



**Teacher Development Models – An environmental scan of teacher
development**

Progress, challenges, and solutions

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Keynote presentation to
Colloquium: Teacher Development Models and PLCs

5 December 2016

Introduction

Following release of the TIMSS results last week there is no doubt that the school system is on an upward trajectory, with a significant improvement in learner performance, at both primary and secondary levels, over the last 6 years. What is responsible for these shifts? Is it perhaps that the general improvement in school infrastructure over the past 20 years is beginning to have an effect on learning? What about books? National and provincial departments have in the last 5 or more years systematically improved supplies of LTSM to schools, and here the DBE Workbook programme stands out as a well distributed and commonly used example. And what has been the role of the professional development programmes which have flooded our school system for two or three decades. We assume that CPD is improving teacher capacity, and that more knowledgeable teachers, in turn, are being more effective in their classrooms. But is the case? And, if so, are some programmes more effective than others? Above all, how can we accelerate the quality improvement that is undoubtedly happening? My talk today makes the case that science should play a more prominent role in answering these questions.

What are we learning from current CPD programmes?

The public sector annually allocated in excess of R1bn for educator development, while the private sector commits a similar amount. Yet, little is known about the effects of this spending. Without understanding the effects of intervention programmes, we run the danger of simply repeating the same mistakes over and over. Considering the unspent funds in government's CPD budget, there cannot be an argument that no money exists for programme research and evaluation. Just five percent of the public training budget would amount to R50 million, which could very fruitfully be used for assessing project impact and mechanisms of change. Currently all R&D funds have to be sourced from international and local donors.

This investment is likely to leverage savings in terms of money spent on more effective programmes and the elimination of those that serve no purpose other than to waste the time of participants and the hard-earned rand of the SA taxpayer. In recent years, government has begun to show a greater appetite for research and to build its own capacity to use research in making policy and planning decisions. The time is ripe to go one step further, and for DBE to take a lead role in the evaluation of CPD programmes. In addition, internal systems for monitoring progress should be strengthened to improve the reliability of information, in the interests of identifying bottlenecks early on, to facilitate implementation understanding the mechanisms which enhance impact.

The topic of my talk today contains the word model, but in my view the choice or construction of a particular model is just the first step in instituting any intervention aimed at teachers, important as it is. But a model that works with one audience may not work with another, the quality of the implementers is as important as the programme design, while unintended consequences and perverse incentives need to be watched.

None of these variables is open to optimal regulation entirely through logical deduction, although logic is the force which animates any theory of change. But all assumptions around design and implementation, however logical, require empirical verification. So, every step of any intervention should be preceded, accompanied and followed by a continuous research and development initiative, which steadily builds knowledge about the optimal design, ideal implementation conditions, and predicted effects of the intervention on teaching and learning.

An outstanding example of this kind of work is the early grade reading programme currently being rolled out across all primary schools in Kenya, and which was visited by a South African delegation earlier this year. Encouragingly, work of this kind is being taken up in South Africa, through public/private partnerships, such as the programme which started life as Gauteng Primary Literacy Strategy (GPLS) in GP, and has subsequently been piloted in KZN, NW and MP through a partnership between DBE, the universities and several local and international donors. I quote the experiences of GPLMS at some length during the remainder of my presentation, not so much because it is achieving strong impact, but because of the lessons it offers us regarding the design, implementation and understanding of large-scale interventions aimed at systemic change. I want to add that I am in fact rather dubious about the validity of the assumption underlying GPLMS, namely that teachers can teach what they themselves don't know, provided they follow a good script. But, as I have said, our theoretical assumptions require empirical validation.

The Gauteng Primary Literacy and Mathematics Strategy

In 2010, acknowledging the poor state of learning revealed in both the GDE's 2008 Systemic Evaluation exercise and the 2010 ANA results, the GDE launched the Gauteng Primary Literacy Strategy to address the low level of literacy achievement in the Foundation Phase in the province. By late 2011, it was realised that a programme was needed in both mathematics and languages, and in the whole of the GET band (Grades 1-7). The project extended its scope, added a mathematics component, and became known as the GPLMS. The programme has been evolving ever since and at this stage four distinct phases are recognisable.

Phase 1: Gauteng

The GPLMS was applied in schools that scored 40% or below in literacy in the 2008 provincial Systemic Evaluation¹. By the end of 2012, the project was assisting 832 poorest performing schools in the province, reaching nearly 600 000 primary learners. It had three central elements: supporting teaching and learning in classrooms through the use of trained coaches, the provision of lesson plans for teachers to use daily, and a supply of materials in the form of readers, workbooks and textbooks linked to the lesson plans.

The most controversial feature of GPLMS is the *scripted lesson plans*, which are aligned with CAPS, as a way of addressing the problem of slow pacing which is endemic in schools serving the poor. The lesson plans are designed as a practical mechanism to provide knowledge resources to teachers in a direct manner to enable them to pick up the pace in classrooms. One of the early project documents describes their purpose as follows:

The lesson plans would dramatically change the daily rhythms and tasks of teaching, accelerating and intensifying the teachers' work rate in the English classes.

Programmes which feature scripted lesson plans as a central design element are accused from certain quarters of wanting to deprofessionalise teachers, taking away their autonomy to plan and direct their own teaching and being constrained to comply with a one-size-fits-all straight jacket. The counterargument is that many teachers have proved themselves unable to plan and execute lessons

¹ Fleisch; and Schöer, V. (2012). Large-scale instructional reform in the Global South: insights from the mid-point evaluation of the Gauteng Primary Language and Mathematics Strategy. *South African Journal of Education, Volume 34, Number 3*

with sufficient pace and cognitive density, and in fact research is indicating that teachers find the lesson plans very useful.

In contrast to many CPD programmes which target an improvement in teacher content knowledge and PCK, the GPLMS assumes that effective classroom practices can be *scripted*, and that if teachers are taught how to follow the script by expert pedagogues, then learners will be presented with a far more coherent induction into the disciplinary field in the short run, and teachers will come to grasp what it is they did not know in the medium and longer term. These assumptions are what lie behind this particular *model of teacher capacitation*.

A notable feature of the GPLMS was that, after two years, the language component was still under construction. And, after 5 years of piloting in various contexts, the lesson plans remain in a state of dynamic evolution in response to classroom conditions. In addition, it was found that reading material available at the time required significant supplementation through newly commissioned graded readers. After one year the mathematics component was taken back to the drawing board, with lesson plans and workbooks being entirely rewritten.

The important lesson to emerge from the first phase of GPLMS is one that South Africans have ignored in the past: the need to provide time and space for adaptations to the design of ambitious new programmes to ensure their suitability for target classrooms. An external implementation evaluation of the programme early in its life found that, once teachers had adapted to using the lesson plans and materials in class, they were generally favourably disposed to GPLMS, although some complained of the increased work required to keep to the pace of the lesson plans. These findings were supported by NEEDU's school visits in the province in 2012.

One flaw in the evaluation of Phase 1 is that it was not instituted at the start of the programme and therefore could not follow an experimental design. However, using a regression discontinuity technique *ex post facto*, the evaluation was able to conclude that learners in GPLMS-treated schools did experience improvements in their numeracy scores compared to learners in non-treated schools². They began to experience improvement in 2012 when the numeracy intervention had just begun suggesting a strong carry over from the literacy component. By 2013, the treated schools had received 18 months of early-grade mathematics intervention, and two-and-a-half years of early-grade language support. The intervention schools had higher average numeracy scores, of up to 0.77 of a standard deviation, compared to the comparable group that was not exposed to the intervention. While the gains are strong, strictly speaking they only apply to the sample of schools around the assignment threshold (a local treatment effect), another disadvantage of not using an experimental design. Moreover, the evaluation was not able to separate out the mechanism and the individual components that contributed to the gains, nor whether schools falling below the threshold encompassed by the discontinuity benefitted from the GPLMS.

Phase 2: Pinetown

A second phase of the GPLMS occurred in Pinetown, KZN. This involved piloting the Reading Catch-Up Programme, an eleven-week course, which focuses on re-teaching Foundation Phase English First

² Fleisch, B., Schöer, V., Roberts, G., and Thornton, A. (2016). System-wide improvement of early-grade mathematics: New evidence from the Gauteng Primary Language and Mathematics. *International Journal of Educational Development*, 49: 157–174

Additional Language skills and content to Grade 4 learners in underachieving primary schools³. It was designed to replace the curriculum for a single term, to ensure that learners in these schools had an opportunity to master the basics of English-language literacy, without which they could benefit little from curriculum offerings at Grade 4 level. The RCUP contains the same three key elements which characterise the GPLMS as a whole: scripted lesson plans, provision of high-quality learning materials, and on-site coaching. The scripted lesson plans divide the term into 11 weeks, with a consistent weekly teaching routine prescribed, to be followed in the same sequence every week. The teaching week is divided into seven half-hour teaching periods, with the content, activities, use of printed materials, and homework for each period specified.

The theory of change assumed by the programme is that aligning these three interventions acts to disrupt and re-engineer three core elements of practice. First, the lesson plans and the coaching change how time is understood and used. The pace remains the same even if teachers are absent or the day is interrupted for any reason. The responsibility, or burden, shifts to the teacher to keep up with the pre-specified time frames. Second, the lesson plans and the learning resources, complemented by the work of the coaches, expand the teachers' pedagogic techniques and classroom management repertoire. Third, a consistent finding in international literature on large-scale reform is the negative consequences of the overambitious curriculum. By beginning with the average actual reading levels of learners, and moving them systematically along, the intervention aims to provide a large proportion of learners with the opportunity to benefit from reading instruction and reading materials at the appropriate grade level.

Recognising the weaknesses inherent in the evaluation of Phase 1, an evaluation of the RCUP in KZN used a randomised controlled trial design, the gold standard to determine whether a change in the target population has occurred, relative to a comparable control group. The evaluation found that, while both intervention and control groups improved substantially between the pre-test and the post-test, the improvement is only marginally better in the treatment group, and the difference is not statistically significant. However, while there was no significant effect on the overall reading score, there are significant positive effects observed for spelling and language. There were also improved effects shown with increased compliance with the programme (higher dosage) and with the quality of coaching. Thus, there is evidence to suggest that with higher levels of implementation intensity and/or extended duration, and with strong coaching, interventions such as the RCUP could enable learners to narrow the gap between where they are and where the curriculum expects them to be.

The statistically significant findings of gains in two domains, namely spelling and language (grammar), are important. These are clearly the domains most likely to change, as they have the lowest cognitive load associated with them. In contrast, the fact that scores did not change for comprehension, which requires a much wider and more complex range of knowledge and skills to be taught and learnt, is not surprising, given the relative brevity of the intervention. As things turned out, both treatment and control groups showed significant gains, but the difference between the two groups was not significant. Unfortunately, most programmes, government and otherwise, assume that the good intentions of the project advocates are sufficient to ensure effective designs, and that assessing the actual impact is unnecessary. As we have said, this is a dangerous path, which runs the risk of wasting time, money and effort on repeating routines that have no positive effects.

Overall, there is evidence to suggest that, with full programme dosage and strong coaching, interventions such as the Reading Catch-Up Programme could enable learners to catch up to where the curriculum expects them to be. If this is true, then it has implications for pedagogy, indicating

³ Fleisch, B.; Taylor, S.; Schöer, V; and Mabogoane, T. (2015). *Assessing the impact of the RCUP: A report of the findings of the impact evaluation of the Reading Catch-Up Programme*. Johannesburg: Zenex Foundation.

that a scripted approach to literacy instruction, linked to the use of good materials and on-site coaching can be effective in improving the quality of learning.

Phase 3: North West

The project took a further step forward in 2014, when DBE, in collaboration with North West (NW) PED began to plan an RCT evaluation of the GPLMS, with funding from international and local CSI donors⁴. The participation of DBE at this stage is a most important development: government support is key to the success of any systemic programme. This evaluation will attempt to disaggregate the effects of the three main project elements. At the time of writing, the mid-line scores are available and indicate no net learning gains for the target audience when compared with control schools. However, once again the sub-group effects are very informative. For example, urban children tend to benefit from the programme, in contrast to their peers. This is a finding that could have been predicted, given that urban children enjoy a significant advantage due to a combination of higher SES and a generally more stimulating environment. But the GPLMS finding in this regard emphasises the fact that, while the programme appears to be relatively effective in urban schools, rural teachers require a different kind of intervention. Interestingly, the evaluation of the programme in NW is combining an RCT design with a qualitative component aimed at attempting to understand why and how changes in classroom practice occur, and what constrains or enables improved pedagogy.

Phase 4: Mpumalanga

The journey continues: GPLMS is gearing up for implementation and evaluation in Mpumalanga, where all the lessons of the first three phases are being incorporated into refinement of the programme.

Conclusion: lessons for systemic CPD

Five lessons have already emerged from the GPLMS experience.

1. Foster a research culture from the start

Billions are allocated annually by government and the private sector to maintaining training programmes which have shown little systemic impact in the past. Most important, is that the absence of a research and development culture is preventing us from learning about how to improve the design and implementation of such programmes in order to increase their effectiveness. There is little appetite, on the part of both government and private donors, to research the effectiveness of these expensive initiatives. Of those few programmes that have been evaluated rigorously, few have exhibited positive effects on learner performance. In this respect, we are not learning from our mistakes, but repeating them year after year.

It is clear that a rigorous evaluation should be attached to all major INSET initiatives. In particular, no public funds should be spent on programmes that do not have a mechanism for demonstrating their effects. This is not to imply that punishment should follow a 'no significant effects' conclusion: it is important to understand which programme designs are ineffective, since avoiding these will save money, to say nothing of the time and energy expended by participants. But it is even more important to understand the elements of effective programmes. In order to do this an experimental

⁴ Cilliers, J., Fleisch, B., Prinsloo, C., and Taylor, S. (in press). *Scripted lesson plans and teaching to the level of the child: A randomized evaluation two interventions aimed at improving early-grade reading in South Africa.*

evaluation design must be combined with qualitative elements which seek to understand the specific mechanisms of and inhibitions to positive impact.

One lesson that stood out during the first 3 years of GPLMS implementation in Gauteng was that early formative evaluation is very helpful in refining the project design. Thus, for example, the lesson plans were rewritten more than once, as coaches and an external qualitative evaluation provided feedback on how they were working in classrooms.

2. Evaluation is a continuous, formative exercise

Including evaluation of the design, pilot, implementation, impact and cost benefits of major interventions. The GPLMS, after five years of implementation in various contexts, and continuous redesign in response to close monitoring, is still seeking to discern programme impact on the teaching of literacy in the lower primary school.

3. Combine quantitative evaluation designs and qualitative investigations

Establishing whether or not a programme of the nature of GPLMS does impact on the quality of learning outcomes is the ultimate measure of its worth. In order to establish this first goal, beyond reasonable doubt, rigorous quantitative research designs are essential, of which RCT is the recognised gold standard. At the same time, it is important to establish which aspects of such interventions are most effective, and this requires research of a qualitative nature. While the results of an RCT can confidently answer 'yes' or 'no' to the question of programme impact, this is blunt answer and does not indicate what is responsible for the impact, and hence cannot get to the finer levers of policy and practice.

On the quantitative side, the Pinetown study vividly illustrates the importance of having a counterfactual, which defines what might have happened had the programme not been introduced. In other words, compare the learning gains against those of a comparable group of learners who did not benefit from the programme. If this study had used a simple pre-test-post-test design, the conclusion would be a *false positive*, namely that the treatment group gained significantly from RCUP. However a control group was included. Both treatment and control groups showed significant gains, but the difference between the two groups was not significant. Unfortunately, most programmes, government and otherwise, assume that the good intentions of the project advocates are sufficient to ensure effective designs, and that assessing the actual impact is unnecessary. As we have said, this is a dangerous path, which runs the risk of wasting time, money and effort on repeating routines that have no positive effects.

4. Subgroup effects can be very illuminating

Sub-group effects may reflect the quality of coaches, the SES of the learner community, or result from inadequate measurement on the part of the evaluation. In order to narrow areas of potential error with respect to measurement, the most rigorous research designs must be adopted. But in order to understand the mechanisms which generate any such changes in pedagogy, time-consuming observations in situ are required.

5. Programme continuity

Once the programmes has been finalised, initiatives such as the GPLMS require sustained effort over a number of years before they are likely to become embedded in the standard operating procedures of the complex set of institutions and systems comprising schooling. There is a tendency for each new administration, at national and provincial levels, following the election that brought them into

office to introduce significantly new curriculum policies and other projects. Such has been the case in GP, where the GPLMS has been relegated to the side-lined in favour of new priorities.

Perhaps the most important conclusion at this stage is the realisation of just how difficult it is to effect change what happens at the classroom level. There is no magic bullet or 'game changer': the road to reform in instruction is incremental, if applied systematically and continuously building on lessons learned. From this perspective, short time horizons, over-ambitious targets, staff churn – particularly at higher levels of leadership – and the absence of an evaluation culture are the enemies of systemic reform.

6. Knowledge management

Research on programmes to improve early grade reading in other countries, most notably Kenya, indicate that years of trialling, accompanied by on-going research on the effects of particular programme features, are the secret to establishing effective CPD programmes. Under these conditions, drawing out the implications for policy and practice of programmes such as GPLMS requires careful management of the knowledge resources generated by the intervention.

A counter-example of how not to make optimal use of lessons learned is given by the Systematic Method for Reading Success piloted in South African in 2008-09⁵. SMRS, of which the Early Grade Reading Assessment (EGRA) was an integral part, was introduced to the DBE in 2008 by RTI, the company that has assisted Kenya to design and implement a nation-wide early grade reading programme. The basic thesis behind the program is that learners are systematically introduced to letter sounds, blending sounds into words, recognizing sight words, learning vocabulary and comprehension skills through teacher read-alouds, then reading words in decodable and predictable stories. The program was implemented in treatment schools between February and early June 2009, and was adapted to local languages for each of the three provinces included (North West, Limpopo and Mpumalanga).

An experimental study design indicated very significant learning gains associated with the programme, and the evaluation report concluded that:

... despite that less than half of the intervention lessons were completed at the time of the post-assessment, the SMRS program dramatically increased the learning outcomes for South African learners across Limpopo, Mpumalanga and North West provinces.

Table 1: Systematic Method for Reading Success

An evaluation of the SMRS, conducted by Ben Piper in 2009, found the following:

RTI used a pre-test/post-test treatment/control group design to assess the effects of the SMRS on learning in Grade 1 classrooms in 10 treatment and 5 control schools in each of Limpopo, Mpumalanga and North West provinces.

We find that the SMRS program increased the average letters per minute gain between the baseline and post-assessment by 14.34 letters, a .80 standard deviation gain. Similarly, the program increased

⁵ Piper, B. (2009). *Integrated Education Program Impact Study of SMRS using Early Grade Reading Assessment in three provinces in South Africa*. Research Triangle Park, NC: Research Triangle International.

Hollingsworth, S. (2009). *The Systematic Method for Reading Success (SMRS) in South Africa: A literacy intervention between EGRA Pre- and Post-Assessments. Lessons learned*. Research Triangle Park, NC: Research Triangle International.

the average words per minute gain between the baseline and post-assessment by 4.56 words per minute (.79 standard deviations). Critically, the data shows that the program increased the average words read correctly in a connected text passage by 7.21 words (.80 standard deviations), and learners in treated schools scored 8.24 percent higher on reading comprehension (.79 SDs).

Compared to the effect of being in a control school for six months, being a learner in an SMRS school was worth 2.6 times the effect of being in school for half a year on the letter sounding fluency task, 2.77 times the effect of being in school for half a year for the word fluency task, and 2.85 times the effect of a half year of school for the oral reading fluency task, and 2.6 times better on reading comprehension. These remarkably large results were robust to a variety of specifications of the regression models and the inclusion of a variety of other variables.

One has to ask why the country never took the SMRS any further? Here was the most valuable knowledge available for the taking: how to improve the teaching and learning of reading in the FP. But the programme and the reports quoted seemed to disappear, only to reappear, at national scale, in Kenya. Fortunately, it wasn't long before the South African ball was picked up by GPLMS.

But the story of SMRS illustrates a very important point: knowledge gained through interventions, the literature and pilot programmes will be lost if not collated and understood in order to build a solid foundation on which to base future interventions. And this knowledge will be useless if it sits in a library, or on the laptops of those fortunate to come across it. In addition to collation and analysis, lessons learned must be disseminated and publicised in order to gain traction in policy and practice. All of this requires a dedicated knowledge management function in all institutions like DBE, if the organisation is to make efficient use of its experience in making schooling more effective. I hope I have made the case by means of an extended discussion of the GPLMS that knowledge accumulates incrementally, through deliberate research and development initiatives over years, and if not tracked carefully over years the lessons are likely to be lost.

DBD has steadily increased its capacity with respect to research and evaluation over the past 5 years or more, and DBE officials are participating and leading in the various evaluations conducted on GPLMS. Officials at district level are participating in both NW and MP. This is very encouraging. Efforts would be enhanced if a budget were allocated for research and development of programmes support by the overall CPD budget. Equally important is to allocate adequate resources to knowledge management: archiving and publicising research reports, storing information for easy access, commissioning the collation and analysis of findings from R&D initiatives, and engaging with the wider research community through publications and conferences.

That seems an appropriate note to end on, since we are in fact attending one such conference right now. So, well done DBE in organising this meeting, and good luck to all of us for stimulating and productive discussions over the next two days.