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

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# 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**

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# 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**

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# QLP DISTRICTS

1. Kone Kwena
2. Zebediela
3. Bolobedu
4. Moretele
5. S 2
6. C 1
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. Kuilsriver

# 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**

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# Key Outcomes

"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** **PROCESSES** **OUTPUTS**

**DISTRICT DEVELOPMENT**

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

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

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

**SCHOOL DEVELOPMENT**

**SCHOOL QUALITY**
- Profile
- Management and governance
- Community support
- Support from district
- Facilities and resources

**INSTRUCTIONAL QUALITY**
- Resources
- Policies/activities
- Climate
- Educator/learner interaction

**LEARNER PARTICIPATION**

**EDUCATOR DEVELOPMENT**

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

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

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

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

**LEARNER ATTITUDES & ASPIRATIONS**

## QLP EVALUATION

**OUTCOMES**

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

**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

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# Methodology: Sampling Schools

**2000 QLP Schools – 524**

**Assessment Surveys 102 schools**

**Site Visits 36 schools**

# Sample of Schools

| Province/Districts | Number of QLP schools per district | 2000 Survey sample | 2000 Site visit sample |
|---|---|---|---|
| Lusikisiki | 21 | 1 | 1 |
| Flagstaff | 31 | 5 | 3 |
| Libode | 37 | 7 | 3 |
| Bethlehem | 29 | 6 | 2 |
| Vanderbijlpark | 27 | 4 | 2 |
| Soweto | 39 | 4 | 2 |
| Inanda | 21 | 4 | 2 |
| Ixopo | 27 | 6 | 2 |
| Ubombo | 27 | 6 | 2 |
| Moretele | 32 | 10 | 2 |
| Mafikeng | 31 | 4 | 2 |
| Zeerust | 36 | 12 | 2 |
| De Aar | 32 | 6 | 2 |
| Bolobedu | 30 | 10 | 3 |
| Konekwena | 36 | 6 | 2 |
| Zebediela | 24 | 6 | 2 |
| Kuilsriver | 34 | 6 | 2 |
| Total | 514 | 102 | 36 |

# Instruments

☒ Learner tests

☒ Surveys

☒ Site Visits

☒ Field Reports

☒ Intervention data

# Detail list of instruments

| | Instrument | Target |
|---|---|---|
| **District/Circuit** | Questionnaire | Manager/Director |
| | Questionnaire | Learning area specialist |
| | Interview schedule | Manager |
| | Interview schedule | Learning area specialist |
| | <u>Field Report Schedule</u> | QLP Project Co-ordinator[1] |
| **School** | Questionnaire | Principal |
| | Interview schedule | Principal |
| | Interview schedule | Management team |
| | Interview schedule | Teachers |
| **Class** | *Questionnaire* | All Gd 9 and G11 teachers in Mathematics and language |
| | Observation schedule | Classroom |
| **Learner** | Math, Read, Writing Tests Background Questionnaire | Sample of learners in Grd 9 and G11 |

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# 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

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# 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

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# 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

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# 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

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# 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
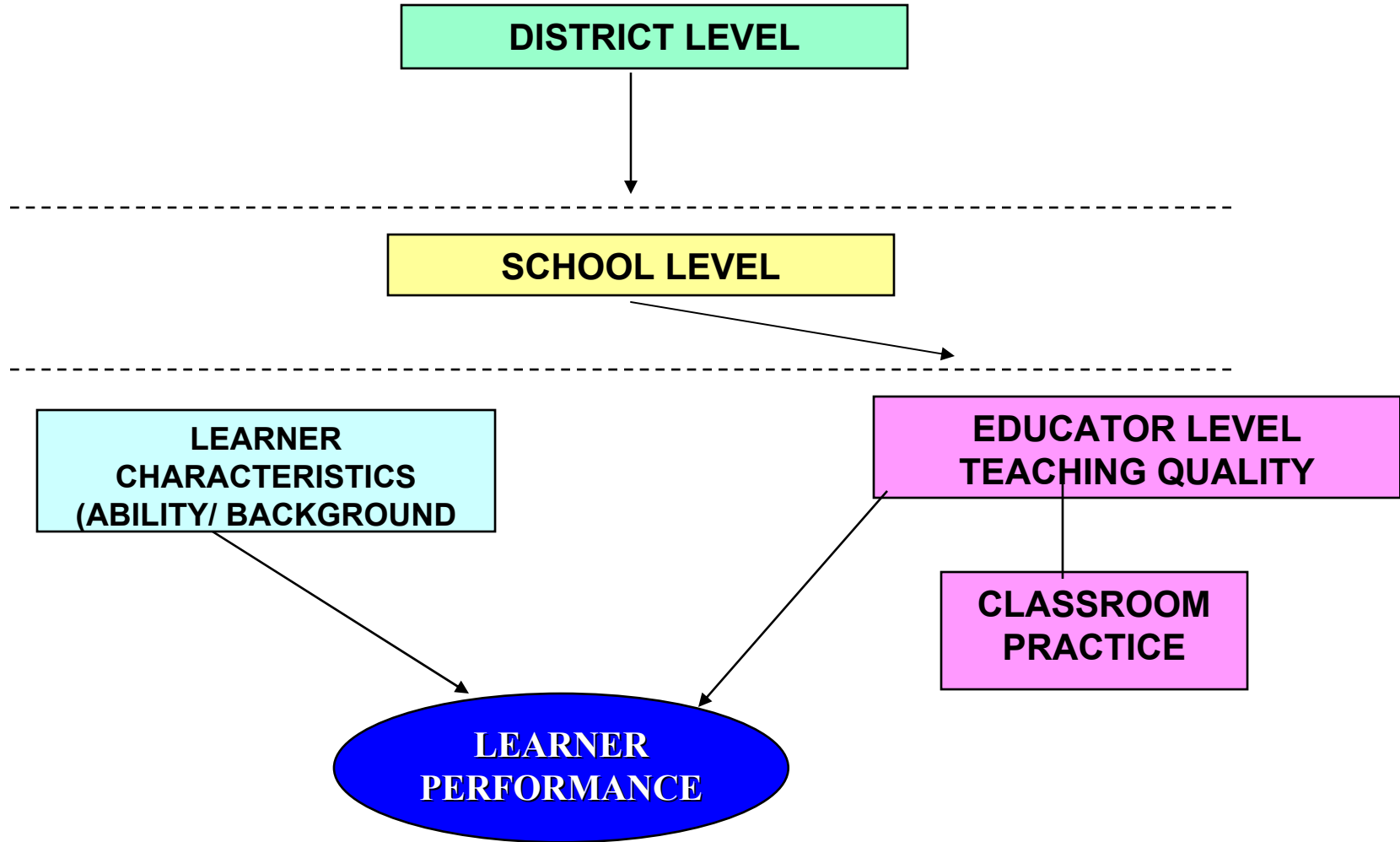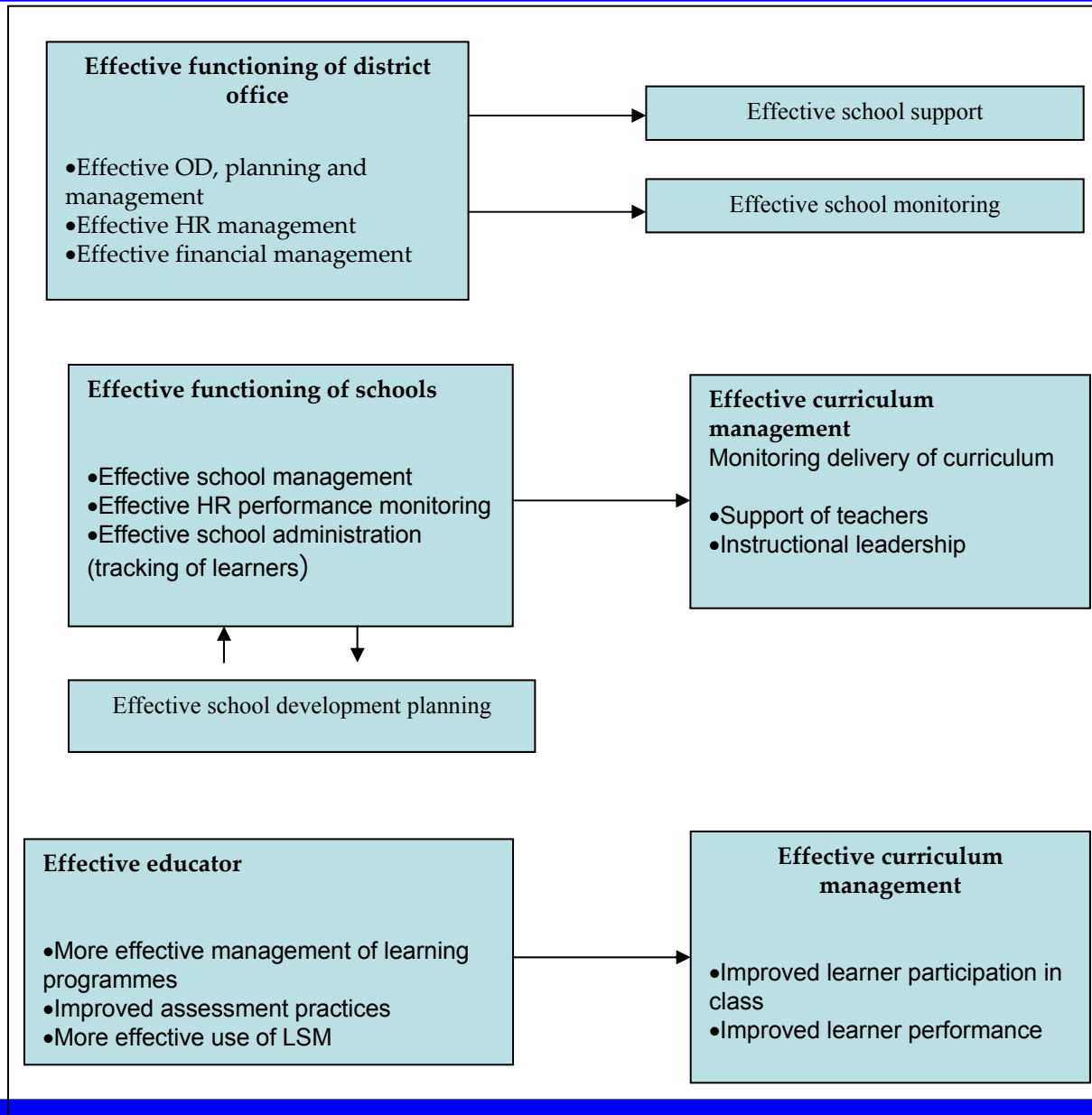- Distribution and collection by XPS
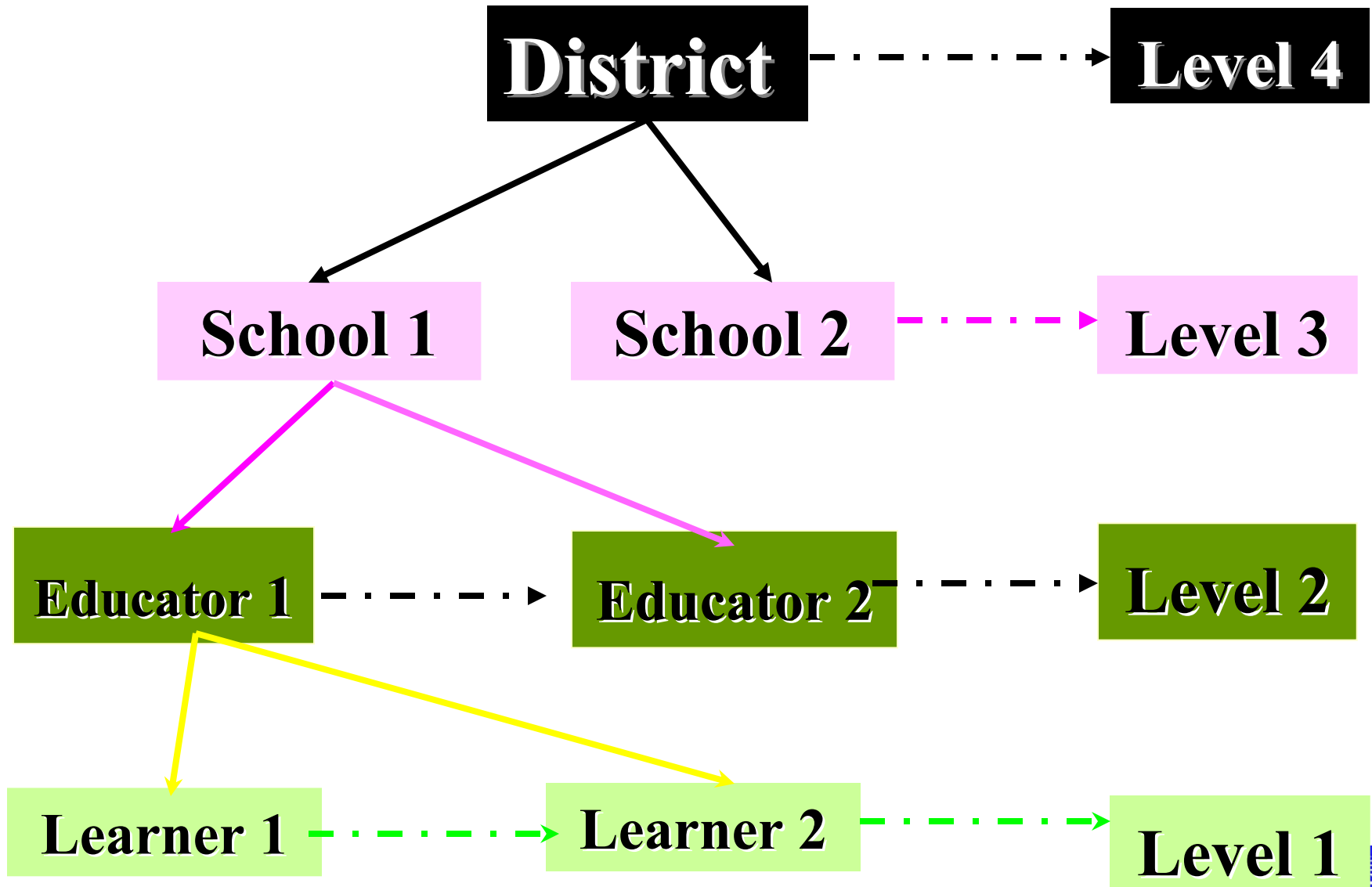
# Methodology and Design

## Year 2

- **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 school support

→ Effective school monitoring

**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 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

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# 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**

**2000 QLP Schools – 524**

> **Assessment Surveys 102 schools**
>
> **Site Visits 36 schools**

**21 to 17 districts**

**2002/4 QLP Schools – 524**

> **Assessment, Surveys + Site Visits**
>
> •**70 (>66) experimental schools**
>
> •**16 (>14) control schools**

**17 districts**

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# Total Sample Obtained for Year 5

| Target group | (2002) 2004 | Control |
|---|---|---|
| Learners[1] | (2067) 2033 | (430) 368 |
| Educators | (259) 271 | (46) 48 |
| School principals | (67) 66 | (14) 12 |
| Circuit managers | (29) 39 | - |
| District managers | (17) 15 | - |
| Mathematics learning area specialists | (15) 11 | - |
| Language learning area specialists | (13) 11 | - |
| Class observations | (405) 403 | (84) 79 |
| | | |
| [1] Figures based on Grade 9 Reading and Writing instruments – i.e. lowest | | |

# 2002/4 List of Instruments

| Level | Target | Instrument |
|---|---|---|
| District/Circuit | Manager/Director | Interview |
| | | Observation schedule |
| | Circuit manager | Interview |
| | | Observation schedule |
| | Learning area specialist | Interview |
| | | Observation schedule |
| School | Principal | Questionnaire |
| | | School Observation Schedule |
| Educator | All Grade 9 and Grade 11 educators in mathematics and languages | Questionnaire |
| | | Classroom Observation Package (English and |
| Learner | Sample of Grade 9 and 11 learners taking Mathematics and English | Mathematics and Read & Writing Tests |
| | | Background questionnaire |
| | | Parent Questionnaire |

# Number of Schools Sampled per District

| Province/Districts | QLP schools per district | 2000 Survey sample | 2000 Site visit | (2002)/04 Sample | (2002) 2004 Contr |
|---|---|---|---|---|---|
| Lusikisiki | 21 | 1 | 1 | (2) 2 | |
| Flagstaff | 31 | 5 | 3 | (3) 3 | |
| Libode | 37 | 7 | 3 | (7) 7 | |
| Bethlehem | 29 | 6 | 2 | (4) 4 | (3) 3 |
| Sedibeng-West | 27 | 4 | 2 | (4) 4 | |
| Joh'burg S Mega | 39 | 4 | 2 | (4) 4 | (3) 3 |
| Inanda | 21 | 4 | 2 | (3) 3 | |
| Ixopo | 27 | 6 | 2 | (4) 4 | |
| Ubombo | 27 | 6 | 2 | (4) 4 | |
| Moretele | 32 | 10 | 2 | (4) 4 | |
| Mafikeng | 31 | 3 | 2 | (3) 3 | |
| Zeerust | 36 | 12 | 2 | (5) 4 | (4) 3 |
| Karoo | 32 | 6 | 2 | (4) 4 | |
| Bolobedu | 30 | 10 | 3 | (4) 4 | (1) 1 |
| Konekwena | 36 | 6 | 2 | (5) 5 | (2) 1 |
| Zebediela | 24 | 6 | 2 | (2) 2 | (1) 1 |
| W Cape Metro E | 34 | 6 | 2 | (5) 5 | |
| Total | 514 | 102 | 36 | (67) 66 | (14) 12 |

# 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**

- **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)**

| Subject/Grade | Monitored | | Not Monitored | |
|---|---|---|---|---|
| | N | Mean | N | Mean |
| Maths Grade 11 | 900 | 20.89 | 1532 | 22.29 |
| Maths Grade 09 | 816 | 25.78 | 1550 | 25.41 |
| Reading & Writing Grade 11 | 986 | 38.43 | 1973 | 35.26 |
| Reading & Writing Grade 09 | 776 | 33.76 | 1508 | 30.68 |

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# 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)**

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# 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**

- **<u>SOME</u> 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**

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# 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**
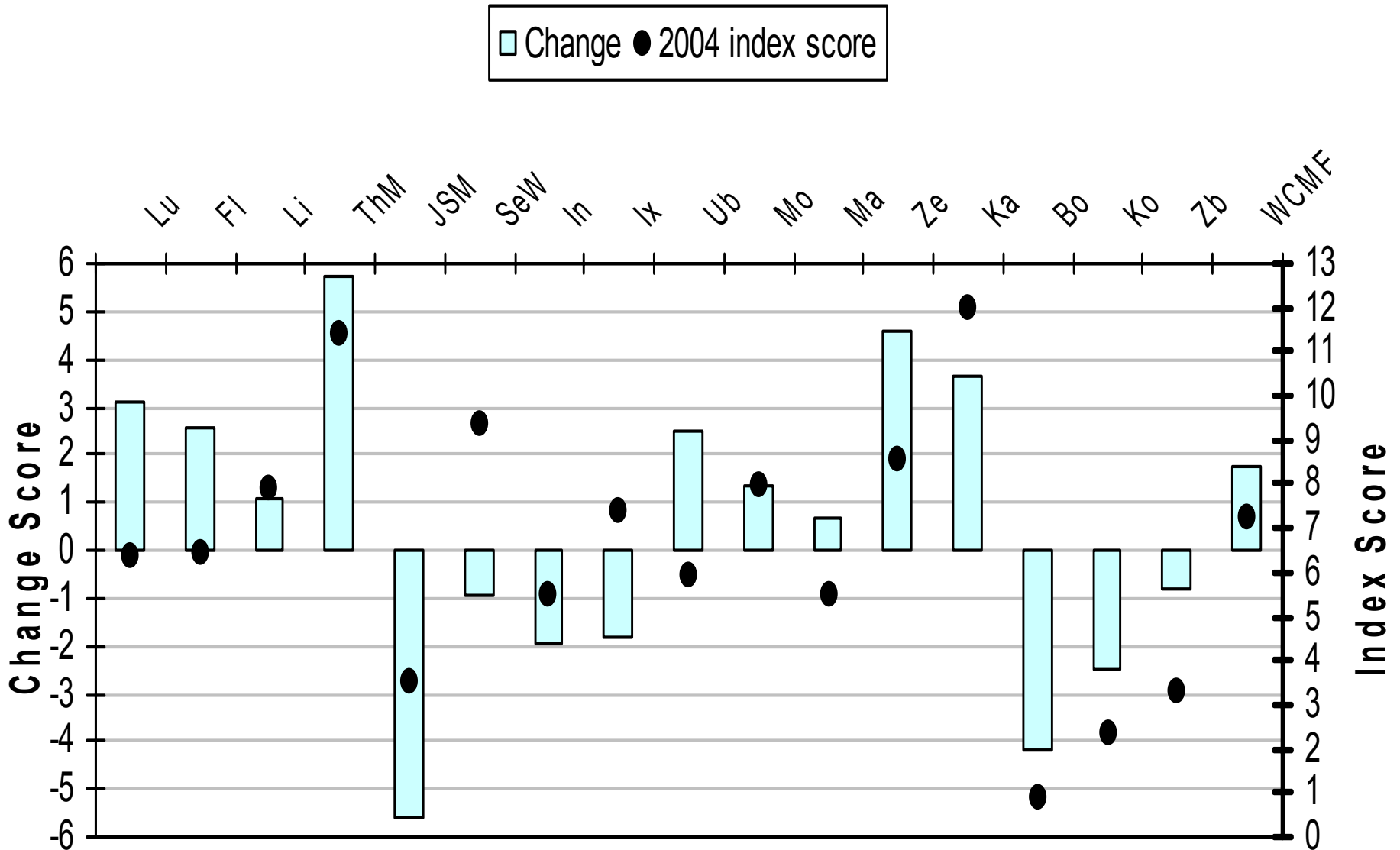
# Questions?

# Comments!

# Selected Results
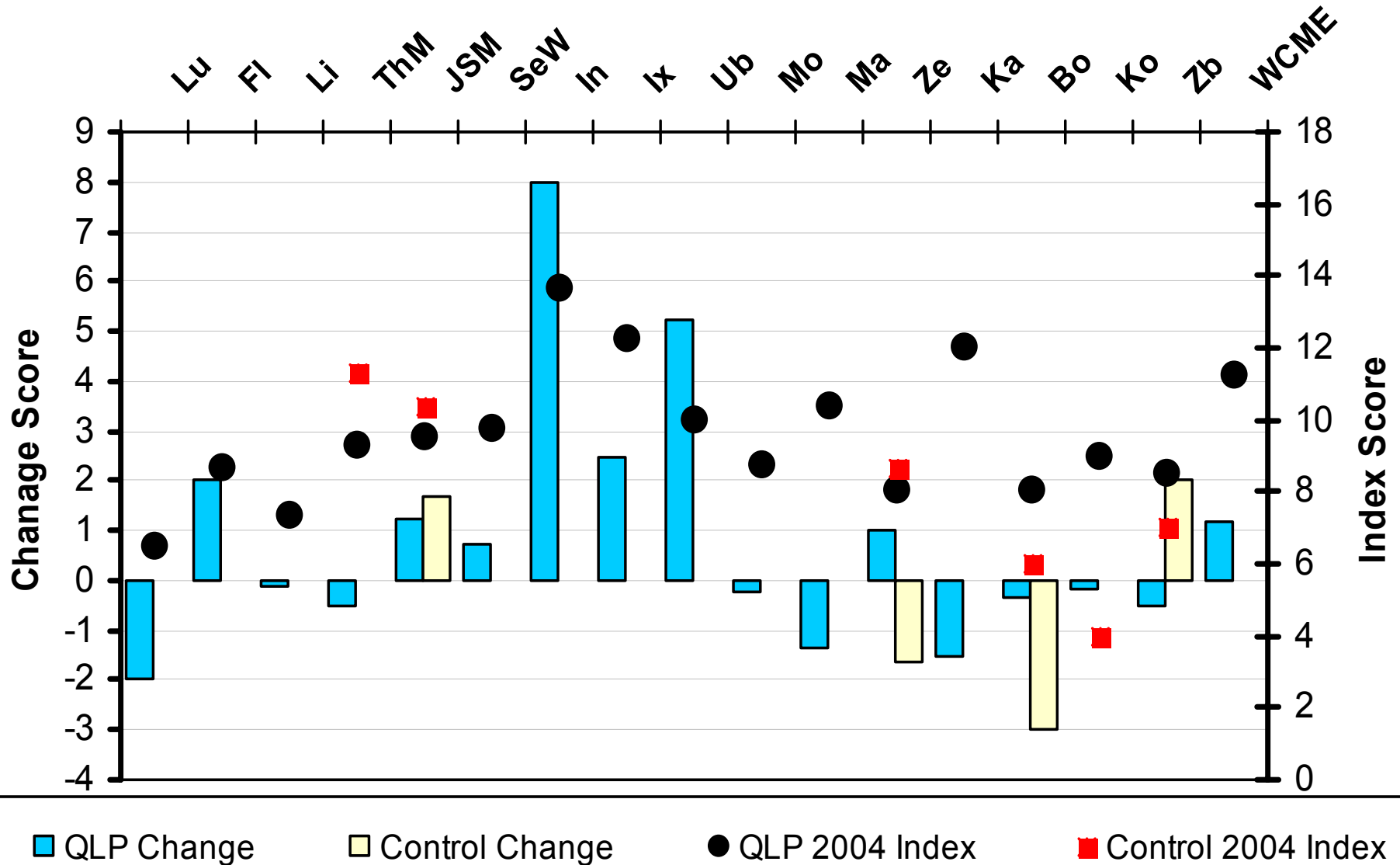
## TIME permitting

# District Functionality

# District functionality index scores / trends

| LOW (0 - 4) | MODERATE (5 - 8) | HIGH (9 - 13) |
|---|---|---|
| **Jhb South Mega** (9.1) <u>3.5</u> [- -] | **Zeerust** (3.9) <u>8.5</u> [+ +]<br>**Moretele** (6.6) <u>8.0</u> [+ +]<br>**Libode** (6.8) <u>7.9</u> [+ +]<br>**Ixopo** (9.2) <u>7.4</u> [- -]<br>**WC Metro East** (5.5) <u>7.2</u> [+ +] | **Karoo** (8.3) <u>12.0</u> [+ +] |
| **Zebediela** (4.1) <u>3.3</u> [- -] | | **Th Mofutsanyana** (5.7) <u>11.4</u> [+ +] |
| **Konekwena** (4.9) <u>2.4</u> [- -] | **OVERALL** (6.0) <u>6.6</u> [+] | **Sedibeng-West** (10.3) <u>9.4</u> [-] |
| **Bolobedu** (5.1) <u>0.9</u> [- -] | **Flagstaff** (3.9) <u>6.4</u> [+ +]<br>**Lusikisiki** (3.3) <u>6.3</u> [+ +]<br>**Ubombo** (3.4) <u>5.9</u> [+ +]<br>**Inanda** (7.5) <u>5.5</u> [- -]<br>**Mafikeng** (4.8) <u>5.5</u> [+ +] | |

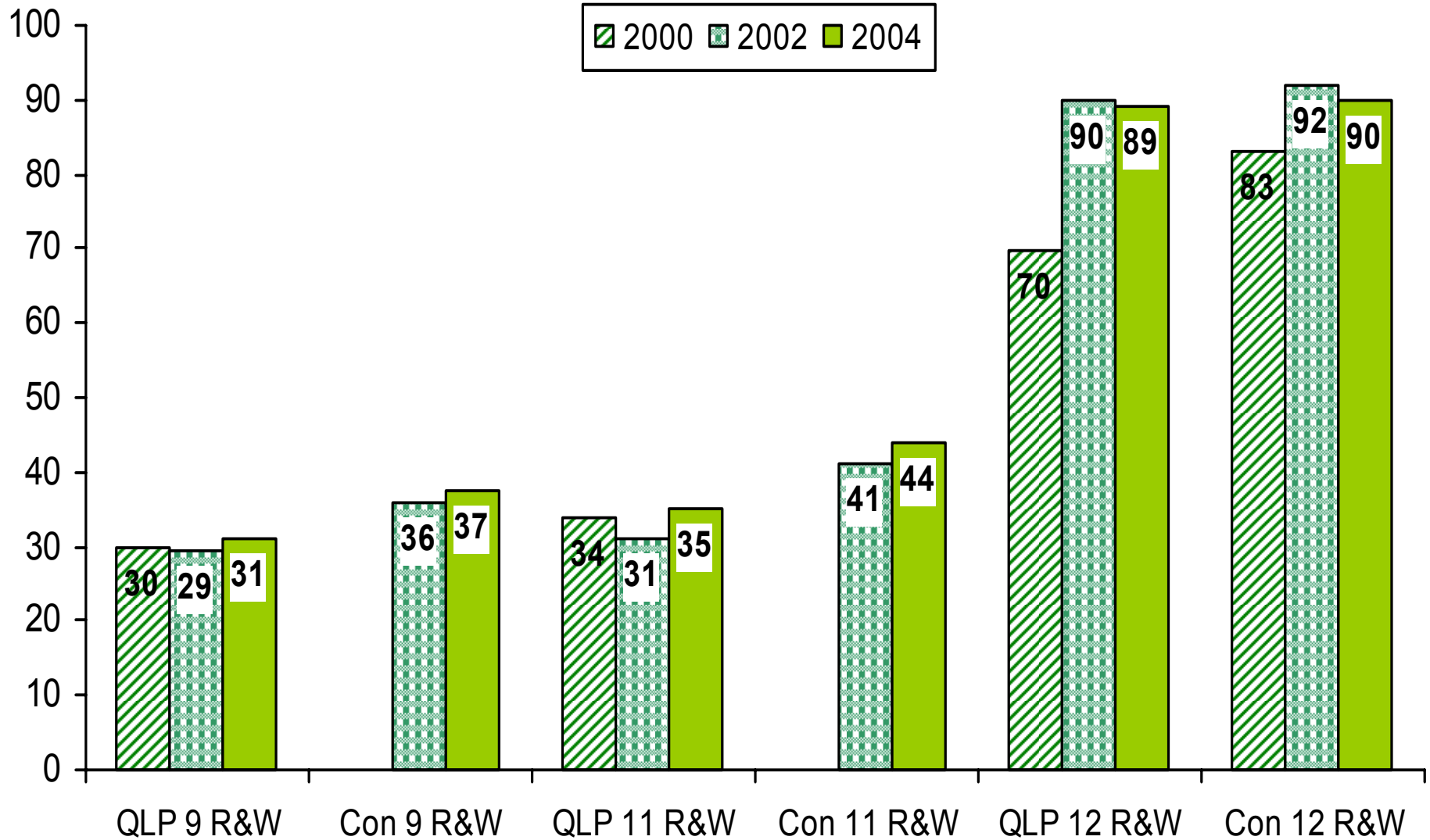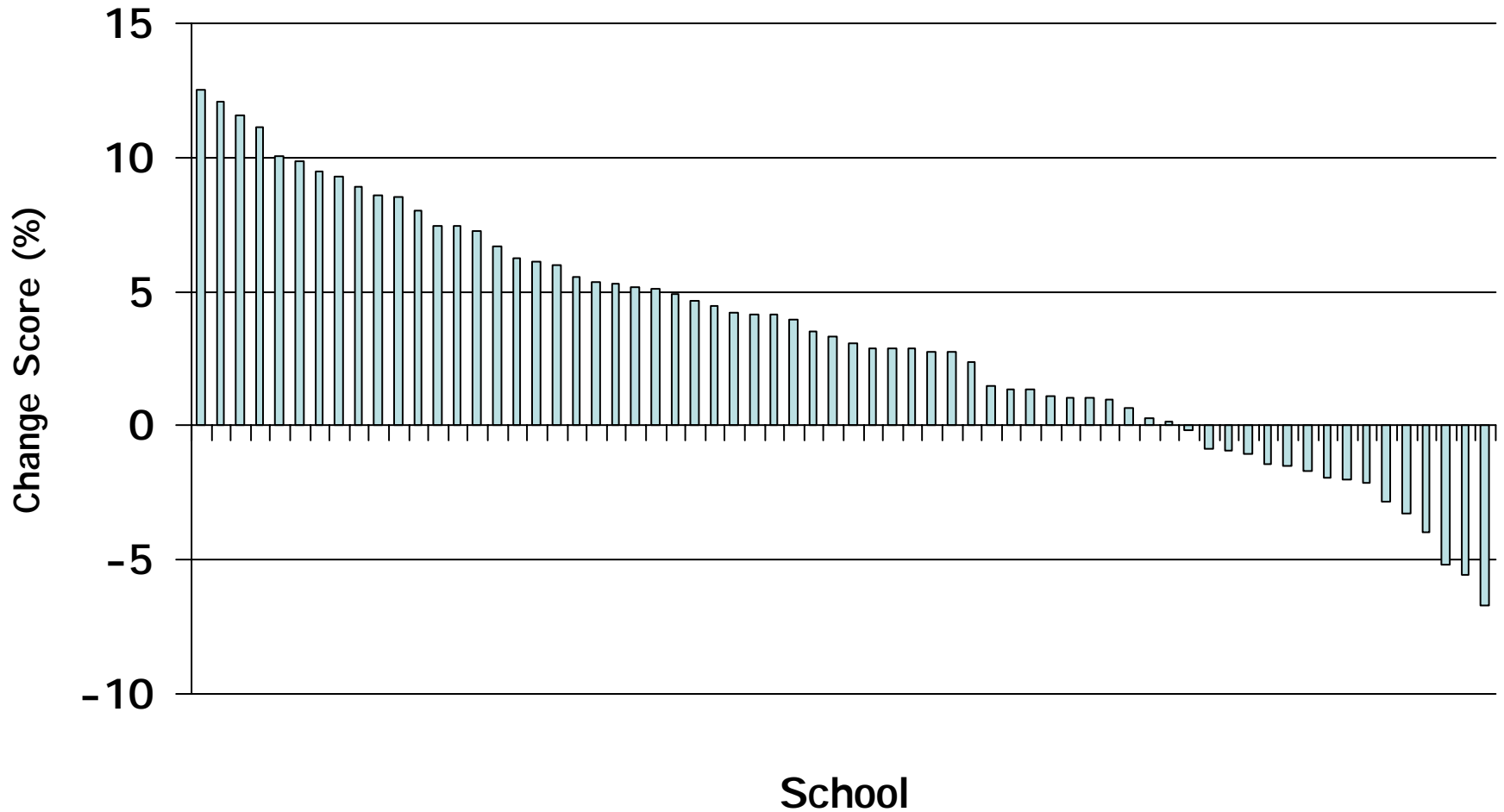**2002 figures in brackets**

# School functioning index by district

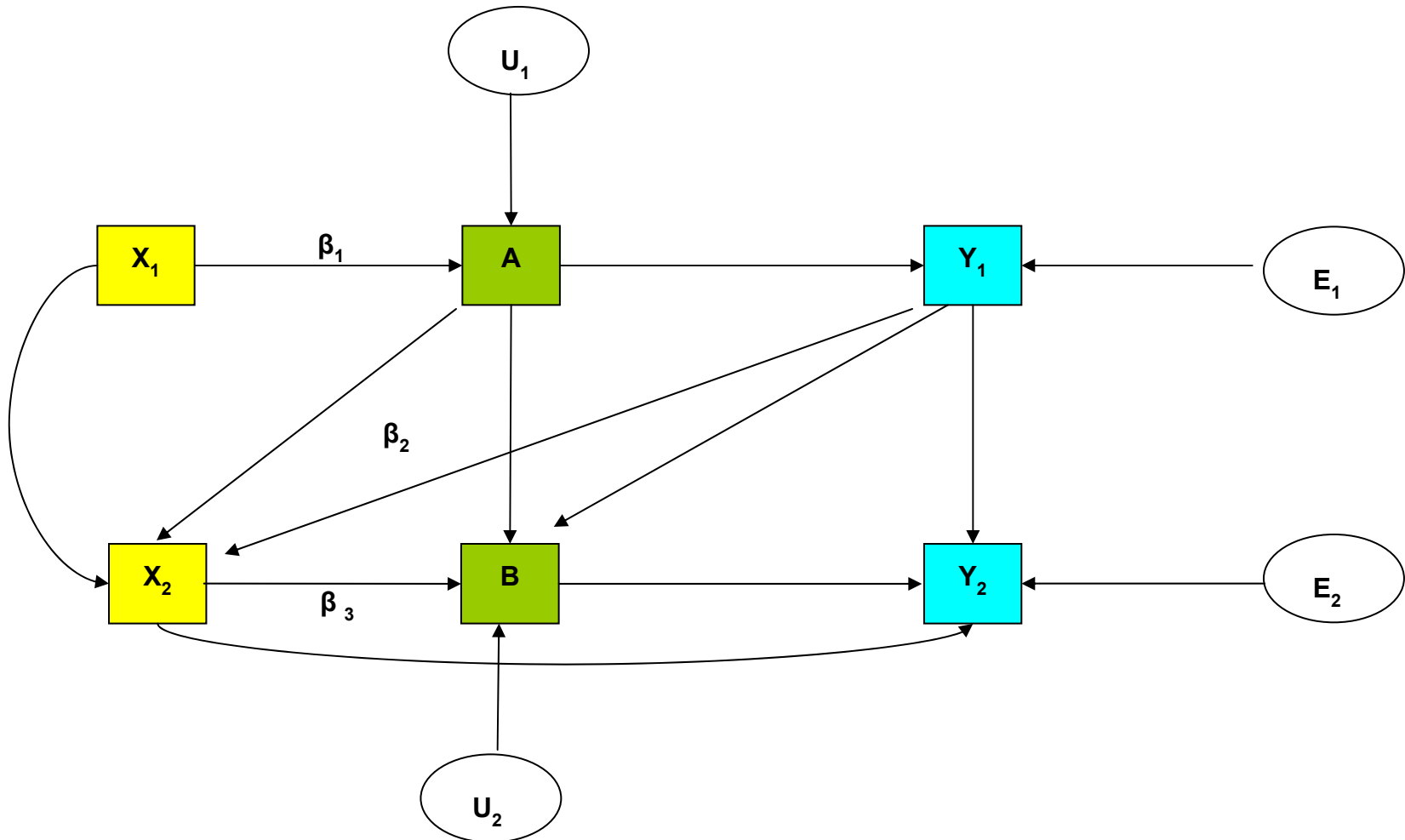# Language scores (%) for QLP and Control schools by Year & Grade



Legend: 2000, 2002, 2004

| Category | 2000 | 2002 | 2004 |
|---|---|---|---|
| QLP 9 R&W | 30 | 29 | 31 |
| Con 9 R&W | | 36 | 37 |
| QLP 11 R&W | 34 | 31 | 35 |
| Con 11 R&W | | 41 | 44 |
| QLP 12 R&W | 70 | 90 | 89 |
| Con 12 R&W | | 83 | 92 | 90 |

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# Grade 11 Language % change in scores: 2002 to 2004

# Causal model and its elements

# Path model applied



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# Indicators and variables used

## Six clusters of information:

- **Cluster 1 ($X_1$) – 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 ($Y_1$) – Learner performance at end 2002**
  (Maths Gr9, Maths Gr 11, R&W Gr 9, R&W Gr 11)

- **Cluster 4 ($X_2$) – 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 ($Y_2$) – Learner performance at end 2004**
  (Maths Gr9, Maths Gr 11, R&W Gr 9, R&W Gr 11)

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# Findings pertaining to Gr 11 R&W

| | Variables | | | Regression coefficient | |
|---|---|---|---|---|---|
| Predicted | ← | Predictor | P | Standardised | Unstandardised* |
| Distr Funct 2002 | 1a | Lang Tchr Intrv 2001/2 | .005 | .324 | .252 |
| Lang11 Tchr Funct 2002 | 1b | Schl Intrv 2001/2 | *** | -.411 | -.092 |
| Lang11 Lrnr Perf 2002 | 2a | Schl Funct 2002 | *** | .376 | .995 |
| Lang11 Lrnr Perf 2002 | 2b | Lang11 Tchr Funct 2002 | .001 | .346 | .391 |
| Distr Intrv 2003/4 | 3a | Lang11 Lrnr Perf 2002 | .011 | .191 | .802 |
| Distr Intrv 2003/4 | 3b | Distr Intrv 2001/2 | *** | .439 | .719 |
| Distr Intrv 2003/4 | 3c | Schl Intrv 2001/2 | *** | -.328 | -.348 |
| Schl Intrv 2003/4 | 3d | Distr Intrv 2001/2 | .009 | .269 | .298 |
| Schl Intrv 2003/4 | 3e | Schl Intrv 2001/2 | .006 | .309 | .222 |
| Schl Intrv 2003/4 | 3f | Lang Tchr Intrv 2001/2 | .002 | .331 | .214 |
| Lang Tchr Intrv 2003/4 | 3g | Lang Tchr Intrv 2001/2 | *** | .665 | .640 |
| Schl Funct 2004 | 4a | Lang Tchr Intrv 2003/4 | *** | .378 | .035 |
| Schl Funct 2004 | 4b | Lang11 Lrnr Perf 2002 | *** | .409 | .160 |
| Distr Funct 2004 | 4c | Distr Intrv 2003/4 | *** | .362 | .350 |
| Distr Funct 2004 | 4d | Distr Funct 2002 | *** | .390 | .464 |
| Lang11 Tchr Funct 2004 | 4e | Lang Tchr Intrv 2003/4 | .003 | .325 | .063 |
| Lang11 Tchr Funct 2004 | 4f | Lang11 Lrnr Perf 2002 | .001 | .346 | .285 |
| Lang11 Tchr Funct 2004 | 4g | Distr Funct 2002 | .001 | -.334 | -.081 |
| Lang11 Lrnr Perf 2004 | 5a | Schl Funct 2004 | .102 | .129 | .342 |
| Lang11 Lrnr Perf 2004 | 5b | Lang11 Tchr Funct 2004 | .049 | -.149 | -.189 |
| Lang11 Lrnr Perf 2004 | 5c | Lang11 Lrnr Perf 2002 | *** | .832 | .867 |

**Effect of teacher functionality on L11 Performance + Trend Line (Modified)**

Legend: Learner Performance — Class Function. — Trendline - Class Function

Y-axis: Mean Score (%)

X-axis: School