausing to make sure students understand) and encourage active participation. Much evidence suggests that structured teaching works far better than open-ended approaches for children from disadvantaged backgrounds, those with learning difficulties and those in large classes." (p.26)

Classrooms should be learning centered rather than learner centered, and learning involves the person who knows (the teacher) actively directing the person who does not know (the learner) through a key area of knowledge with feedback to ensure the learner grasps it. Learning can then proceed in a structured way to the next area of focus. If we take this as the core sequence of teaching and learning it is clear that a number of basic elements must be in place. Firstly, the learners must experience a curriculum that demands a lot from them. They therefore need

to be healthy and they need to participate continually, or the demands of the curriculum will outstrip them. Secondly, teachers need to know the curriculum and know how to teach it so that learners move from where they are to where the curriculum demands they should be. Apart from knowing how to do this, teachers must of course actually do it. Thirdly, the curriculum must be clearly structured and sequenced to ensure that maximum gain in knowledge, skill and attitude is achieved. Fourthly, management structures at school, district, provincial and national level should be directed at ensuring that this core activity of teaching and learning happens effectively in the school, the district, the province and the country.

No matter what school interventions are attempted, if the learner does not arrive at school ready to learn, not much can be achieved. Here research from cognitive psychologists on the cognitive damages wreaked by starvation provides crucial insight. Poor nutrition in the womb and the first three years of life has direct and irreversible impact on cognitive ability and performance. There is no catching up or miraculous recovery. No teacher, curriculum or school feeding scheme can reverse the damage inflicted by stunting and short term memory impairment. Education is tied up with health by the umbilical cord. Health interventions in the first three years of life show a direct and continuous benefit in schooling performance (Fleisch 2008). Early childhood care is a non-negotiable part of schooling as it ensures that children are constitutionally able to perform from their first day at school. Nor can early childhood care be a form of warehousing. It has to form a basal set of attitudes and skills that enable learning to read, write and calculate. This entails habituating the child's body and mind to the social world of schooling while improving confidence, self-esteem and the fine motor skills needed at the school desk. A sustained period of time is needed. The first day of schooling is not Grade One; it begins on the day of conception with the mother's own state of health and education.

Teachers within developing countries need both to know and to practice instructional techniques that work. They also need to understand which broad interventions work overall to provide a quality education for all within a developing context. A number of instructional interventions for disadvantaged learners are known to either improve learner performance or to damage it.

**Not suitable for the poor** without extensive extra time and assistance are: *immersion in a foreign language for basic skills; reliance on discovery learning to teach basic skills; 'whole word' reading instruction; learners constructing own textbooks and relying on materials from the environment; teacher training focused towards advanced degrees* (Abadzi 2006, p.139). These kinds of interventions should be actively discouraged within a developing context as they have consistently been shown not to work or to over-exploit limited resources. Beeby would not be surprised. Interventions that are known to have a direct impact on improving learner performance in disadvantaged communities across developing nations are: *phonics for reading; maximum class time on interactive learning activities; the gradual withdrawal of home language combined with bilingual education; structured health interventions; attractive schools with quiet classrooms, lots of light and controlled temperature* (Abadzi 2006, p.139). The relevant interventions have to become basic to the teacher education curriculum (both for initial and continuing teacher education). We also know from research within developed

| Interventions with cross-national evidence | Researched in industrialised countries, need to pilot in low-income schools | Limited research, but worth piloting and evaluating | Not suitable for the poor without extra time and help |
|---|---|---|---|
| Phonics for reading (analytical -synthetic method) | Structured vocabulary building in mother tongue | "Direct instruction" (scripted basic skills teaching) | Immersion in a foreign language for basic skills |
| Maximal class time on interactive learning activities | Structured, directive teaching for lower achieving students | Basic math in one language throughout school | Relaince on discovery learning to teach basic skills |
| Bilingual education, gradual withdrawal of mother tongue | Mother tongue development in preschool | Rightstart program for math competence | "whole-word" reading instruction |
| Package of school health interventions, appropriate for each country | Teacher training based on role modelling issues | Sustainable grouping techniques for larger classes | Learners constructing own textbooks, relying on materials from environment |
| Attractive schools with quiet classrooms with plenty of light and controlled temperature | Intrinsic incentives for improved teacher performance | Chewing gum when concentrated study is required | Split-shift with reduced teaching time |
| | Feedback to teachers on instructional time use | Music training and group performances | Teacher training focused towards advanced degrees |

**Table 1: Pedagogic strategies that do and don't work in developing contexts (Abadzi 2006, p. 139)**

countries that the following interventions work for disadvantaged students: *structured vocabulary building in home language; structured, directive teaching for lower achieving students; home language development in preschool; intrinsic incentives for improved teacher performance; feedback to teachers on their teaching* (Abadzi 139). A simple analysis of what current teacher education programmes are doing or not doing will point to just how inefficient our current systems are in developing what is known to work and removing what is known not to work from the curriculum. Educator training in a developing context should be based on the pedagogic principles that we know will generally work within such contexts. It should focus on a skilled approach to numeracy and literacy, good development of basic content knowledge and ensuring home language teachers for learners in that home language.

The structure, coherence and clarity of the school curriculum are also crucial within a developing context. A curriculum that is poorly planned, specified, organized and managed limits the effectiveness of the core act of teaching and learning: it handicaps the teacher. The

framework of learning across grades and subjects must be very carefully put together with each component clearly specified, articulated and sequenced to ensure that both teachers and learners can recognize what needs to be done and realize it in practice. Abadzi notes that "curricula often reflect the learning needs and rhythms of the urban middle class. Thus, they are loaded with myriad activities for the first few years. Predictably, few schools serving the poor reach the end of the textbook - if they have one." (Abadzi 2006, p. 95-6) This is a complex problem. The need to simplify the curriculum and identify core areas that must be mastered by all has to be juxtaposed with the need for a curriculum that enables entry into university and is internationally competitive. It is also politically risky not to have middle class buy-in to the national curriculum. One strategy is to identify failing schools that are not managing to teach the curriculum at all and provide them with a stripped down core curriculum as well as extensive support and guidance in mastering it. Using a core curriculum with essential lessons per subject in every grade becomes a manageable task for a failing school, especially if these lessons are carefully designed and come with all support materials attached as well as training for the teachers and external assessment at a specified time.

In this framework, the curriculum is distilled in a key document that reaches the teacher and the learner: a textbook. Here the work of the national department, curriculum committees and subject specialists can reach into the heart of the teaching and learning environment. The textbook is also the learner's take-home resource that extends learning beyond the classroom; it supports the teacher who is unsure of a particular section; it structures the work of the year into a coherent whole that builds on the previous year and prepares for the next one. Good textbooks for all are one of the cheapest and most effective ways to get quality into the classroom and the home. Unfortunately research into the actual quality of textbooks is scarce. We do know what the basic attributes of textbooks should be (Abadzi 2006, p. 91). Serious focus on content comes first, with rich and extensive explanation and elaboration of concepts. Secondly, there should be extensive use of pictures, drawings, diagrams and figures that capture the essence of important concepts. These are not cartoon drawings of figures with bubble instructions or arbitrary images of some event, but rather skilled pedagogic distillations of the essential patterns, relationships and logic of a specific content area. Thirdly, there should be ample space for practice and elaboration that enables graded upward progression. This can be provided either in the textbook or in an attached workbook. Fourthly, the textbook topics should be efficiently and clearly organized and they should be simple to read, with uncluttered layout that foregrounds meaning. Fifthly, clear and explicit structural links should be made with the material already covered and should take learners through increasing levels of difficulty, elaboration or focus. Textbooks are a key resource; high quality here is a non-negotiable. To allow for 'democratic choice' between various textbooks of questionable quality is to abrogate the professional responsibility of the department. Textbooks should be rated by experts through a process that is beyond corruption, well structured and well rewarded. Senegal has two textbook evaluation committees for each textbook, in order to counteract corruption issues.

Measures such as identifying and explicitly developing key pedagogic methods, key knowledge forms, and key progression sequences still depend on a supportive local school environment

for successful implementation. We will see later on that investment in school resources, infrastructure and increased personnel does not seem to have large payoffs in South Africa. However this is not because these kinds of investments do not have an effect but rather because only massive investments across the board will meet the level of deprivation suffered in many schools. Investments seem to get swallowed up in a big hole, precisely because there is a big hole. Safe, equipped schools that have toilets and lighting have only the necessary *pre*conditions for schools to work in terms of improved performance; these investments do not target performance directly. This should be taken into account when economic measures are applied to such investments.

Class size has become a matter of intense debate since the World Bank found that reducing class size within a certain range did not impact on learner performance. They advised countries to increase class size (Lockheed and Verspoor 1991). This seemed to be backed up by studies of the PASEC countries in West Africa (similar to the SACMEQ countries of Southern and Eastern Africa), which showed that numbers of up to 62 learners in a classroom still resulted in a positive increase in scores and the increase only fell off after this point (Abadzi 2006, p.103). Bizarre recommendations followed: for example, that classes of up to 100 learners should not be broken up. Quantitative correlations of this kind must be taken up with care as they may give no insight into what is actually happening in the classrooms. It is very likely that the reason for this statistic is that quality schooling is a scarce resource in Africa: learners flock to those schools that provide it and class size consequently increases there, while smaller classes then become an indicator for dysfunctional schools. But good schooling is happening *in spite of* the increase in class size: correlations do not a cause make.

However, the attempt to reduce class size within a developing context has produced an unintended consequence - a paucity of trained teachers. Reducing class size forces the hiring of more teachers: if they are low quality teachers, the system as a whole suffers and continues to do so for generations. It is imperative that only quality new teachers are allowed into a developing country's educational system, for it is these teachers who will carry the struggle for a generation and produce the next generation of teachers. New blood must be quality blood.

Given that fairly large classes are a de facto reality in developing countries, especially with increased enrolment and the elimination of school fees, and that warehousing these learners is unacceptable, policy makers and teacher education must square up to what it means to deliver quality education to large classes. There is one non-negotiable: learners must become able to learn on their own. This is only possible if they are fluent in basic reading, able to write and calculate. High quality teaching in the early grades is thus the absolute determiner of how a system can cope with high enrolment.

We have seen throughout this review that teachers are the crucial factor determining quality within educational systems. A key question revolves around how to get good teachers into the system, how to motivate and incentivize good performance and how to continually improve their abilities and performance. Let us then firstly explore some strategies that do *not* work. Paying

teachers based on learner performance is a perverse incentive: it results in all sorts of behaviors that target short term improvement without any long term benefit. For example, a random set of teachers in Kenya were offered the incentive of payment for improved learner test scores. There was an improvement in learner marks but these were not sustained across the year or in other subjects. The teachers taught to the test. There was no improvement in teacher attendance, in homework given or marked, in pedagogic preparation or style. The teachers taught to the test - that was all (Abadzi 2006, p.116). Similar results have been shown in developed countries, often to the point where teachers fake scores to improve student results and get the bonus (Levitt and Dubner 2005).

Teachers already inside the system need to have a combination of internal and external motivations as well as internal and external forms of accountability. Teachers that are never visited in their classrooms by other teachers, the principal, or an inspector have only their own inner drive to keep them going. Creating accountability structures within the school between teachers, their peers, the head of department and the principal, between the school and the inspectorate and between the school and the community can help to fill this void. This does not have to be overly complex and can entail short visits that work with a limited set of variables and simple standards that the community can hold teachers accountable to (such as learners must be able to read, write and calculate by grade 3). The type of accountability and motivation will depend on the nature of the education system. Finland, for example, has a high degree of autonomy for teachers and schools, with the curriculum and assessment under local control. It also abolished external evaluation and the inspectorate at the same time. Teachers have thus taken on enormous levels of responsibility, with colleagues in schools and districts working together intensively to develop quality education adapted to both local and international demands. However, to imagine that such a system is applicable in developing countries is to be in love with impossibility. Again the Beeby model rings true: try to get to an end point in steps, and don't imagine that the first steps resemble the end point or must mimic it. The route to a constructivist, learner-centered, meaning-based, whole child pedagogy can start with an embrace of formalism – including basic, explicit, sequenced lessons with clear textbooks and strong evaluation, assessment and inspection. If this sounds reactionary or conservative we would point to Hegel, Marx and the dialectic as both the inspiration and orienting device we are working with.

Rationale for adopting formalism is not hard to find. Systematic abuse of pupils, ghost teachers, transfer of problematic teachers to low income schools, lack of interest in children's learning, low attendance, second jobs - all feature in reports on the state of teaching in developing countries (Abadzi 2006 p.124). Considering the physical state of many of the schools combined with the exhausting attrition that comes from the kind of lessons taught day after day (chanting and rote learning in noisy classrooms), it is not surprising that very powerful forms of external accountability are needed. (However, in developing countries the demand for external accountability often comes into conflict with powerful trade unions focused on improving the wage demands and conditions of service of their members. The beginnings of this struggle are apparent in South Africa with the NEEDU report.)

To consolidate the above we can use two extensive but recent studies on education in Africa. The first asks what the largest determinants of quality are in the PASEC and SACMEQ countries (Fehrler et al 2006). Textbook availability, school resources, local language instruction, avoiding split shift teaching, use of female teachers, low absenteeism, teacher job satisfaction, visits by an inspector and contract teacher status were the key variables in the PASEC countries (Michaelowa 2001). The combined analysis threw out similar results. There were interesting differences between the two regions. In West Africa there was no correlation between length of teacher qualification and learner performance, whereas in Southern and Eastern Africa there was, indicating that teacher education is of higher quality down South. Similar positive results were shown for teacher manuals (only for SACMEQ countries). On the other hand there was a positive correlation between inspections and learner performance in the PASEC countries but not the SACMEQ countries. This indicates a need to understand the different kinds of inspection of these regions (Fehrler et al 2006, p.22).

The second relevant study asks what recent research and policy interventions in Africa tell us about how to improve quality in *secondary* education. The Education for All initiative resulted in massive enrolments at primary school level. This has predictably put strain on secondary educational systems across the developing world. The stress is compounded by the poor levels of literacy and numeracy of learners coming through to secondary education. To address this issue the World Bank began the Secondary Education in Africa (SEIA) initiative in 2003. Eight key reports, three conferences and one synthesis report later we have a highly detailed set of deliberations on what quality education means within an African context. Strikingly, the South African educational system appears quite positively in relation to many of the other African countries in the report (an important point, given the depressing section on *Quality education in a South African context* that follows.) In comparison to most of Sub-Saharan Africa we have high enrolment figures in primary, secondary and tertiary education; impressive gender equality; low drop-out rates; an ability and will to invest in education; powerful equity measures; substantial financial support for poorer schools; re-establishment of quality assurance boards; ongoing, responsive curriculum reform and monitoring; transparency in promotion systems; effective legislation; good textbook publishing and distribution infrastructure; devolution of authority from national to provincial, district and circuit levels; targeted interventions for dysfunctional schools; and accurate and detailed national and provincial education reports, a basic technical and vocational education and training infrastructure. We continually investigate how to improve our educational system and we follow up with very ambitious action. Reform fatigue has set in, but this is not necessarily a bad thing as it has turned us towards realistic and systematic achievement and away from grandiose visions that founder in the real world.

The most relevant section of the SEIA initiative for the purposes of this review is working paper 128 - *Curricula, Examinations, and Assessment in Secondary Education in Sub-Saharan Africa* (2008). The strong subtext of this paper is the difficulties being experienced with various progressive pedagogic and curriculum strategies in Africa. By “progressive” we mean the learner- centered, outcomes based, integrated constructivist approaches favored by some European countries.

The following key findings are relevant to South Africa:

- Be careful of a spiral build up of curricula where the same topic is repeated year after year, supposedly at ever higher levels of complexity. Mostly the same topic is repeated over and over again without any changes (xii).
- Be careful of integrating topics across learning areas where the same topic is dealt with from the angle of each subject area. Mostly the same learning matter is taught again and again in the different subjects (e.g. HIV and AIDS lessons) (xii).
- Code switching is a reality in classrooms throughout Africa and must be recognized and worked with.
- At junior secondary level reduce possible subject combinations, have deeper rather than broader content focus, and be careful of integration, although it is an international trend. When different specializations are wrapped up in one package and taught at the same time, the subject structure becomes unclear.
- Pay extended attention to technical and vocational education and training (TVET) in its own right as it offers immense rewards in terms of upskilling, but do not underestimate the difficulty of the task. Botswana is a good example here (xiii).
- Single qualification frameworks like the NQF that include TVET and academic subjects in the same structure mostly do not work. "They significantly complicate efforts to increase the quality of the formal curriculum, and blur the focus on the primary need to increase the quality of the curriculum in the classroom." (xiv)
- Use German and Francophone models that distinguish between academic and TVET structures.
- Implementation of active learner centered strategies has proved problematic across Africa.
- Be careful of overcomplicating the job of teaching. In South Africa teachers spend more time on administration than on teaching.
- The number of textbooks available in sub-Saharan Africa has decreased over the last few years. Given how important textbooks are in resource-poor environments, this is a vital intervention area. Although South Africa has a good track record compared with other African countries, we still need to ensure that every learner has a set of textbooks (mostly in their home language) to take home, and that this is adequately managed. Making this a key performance indicator will help.
- Continuous assessment is not effectively utilized in Africa. Written tests of knowledge (i.e. summative assessment) tend to prevail. Experimental forms of assessment are unpopular and poorly implemented. In Nigeria CASS is called "continuous harassment" (xvi). Portfolio assessments are far too complicated and burdensome at a secondary education level.

- Curriculum reform across Africa (and the world) struggles to move from ideal conception to actual implementation. Therefore, set realistic timelines and achievable goals; recognize that many stakeholders and levels in the system are implicated; optimize and evaluate prototypes through extended development and research; and then work systematically on the implications of going to scale.
- Get effective and functional ICT structures throughout the system as this helps facilitate the reform initiatives.
- Remember that failure at the primary level will have an extended knock-on effect at secondary and tertiary levels of education
- Carefully manage the gap between the intended curriculum with all its plans and outcomes and the implemented curriculum in all its complexity and difficulty.
- Teacher professional development does not work by replacing one set of techniques (teacher centered) with another (learner centered); it works incrementally in the classroom context through small but tangible shifts
- Clear job standards help model professional practice
- Staff development should not target teachers only. It should look at all levels of the system (education planners, examination agencies, curriculum specialists, district managers etc) with specific programmes designed for each (xxii)

Research across the developing world is coming out with a message that speaks directly to the South African project of improving educational quality for all. In essence it advises: Work with the fundamentals before attempting the significant. Start off with what is feasible and doable rather than with a glorious dream. Take a long term view; start with small implemental steps, working from what the system can currently handle towards what it can achieve. Always heed what reliable, context-specific research is telling you. Explore comparisons with educational systems that are similar to yours rather than with those that are beyond your capacity. Draw on international best practice for developing long term visions, not for short term objectives.

# 4. Quality education within a South African context

The underperformance of the South African education system was exposed on several levels when it was compared with its neighbours rather than with European, American and Asian systems. Taking grade 6 mathematics and language scores as a comparative device, South Africa came in the lower third of 14 countries participating in standardized tests organized by the Southern and Eastern African Consortium for Monitoring Education Quality (SACMEQ). Figure 6, showing the SACMEQ II results in literacy, brilliantly captures issues around delivering quality education in a developing context.

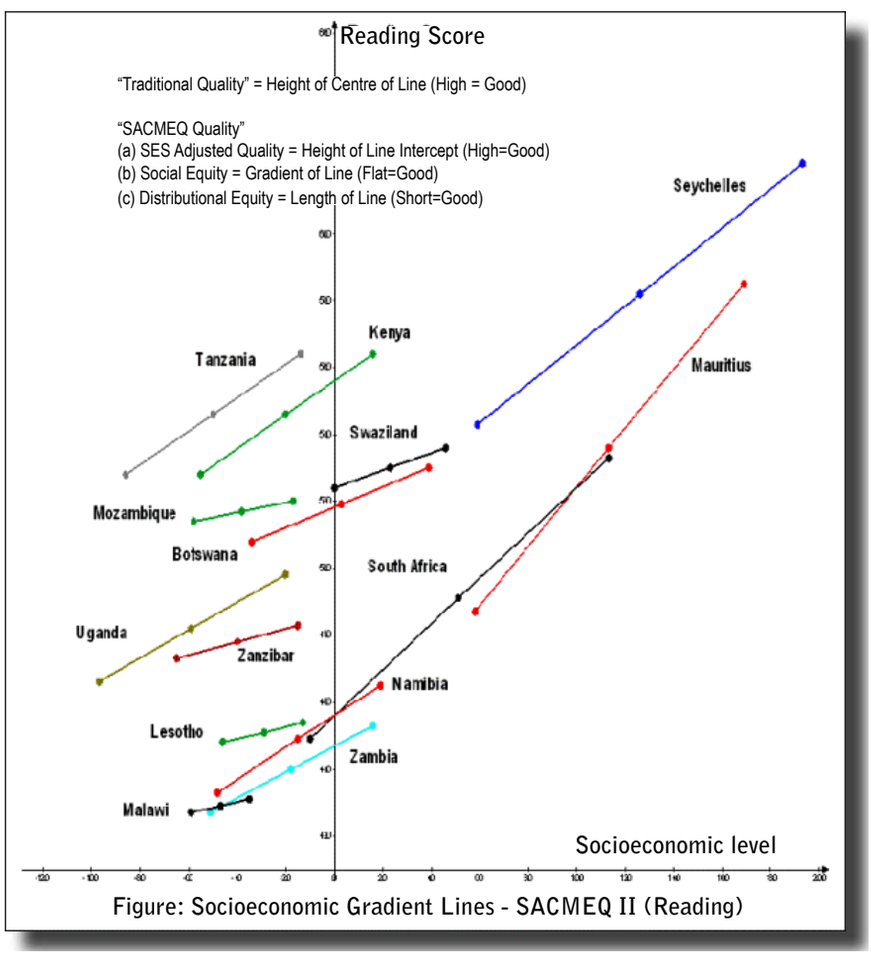



**Figure 6: Comparison of SACMEQ countries using a combination of quality and equity measures**

The height of the centre of the various national lines in Figure 6 expresses the national average test scores. On this traditional league table measurement South Africa manages to come in above Uganda, Zanzibar, Lesotho, Namibia, Zambia and Malawi. Beyond South Africa, however, stretch the averages of Mozambique, Botswana, Swaziland, Mauritius, Tanzania, Kenya and the Seychelles. This is read off from the vertical reading score measurement.

When we consider the horizontal line that reflects socio-economic level, several other features of the South African educational system spring into view. Only the Seychelles and Mauritius are located ahead of South Africa in terms of socio-economic levels, and one could argue that their better school performance is partly accountable to their learners coming from better socio-economic contexts. The fallacy of this argument becomes quickly apparent if one compares how South Africa does at SES level 120 (to take one example) and at SES level 0. Learners from an equivalent socio-economic level in the Seychelles and Mauritius do better than South African learners at the 120 level. But when one looks at the performance of Kenya and Tanzania it becomes clear that they have learners who are far poorer performing at the same level as South Africans at the 120 mark. This indicates the underperformance of the South African system. Many of our learners come from socio-economic conditions substantially better than other Southern and Eastern African countries, but our results are worse. Poorer learners from Lesotho, Zanzibar, Uganda, Botswana, Mozambique, Swaziland, Tanzania and Kenya are getting better results than their better off South African counterparts. The easiest way to see this is to look at where the various country lines intersect with X at the average socio- economic level of all the countries involved (where X = 0). If the country line does not intersect with X = 0 then a simple projection of the line allows one to see where the country would be. (To show how it works, run the Mauritius line down to where it intercepts with X=0, and it becomes clear that Mauritius on the adjusted quality line is performing worse than any other SAQMEC country. This strange result points to radical inequality within a system that seems to be performing fairly well. It also points out that these results must be used with care.) This provides an adjusted quality league table that compares how learners at the same average economic level perform.

The figure also informs us of the gap between the best and worst readers. The longer the line, the worse the distribution gap must be. Mozambique and Swaziland both have good levels of distributional equity, where the difference between their best and worst students is small. South Africa has one of the longest lines.

Finally, the flatter the line, the better the system will be in terms of social equity. The gradient points to how well the educational system deals with inequalities and ensures that all learners perform within a small range regardless of socio-economic status. Mozambique is particularly impressive in this regard. Barring Mauritius, South Africa has the steepest gradient and is thus one the worst performers in terms of ensuring that its poorer learners do as well as their better off counterparts. In relation to its African peers, South African education has a dismal profile in terms of average learner performance and this only worsens when placed in relation to socio-economic conditions. Explaining away South Africa's poor education record in terms of poverty cannot account for the fact that poorer learners in Southern and Eastern Africa are doing far better than their South African counterparts.

Clearly a far more nuanced understanding of the differing colonial experiences must come to bear on the analysis. South Africa suffered more brutally and systemically from both colonial exploitation and oppression than many of its neighbours. This awareness should be in the foreground when quality in South African education is analysed. The next graph (Figure 7),

makes the point dramatically. The bar graph represents the overall spread in student reading scores per country, with a long line revealing large differences (Seychelles, Mauritius and South Africa) and a short line revealing small differences in reading score (Swaziland, Mozambique, Lesotho, and Malawi).

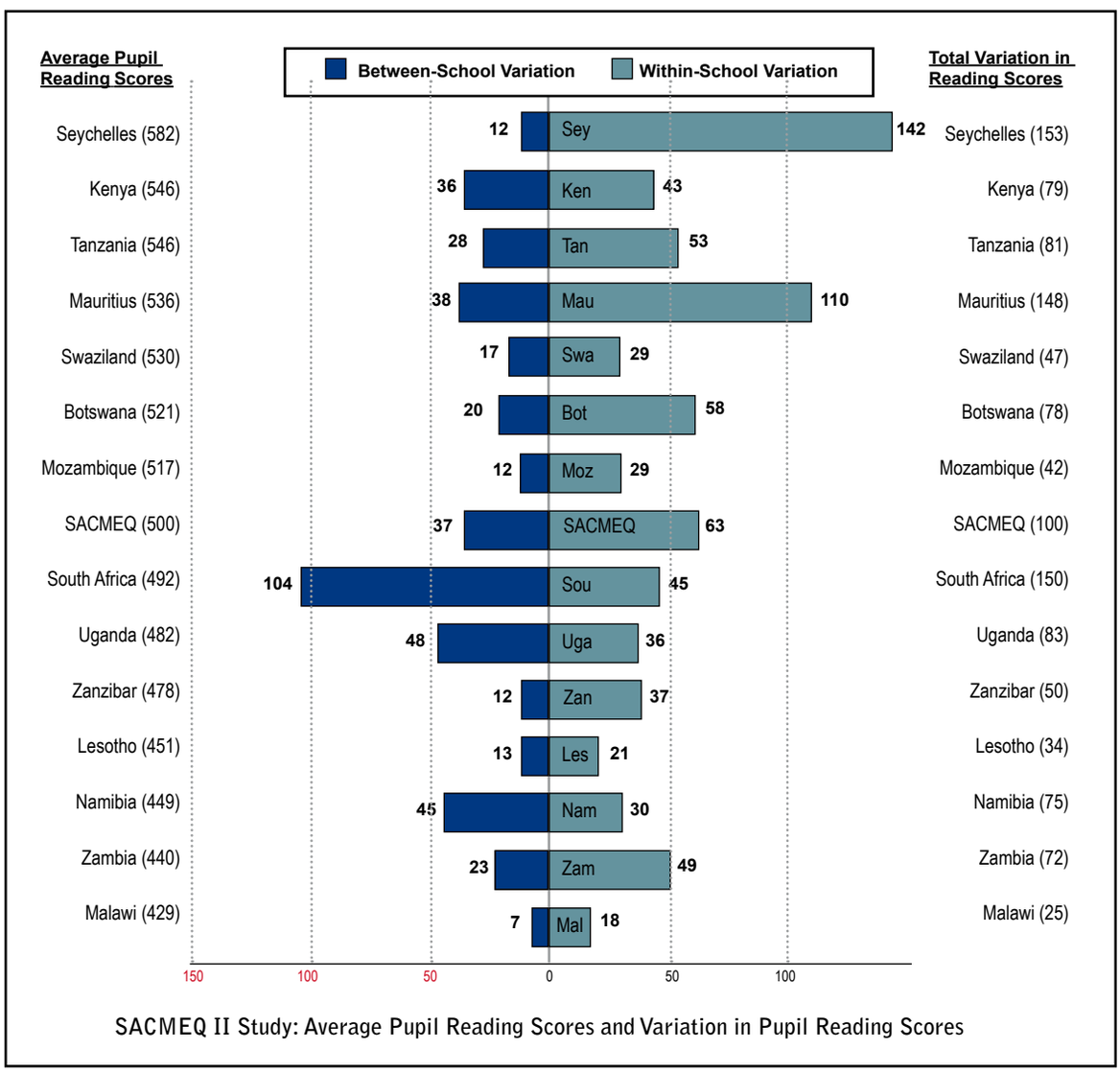



**Figure 7: Between school and within school variation in SACMEQ countries**

Crucially, the bar graph is broken into the spread of performance *within* schools (on the right) and the spread of performance *between* schools (on the left). Large differences in reading performance *within* schools point to very different kinds of equity problems from those are indicated by large differences *between* schools. The bar graph clearly captures how both South Africa and the Seychelles have massive equity issues, but they have different sources. Seychelles has vast differences within schools (142) while South Africa has huge differences between schools (104). Out of all the SAQMEQ countries,
South Africa has the highest difference related to between-school performance. This correlates directly to our apartheid past with historically black schools overwhelmingly performing worse than historically white schools. The issue is not how to expand or adapt quality practices already in place within schools (as in the Seychelles) but how to deal with whole schools that have no experience of quality practices in education.

The extreme nature of this challenge is currently described as the bimodal nature of South African education and it has radical implications for South Africa's ambition to have a high cost, high participation, high quality education system. Historically black schools in low income rural and peri-urban areas systematically perform worse than historically white schools in medium to high income areas. Issues of racial discrimination, language discrimination and poverty intersect towards one tragic result that shows up in all the analyses within South Africa, no matter what province, what year, what subject, what test (Fleisch 2008, pp.1-30). Explaining this performance gap, especially after a decade and a half of reform, is a harder task, but to do so opens the door to improving quality. The difficulty is that many of the key variables overlap: poor learners tend to be black and not speak the language of instruction at home so it is hard to disaggregate the variables. Blackness in South Africa carries with it poverty, rurality, historical disadvantage, language discrimination. So we need to respond step by careful step to these issues as we ask what quality education means in South Africa.

Both Hattie and the McKinsey report pointed to the key role played by teachers in educational systems. SACMEQ unfortunately does not have data on teacher knowledge in South Africa as teachers refused to take the tests. But we are quickly getting beyond the point where levels of teacher knowledge cannot be interrogated. We do currently have some data on this key factor from other sources, usefully summarized by Taylor (2009).

The Khanyisa programme in Limpopo administered literacy and mathematics tests to a small sample of Grade 3 teachers from rural areas – 25 mathematics teachers and 23 literacy teachers. The tests were designed for grade 6 learners and teachers on average scored around 67% for the mathematics test and 55% for the literacy test. The Integrated Education Project (IEP) worked in 1000 schools across KwaZulu-Natal, Eastern Cape, Limpopo and Northern Cape provinces. Mabogoane and Pereira (2008) report on how teachers performed before and after the intensive four-year programme. The table below reflects the results after the intervention. Taylor (2008) points out that no teacher achieved 100% on any test before or after the intervention. In addition, the minimum scores for all four tests are well below what the primary school curriculum expects from the average learner.

**Results of tests administered to teachers at the end of the IEP project, 2007**

| Subject | No. of teachers tested | Grades taught | Grade level of test | Teacher Scores (%) | | |
|---|---|---|---|---|---|---|
| | | | | Min | Max | Mean |
| Literacy | 46 | 1-3 | 1-6 | 58 | 94 | 75.6 |
| Maths | 63 | 1-3 | 1-4 | 14 | 73 | 39.7 |
| Maths | 67 | 4-6 | 4-7 | 10 | 73 | 32.5 |
| Science | 66 | 4-6 | 4-7 | 47 | 89 | 68.7 |

Source: Mabogoane and Pereira, 2008

**Table 2: Test results of teachers at the end of the IEP project (2007)**

Taylor is harsh at this point in his review of the quality of education in South Africa.

> "The very low levels of subject knowledge exhibited by these teachers...is only comprehensible if it is concluded that the teachers undertake very little or no self study from the textbooks which they have at their disposal: even a desultory reading of the many books available to teachers, and seen in significant quantities in their schools, would take them to higher levels of knowledge than those shown." (Taylor 2008, pp.10-11)

It is an uncomfortable issue. Why are our teachers not learning on the job? Even if their level of knowledge was low when starting out as teachers, why does it remain so after teaching the subject for a number of years?

Teacher knowledge combines with types of teaching and learning styles. Staying with literacy and numeracy studies, there are a number of telling accounts of what is happening in the foundation phase in South Africa. One such study that provides clear examples is the Primary Mathematics Research Project (1998-2004). Schollar, working with 7028 learners from 154 schools in 24 districts in all 9 provinces found that around 80 percent of grade 5 learners still relied on simple unit counting to do mathematics problems.

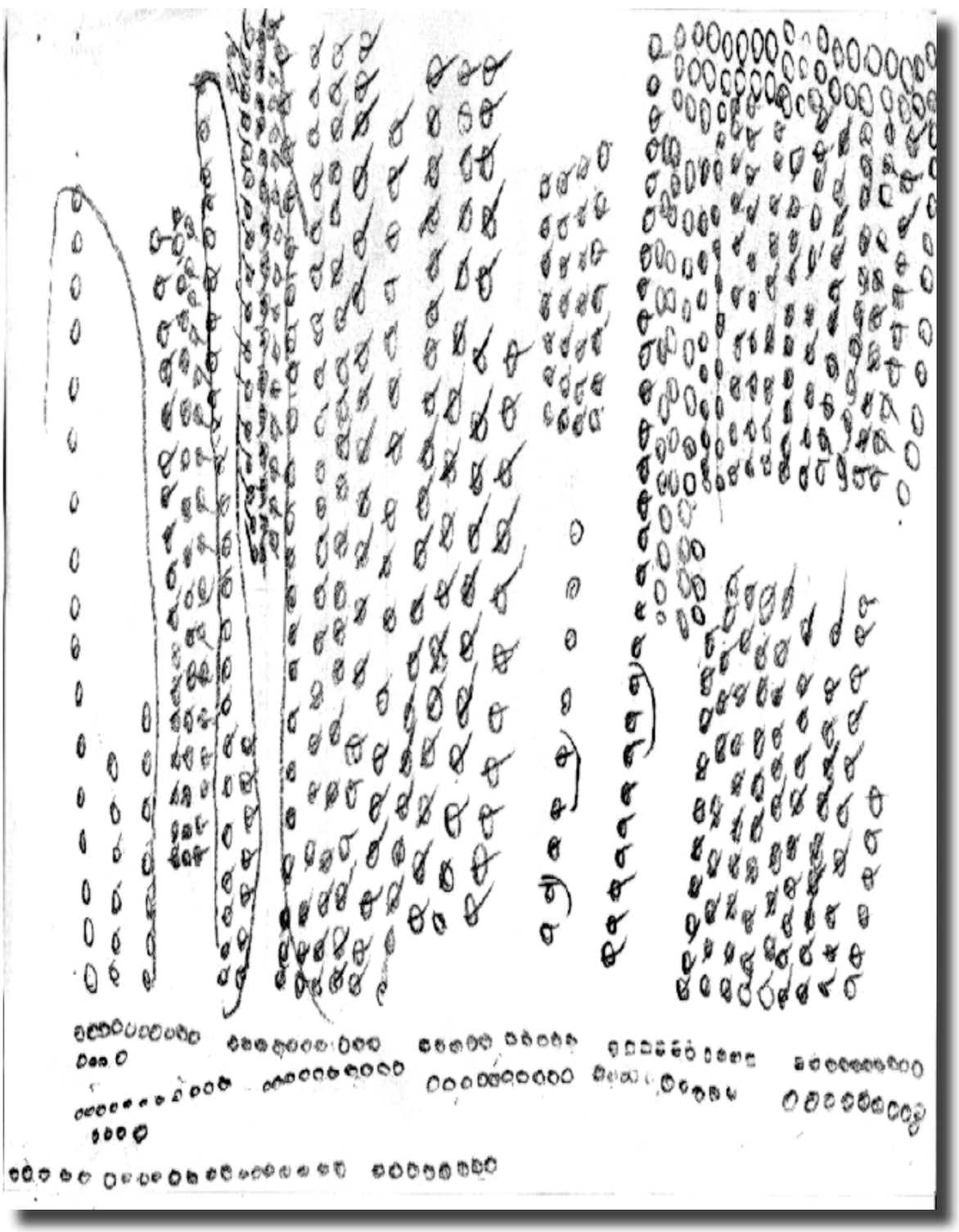


**Figure 8: learner calculation at grade 5 level using elementary unit counting (Schollar 2004)**

The lessons reflected are extremely time consuming and involve massive amounts of mind-numbing repetition to do basic calculations. There is no shift from concrete manipulation of particulars into simpler abstract forms. Schollar provides an example taken from a standard kind of mathematics lesson:

> "If you are asked 15 times four, its meaning is that you are counting 15 four times. To do this you must first expand the sum."
>
> Writes on board:
> 15x4 = (10x4)+(5x4) = 10+10+10+10) + (5+5+5+5) = 1111111111+1111111111 –four times) + (11111+11111 –four times)
> Counts units = (40)+(20)
>
> "When you add 40 and 20 what do you get?"
>
> First group to answer 60 is asked to show workings on board:
> Pupil comes to board and writes (1111111111 – four times) + (111111111 – twice).
> Counts individual units and writes = 60.
>
> Each group is given a sum.
> Workings of first group to report: 23x7 = (20x7)+(3x7) = (1111111111111111111 + 111111111111111111 –seven times) + (111+ 111 –seven times).
> Counts units = 160 [correct answer is 161].

Marlene Roussouw, working in the Bitou region of the Eastern Cape with 10 rural schools (hence the name Bitou 10 Project) notes that in all the reading lessons she observed there was only one reading method – all grade 4-7 learners read aloud simultaneously using the same text. She observes that this "barking at print" means that hesitant readers are not picked up on, good readers get bored and the teachers look increasingly harassed by the noise. On average, two set books are read in this manner per year, and much of the 'reading' is done through memorization. After reading there is no discussion or post reading activities and no attempt is made to link the text with learners' existing knowledge and interest structures. Beeby's description comes to mind: "all the defects of formalism and none of its virtues". One has to move through formalism to get to the other side.

Although we cannot generalize across South Africa from these two examples, it is reasonable to assume that these are the experiences most of our rural and township young learners go through in the key areas of numeracy and literacy. A number of similarities become apparent across these two 'signature pedagogies'. Firstly, the cognitive difficulty levels are very low. Memorization and repetition hold sway, with the most basic of moves being repeated day after day. Progression is painfully slow with minimal building on what has been established. For

example in numeracy there is minimal movement to using base 10, in literacy little movement to silent reading. Hardly any writing is apparent: the oral mode dominates.

It is not possible to cover a national curriculum using these methods. The abuse of time within our system is frightening. As Abadzi pointed out, firstly we have to get schools to protect school time and not squander it on non-academic activities. Then we must get schools to ensure that their teachers and learners are present, in class, and that in class they do learn. Once the door to the classroom is closed and the teacher and learners square up to the task at hand, the quality and pacing of the lesson must enable the national curriculum to be adequately covered and understood. This needs the most basic of interventions, stripping the curriculum down to its essential steps and ensuring that the teachers understand the basic content - before evaluating externally whether and how this has happened. Again, Beeby's account (of primary schools at base level one and of what is needed to move them up one level) comes painfully to the fore.

The systemic evaluations at grade 3 and 6 levels bear this out, with only 36% of our eight and nine year olds being able to read and count. Similar results were found in our best performing province (Western Cape) in the extensive Assessment of the
Language and Mathematics Skills of Grade 8 Learners in the Western Cape in 2006 (Heugh 2007). Around 30% of the learners could barely read or write. Many of them pretended to write by either copying of some element of the test directly, or by randomly writing arbitrary letters or shapes. There were very few learners performing in the top three levels of the home language tests (8% of the Afrikaans, 14% of the English, none of the isiXhosa) and the Mathematics tests (only 7%).

Given the above context of South African education (and bearing in mind that the current state of education in KwaZulu-Natal and South Africa will be dealt with extensively in Paper 2 of this project) what evidence do we have of quality educational practices that work in a South African setting?

There have been numerous interventions attempting to improve the quality of education in South Africa. Hundred of millions of rands have been spent by major investors on precisely this task, with uneven success. Taylor reports that only 30% of the projects have resulted in improvements which in addition are often short-lived and do not carry through to higher grades. What were the most successful interventions and what do they tell us?

One of the most informative success stories is the District Development Support Programme (1998-2002) in which 589 schools in 14 districts in four provinces (including KZN) participated in a concerted attempt to improve the quality of classroom practices, school and district management and school governance. Researched best practices for whole school and district development were used for the intervention. The high information value of this intervention is apparent in certain patterns that emerged: learner performance only really improved in one of the years of the intervention (2002); only one province (KZN) managed to maintain and improve these gains in 2003, and real gains were shown only in numeracy. What happened in

2002, why only KZN, what happened to literacy? The answers to these questions begin to tell us what needs to be done to improve the quality of South African primary education. The table opens the issues out:

| | Numeracy | | | | Literacy | | | |
|---|---|---|---|---|---|---|---|---|
| | EC | KZN | NC | LP | EC | KZN | NC | LP |
| 2000-2001 | +2.12 | -0.35 | +1.88 | +1.12 | -0.87 | -4.88 | +1.68 | -1.91 |
| 2001-2002 | +9.35 | +12.68 | +8.21 | +11.55 | +11.18 | +5.79 | +5.02 | +6.19 |
| 2002-2003 | -1.73 | +2.84 | -10.18 | +0.33 | -3.42 | +2.13 | -4.14 | -1.89 |

**Table 3: Annual changes in provincial sub-sample data**

What happened in 2002? Why the sudden dramatic increase? Schollar, in his summative report, provides the account. Shocked by the poor responses to the intervention in 2000-2001, USAID and RTI called a meeting and demanded improved pupil performance from the providers. Accounts of improved practices, although welcomed, were not accepted as the final outcome. Learner performance had to improve, and to ensure this more staff and support was provided to schools. Crucially, however, a document analysing the results of the baseline tests was also circulated. It clearly isolated the problem areas in the learner responses and then provided explicit guidelines on what learners should be able to do in each grade. Thus the selection and sequencing of the curriculum was strengthened. Schollar quotes from the JET report (Jet did both the baseline test and analysis):

> "…the results of the DDSP Baseline Study suggest that the following measures in curriculum management and pedagogy are likely to have the most effects on learner performance:
>
> - Specifying clear outcome standards for each Grade in literacy and numeracy.
>
>  For example: "By the end of Grade 2 learners should be able to add, subtract and multiply two numbers up to 999". "By the end of Grade 1 learners should be able to read, comprehend and write simple sentences".
> - Monitoring and supporting teachers in achieving these outcomes at the end of each respective Grade. Such measures should include regular assessment of learner performance, which is moderated and monitored at school and district levels.

- Weaning learners from the use of 'concrete' methods in arithmetic during the Foundation phase, to methods which utilize a flexible understanding of the number system as the foundation for all higher order problem solving skills in mathematics." (p.32)

Unlike Curriculum 2005, which gave teachers no topic specifications and allowed enormous choice for textbooks and resources, the project provided clearly structured learner workbooks that worked explicitly with what the learners needed to know, along with extensive practice material to encourage continual repetition towards mastery. Not only were the final outcomes rigorously specified but specific material was provided to ensure that learners could get there. This resulted in the dramatic gains in numeracy results across the provinces. Schollar has attempted a similar intervention in numeracy that worked with high levels of specification, extensive drilling and memorization and graded levels of difficulty; all designed to move learners from concrete particulars into more abstract operations. It was spectacularly successful (Schollar 2008). Education policy reforms in South Africa have increasingly come to recognize that increased specification, structuring and sequencing of the curriculum is needed, along with tighter and more explicit accountability structures. The DDSP intervention bears this out. Beeby would point out that we have begun to aim at the possible rather than dream the impossible and fail those we are most trying to help. The moment of hubris is over.

Only KZN noticeably improved on the DDSP gains in 2003. It was the only province where the DDSP staff continued to work, providing learner workbooks in both numeracy and literacy that addressed problems revealed by analysis of the tests. Furthermore, KZN involved district level officials in the testing and submission of final marksheets, resulting in greater accountability and participation by the administrative apparatus. Other project evaluations of successful interventions such as the Business Trust Project (discussed further on) also indicate that the combination of resource materials with teacher training in schools results in progress. One-off training programmes or dropping off a bunch of resources has almost no effect.

| | | Numeracy | n | Literacy | n |
|---|---|---|---|---|---|
| Baseline | 2000 | 25.84 | 14 366 | 52.58 | 13 828 |
| Mid-Test | 2001 | 26.78 | 14 174 | 50.23 | 14 174 |
| Mid-Test | 2002 | 38.04 | 13 425 | 57.22 | 13 425 |
| Post-Test | 2003 | 37.32 | 2 434 | 56.01 | 2 434 |
| Result | Gain | +11.48 | | +3.34 | |

**Table 4: Gain in mean scores at Grade 3 level in DDSP project**

Why were the literacy gains not as dramatic, with a net gain over the 3 years from 52.58 to 56.01 (+3.43) in comparison to the +11.48 of numeracy (an increase of over 30%, from 25.84 to 37.32)?

Schollar points out that literacy interventions are more complex than numeracy interventions due to the structure of the knowledge form. It is simple to identify key numeracy problems and then drill the learners in specific areas. Reading and writing practices can be harder to specify, depending on the theory of literacy one subscribes to. The province that did show a dramatic increase in literacy results was the Eastern Cape. The organization involved in the DDSP in this province was READ. The service provider for the other provinces was MOLTENO. In order to understand the difficulties involved in literacy interventions we can turn to the in-depth evaluation of literacy in Limpopo.

In a major report titled 'The evaluation of literacy teaching in Primary Schools of Limpopo Province' Reeves analyses the complexities involved in literacy teaching in a South African context. His account takes issues of language and poverty seriously. A continual refrain through the 318 page report is that the Department of Education was ill advised to discard explicit and direct methods of teaching literacy, especially in regard to phonics. Excellent research in effective literacy practices had been dismissed on ideological grounds as conservative since it recommended direct instruction, memorization and drilling. Models of literacy that resonated with learner-centered discovery learning were adopted without asking if these were suitable for the complex linguistic environment of South Africa. Reeves is scathing about the whole language approach with its romantically naïve notion that all children will be able to read naturally.

> "Owing to a series of systematic assessments in South Africa over the last decade, it is clear that the whole language approach, and more laissez-faire approaches to literacy development, in conjunction with the communicative approach to language teaching, are having seriously negative effects on the education of the majority of children who are from socio-economically disadvantaged communities." (Reeves 2008, p. 46).

Whole language works with sustained passages of reading that deal with interesting and relevant issues and contexts. It was developed in a context of middle class home language speakers of English in the developed world. In this approach children learn to read for meaning rather than "barking at print". It is understandable that in the initial stages of reform fever whole language approaches were taken as a rich, engaging, even beautiful antidote to the rote chanting of memorised but meaningless scripts practised in apartheid schools. Unfortunately, this response excluded *useful* practices that had some similarity to "barking at print": practices of focused drilling that result in memorized mastery. Thus, instead of trying to bring clarity and efficiency to confused and inefficient formalist teaching, the department replaced it with a far more complex pedagogy. This had no chance of surviving, given the teachers' level of training and the amount of resources. Teachers should have been trained to teach early reading and writing drills rather than "whole language" communication for meaning. Why? We know from neurolinguistic research that automaticity is vital in reading as it frees up memory space to focus

on meaning rather than trying to work out how to pronounce parts of the word. Automaticity comes from practice, practice, practice. Letters and phonemes have to become automatic so that words become automatic so that sentences become automatic so that readers don't have to concentrate on these forms any longer, they can concentrate on meaning. The deep irony is that in order to get focused on meaning, reading must first become automatic and systematic; and explicit formal instruction and practice is needed to achieve this, especially if the learner has not already been immersed in reading practices from toddlerhood. We need to consider these counter-intuitive results carefully. Often by imitating the end result at the beginning one destroys the ability to reach that end result.

Reeves summarizes the research on what learners in sub-Saharan Africa need in three points. Teaching of reading and writing must be explicit; as this is a very specialized and complex task in developing countries, teachers must be well qualified; reading resources/books must be made available to counter the paucity of materials.

The issues become much more complex when working with learners whose home language is not the same as the language of instruction at school. International research on this issue is unequivocal. The key study in this regard is *A National Study of School Effectiveness for Language Minority Students' Long-Term Academic Achievement* by Thomas and Collier (1997). Students that opted for being taught in a second language from the beginning were by far the worst performers in the second language after 12 years. Amongst the best performers were those that had stayed with home language instruction until fully proficient, whilst taking the second language as a subject. The correlation is crystal clear. The largest variable determining success in second language achievement is how much instruction has been given in the first language. Learners must be taught in their home language for at least six years while the language of instruction is taught as a separate subject in an explicit way. Eight years of home language instruction is preferable. Most desirable of all is dual medium instruction where both the home language and the second language are used for instructional purposes. This is feasible in schools where there are learners using either of two dominant home languages, but in schools where the linguistic landscape is complex it is more difficult. Gauteng schools do tend to have complex linguistic landscapes, but KZN has much more linguistic homogeneity. Furthermore, it must be noted that code-switching is de facto practice in most of our schools. To shift from this practice into dual medium instruction is not a bridge too far and this is the best possible model we know of in current research. Parents who opt to send their children straight into schools where the language of instruction is not their home language are damaging their children's ability to perform at school, although they might have good current reasons for the choice. The table on the following page illustrates the magnitude of the error when a longitudinal approach of longer than three years is taken into account.

No amount of democratic choice for communities around language policy can hide this fact. The problem is that learners initially make rapid progress in learning the second language, but this drops off dramatically as the level of difficulty and complexity in subject matter increases. Then their performance levels suddenly drop way below those who stayed with home language

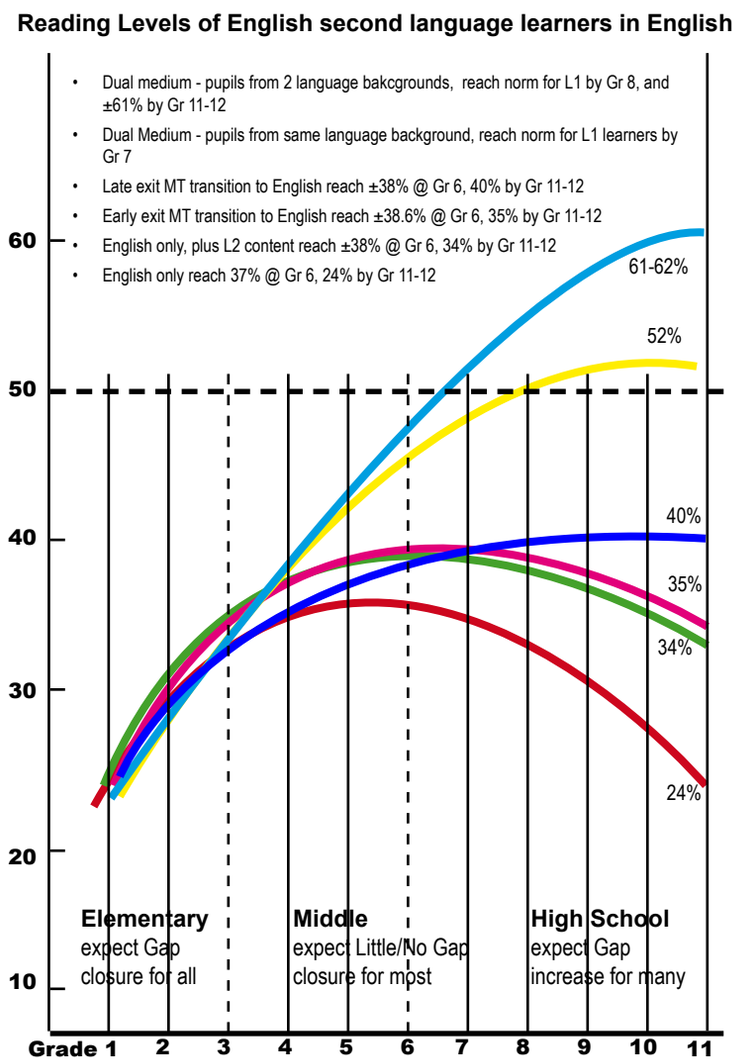



**Figure 9: Graph, adapted from longitudinal study of Thomas and Collier (1997)**

instruction. Many studies throughout Africa have reported that early transition from home language to a second language as the medium of instruction has worked, but these studies only tracked learners through the early grades and so have fundamentally misinformed policy makers on the success of early transition away from home language instruction. In the SAQMEQ countries those that have home language instruction throughout primary school tend to perform better. Tanzania, where Kiswahili is the language of instruction for the first seven years, is a good example. Even better is Ethiopia, where the two regions that kept home language as medium of instruction until grade 9 showed the best academic results. To reiterate: since we already have the practice of code switching throughout our schools, this should be actively developed into a dual medium approach, especially in Kwazulu-Natal.

If these points are not convincing enough one should also note, as Abadzi points out, that English is one of the most difficult languages to learn: its phonetic system is complex and its grammar opaque. Languages that are phonetically based are far easier to learn, both in reading and in writing. IsiZulu is phonetically based. This should be celebrated, embraced and consolidated to the point where learners take isiZulu forward into the Intermediate phase as their language of choice for learning cognitively demanding academically specialized language. There is no reason within the structure of isiZulu that prevents the creation of a specialized lexicon using the same techniques as other languages which have done this i.e. compounding, derivation, borrowing (Delvit, Murray and Terzoli 2009). Furthermore, almost all of our teachers in rural and 'township' schools speak their own home language better than English. Certainly only a few of them are equipped to teach properly in English as the language of instruction. The benefits of home language instruction would impact directly on the efficiency of the education system, saving massive amounts of money. While textbooks are currently an issue, textbooks are one of the cheapest forms of intervention possible within an education system, as the World Bank has pointed out often enough (Abadzi 2006).

Whilst home language instruction is happening, explicit teaching of the second language must happen at pace. Learners working in their first language as the medium of instruction double their vocabulary each year, reaching around 40 thousand words by grade 5 (Abadzi 2006, Reeves p. 48). Those learning English as a second language do not need as high a vocabulary count (as they are developing in their own home language) but still need to learn 1000 – 2500 new words a year. This happens most effectively with a structured and explicit curriculum that is incrementally graded in increasingly difficult levels. Reeves points to Snow (1998) as providing an excellent example of how to go about learning a second language in a targeted manner. It is a complex and specialized task that needs trained teachers who are informed and practiced in language education.

Getting language learning right is the single most important factor in education systems. Language is the sea in which learning happens. Learning a complex language like English takes a minimum of five years of sustained quality instruction. This is in optimum conditions with well trained teachers, good resources and focused time on task. If these conditions are not in place at least seven years are needed. Effectively this means that in South Africa the whole of primary school should be taught through the home language with English explicitly taught as a second language. To shift learners into English as the medium of instruction by grade 4 condemns them to failure. The scale of impossibility is of the following magnitude: by grade 4, learners working with English as a second language have around a 500 word vocabulary strung together in simple single clauses in the present tense. The curriculum at grade 4 expects at minimum a vocabulary of 5000 words strung together in complex sentences with main and subordinate clauses in the present, past, future, conditional and continuous tenses (Reeves p. 54). Ninety % of the curriculum is then incomprehensible to these learners and the only strategy possible is to rote learn meaningless symbols. This perpetuates the very system that apartheid inflicted on learners. By grade 8 these students have not caught up in any way. Although they might be proficient in their home language as a subject they are unable to write anything coherent

using English in subject areas like history, geography and biology (Heugh et al 2007). This was shown in a study of the best performing province of the country (Western Cape). Many of the students pretended to write their responses, but close inspection showed that they had copied other parts of the test paper or just written meaningless symbols resembling letters. Juxtapose this with the Department of Education saying in their *Teachers Guide for the development of learning programmes for Foundation phase* (2003) that 'we learn a first additional language in much the same way as we learn our home language' (Reeves, p.50) and we see the level of incomprehension of what is actually needed. The *Teachers Guide* offers no systematic concrete examples of how to teach literacy. It is all about context and background information, with no explicit guidance on what to do in actual practice.

The Reeves Report on the Limpopo province makes for depressing reading. It painstakingly builds up a picture of a culture of illiteracy where the following conditions prevail: learners have little opportunity to systematically learn reading and writing, either at home or at school; home language development is not encouraged through primary school; English is introduced as the language of instruction prematurely and at great cost to learner development; teachers don't take advantage of the numberless opportunities to develop language and literacy skills; education department policy documents are ambiguous, underspecified and misinformed; most teachers do not know how to teach reading and writing in an explicit way and do not understand the crucial connection between teaching home language and second language; the pace and cognitive level of work done in classrooms is painfully slow and weak; there is poor management and use of available materials; teachers provide limited individual feedback to learners on their progress in reading and writing; curriculum coverage and delivery is insufficiently monitored by heads of department and principals; almost none of the Foundation phase teachers have post- graduate degrees; and the current teacher education programmes lack both the necessary capacity and content for developing teachers specializing in literacy. Even worse, the practices we do have in place such as code switching have not been taken advantage of and are often discouraged.

Reeves' recommendations on getting out of this mess make for interesting reading when compared to what Naledi Pandor initiated with the Foundations for Literacy campaign. They could have been co-authored. Here are Reeves' 12 points:

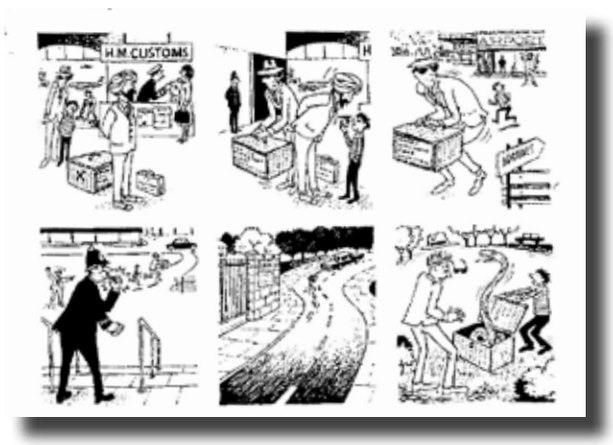
- Optimize literacy benefits of grade R
- Create literacy rich schools and classrooms
- Every learner to get textbooks and readers that are well managed and distributed
- Explain key research on strong literacy development in multi-lingual settings to all key stakeholders
- Ensure learners get grade-appropriate, cognitively challenging opportunities to learn reading and writing. The volume and quality of this work must be checked by internal and external authorities

- Improve quality of literacy instruction by explicitly specifying levels of performance and intensifying focused in-service training
- Overhaul primary school teacher education
- Foster home learning environments
- Link strategies to existing national and provincial initiatives

This report came out a year after the results of South Africa's participation in PIRLS 2006 were made public. That we came last is well known and unexpected, given that the only other African country participating was Morocco. More importantly, the literacy tests were conducted in the languages of instruction of the school, providing valuable data on how learners were doing in the various national languages. Those writing in Afrikaans and English did best, while those writing in African languages did exceptionally poorly. This does not mean, however, that English and Afrikaans should be the medium of instruction, only that schools that have English and Afrikaans as their language of learning and teaching overwhelmingly have a history of privilege, better resources and better teachers. Poor learners who get into these schools will tend to perform better even though the language of instruction is foreign to them, not because they are learning in English but because the school actually teaches them. This pattern obscures the very real need to develop isiZulu as the language of instruction throughout primary school in our KZN context. We should use all possible resources to develop the capacity of the system to do so and should give this the highest priority.

Figure 11 below crystallizes this priority. When isiXhosa learners in a Khayelitsha primary school were asked to do a simple writing task that constructed a narrative around the pictures they were able to give a coherent account in isiXhosa but when attempting the same account in English the writing became incoherent. The tragedy is that these learners are supposedly in English medium classrooms and are assessed in English, not in isiXhosa, but their ability to write in isiXhosa is far better than in English.

Pictures used in the language test in isiXhosa and English. Children were asked to arrange the pictures to make a story and write a brief paragraph describing the events in the story.




She found that a group of children studying in English-medium classes had a very rich vocabulary in isiXhosa but a very limited vocabulary and understanding of the basic rules of English language, as illustrated in the samples below.

**Sample 1**

isiXhosa version: Kwakukho utata waza webeka ibhokisi phantsi encokala notata wekhe kwasukha kwathi gqi ubhuti wathatha ibhoks yala tata wabaleka waleqwa ngumntwana omnye wakhalisa impempe omnye emkhemba wabaleka wayo kuqabela imoto wayiqhuba abanye bavula ibhokisi kwavela inyoka wathuswa yinyoka idimasi.

Translation from isiXhosa: There was a father (old man) who put his box down, conversing with his father. Then a certain young man (brother) appeared and took the old man's box and ran away. He was chased by a child and the one blew a whistle, and the other one pointed at him. He ran away with it and got into a car and drove very fast. The other opened the box and a big snake. The other was shocked by the snake and his sunglasses fell down.

Written in English:
Once upon a time
Long long ago
Ly Buter uteatsha fourboy late my father
I taket my tyesi
goiu m father in goiu boeke
Look my boy?

**Figure 10: Answering questions in home language and language of teaching and learning (Fleisch 2008, p.103).**

Other strange patterns appear in the analysis of the PIRLS data set (van Staden & Howie 2008 CEPD conference). Learners with teachers under the age of 25 or over the age of 60 did exceptionally well in the tests. Learners with teachers between the ages of 25 and 59 performed poorly. This strange set of results is partly due to there being very few teachers under the age of 25 (0.93%) or over 60 (0.11%), with 99% of the teachers falling between 25 and 59. The poorest performing teachers were 30 – 39 years old. There is no direct correlation between increased experience and increased performance. HIV and AIDS must play a role in this group of teachers. Teachers who state in the questionnaire that they do not use textbooks at all have the best performing learners, while those who use textbooks every day have the worst performing learners. This is partly due to better teachers using their own resources or school resources developed to suit their own particular context and style, but it is also an indictment on the quality of textbooks available in the Intermediate phase, as well as the language the textbooks are written in. The majority of teachers participating in the PIRLS study thought their learners reading abilities were average, with only 6% of teachers stating they thought their learners reading to be under average. Given the nature of the test results this is disturbing. It is possible that teachers exaggerated their learners' abilities, but this result points to teachers not recognizing or realizing the required levels of literacy required. If the teachers do not know what is required of literacy in the Intermediate phase, what can we expect from the learners? Finally, teachers reported that a large amount of their time was spent reading to their classes: little time was allocated to either silent reading or direct reading instruction. The teacher reading to a whole class does not improve a learner's ability to read.

We do have accounts of South African schools that promote effective literacy learning for learners from low income areas. Sailor, Hoffman and Mathee provide a particularly detailed account of these successful schools, based on a subset of the 957 primary schools involved in the Business Trust's Learning for Living project. This five-year, 153 million rand project attempted to improve reading and writing of learners from poor communities. Sailor et al did a qualitative study on seven of the highest performing schools. What were these schools doing right? Five basic themes emerged: a safe, orderly, positive learning environment; strong leaders; excellent teachers; a shared sense of pride in the school; and high levels of school and community involvement (p42). Locked gates, barbed wire, alarm systems, good fences and nightwatchmen all contributed to an external sense of the safety of the schools whilst internally there was an orderly and disciplined sense of purpose. Strong leadership was universally credited as crucial to success in all the schools. Principals showed proactive financial and organizational management; had effective, well-established community relationships; and consulted democratically with their staff. The teachers in these schools were qualified and highly dedicated, and ensured that their classrooms were rich and stimulating environments where learners actually engaged with texts. These teachers worked at improving their own teaching practices, taught from the heart and collaborated well with each other. The schools had strong relationships with the community and reputations for high quality within the community; they were proud of their status and affirmed local culture and practices; they were clean and well maintained with relatively comfortable facilities for both staff and learners. The learners were confident and keen to show off what they had learnt, and many were fluent in English.

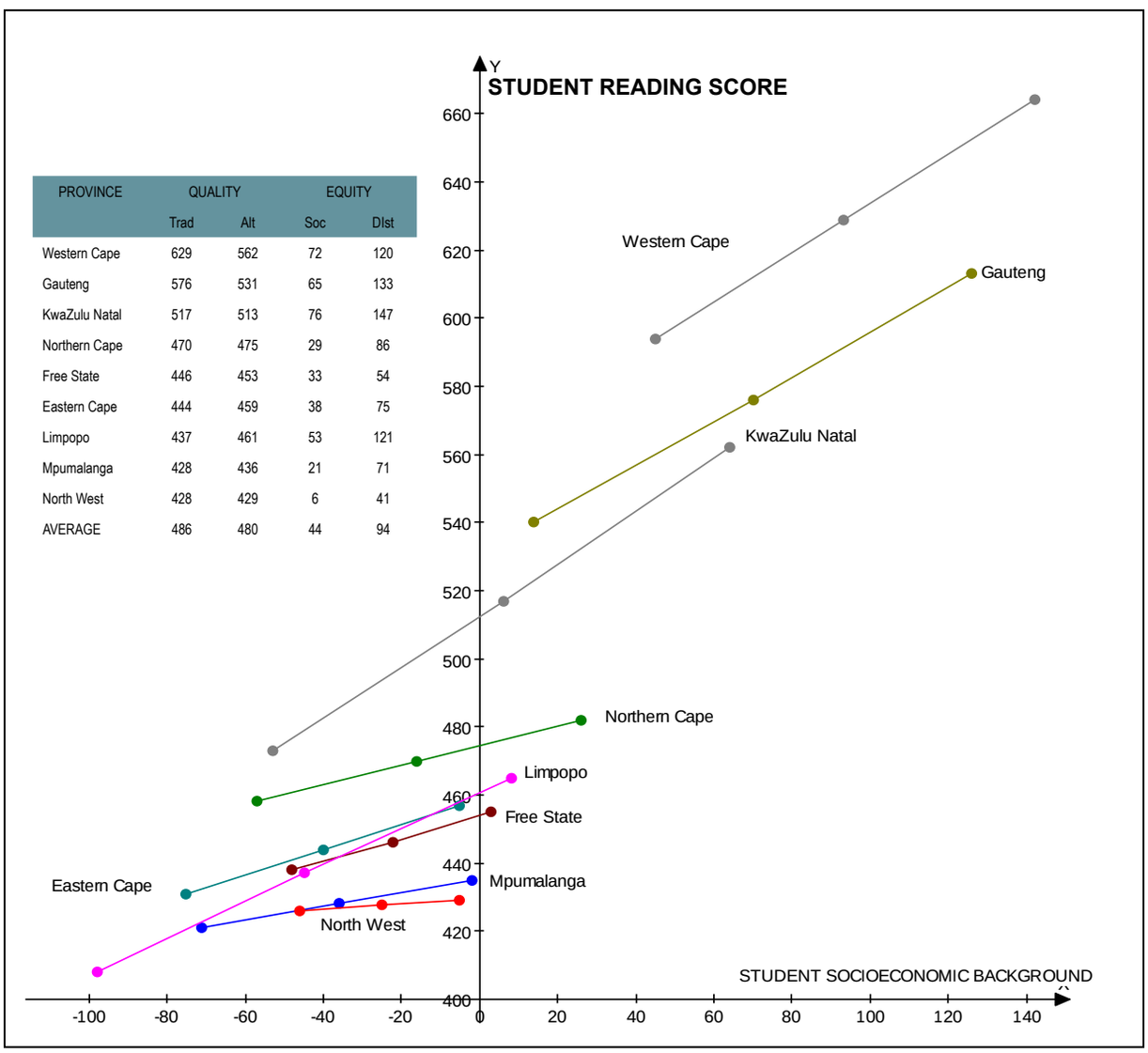
However, strong countervailing forces threatened sustained excellence in these schools. Firstly, their reputation for excellence brought over-enrolment and increased class size. Secondly, as good teachers left or retired they were replaced by teachers from the 'surplus list'. This highly problematic practice is almost guaranteed to reduce quality within a school, as it brings in mostly retrenched teachers from poorly performing schools with declining enrolments (p.384). Thirdly, excellence had been achieved in reading but not in writing. As good as these schools were, they gave little opportunity and little encouragement to sustained writing.

Successful schools in low income areas present a dilemma for anyone trying to identify the most effective possible investments. We know from extended interventions within poorly performing schools in low income areas that it is exceptionally difficult to show results there, since these schools need continued investment across the board and often this is very badly managed and poorly sustained. Schools that *do* show potential for change and desperately need more funding to maintain their levels of quality as more and more learners attempt to enrol are very attractive options for investment. Investors refer to these schools as "beacons of hope". Clearly strategies that intend to improve the quality of education in South Africa need to differentiate between schools, much as Beeby did 40 years ago, and develop different kinds of interventions for different kinds of schools. This is partly based on the hierarchical principle whereby certain basic conditions have to be in place before other interventions can take effect. Nick Taylor has made a relevant distinction between dysfunctional and functioning schools within low income communities. Dysfunctional schools need basic time management strategies to ensure that schools are open, not closed, and teachers are present, not absent. Only once these basic conditions are in place can interventions focus successfully on improving teacher knowledge and classroom resources. In other words, many of our schools are not even at stage one on Beeby's scale. The task here is not professional development of teachers: it is to get them in school, in class, teaching.

Funders of school development over the years have slowly begun to identify strategies that result in effective interventions. The Zenex Systemic Programme has distilled the following effective rules of thumb: work with schools that have potential - an already existing basic work ethic, with teachers and learners at school and an effective principal; cluster schools so that they can work with each other; work with all the teachers in a school; focus on structured and scripted content lessons rather than ideologies like OBE or learner centered education. This is an acceptable strategy for development organizations that have to account to their funders but cannot be the only policy within a province where all the children are its responsibility.

We do have excellent attempts to improve education at a provincial level in the country. Two stand out for our purposes here. Firstly, the Khanyisa school transformation programme in Limpopo, that ambitiously attempts to reform education throughout the province from classroom and school level all the way up through circuits, districts and provincial management. Secondly, the strategic Western Cape decision to target basic numeracy and literacy as the key leverage points for improving performance throughout the system. These two provinces sit on either side of KZN in terms of educational performance in relation to equity.

The following figure demonstrates the situation clearly:




| PROVINCE | QUALITY | | EQUITY | |
|---|---|---|---|---|
| | Trad | Alt | Soc | Dist |
| Western Cape | 629 | 562 | 72 | 120 |
| Gauteng | 576 | 531 | 65 | 133 |
| KwaZulu Natal | 517 | 513 | 76 | 147 |
| Northern Cape | 470 | 475 | 29 | 86 |
| Free State | 446 | 453 | 33 | 54 |
| Eastern Cape | 444 | 459 | 38 | 75 |
| Limpopo | 437 | 461 | 53 | 121 |
| Mpumalanga | 428 | 436 | 21 | 71 |
| North West | 428 | 429 | 6 | 41 |
| AVERAGE | 486 | 480 | 44 | 94 |

**Figure 11: Provincial comparison of SACMEQ scores using quality and equity indicators**

On the traditional league table measurement, KZN comes third (517). The Western Cape (629) and Gauteng (576) average well above KZN and all the other provinces average well below, with Limpopo coming in seventh at 437. Furthermore, only the Western Cape, Gauteng and KZN are performing above the national average of 486: the other six provinces are below this level.

If one takes into account socio-economic levels and looks at adjusted quality by checking where the various province lines intersect with the x axis at 0 (the vertical line) then the various provincial lines come much closer together. This provides a more reasonable league table

comparison. Although still first, the Western Cape (at 562) is now far closer to Gauteng (531) and KZN (513), while Limpopo jumps up to fifth place at 461. On this measure, only the 'top' three provinces still score above the national average. However, if one takes into account both social and distributional equity then a different picture of provincial performance in terms of quality education jumps into view.

Social equity measures the impact of socioeconomic level on educational performance. The flatter the slope the less the impact, as it points to learners from poorer backgrounds doing well despite their background. The steeper the slope, the bigger the difference in performance between rich and poor learners within the system. On this measure KZN comes last: it has the steepest slope, indicating that students from wealthier backgrounds are doing far better than students from poorer backgrounds. The Western Cape and Gauteng don't do much better. The Northern Cape, Eastern Cape and the Free State come to the fore as educational systems that are delivering greater social equity than their richer neighbors. It would be incorrect to include the NorthWest and Mpumalanga in that category, however, for although their lines are very flat they are also very low, indicating that not much is happening educationally. Here they are not enabling poorer learners to achieve levels close to more advantaged ones; rather, everyone is doing badly – an equality that does not make for equity. These provinces are literally "flatlining".

Distributional equity measures the difference between the worst and best learner performances in relation to socio economic status – the longer the line the higher the inequality. Again, KZN comes last with the Western Cape and Gauteng not far behind. Again it is the Northern Cape, Eastern Cape and the Free State that come out with better distributional equity than their higher status neighbors. Limpopo is clearly an interesting case as it has the worst levels of performance combined with the worst levels of poverty, but there are clear signs that as a system it is alive, because at least some of their students are performing above the adjusted quality average.

The "flatlining" phenomenon highlights the difficulties of improving the quality of education in South Africa. Because much of the South African education system is completely dysfunctional, certain interventions barely seem to register. The current debate over the impact of expenditure on our educational outcomes has helped to spark this project. Why is it that we spend so much money and get so little for it?

If one combines all four measures, the Northern Cape is seen to be producing the highest levels of quality in relation to equity, while KZN sits uncomfortably with high levels of social and distributional inequality (here we exclude the non performance of the North West and Mpumalanga). KZN is a fascinating case to work with in that its profile sits closer to that of South Africa as a whole than any other province; but this aspect will have to wait for the second paper.

If what happens inside the classroom between the teacher and the learner provides the first leverage point for improving educational quality, then it is the leadership and management practices of the school that provide the surrounding conditions which enable, sustain and thus

ensure classroom learning. The most recent (and best) report on the impact of leadership and management on the quality of learning in South Africa is *Managing to learn: instructional leadership in South African secondary schools* (2009). This study used a sample of 200 schools in the Western and Eastern Cape to explore how curriculum and instruction was managed in different schools from different socio economic contexts. The principals of schools tended to be experienced male teachers who were well qualified and described their job as consisting mainly of administration and learner discipline. Management of teaching and learning tended to be distributed across the school management structure; therefore the manner in which the school as a whole was managed emerged as more important than the specific leadership traits of the principal in the analysis. The organizational culture of the school is crucial for educational quality. Obviously the principal has a massive impact on this culture but he cannot manage the learning of the school on his own. The key leadership and management variables that impacted on learner performance revolved around curriculum coverage, parental and community support for the school and the governing body's active help. Furthermore, those schools that structured the school day around teaching and managed the learning and teaching material effectively were notably successful. Other variables that impacted on improved results were positive staff members, collaboration between staff members and active plans to improve school results.

None of these results are surprising, but they do bear elaboration. We have already seen that curriculum coverage is a vital prerequisite for improving learner performance (Reeves and Muller 2006) and that across disadvantaged schools in South Africa there is very poor pacing, with rote learning and repetitive exercises dominating the day. A positive school culture with good relationships between teachers on the one hand and principal and teachers on the other is also vital. But very surprisingly, the most important variable in the Hoadley and Ward study (2008) was the relationship between parents and the school, whereby forms of social trust and commitment to the school apparently resulted in dramatic improvement in learner results. This is a correlation, so we are not sure of the causal relationship. It is entirely possible that the reason why parents are supportive of the school revolves around the success of the school. Qualitative studies are needed to open out the correlations. Nevertheless, the variable points to how important it is to build up relationships between the school and the surrounding community, often with the principal playing a key facilitating role.

Other provinces in South Africa have been proactive in developing strategies to improve quality in education. We will review the strategies within KZN in the second paper. In the meantime, two particular provincial strategies that have already been mentioned briefly are of interest for the project.

Firstly, the Khanyisa School Transformation Programme for the Limpopo Department of Education, (2003 – 2010) is a large scale school improvement programme that is working across all the provincial levels of the education system with prominent issues of going to scale and of sustainability. Cluster workshops and in-school professional sessions have been held, along with the development of assessment banks and structured learner workbooks. Common work schedules and tests have been developed and each school has implemented a daily maths

and literacy hour. Districts and circuits have been restructured and resourced with a focus on providing better professional support to schools. Model circuit facilities are also being built with an emphasis on computer labs, science laboratories, libraries, and home-economics centers. The programme report is still pending, but it will certainly provide a powerful example of what can be learnt and achieved at this level.

Secondly, the Western Cape has been actively running a programme to improve literacy and mathematics in primary schools. This was based on the strategic realization that if learners cannot read, write, comprehend and calculate then they cannot learn, analyze or reason at a complex level; and the resulting inefficiencies are carried through the whole education system over time. Launched in 2006 and planned until 2016, the overall strategy focuses mainly on the teacher and her teaching, with eight key component programmes:

1. A pre-school programme
2. Strengthening and modifying classroom practice
3. Teacher training and development (a Cape Teaching College has been established)
4. Development of learning and teaching support material
5. Research
6. Monitoring and support driven by primary school advisers
7. Coordination and sustainability
8. Advocacy, community and public awareness, and family literacy

This is a long-term strategy. As of 2009 there has been some success improving literacy. Mathematics has proven harder to improve and currently highly structured lessons and instruction guides are being developed and used. Again we await researched reports on the success of this intervention.

# 4. Conclusion

We know that poorer learners in other countries throughout Africa are performing better than our own even though we are spending more money on education than they are. The reasons for this come from two sources: one malicious, the other well intended. The effects of apartheid persist across our land and cannot be ignored as a major explanatory variable in the continued poor performance of our learners. Our current teachers had Apartheid education as their experiential frame. We did not take these effects seriously enough when implementing OBE, hoping that the dreams, energies and policies of a brave new educational world would carry us through. OBE expected too much from our teachers, our learners and the educational system as a whole.

Recently there has been a strong recognition that we must return to fundamentals before attempting sophisticated and significant reform, particularly as we are also investing resources in redressing the inequalities of the past. This recognition has been carried forward by a continuing stream of research into what works and does not work pedagogically within a developing South African context. The research firstly recognises the need for a rigorous overhaul of the basic culture of teaching and learning: that is, the use and management of teaching and learning time across the system. This overhaul should range from timetabling, testing and getting teachers to class on time to stronger pacing requirements that will ensure the syllabus gets adequately covered (Taylor 2008). Only when teachers are in their classrooms teaching on a sustained basis will it be possible to start improving pedagogic structures. The second recognition is that professional training must work on simple, explicit improvements that demonstrate one best way to teach specific and basic content within the classroom context. Any attempt to change existing teaching practices radically will flounder or result in strange forms of imitation that do more damage than good. Classroom teaching and learning is the key leverage point within the system: all forms of management, leadership, policy and curriculum design must centre on this sanctum. The third recognition is that if learners are not taught properly in the Foundation phase – the structure on which the whole educational edifice is built - then the entire system will suffer. To achieve effective foundational teaching we must put focused effort into getting experienced, well trained and competent teachers of literacy and numeracy into the system. These teachers must use well known and basic techniques rather than follow sophisticated constructivist models. Home language should be emphasized, celebrated and developed. To this end, quality textbooks and resource materials in the home language must be developed, distributed, engaged with and used. If pedagogy, curriculum, assessment and policy are kept simple, clear and manageable, a slow improvement will become evident across the system. By recognizing the full magnitude of the task apartheid has left us we can identify and adopt strategies that address the problem directly and explicitly, rather than falling for an over-developed dream.

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In February 2009, the Provincial Treasury KwaZulu-Natal awarded a contract to a group of researchers under the auspices of the School of Education and Development, University of KwaZulu Natal, to conduct a study on improving the quality of education in KwaZulu-Natal.

The outputs delivered included:

- A literature review on “What makes education work”
- A synthesis of statistical data and qualitative research on education in the province entitled “The state of education in KwaZulu-Natal”
- A map of schools in the province, detailing key variables related to teachers, learners, schools and districts; and
- A set of recommendations and costing based on the study, entitiled “Policy recommendations: Improving the quality of education in KwaZulu-Natal.”

This document is the literature review entitled “What makes education work?”