Methodological challenges in evaluating large scale intervention programs: Reflections from the Quality Learning Project

Paper presented at the BIENNIAL PSYCHOLOGY CONFERENCE ON RESEARCH IN PSYCHOLOGY AND RELATED DISCIPLINES:
University of Johannesburg
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Human Sciences Research Council
Purpose

- To provide an idea of the key decisions taken to implement the project and the impact on the study
- To share methodological challenges addressed in the QLP
Outline of Presentation

- Context and background to QLP
- Purpose of Evaluation
- Methodology & Design - Year 1
- Methodology & Design - Year 3 & 5
- Analysis
- Selected results – TIME permitting
Context and background
The Quality Learning Project

- 5 Year school improvement project in 524 schools in 17 districts, all 9 provinces
- Aims to facilitate change by working with district officials, school management teams and educators
- Funded by Business Trust R139 M; managed by JET
- 10 service providers
QLP DISTRICTS

1. Kone Kwena
2. Zebediela
3. Bolobedu
4. Mafikeng
5. S2
6. C1
7. Zeerust
8. Mafikeng
9. Ubombo
10. Inanda
11. Ixopo
12. Flagstaff
13. Bizana
14. Lusikisiki
15. Libode
16. Port St. Johns
17. Ngqeleni
18. Bethlehem
19. De Aar
20. Kuilsrivier
Aim of the QLP

- Improved learning outcomes in Maths and LoL
- Improved teaching of LoL and Maths
- Improved governance and management of schools
- Improved management of District offices
- Improved support to schools
“Each provincial cohort of the QLP schools would, by the end of 2004, show an improvement in school performance measured by overall learner performance with special emphasis on:

- a 10% improvement in mean overall Matric pass rate;
- a 10% improvement in mean mathematics pass rate; and
- a 10% improvement in mean English Second Language pass rate,

against a comparable sample drawn for the province.”

(Cited from original JET/QLP working documents.)
Purpose of Evaluation
Purpose

In **Phase 1** (baseline evaluation – 2000):

- What was the situation in district offices and schools with reference to the five key outcomes stipulated for the QLP?

In **Phase 2** (mid-term evaluation – 2002) and **Phase 3** (summative evaluation – 2004):

- What changes had taken place since the interventions began?
- What was the effect of these changes on practice at the district, school, and classroom level?
- To what extent can these changes be attributed to the interventions?
Ideal design

- **Experimental and Control groups**

- **Problem:**
  - No control group – working with population
  - Not possible to randomly select learners for control and experimental

- **Option** – tracks changes over time

- **Identify effect of interventions**
Methodology and Design

Year 1
1999 Evaluation Model (HSRC)

**INPUTS**
- **DISTRICT DEVELOPMENT**
  - FISCAL & OTHER RESOURCES
    - Class size
    - Pupil expenditure
    - Parent education
    - School fees

**PROCESSES**
- **DISTRICT QUALITY**
  - Management/Administration
  - Policy implementation
  - Monitoring & evaluation
  - Profile
  - Support to schools
  - Management of curriculum
  - Facilities and resources

**OUTPUTS**
- **CURRICULUM QUALITY**
  - Management of curriculum
  - Instructional strategies
  - Assessment
  - Curriculum materials

**SCHOOL DEVELOPMENT**
- **SCHOOL QUALITY**
  - Resources
  - Policies/activities
  - Climate
  - Educator/learner interaction

**EDUCATOR DEVELOPMENT**
- **EDUCATOR QUALITY**
  - Profile
  - Qualifications
  - Experience
  - Staff development

**LEARNER BACKGROUND**
- Profile
- Home background
- SES

**LEARNER ATTITUDES & ASPIRATIONS**

**INSTRUCTIONAL QUALITY**
- Teaching load
- Class size
- Working conditions
- Autonomy/collegiality

**TEACHING QUALITY**
- Teaching load
- Class size
- Working conditions
- Autonomy/collegiality

**LEARNER PARTICIPATION**

**LEARNER ACHIEVEMENT**
- Mathematics
- Language of learning and teaching

**LEARNER ATTITUDES & ASPIRATIONS**

**QLP EVALUATION**
- Improved management of district
- Improved support to schools
- Improved school governance and management
- Improved teaching practices

**OUTCOMES**
- Improved learning outcomes in Math’s, Reading & Writing
Sampling parameters

- Focus mathematics and reading/writing
- Grade 9 and 11 learners per school
- 40 Learners from all classes
- Prior sampling of learners at HSRC
- 30% replacement learners also identified
- All Grade 9 and 11 mathematics and English/Afrikaans teachers
- School principal
- District officials - manager/director, subject specialists
Methodology: Sampling Schools

2000 QLP Schools – 524

Assessment Surveys
102 schools

Site Visits
36 schools
## Sample of Schools

<table>
<thead>
<tr>
<th>Province/Districts</th>
<th>Number of QLP schools per district</th>
<th>2000 Survey sample</th>
<th>2000 Site visit sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lusikisiki</td>
<td>21</td>
<td>1</td>
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<tr>
<td>Flagstaff</td>
<td>31</td>
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<td>Libode</td>
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<td>3</td>
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<td>Bethlehem</td>
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<td>Vanderbijlpark</td>
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<td>Soweto</td>
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<td>Inanda</td>
<td>21</td>
<td>4</td>
<td>2</td>
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<td>Ixopo</td>
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<td>2</td>
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<td>Ubombo</td>
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<tr>
<td>Moretele</td>
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<td>Mafikeng</td>
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<td>Bolobedu</td>
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<td>Konekwena</td>
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<td>Zebediela</td>
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<td>Kuilsriver</td>
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<td>2</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>514</strong></td>
<td><strong>102</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>
Instruments

- Learner tests
- Surveys
- Site Visits
- Field Reports
- Intervention data
## Detail list of instruments

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>District/Circuit</strong></td>
<td></td>
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<tr>
<td>Questionnaire</td>
<td>Manager/Director</td>
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<tr>
<td>Questionnaire</td>
<td>Learning area specialist</td>
</tr>
<tr>
<td>Interview schedule</td>
<td>Manager</td>
</tr>
<tr>
<td>Interview schedule</td>
<td>Learning area specialist</td>
</tr>
<tr>
<td>Field Report Schedule</td>
<td>QLP Project Co-ordinator¹</td>
</tr>
<tr>
<td><strong>School</strong></td>
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<tr>
<td>Questionnaire</td>
<td>Principal</td>
</tr>
<tr>
<td>Interview schedule</td>
<td>Principal</td>
</tr>
<tr>
<td>Interview schedule</td>
<td>Management team</td>
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<tr>
<td>Interview schedule</td>
<td>Teachers</td>
</tr>
<tr>
<td><strong>Class</strong></td>
<td></td>
</tr>
<tr>
<td>Questionnaire</td>
<td>All Gd 9 and G11 teachers in Mathematics and language</td>
</tr>
<tr>
<td>Observation schedule</td>
<td>Classroom</td>
</tr>
<tr>
<td><strong>Learner</strong></td>
<td></td>
</tr>
<tr>
<td>Math, Read, Writing Tests</td>
<td>Sample of learners in Grd 9 and G11</td>
</tr>
<tr>
<td>Background Questionnaire</td>
<td></td>
</tr>
</tbody>
</table>

¹ Field Reports recorded years 2 to 5
Questionnaire Development

- Indicators from JET - B T proposal
- Elaborate & categorise indicators into different instruments (input from experts) + triangulation
  - Develop items and
  - Translate items
- Compile drafts
- Distribute for comments
- Pre-testing
- Pilot Study
- Main study
- Comments & input by local and international experts & DoE, NBI, JET
Development of Assessment Instruments

- Consultations with DoE (FET staff) & JET
- Context of Grade 9 & 11 syllabus + RAMS work
- Develop frameworks
- Distribute framework for comment
- Local teachers developed items
- Developed draft - 2 forms, 2 languages
- Distribute instruments for comment
- Pre-testing
- Pilot Study
- Main study
- Comments by DoE, JET, local teachers and external moderators
Pre-testing

- To test the administration process - i.e. sampling, learner instructions, time allocation, instrument distribution and collection, etc.
- 2 local schools - English and Afrikaans
- Grade 9 and 11 learners
- Applied all instruments
Pilot Study

- To obtain data on all items - use to develop instruments for main study
- To test process and logistics of administration of instruments, fieldworker training, distribution and collection of instruments, monitoring process, etc.
- Schools selected to resemble QLP schools
- 3 Provinces: Gauteng, Kzn, N. Cape
- 2 monitors to each province
- Approximately 18 schools
Main Study Site Visits

- 2 schools per district
- Interviews with school principal, Grade 9 and 11 maths and language teachers
- Classroom observation - 3 days per school
- Interview and questionnaire - District (+ circuit) manager, subject area specialists
- Collection of relevant evidence - e.g. business plans
Methodology: Main Study Administration

- Seminal point of contact with the QLP
- Appointed 11 HSRC co-ordinators
- Fieldworkers: Prior exposure to project & process
- All training conducted by HSRC researchers
- 2 days administration per school
- Fieldworkers: teams of 2 - Grade 9 and 11
- Each team to administer at 2 schools
- Learners sampled at HSRC by HSRC researchers
- 40% of schools monitored by HSRC researchers
- District offices visited by HSRC researchers
- Distribution and collection by XPS
Methodology and Design

Year 2
After publication of 1st Report

- Identified need for coordinated approach to:
  - intervention,
  - Management, AND
  - evaluation
QLP Theoretical Model

DISTRICT LEVEL

SCHOOL LEVEL

LEARNER CHARACTERISTICS (ABILITY/BACKGROUND)

EDUCATOR LEVEL TEACHING QUALITY

CLASSROOM PRACTICE

LEARNER PERFORMANCE
Indicators at the District, School and Educator Level

Effective functioning of district office
- Effective OD, planning and management
- Effective HR management
- Effective financial management

Effective functioning of schools
- Effective school management
- Effective HR performance monitoring
- Effective school administration (tracking of learners)

Effective curriculum management
- Monitoring delivery of curriculum
- Support of teachers
- Instructional leadership

Effective school support

Effective school monitoring

Effective school development planning

Effective educator
- More effective management of learning programmes
- Improved assessment practices
- More effective use of LSM

Effective curriculum management
- Improved learner participation in class
- Improved learner performance
# Outcomes for the QLP model

## DISTRICT LEVEL
- More effective OD, planning and management
- More effective HR management
- More effective financial management
- More effective school monitoring
- More effective support to schools

## SCHOOL LEVEL
- More effective school development planning
- Improved school governance
- More effective HR management
- More effective curriculum management
- More effective school administration

## EDUCATOR LEVEL
- More effective management and delivery of learning
- Improved assessment practices
- More effective use of LSMs
- Improved learner participation

## LEARNER LEVEL
- Improved learner scores
Relationship between Survey and Case Study Samples

2000 QLP Schools – 524
- Assessment Surveys 102 schools
- Site Visits 36 schools

2002/4 QLP Schools – 524
- Assessment, Surveys + Site Visits
  - 70 (>66) experimental schools
  - 16 (>14) control schools

21 to 17 districts

17 districts
## Total Sample Obtained for Year 5

<table>
<thead>
<tr>
<th>Target group</th>
<th>(2002)</th>
<th>2004</th>
<th>Control</th>
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<tbody>
<tr>
<td><strong>Learners[1]</strong></td>
<td>(2067)</td>
<td>2033</td>
<td>(430)</td>
</tr>
<tr>
<td>Educators</td>
<td>(259)</td>
<td>271</td>
<td>(46)</td>
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<tr>
<td>School principals</td>
<td>(67)</td>
<td>66</td>
<td>(14)</td>
</tr>
<tr>
<td>Circuit managers</td>
<td>(29)</td>
<td>39</td>
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<tr>
<td>District managers</td>
<td>(17)</td>
<td>15</td>
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<tr>
<td>Mathematics learning area specialists</td>
<td>(15)</td>
<td>11</td>
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<tr>
<td>Language learning area specialists</td>
<td>(13)</td>
<td>11</td>
<td>-</td>
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<tr>
<td>Class observations</td>
<td>(405)</td>
<td>403</td>
<td>(84)</td>
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</table>

[1] Figures based on Grade 9 Reading and Writing instruments – i.e. lowest
### 2002/4 List of Instruments

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<thead>
<tr>
<th>Level</th>
<th>Target</th>
<th>Instrument</th>
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<td>District/Circuit</td>
<td>Manager/Director</td>
<td>Interview</td>
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<tr>
<td></td>
<td>Circuit manager</td>
<td>Observation schedule</td>
</tr>
<tr>
<td></td>
<td>Learning area specialist</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observation schedule</td>
</tr>
<tr>
<td>School</td>
<td>Principal</td>
<td>Questionnaire</td>
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<tr>
<td></td>
<td></td>
<td>School Observation Schedule</td>
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<tr>
<td>Educator</td>
<td>All Grade 9 and Grade 11 educators in</td>
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<td></td>
<td>mathematics and languages</td>
<td>Classroom Observation Package</td>
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<tr>
<td></td>
<td></td>
<td>(English and Mathematics and Languages)</td>
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<tr>
<td>Learner</td>
<td>Sample of Grade 9 and 11 learners taking</td>
<td>Mathematics and Read &amp; Writing Tests</td>
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<tr>
<td></td>
<td>Mathematics and English</td>
<td>Background questionnaire</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parent Questionnaire</td>
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</table>
## Number of Schools Sampled per District

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<tr>
<td>Lusikisiki</td>
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<td>1</td>
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<tr>
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<td>31</td>
<td>5</td>
<td>3</td>
<td>(3) 3</td>
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<td>Libode</td>
<td>37</td>
<td>7</td>
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<td>(3) 3</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>514</strong></td>
<td><strong>102</strong></td>
<td><strong>36</strong></td>
<td><strong>(67) 66</strong></td>
<td><strong>(14) 12</strong></td>
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ANALYSIS
How was the data analysed?

- Questionnaire and Observation data
  - Calculation of indices

- Learner scores
  - Item analysis
  - Equating Maths scores

- Measure effect of interventions
  - SEM (AMOS)
Brief overview of analysis challenges

- Instruments changed for 2002 study to reflect the new causal model adopted – insufficient continuity

- Some indices - all common items
  - directly comparable

- Some indices - only some common items
  - Calculate two sets – one to compare and one to report on current

- Some indices NO common items
  - Not possible to compare
Brief overview of analysis challenges

- School level is lowest for which cases remain consistent (learner data cover different samples in subsequent years)
- Effect – sample rather small
- Reduced indices to overall levels of functionality, intervention & performance (after checking consistency)
## Mean Scores Schools: 2004 Monitored and Not Monitored

<table>
<thead>
<tr>
<th>Subject/Grade</th>
<th>Monitored</th>
<th></th>
<th>Not Monitored</th>
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<td></td>
<td>N</td>
<td>Mean</td>
<td>N</td>
<td>Mean</td>
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<tr>
<td>Maths Grade 11</td>
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<td>20.89</td>
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<td>22.29</td>
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<td>Maths Grade 09</td>
<td>816</td>
<td>25.78</td>
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<td>Reading &amp; Writing Grade 11</td>
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<td>Reading &amp; Writing Grade 09</td>
<td>776</td>
<td>33.76</td>
<td>1508</td>
<td>30.68</td>
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</table>
Calculation of Indices

- Selected items for inclusion in index
- Inspected distributions of item responses
- Did recoding if required
- Summed scores to create index
- Conducted external validity checks
Learner scores

- Item analysis
  - Calculated and checked difficulty and discrimination values

- DIF analysis
  - Gender, Language

- Equating
  - NB: Maths instruments changed to include additional items
  - Process of putting Maths scores on the same scale to ensure comparability
  - Used Classical Test Theory methods (NOT IRT)
Measure effect of interventions

- Requires the testing of the QLP model

- Used Path Analysis – AMOS software
  - Model specification: path model based on QLP model
  - Estimated model parameters
  - Tested the model?
  - Interpreted data and adapted model if required
  - Backwards elimination
DATA MANAGEMENT

- Data entry – double entry
- Schools constant
- SOME teachers & principals – constant
- Learners - change
- Track over time – 2000 (tests), 2002, 2004
- Track control and experimental
- Track equated (maths) scores
- Organise data for AMOS

NB: DATA MANAGEMENT 90% of work
Outline of the Summative Report

- Chapter 1: Intro + info on interventions
- Chapter 2: Design & Methodology
- Chapter 3: District results
- Chapter 4: School results
- Chapter 5: Educator results
- Chapter 6: Learner results
- Chapter 7: Effect of interventions
- Chapter 8: Conclusion
Questions?
Comments!
Selected Results

TIME permitting
District Functionality

[Chart showing change in index scores for various districts]
### District functionality index scores / trends

<table>
<thead>
<tr>
<th>LOW (0 - 4)</th>
<th>MODERATE (5 - 8)</th>
<th>HIGH (9 - 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jhb South Mega (9.1) 3.5 [- -]</td>
<td>Zeerust (3.9) 8.5 [+ +]</td>
<td>Karoo (8.3) 12.0 [+ +]</td>
</tr>
<tr>
<td>Zebediela (4.1) 3.3 [- -]</td>
<td>Moretele (6.6) 8.0 [+ +]</td>
<td>Th Mofutsanyana (5.7) 11.4 [+ +]</td>
</tr>
<tr>
<td>Konekwena (4.9) 2.4 [- -]</td>
<td>Libode (6.8) 7.9 [+ +]</td>
<td>Sedibeng-West (10.3) 9.4 [-]</td>
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<tr>
<td>Bolobedu (5.1) 0.9 [- -]</td>
<td>Ixopo (9.2) 7.4 [- -]</td>
<td>OVERALL (6.0) 6.6 [+]</td>
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<td></td>
<td>WC Metro East (5.5) 7.2 [+ +]</td>
<td>Flagstaff (3.9) 6.4 [+ +]</td>
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<td></td>
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<td>Lusikisiki (3.3) 6.3 [+ +]</td>
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<td>Ubombo (3.4) 5.9 [+ +]</td>
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<td>Inanda (7.5) 5.5 [- -]</td>
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2002 figures in brackets
Language scores (%) for QLP and Control schools by Year & Grade

- QLP 9 R&W: 30, 36, 34, 41, 70, 90
- Con 9 R&W: 29, 37, 31, 44, 83, 92
- QLP 11 R&W: 31, 35, 41, 70, 90
- Con 11 R&W: 30, 37, 44, 89, 92
- QLP 12 R&W: 89, 90
- Con 12 R&W: 92, 90

Years: 2000, 2002, 2004
Causal model and its elements
Path model applied
Indicators and variables used

Six clusters of information:

- **Cluster 1 (X₁)** – Interventions mid-2001 to end 2002
  (district, school, maths teachers, language teachers as var.s)

- **Cluster 2 (A)** – Initial functionality level at end 2002
  (district, school, classroom) – latter = x 2 subjects x 2 gr.s)

- **Cluster 3 (Y₁)** – Learner performance at end 2002
  (Maths Gr9, Maths Gr 11, R&W Gr 9, R&W Gr 11)

- **Cluster 4 (X₂)** – Interventions since 2003 to mid-2004
  (district, school, maths teachers, language teachers as var.s)

- **Cluster 5 (B)** – Eventual functionality level end 2002
  (district, school, classroom) – latter = x 2 subjects x 2 gr.s)

- **Cluster 6 (Y₂)** – Learner performance at end 2004
  (Maths Gr9, Maths Gr 11, R&W Gr 9, R&W Gr 11)
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Effect of teacher functionality on L11 Performance +
Trend Line (Modified)