

# The effect of extra classes a year later on Grade 9 exit marks

## Technical Supplementary Report on the PlusTime Project

Funded by The Shuttleworth Foundation  
For the Western Cape Education Department  
Study by the Human Sciences Research Council

July 2009  
Prinsloo, CH

Education, Science and Skills Development (ESSD) Research Programme



HSRC RESEARCH OUTPUTS  
4963

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## Acknowledgements

The project report published in 2008 on completion of the original project contains all the necessary acknowledgements. The same applies to the background on research methodology and design, and related reporting aspects. It would be redundant to repeat all of these again. New readers interested in the original full report can consult the electronic version available on the websites of the Human Science Research Council (HSRC), the Western Cape Education Department (WCED) and the Shuttleworth Foundation (SF). The appropriate reference is:

Prinsloo, C.H. (2008). Extra classes, extra marks? Report on the PlusTime project. Pretoria: HSRC.

Although very little content from the original report is repeated in the present supplementary report, it made sense to follow the original report's structure for continuity and ease of cross-referencing.

The many individuals, groups and organisations, without whom the project would not have happened or provided the rich information that it had, remain as mentioned in the original report. They include, in summary:

- the learners, parents (and other caregivers), teachers, coordinators and principals of the project and control schools;
- the tutors;
- the Metropole-South Education District managers and other officials;
- the project manager from Metropole-South Education District;
- the various managers and officials in the Provincial office of the WCED;
- the independent coordinator, Ms Lynette Maart, who continued providing structure and linkages between the client, the funding organisation and the research team also for the present follow-up phase;
- the funding organisation (the Shuttleworth Foundation), also for providing an additional amount of financial support for the follow-up monitoring and analysis work;
- HSRC colleagues who formed part of the research team and otherwise, including Ms Erika Masser as new project administrator, and Ms Mbali Mkhize from the Corporate Communications department for continued assistance with dissemination; and
- various stakeholders, academics, and other parties.

In addition to the few new names mentioned above, the following individuals were instrumental in making sure that the follow-up learner-performance data required from the data systems of the WCED got selected and provided to the researchers: Ms Zodwa Modimakwane; Mr Theo Hamman; Dr Ronald Cornelissen; and Dr Andile Siyengo.

In closing, the contributions of many journalists and reporters from provincial, regional, local and community newspapers and radio stations are acknowledged. They played a major role in hosting dissemination activities and sharing information on the findings from the original project. Far more than 30 interviews and/or articles appeared in the period of two to three months immediately following the release of the original report during 2008. It is hoped that this present release of additional findings will meet with similar interest.

Note: This technical version of the follow-up report was also converted and shortened into a more accessible edition in which technical and complex contents had been removed. It is released with the following reference:

Prinsloo, C.H. (2009). Extra classes, better marks ... also later: Short supplementary report on the PlusTime project. Pretoria: HSRC.

## Acronyms used

CASS	Continuous assessment
CEMIS	Central Education Management Information System
CTAs	Common tasks of assessment
EMDC	Education Management Development Centre (formerly called a District; presently called an Education District)
ESSD	Education, Science and Skills Development (HSRC research programme)
FET	Further Education and Training
HSRC	Human Sciences Research Council
MCQ	Multiple-choice questions
PIRLS	Progress in International Reading Literacy Study
REC	Research Ethics Committee (of the HSRC)
SF	The Shuttleworth Foundation
TIMSS(-R)	Trends in International Mathematics and Science Study (R = Repeat - of 3 <sup>rd</sup> study)
WCED	Western Cape Education Department

## **Abstract (one-page summary version)**

The Shuttleworth Foundation, the Western Cape Education Department and the Human Sciences Research Council agreed in 2006 to undertake a joint study during 2007. The study piloted or demonstrated an intervention procedure aimed at increasing teaching time for a group of Grade 8 learners in Mathematics and English to improve their performance in the two learning areas. It was hoped that more would be learned about how one could try and improve the underperformance of learners, which was considered in part to have resulted from poor foundational knowledge.

The intervention programme was implemented from July to November 2007. It involved 20 hours of extra classes after school hours in the two learning areas mentioned. Learners in project schools volunteered to attend these extra lessons in only one or both of the learning areas. Baseline information had been collected on learners' achievement levels and related contextual information before the project started.

The learners came from pairs of well-selected project and control schools. To keep as many conditions as consistent as possible, schools from only one Education District in the Western Cape (Metropole-South) participated. Eight potential control schools had initially been invited to complete baseline information. These eight were reduced to four before the project started. This was done on the basis of how similar conditions at each of the four schools were to the conditions at the project school that had to form the other member of each pair. Baseline information comprised learner achievement on a multiple-choice Mathematics and English test, as well as various pieces of contextual and background information from learners, their parents, teachers, tutors and school principals. Classrooms and school sites were also observed, and document review took place at the level of schools, teachers and learners on aspects such as facilities, systems and management practices. The same learner tests were administered after completion of all the extra lessons.

The technique used to determine if learners from project schools benefited from the extra lessons, was to compare how much their performance level improved over time in comparison with that of learners from the control schools. Findings from the initial project in 2007 were inconsistent. The improvement of project-school learners' performance was also smaller than hoped for. Project-school learners with high attendance levels at their Mathematics tuition sessions consistently improved more over time than those project-school learners who had attended less well. In terms of English tuition, project-school learners' performance improvements slightly exceeded those of control-school learners. Many contextual and background factors seemed to have influenced the findings further. They included: the expertise of tutors; some school and classroom factors (such as levels of order and discipline, and time on task); and many parental and learner factors (such as opportunity to read and write, and general learner support). The findings suggested that learners who had fallen behind and failed to master foundation knowledge, even as early as the Foundation Phase, struggled with their performance in Grade 8. They were also unable to benefit from the extra lessons.

In the report on the 2007 study it was recommended that the original cohort of learners be traced into their school future. The present study obtained a set of common marks for the original project and control learners another year down the line. These marks entailed their Grade 9 exit score compiled from continuous assessment during 2008 and Common Tasks of Assessment (CTAs) towards the end of the year.

Findings from the 2008 follow-up work point to learners' language ability, particularly its improvement, being a strong factor influencing their performance in almost all other learning areas, that is, across the curriculum. The effects of the earlier additional tuition after school seem to have become stronger and more widespread over time. Learners from project schools gained much more, over a very broad front, compared to learners from control schools. The size and consistency of the outcomes for project-school learners who had attended their tuition sessions very well were even more encouraging. Initial Mathematics tuition had lasting effects on the expected numbers-based learning areas such as Natural Sciences, Mathematics and Economic and Management Sciences. The initial English tuition also benefited learner performance over time in these learning areas, but also in the more closely related text-based learning areas. Additional Language learners benefited more than First Language learners.

The effects observed in the 2008 study were much more consistent and widespread than those initially observed for the original 2007 study.

## **Note on Executive Summary**

Because the extent of the current report is quite limited in comparison to that of the original report, and also because this follow-up study was geared towards providing a replication and update of the original findings in as far as the main effects observed in 2007/2008 could be sustained for another year towards 2008/9, a separate executive summary is not considered meaningful.

The one-page abstract above and the report contents that follow, especially Section 5 comprising the conclusions, implications and recommendations derived on completion of it, provide a sufficiently concise reflection of the new, additional findings. An even shorter, non-technical version has also been prepared and issued alongside the present “academic-technical” one. It was released under the title: “Extra classes, better marks ... also later”.

# 1

## The origins of the project (background)

Readers are reminded that the project originated towards the end of 2006. The original and main phase was completed towards the end of 2007, and reported on in 2008.

It had the character of a demonstration research project, and specifically explored the effect of increasing the teaching time for Mathematics and English on the overall academic performance of learners. These two learning areas aligned with two core thrusts driving the work of the Shuttleworth Foundation, which funded both the original and this follow-up project. These thrusts focus on how best to develop communication and analytical thinking skills among learners while at school. In addition, the project was also the outcome of parallel sets of discussions between the Shuttleworth Foundation, the Western Cape Education Department and the Human Sciences Research Council at the time.

Key work at the outset entailed selecting project and control schools, conducting pre-tutorial learner assessment, collecting baseline contextual information, preparing tuition materials, recruiting tutors, setting the tutorial timetable, delivering the tutorial programme, and conducting the post-tutorial assessment and information collection, all during May to November 2007.

The central hypothesis was that enhancing the contact-time that learners had for Mathematics and English would improve learners' performance. Additional time was afforded by inviting learners to come for extra tuition after school. It was decided that the study should be empirically and experimentally robust, in the form of testing out a realistic, limited-scale demonstration project accompanied by an impact evaluation. The rationale behind this approach was to keep interventions as realistic as possible within day-to-day school activities, to have its scientific scrutiny and tracking robust, and to leave opportunity early down the line to come to conclusions that would support making incremental decisions about adjustments, modifications, termination or further role out. As a result, the study took on an almost action-research or trial-study approach, as the description as "demonstration" project would suggest, in an attempt to achieve a better balance of the many scientific and practical issues at stake.

### 1.1 Research ethics

As with the original proposal, also the follow-up collection of marks and analyses pertaining to the present part of the study were approved formally by the HSRC's Research Ethics Committee (REC).

### 1.2 Literature

Literature and theory were cited at the onset in 2007 to support the claim that literacy underpins all further acquisition of concepts, meaning and knowledge. This situation has not changed, and no additional citations are offered in this regard, as the original report suffices.

The writing of an article on the findings of the original study is in process (Prinsloo & Ntabanyane, in progress). It was submitted to an international journal for peer-review, but it was felt that it would be better to expand it first to include the present follow-up findings before final submission to the journal. References to a number of related publications by Prinsloo are also mentioned at the end of this report.)

### 1.3 Problem statement

Learners seem to be unable to perform at desirable levels, a situation made more difficult by scant access to physical resources and impoverished living conditions at home. Such conditions may imply that classroom time is not extended enough into homework time to affirm what was learnt at school. The central question is

how to amplify school-based work contents and rates through after- and outside-school tuition or assistance of some sort in order to improve learner performance.

#### **1.4 Rationale for the study**

It is expected that if one confirms and extends the initial transfer of knowledge and learning content during the formal/official school day to some formally structured outside-school mechanisms, one would be able to make significant gains in terms of learners' ability to master more (and more difficult) work in parallel to the normal within-school pacing and coverage of the curriculum, and so increase their performance within a relatively short timeframe, with some lasting effects, even across learning areas.

#### **1.5 Hypotheses**

Given the earlier references to the project being about realistic, practical and affordable ways to try and extend contact time, it was assumed that structuring additional opportunity outside formal (within-school) teaching and learning provision should increase the ability of learners to master their regular school work as they go. A 10 percentage-points improvement of learner performance by project learners above that of a comparable group of control learners was hoped for (within the single year that the original project occurred, or over the short term). The current (follow-up or tracking) study was intended (and envisaged right from the outset) to establish if any such gains would be sustained over a longer term. Such an opportunity would arise at the end of 2008, that is, a year to 18 months after the first study, when the project learners would complete Grade 9, and the WCED would be able to make available common marks for them. (According to assessment policy and practices for the Grade 9 year, each learner is assessed on a continuous basis during the year, and in the end the sub-total for this aspect is converted into a 75% contribution to the final mark for every learner. The other part is derived by adding the two scores, for Section A and Section B of the so-called Common Tasks of Assessment (CTAs), to be precise, and working this second sub-total back to a 25% contribution. The two sub-totals mentioned are then combined to render a final Grade 9 mark for every learner.)



# 2

## Design and methodology

In this section, a recap is given of salient features of the original study, while additional information is provided to give an update of new developments and figures pertaining only to the follow-up phase.

### 2.1 The purpose and objectives of the study

The original study was designed to test critical assumptions around Mathematics and language, especially in terms of the factors enhancing or detracting from learner performance. These were reported on extensively in the original report. Given the timeframes and extent of the current follow-up study, this aspect is not attended to again at this point, and would in any case not be expected to yield much new information. The focus now remains on the sustainability of any original learner-performance improvements supposedly having been the result of the deliberately practical and cost-effective pilot and demonstration work in the form of an intervention through after-school tuition to improve Mathematics and language teaching and learning.

The follow-up agreement between the various research partners retained a description of the focus of the SF and WCED, with minimal amendment of the original terms. The intended goals and benefits were the following (paraphrased unless cited in inverted commas):

- Shuttleworth Foundation (SF), through making funding available for cost-effective research studies, pursues finding innovative solutions in order to:
  - (i) improve learner performance;
  - (ii) test its own assumptions about the impact of increasing teaching and learning time for Mathematics and English; and
  - (iii) translate the recommendations from such research studies into educational policy and to implement such recommended changes.
- The Western Cape Education Department (WCED) needs to improve the success of teaching and learning under taxing operational circumstances pertaining mainly to:
  - (i) large numbers of learners lacking sound foundational knowledge, including concerns about a high drop-out rate towards and after Grade 10;
  - (ii) the challenges pertaining to teacher capacity and motivation;
  - (iii) the situational conditions in classrooms; and
  - (iv) the effects of recent curriculum packaging on time utilisation for teaching / learning Mathematics and English.
- Engaging in a "... joint agreement to conduct a follow-up study of learner performance one year after the 'PlusTime' demo pilot research project of 2007 to test some critical assumptions about the delivery of Mathematics and English – with the view to improve proficiency and grade results of learners in the relevant selected Western Cape high schools."

The project scope was formulated accordingly to express the intention to determine the sustainability over time of any initial effects from the intervention, as well as its influence on learner performance "on the whole", that is across the curriculum in other learning areas. With regard to the latter, the follow-up study provided the first opportunity to extend evaluation of the original within-subject effects (Mathematics tuition on learner improvement in Mathematics, and English tuition on learner improvement in English) to performance improvement effects in learning areas outside these initial two. The reason for this possibility is that common learner marks for other learning areas across the curriculum only now became available.

### 2.2 Approach to the study (design and methodology)

The original approach to the study of having a very tightly matched or paired control-group design remained intact. The only additional feature at this point was adding a set of learner-performance data collected at a

second point, being one year after completion of the intervention programme. This would give effect to the intention held from the outset to undertake some longitudinal tracing to allow investigating the sustainability of any project effects up to three or preferably five years after the event. A strong motivation for this was to isolate and overcome the initial Hawthorne effect, where improvement merely results from the attention of participation and being observed. Sustainability over time is a critical success factor for the envisaged work. To achieve this, additional information at Grade 9 and Grade 12 levels was targeted.

Figure 2.1 reflects the main design elements. The study is now in the second post-test phase ( $O_2$  in the figure).

**Figure 2.1: Simplified schematic view of the quasi-experimental study design**

Group	Pre-tests	Intervention	Post-tests	Time lapse	Follow-up(s)
Control (C)	$O_c$		$O_{1c}$	(one year)	$O_{2c}$ ( $O_{3c}$ )
Project (X)	$O_x$	$X_1$	$O_{1x}$	(one year)	$O_{2x}$ ( $O_{3x}$ )

“Difference-in-difference” analyses were conducted again to detect any lasting effects of the interventions on the performance of learners. The term “difference-in-difference”, also sometimes called “double-difference”, refers to the comparison of the expected **increase over time** in level of learner achievement **between the two groups** (control and experimental, denoted as C and X in this case in Figure 2.1). Put differently:

- 1<sup>st</sup> difference calculation → project school learners’ follow-up score minus their initial achievement score
- 2<sup>nd</sup> difference calculation → control school learners’ follow-up score minus their initial achievement score
- 3<sup>rd</sup> calculation → the difference between the 1<sup>st</sup> and 2<sup>nd</sup> difference scores (or increases) above.<sup>1</sup>

Figure 2.2 shows a simulation (learner scores illustrated in brackets) of how such analyses could unfold.

**Figure 2.2: Illustrative schematic view of the result of difference-in-difference analysis**

Baseline (Pre-test)	Intervention	Post-test 2007	Difference 1 (@ base)	Follow-up 1 in 2008	Difference 2 (@ base)	Follow-up 2 in 2011	Difference 3 (@ base)
Gr 8 MCQ		Gr 8 MCQ		Gr 9 exit		Matric exit	
E (45)	YES, yes, y	E (58)	13	E (60)	15	E (55)	10
Same/diff b(aseline)		diff from b (+10 % pts)		diff from b (+10+ % pts)		diff from b (+10+ % pts)	
C (42)	No	C (45)	3	C (45)	3	C (37)	-5
	Diff-in-diff scores	(in % pts)	10		12		15

\* MCQ = Multiple-choice questions/items

## 2.3 Sample

The study was pitched at Grade 8 level in 2007, when it was hypothesised that there would still be an opportunity to remedy some of the gaps that had been assumed to exist in terms of the foundational conceptual knowledge of early high-school learners, before it became too late. The participating learners completed Grade 9 at the end of 2008, and available performance marks are now being analysed to detect any intervention outcomes one year later.

## 2.4 Procedures

### 2.4.1 Development of the tutorial contents

New readers are reminded to consult the initial report for the procedures followed in the first half of 2007 for the development of the tutorial contents. Suffice it to say that attention was also given to the coverage of some of the numeracy and literacy contents from Grades 6 and 7 that learners typically struggle with.

<sup>1</sup> For the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> calculations respectively, the sums will be: (i)  $O_{2c} - O_{c}$ , (ii)  $O_{2x} - O_{x}$ , and (iii)  $(O_{2x} - O_{x}) - (O_{2c} - O_{c})$ .

A consistent element during the development of the materials was to compile a session worksheet that would fit into 60 minutes, comprising the introduction of a theme/topic, and some group or individual assignment. It would sometimes imply that learners had to complete an exercise afterwards. Various lessons made provision for various modes of learner participation, such as open discussion, constructions, completing exercises, making presentations, etc.

#### **2.4.2 The recruitment of tutors**

The procedures followed in recruiting the tutors are also sufficiently covered in the original report. The discussion there includes issues such as remuneration, incentives and training for the task.

#### **2.4.3 Baseline administration of learner performance assessment and contextual survey instruments**

The information collected during the administration of the learner performance assessment before commencement of the tuition programme by the middle of 2007, forms the baseline for the comparisons undertaken at this point, and, with all the contextual information collected from learners, parents, teachers, tutors and schools, remains unchanged.

#### **2.4.4 Implementation of the tutorial programme**

The original records about the implementation of the tuition programme during 20 hours of contact time during the second semester of 2007, especially the learner attendance records and levels associated with that, were used in the present analyses.

#### **2.4.5 Matching of groups**

On the basis of available contextual information about the schools, classrooms, teachers, learners and the parent community, four project and four control schools were paired or matched up-front to control non-systematic influences. This allocation remained unchanged for the present analyses.

#### **2.4.6 Post-intervention learner assessment**

The participating learners from the four control and four project schools were assessed during November 2007 by means of post-tests in English and Mathematics. These were the same instruments that had been used for the pre-test of June 2007. For the present and second “post-test” opportunity, Grade 9 exit marks (comprising continuous assessment (CASS) and common tasks of assessment (CTA) components) were obtained directly from the CEMIS system from the WCED based on the list of almost 800 project and control learners who had signed up for the study in 2007.

Another delayed post-test, at the end of Grade 12, is recommended, but still to be decided upon by the stakeholders, to confirm the sustainability of intervention effects up to the end of high school, and to rule out falling back to old ways when challenges become even stiffer. The common matriculation exit-examination marks from the system itself, as provided by the Department, would again be the ideal scores to use.

### **2.5 Instruments**

Details pertaining to the instrument grid that had been developed beforehand to specify the information that was collected at the baseline, and the sources from and the modes through which it had to be done, remain as recorded in the initial report. The single addition at the moment comprises the recent collection of the Grade 9 exit marks for all participating learners from the intervention and control groups.

# 3

## Sampling outcomes

In this section, new information comprises the extent to which the 2008 Grade 9 exit marks could cover the original sample of learners who had participated in the study during 2007. Before that, readers are reminded very briefly about the outcomes of the exercise (in 2007) to match control and project schools (Section 3.1).

### 3.1 Matching / pairing project and control schools

Once a very wide range of contextual data had been collected and compared, for eight potential control schools and the designated four project schools, the best possible pairing or matching of schools came to the following (through a process of provisional conceptual matching of schools followed by a two-stage empirical verification as all the required information became available):

<u>Project school</u>		<u>Control school</u>
Ocean View	&	Aloe
Fairmount	&	Steenberg
Vuyiseka	&	Phakama
Intsebenziswano	&	Siyazakha

Matching of control and project schools considered a very wide range of variables, but focused mainly on:

- key functionality constructs from the school- and classroom-level observation schedules and teacher questionnaires (including class size, school conditions, discipline, learner performance in general, curriculum management, assessment practices, teacher qualification level, teacher experience in years, teacher workload, teacher career aspirations, time use, and provision of extra classes to learners);
- the socio-economic status of learners and parents; and
- other socio-contextual factors (such as reading opportunity and parental qualification levels and employment profiles), gained from the relevant questionnaires.

### 3.2 Sample realisation

Officials from the WCED were provided with the list of 774 learners for whom some or the other level of analysis became possible during the study and assessments during 2007. Practical realities then determined how many learners sat for the pre-tests in 2007, and which 2008 Grade 9 exit and 2007 pre-test records could be traced and matched within the CEMIS system later. Also, a number of learners left their schools during or before 2008. This initially reduced the number of learners for whom records could be retrieved and matched automatically (digitally) after the end of 2008 to 584. Through further manual tracing and matching by WCED officials, the marks of another 40 learners were added, bringing the frequency of matched learner records to 624, and rendering a return or matching rate of 81%. Only 12 of these learners were not promoted to Grade 10 at the end of 2008. Being promoted would coincide with remaining on track. For 150 learners, though, no additional Grade 9 marks could be retrieved. The data in the CEMIS records suggest that for 86 of these learners no appropriate or only erroneous information could still be found (many or most if these learners may have left the Province, or became otherwise untraceable). For an additional 61 learners, it became clear that they dropped out of the system during 2008 and/or failed to attain Grade 9 exit scores at the end of that year. The records confirmed for at least 45 of them that they had failed their Grade 8 year and only reached Grade 9 at the beginning of 2009, and not in 2008, as would be the case should they have remained on track. For one learner an “in transit” status was indicated, and for a further two no information could be retrieved.

Equal numbers of learners from project and control schools were included in the figures just cited for those that remained in the study (624), and those that would no longer be part of it (150). In addition, similar

portions of the original number of learners no longer formed part of the study across the various sub-groups. Furthermore, the difference between the pre-test performance levels of those learners who remained at the schools and those learners who had left were consistent across the project and control groups with as close as one percentage point. As expected, those learners who had left the study achieved slightly lower marks on the pre-tests than those who remained. Thus, fears that different portions within the project and control groups of learners with low achievement marks would have fallen out did not materialise. Such a situation could have influenced the findings. The only occurrence of a potentially concerning situation was observed with regard to Mathematics, between learners with high and low attendance levels at the tuition sessions, that is, within the project group. In this case, the 11 high-attendance learners that fell out initially had a 5,7 %-points weaker performance on the pre-test than the 91 learners remaining in the dataset. The 24 low-attendance learners falling out had a 1,0 %-points lower achievement level than the 63 learners remaining in the study. Simulations showed that the relevant difference-in-difference comparisons could be lower by at most 0,6 points. This would happen when comparing high- and low-attendance learner gains over time, as well as high-attendance project learner gains against the gains experienced by learners from the control group. As will be appreciated when the findings are reported, such potential changes would not materially change any observations or trends, and they would in any case only apply to outcomes related to undergoing original Mathematics tuition, or not. Also acknowledging the fact that these 11 learners by far constitute the smallest drop-off figure, it actually comes as some consolation that the intervention effort and motivation level (for high-attendance learners) kept this group of learners in school and succeeding as much and for as long as possible.

The marks returned, as reflected in the frequencies in Tables 3.1 (a) and (b), were therefore considered sufficient for analyses. An additional distinction this time around is the separation of Grade 9 exit marks for language between those learners who have English as First and as Additional Language.

**Table 3.1 (a): Numbers of learners who completed performance assessment instruments for Mathematics and English First Language by stage of testing**

		Both English pre-test (2007) and Grade 9 First Language exit (2008) marks		
		No	Yes	Row totals
Both Mathematics pre-test and Grade 9 exit marks	No	73	104	177
	Yes	379	68	447
Column totals		452	172	624

**Table 3.1 (b): Numbers of learners who completed performance assessment instruments for Mathematics and English Additional Language by stage of testing**

		Both English pre-test (2007) and Grade 9 Additional Language (2008) marks		
		No	Yes	Row totals
Both Mathematics pre-test and Grade 9 exit marks	No	129	48	177
	Yes	206	241	447
Column totals		335	289	624

The figures reflected in Tables 3.1 (a) and (b) suggest three layers of potential analysis, as below (see bulleted list). Although all of these were conducted in full in 2008 between the pre-and post-tests, not all of these calculations could be replicated in full this time around, for lack of time provisioning. The second batch of (essential) analyses was retained, but not the first and third batches. For the third batch, not much would have been expected to change from the trends observed during the initial study. In terms of the first batch, the finding in the 2008 report that those learners (and there would be too few in the English First Language group now anyway for reliable findings) who had participated in both tuition programmes did not benefit as much as learners who selected only one, predicts that the optimal place to look for long-term effects would be in analyses according to the second batch's figures and data.

- Strict (joint) modelling on the 68 and 241 learners who participated in the tuition programmes for Mathematics and both English learning areas, respectively, and for whom pre-test and Grade 9 exit marks and related data are available (including tuition attendance records for the project-school learners).

- Modelling separately by learning area (Mathematics, English First and English Additional Language) for the learners (447, 172 and 289 respectively) who, for the relevant subject, wrote both the pre- and post-tests, and for whom tuition attendance records are available, where applicable.
- The larger number, in various configurations, of 624 learners for whom at least some information is available that would allow single-layered analyses, calculating correlations and other statistics, between contextual and performance information.

With regard to the test completion per research group (project and control), and per learning area and stage of testing, the individual frequencies as reflected in Table 3.2 materialised.

(The total numbers of participating learners, for whom any or at least one item had been recovered, appear in the left columns of the various sets of difference-in-difference analysis tables in Section 4.)

**Table 3.2: Numbers of learners who completed performance assessment instruments across research groups, learning areas and stages of testing**

Research group	Phases / sub-groups	Mathematics		English First Language		English Additional Language	
		Pre-test	Gr. 9 exit	Pre-test	Gr. 9 exit	Pre-test	Gr. 9 exit
Project schools	Paired testing	193	193	74	74	133	133
	All tests	197	273	211	85	211	188
Control schools	Paired testing	254	254	98	98	156	156
	All tests	254	344	254	149	254	196

# 4

## Findings

In the initial report on the 2007 data, Section 4 covered observations and findings pertaining to contextual profiles underpinning learners' performance, tuition programme implementation and attendance, baseline and post-project assessment levels of learner performance, the difference-in-difference analysis on the impact of the tutorial programme, and the effects that contextual variables had on learners' performance improvement over time, given their participation or not in the tutorial programme. Because the follow-up Grade 9 exit marks from 2008 were collected to establish whether or not any longer term effects from the tuition programme would remain in comparison with the baseline position, respectively for those who had and had not undergone extra tuition, and also for those who had attended the tuition sessions well or not, the focus now has been on calculating and comparing the new difference-in-difference scores between the various sub-groups. As a result, only minimal reference is made to issues pertaining to contextual information and their influence, and tuition programme implementation and attendance as such.

### 4.1 Contextual profiles in terms of school, classroom, teacher, own and parental background

These profiles remained exactly as before, as no sample or learner changes took effect in the meantime.

#### 4.1.1 Learner context

It was noted before that sufficient variance had to exist to enable meaningful differentiation between learners, and that school access had been one such area where relatively little of that occurred. Learners were not always able to provide exact or complete primary-school marks to enable detecting the effects of prior knowledge and proficiency reliably. It already became clear that English proficiency scores tended to be lower than those for other learning areas, suggesting some compromise to later learner performance levels. When looking at basic home facilities as a proxy for socio-economic status, learners were shown not to be severely deprived. Exposure to books and reading opportunity tended to be lower and more diverse, even suggesting a lack of reading culture in quite a large portion of the sample. Time use at home (for sufficient learning) got characterised by pressure on learners to do home chores, shopping and paid work, and sometimes by their television viewing patterns. The extent of support within the school environment, including levels of discipline and time loss at school, varied widely, albeit not down to levels of dysfunction. Learner absenteeism was shown as a potential disturbance factor. A range across assessment and feedback practices became clear. Textbooks were in reasonable supply, while many learners took extra lessons after school (in small groups and individually). Learner and parent aspirations for the future were always high, albeit somewhat unrealistic and poorly informed. Parental support with homework, assignments and preparation for examinations and tests was perceived as strong, and supplemented by assistance from other resource persons.

#### 4.1.2 Parent context

Surveying the parental context largely confirmed the picture derived from learner inputs, and applies to support given to learners (including transport arrangements and retrieval of information), parental literacy and reading levels, their academic qualifications and current study activities, and general contact with the school.

#### 4.1.3 School context

The potential external influences on the effectiveness of after-school tuition could come, as indicated in the initial report with regard to the school as context, from location, size, resource and facility levels, staff numbers, teacher:learner ratios and poverty ratings, as demographical characteristics, and also the use made of teaching time and punctuality, and curriculum and assessment practices, all of which were rated as more, rather than less, functional, and showed some variation of extent and quality.

#### 4.1.4 Teacher and tutor context

With regard to tutors and class teachers, various conditions and practices were surveyed to enable detecting any influences from this side, and it was always recorded who every learner's teachers / tutors were. Such aspects included demographic details (of age, sex, home language, etc.), teacher qualifications and experience, career aspirations and job satisfaction, classroom conditions and equipment, the presence and use of learning support materials, the existence and use of curriculum materials and management practices (including lesson preparation), the degree of order and discipline prevailing in classrooms, teacher workload, assessment practices and feedback, the use made of teaching time at school, and other support provided to learners (such as extra classes). Although useful variation occurred, levels of functioning were never approaching severe dysfunction, and the small sample size rendered any analyses and findings a bit precarious and provisional.

#### 4.2 Baseline to Grade 9 exit learner performance

Whereas concerns were raised in the 2007 report about the low levels of learner performance in Mathematics and English, a direct comparison of level of performance to the Grade 9 exit marks from the end of 2008, for instance by means of equating, is not possible, because the basis on which these two sets of marks are calculated, is different. However, this does not compromise the rationale of and way in which difference-in-difference calculations are made and used in the study. The main reason is that a common process and procedures were still followed across all learners, with parts of the second evaluation indeed resting on common tests. The 2007 assessment was conducted by the HSRC itself in only the two learning areas of intervention by using internationally benchmarked tests developed for a comprehensive Grade 8 learner evaluation just the year before among all Western Cape learners. This test was administered in both the pre- and post-assessment. The 2008 Grade 9 exit mark for each learner is derived through a standardised process. According to this, schools and teachers assess all their Grade 9 learners in all their learning areas towards the end of the year, during a specified period, using common assessment tasks that every learner undertakes. The mark obtained in this way is added to a continuous assessment score built from evaluations of learners' work during the year.

A great gain in the value of this second post-assessment comparison is that many more learning areas are now covered. In order to provide some benchmark of the various performance levels, the average percentage scores of learners in terms of these 2008 Grade 9 exit marks are now briefly indicated. The scores are ranked from lowest to highest, and all learners are combined (close to 624, ideally, but here and there a few learners' marks have not been obtained). It has to be noted too that project and control groups are separated and reported on later. Attempting to read more about the proficiency of learners or the difficulty level of learning areas into the apparently higher marks that follow, relative to 2007, would assume some equating of (Grade 9 exit) assessment standards over time (and across learning areas), and is best avoided. The lower achievement levels that occurred in Afrikaans Home Language, Mathematics, Technology and Natural Sciences, and the higher levels in English Home Language, Life Orientation, and Xhosa Home Language, perhaps provide some clues as to the noted learner proficiency or learning area difficulty issues. The mean Grade 9 exit scores were: Afrikaans Home Language (n=110) – 39,9%; Mathematics – 42,5%; Technology – 44,3%; Natural Sciences – 44,6%; Afrikaans Additional Language (n=298) – 45,8%; Social Sciences – 45,9%; Economic and Management Sciences – 46,7%; English Additional Language (n=384) – 46,8%; Arts and Culture – 48,5%; English Home Language (n=234) – 49,8%; Life Orientation – 50,7%; and Xhosa Home Language (n=271) – 52,5%.

Given this general picture, further analyses soon focus on the direct effects of tuition attendance on learner performance.

#### 4.3 Tuition contents and learner attendance

The information and data collected and captured during 2007, as described in detail in the original report, remain exactly as they were, and cover how and how many of the tuition sessions got delivered, descriptions in terms of the use of textbooks and learning materials, lesson approach, assessment, etc., and especially compiling a full record of individual learner attendance to enable distinguishing between those who had attended their lessons well, and those who had not. The cut-off point for good attendance was eventually set at 82%, or missing no more than three sessions. Initial visual inspection of the data suggested attendance of at



least 62% of the tuition sessions, as an above-average level, but also one that would bring about good variance in performance improvement between those learners who had low and high attendance levels. Closer simulations and inspections on the data actually suggested differently, also addressing the fact that many of the low-attendance cell frequencies at school level became quite small with the split at the 62% attendance cut-off point. Acceptance of the higher cut-off was the result.

#### 4.4 Difference-in-difference analysis (the effect of the tuition programme)

The main objective of this second phase of the evaluation is to detect if the tuition programme continued to benefit learners who had undergone the programme 12 to 18 months before. This objective translates into two strategies for determining that. The first would be to establish if learners from the project schools were indeed better off after a reasonable lapse of time than learners from control schools. The second would be to detect if learners within the project group would benefit more over this lapse of time if they initially got exposed to more tuition, compared to lesser benefit from lesser initial exposure. The best way to quantify the latter at learner level was to split them into two sub-groups according to high and low levels of attendance at tuition sessions. Combining these two strategies, as a third route, would be to compare how much more the (hypothesised) gains of those project-school learners with high tuition attendance would be beyond the gains by control-school learners.

##### 4.4.1 The sustained effect of additional Mathematics tuition on Mathematics performance

Tables 4.1 to 4.5 reflect the situation strictly for Mathematics.

Table 4.1: Pre-test (2007) and Grade 9 exit (2008) Mathematics scores for all project- and control-school learners

Learner group (total n=624)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=279)	(63) 29,8%	+11,1	(63) 40,9%	Low (did both tests)
	(91) 28,2%	+16,9	(91) 45,1%	High (did both tests)
	(154) 28,8%	+14,5	(154) 43,4%	Low + high (did both tests)
	(197) 28,2%	+16,2	(273) 44,4%	Did either one or both tests
Control learners (n=345)	(254) 30,2%	+9,5	(254) 39,7%	Did both tests
	(254) 30,2%	+10,9	(344) 41,0%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.1:

- The 2008 Grade 9 exit data show the overall out-performance of control-school learners by project-school learners, a situation that did not apply to the 2007 data.
- High-attendance learner gains > low-attendance learner gains by 5,8 %-points (was 3,0 before).
- Project-learner gains > control-learner gains by 5,0 %-points (was -1,5 before).
- High-attendance project-learner gains > control learner gains by 7,4 %-points (was -0,2 before).

This reflects an improvement of benefits to project-school learners above control-school learners on all counts. The difference in the difference scores are all in the five to ten percentage-point range.

**Table 4.2: Pre-test (2007) and Grade 9 exit (2008) Mathematics scores for learners from Pair 1 (Schools 101 and 206)**

Learner group (total n=136)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=78)	(23) 28,0%	+11,9	(23) 39,9%	Low (did both tests)
	(36) 30,0%	+16,2	(36) 46,1%	High (did both tests)
	(59) 29,2%	+14,5	(59) 43,7%	Low + high (did both tests)
	(62) 29,0%	+15,9	(74) 44,8%	Did either one or both tests
Control learners (n=58)	(44) 25,5%	+18,0	(44) 43,5%	Did both tests
	(44) 25,5%	+16,8	(57) 42,4%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.2:

- The 2008 Grade 9 exit data show the same situation as in the 2007 data where the project-school learners could not out-perform the control-school learners, albeit with a figure smaller than five percentage points.
- High-attendance learner gains > low-attendance learner gains by 4,2 %-points (was 1,4 before).
- Project-learner gains  $\neq$  control-learner gains by -3,5 %-points (was -3,1 before).
- High-attendance project-learner gains  $\neq$  control learner gains by -1,8 %-points (was -2,6 before).

This reflects the same situation regarding the lack of benefits to project-school learners above control-school learners, as well as, on the other hand, high-attendance learners outperforming low-attendance learners within the project group. The difference in the difference scores all remained below the five percentage-point range.

**Table 4.3: Pre-test (2007) and Grade 9 exit (2008) Mathematics scores for learners from Pair 2 (Schools 102 and 205)**

Learner group (total n=210)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=65)	(9) 32,5%	+21,9	(9) 54,4%	Low (did both tests)
	(16) 26,9%	+30,8	(16) 57,7%	High (did both tests)
	(25) 29,0%	+27,6	(25) 56,5%	Low + high (did both tests)
	(29) 29,7%	+21,8	(65) 51,6%	Did either one or both tests
Control learners (n=145)	(71) 31,2%	+12,7	(71) 43,9%	Did both tests
	(71) 31,2%	+14,0	(145) 45,1%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.3:

- The 2008 Grade 9 exit data show the overall out-performance of control-school learners by project-school learners, a situation that also applied to the 2007 data, albeit to a much lesser extent.
- High-attendance learner gains > low-attendance learner gains by **8,8** %-points (was 5,9 before).
- Project-learner gains > control-learner gains by **14,8** %-points (was 3,3 before).
- High-attendance project-learner gains > control learner gains by **18,0** %-points (was 5,7 before).

This reflects an increase in the extent of the benefits to project-school learners above control-school learners on all counts. The difference in the difference scores is almost always above the ten percentage-point target.

Table 4.4: Pre-test (2007) and Grade 9 exit (2008) Mathematics scores for learners from Pair 3 (Schools 103 and 207)

Learner group (total n=139)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=66)	(25) 28,5%	+5,8	(25) 34,3%	Low (did both tests)
	(26) 25,6%	+6,0	(26) 31,7%	High (did both tests)
	(51) 27,0%	+5,9	(51) 33,0%	Low + high (did both tests)
	(53) 27,1%	+4,2	(65) 31,3%	Did either one or both tests
Control learners (n=73)	(70) 31,4%	+6,6	(70) 37,9%	Did both tests
	(70) 31,4%	+6,5	(73) 37,9%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.4:

- The 2008 Grade 9 exit data show the same situation as in the 2007 data where the project-school learners could not out-perform the control-school learners, albeit now with a figure of just more than five percentage points.
- High-attendance learner gains > low-attendance learner gains by 0,2 %-points (was 1,9 before).
- Project-learner gains  $\neq$  control-learner gains by -0,7 %-points (was -8,6 before).
- High-attendance project-learner gains  $\neq$  control learner gains by -0,6 %-points (was -7,5 before).

This reflects the same situation regarding the lack of benefits to project-school learners above control-school learners, as well as, on the other hand, high-attendance learners outperforming low-attendance learners within the project group. The difference in the difference scores remained or dropped below the five percentage-point range, though.

Table 4.5: Pre-test (2007) and Grade 9 exit (2008) Mathematics scores for learners from Pair 4 (Schools 104 and 210)

Learner group (total n=139)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=70)	(6) 38,1%	+13,7	(6) 51,8%	Low (did both tests)
	(13) 29,9%	+23,8	(13) 53,6%	High (did both tests)
	(19) 32,5%	+20,6	(19) 53,1%	Low + high (did both tests)
	(53) 27,6%	+22,1	(69) 49,7%	Did either one or both tests
Control learners (n=69)	(69) 31,0%	+3,7	(69) 34,6%	Did both tests
	(69) 31,0%	+3,7	(69) 34,6%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.5:

- The 2008 Grade 9 exit data show the overall out-performance of control-school learners by project-school learners, a situation that did not apply to the 2007 data.
- High-attendance learner gains > low-attendance learner gains by 10,0 %-points (was 18,4 before).
- Project-learner gains > control-learner gains by 16,9 %-points (was -0,7 before).
- High-attendance project-learner gains > control learner gains by 20,1 %-points (was 2,7 before).

This reflects an improvement of project-school learner gains above control-school learners on all counts. The difference in the difference scores is above the ten percentage-point target, sometimes by quite some margin.

For Mathematics, school pairs remained consistent in terms of the learner performance improvement over time being larger for those learners who had attended more than 82% of their tutorial sessions compared to those learners who had not. In addition, this advantage seems to have become larger over time, although one should remember that part of this apparent increase in difference between the gain scores of the two groups can be attributed to the higher scores on the 2008 Grade 9 exits. The possibility remains promising to remedy performance levels as late as in Grade 8 through an intervention of as little as six months with lasting effects 12 to 18 month later, when there is some minimum level of commitment among learners and tutors.

Some inconsistency remained regarding the ability of project schools to outperform control schools in two of the initial three school pairs, although the overall picture has changed in favour of the project schools since 2007, when control schools seemed to be better off, relatively speaking. This could be seen as an indication that some intervention effects do not take effect immediately, but may manifest over a longer period.

#### 4.4.2 The sustained effect of additional English tuition on English Additional Language performance

Tables 4.6 to 4.10 reflect the situation for English when written as Additional Language. It has to be noted in this regard that for the 2007 project a single English test, developed by the HSRC, was administered to all learners, while the Grade 9 exit marks from 2008 differentiate between learners who has English as Additional and as First Language, allowing for a more nuanced analysis of outcomes at this stage, although sub-group sizes may become small on occasion.

**Table 4.6: Pre-test (2007) and Grade 9 exit (2008) English Additional Language scores for all project- and control-school learners**

Learner group (total n=624)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=279)	(57) 33,0%	+12,9	(57) 45,8%	Low (did both tests)
	(62) 29,7%	+18,0	(62) 47,7%	High (did both tests)
	(119) 31,2%	+15,5	(119) 46,8%	Low + high (did both tests)
	(211) 31,8%	+14,7	(188) 46,5%	Did either one or both tests
Control learners (n=345)	(156) 34,5%	+13,1	(156) 47,6%	Did both tests
	(254) 36,1%	+10,9	(196) 47,0%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.6:

- The 2008 Grade 9 exit data show that the overall out-performance of control-school learners by project-school learners was retained from the situation that applied to the 2007 data.
- High-attendance learner gains > low-attendance learner gains by 5,1 %-points (was 1,5 before).
- Project-learner gains > control-learner gains by 2,4 %-points (was 1,0 before).
- High-attendance project-learner gains > control learner gains by 4,9 %-points (was 1,7 before).

This reflects a consistent improvement of benefits to project-school learners above control-school learners on all counts. The difference in the difference scores in one case got close to and in another case exceeded the five percentage-point level, unlike before, when figures were marginally above zero.

**Table 4.7: Pre-test (2007) and Grade 9 exit (2008) English Additional Language scores for learners from Pair 1 (Schools 101 and 206)**

Learner group (total n=136)*	Pre-test score as mean % (n)	Difference (in %-pts)	Grade 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=78)	(11) 28,5%	+11,0	(11) 39,5%	Low (did both tests)
	(10) 31,7%	+14,8	(10) 46,5%	High (did both tests)
	(21) 30,0%	+12,8	(21) 42,8%	Low + high (did both tests)
	(58) 30,7%	+14,5	(39) 45,1%	Did either one or both tests
Control learners (n=58)	(16) 29,2%	+9,0	(16) 38,2%	Did both tests
	(43) 29,0%	+9,4	(23) 38,4%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.7:

- The 2008 Grade 9 exit data show the same situation as in the 2007 data where the project-school learners out-performed the control-school learners.
- High-attendance learner gains > low-attendance learner gains by 3,8 %-points (was 3,0 before).
- Project-learner gains > control-learner gains by 3,8 %-points (was 2,7 before).

- High-attendance project-learner gains > control learner gains by 5,8 %-points (was 4,1 before). This reflects a consistent improvement of benefits to project-school learners above control-school learners on all counts. The difference in the difference scores in one case got close to and in another case exceeded the five percentage-point level, unlike before, when figures ranged from 2,7 to 4,1.

**Table 4.8: Pre-test (2007) and Grade 9 exit (2008) English Additional Language scores for learners from Pair 2 (Schools 102 and 205)**

Learner group (total n=210)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=65)	(15) 36,2%	+13,0	(15) 49,3%	Low (did both tests)
	(0) -%	-	(0) -%	High (did both tests)
	(15) 36,2%	+13,0	(15) 49,3%	Low + high (did both tests)
	(54) 35,9%	+12,6	(16) 48,5%	Did either one or both tests
Control learners (n=145)	(3) 38,4%	+4,6	(3) 43,0%	Did both tests
	(71) 42,3%	+3,4	(34) 45,7%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.8:

- The 2008 Grade 9 exit data show the overall out-performance of control-school learners by project-school learners, a situation that did not apply to the 2007 data.
- High-attendance learner gains could not be compared to low-attendance learner gains, or control learners, because of insufficient learner variation (there were no learners in the high-attendance group because of the low sample size).
- Project-learner gains > control-learner gains by 8,4 %-points (was -0,6 before).
- (The latter figure, for matched learners, increases to 9,3 %-points by using the unmatched data.)

This reflects an increase in the extent of the benefits to project-school learners above control-school learners, a situation that did not apply in 2007. The difference in the difference scores is also quite large, approaching or potentially exceeding the percentage-point target.

**Table 4.9: Pre-test (2007) and Grade 9 exit (2008) English Additional Language scores for learners from Pair 3 (Schools 103 and 207)**

Learner group (total n=139)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=66)	(15) 31,2%	+13,5	(15) 44,7%	Low (did both tests)
	(19) 33,6%	+15,0	(19) 48,6%	High (did both tests)
	(34) 32,5%	+14,3	(34) 46,9%	Low + high (did both tests)
	(46) 31,2%	+15,0	(65) 46,3%	Did either one or both tests
Control learners (n=73)	(70) 38,8%	+15,4	(70) 54,2%	Did both tests
	(71) 38,8%	+15,2	(72) 54,0%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.9:

- The 2008 Grade 9 exit data show the inverse situation compared to that applicable to the 2007 data. High-attendance learner gains this time exceeded those of low-attendance learners, but project-school learner gains could not out-perform those of control-school learners, as before. The latter differences are marginal, though, at much smaller than five percentage points.
- High-attendance learner gains > low-attendance learner gains by 1,5 %-points (was -1,6 before).
- Project-learner gains  $\neq$  control-learner gains by -1,0 %-points (was 3,4 before).
- High-attendance project-learner gains  $\neq$  control learner gains by -0,4 %-points (was 2,4 before).

This reflects the opposite situation (now a lack of benefits to project-school learners above control-school learners, as well as, on the other hand, high-attendance learners outperforming low-attendance learners within the project group) compared to the one before. The difference in the difference scores remained well below the five percentage-point range.

**Table 4.10: Pre-test (2007) and Grade 9 exit (2008) English Additional Language scores for learners from Pair 4 (Schools 104 and 210)**

Learner group (total n=139)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=70)	(16) 34,6%	+13,4	(16) 48,1%	Low (did both tests)
	(33) 26,7%	+20,6	(33) 47,4%	High (did both tests)
	(49) 29,3%	+18,3	(49) 47,6%	Low + high (did both tests)
	(53) 29,3%	+17,7	(68) 47,0%	Did either one or both tests
Control learners (n=69)	(67) 31,2%	+12,1	(67) 43,2%	Did both tests
	(69) 31,6%	+11,7	(67) 43,2%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.10:

- The 2008 Grade 9 exit data show the overall out-performance of control-school learners by project-school learners, a situation that applied to the 2007 data as well.
- High-attendance learner gains > low-attendance learner gains by 7,2 %-points (was 12,0 before).
- Project-learner gains > control-learner gains by 6,2 %-points (was 1,1 before).
- High-attendance project-learner gains > control learner gains by 8,6 %-points (was 4,3 before).

This reflects an improvement of benefits to project-school learners above control-school learners, although the difference in gains for high-attendance learners above low-attendance learners diminished somewhat.

However, the difference in the difference scores is always within the five to ten percentage-point range.

For English Additional Language, absolute consistency now applies, with the exception of one pair where data limitations did not allow comparisons, across the school pairs and overall, in terms of the learner performance improvement over time being larger for those learners who had attended more than 82% of their tutorial sessions compared to those learners who had not. This did not apply in 2007 in the case of two schools. Although overall the advantage decreased somewhat, it is still above the five percentage-point mark. The possibility also here remains promising to remedy performance levels as late as in Grade 8 through an intervention of as little as six months with lasting effects 12 to 18 month later, when there is some minimum level of commitment among learners and tutors.

However, some inconsistencies still apply with regard to the ability of project schools to outperform control schools in the case of one school pair, albeit a different one to 2007. However, the magnitude of the advantage of project-school learners above control-school learners increased quite a bit. This could be seen as an indication that initial small intervention effects may incrementally incur more benefits as time passes.

#### 4.4.3 The sustained effect of additional English tuition on English First Language performance

Tables 4.11 to 4.15 reflect the situation for English when written as First Language. It has to be noted in this regard that during the 2007 project a single English test developed by the HSRC was administered, while the Grade 9 exit marks from 2008 differentiate between Additional and First Language, allowing for a more nuanced analysis of outcomes at this stage, although sub-group sizes may become small on occasion, especially in two school pairs where learners were predominantly isiXhosa-speaking.

**Table 4.11: Pre-test (2007) and Grade 9 exit (2008) English First Language scores for all project- and control-school learners**

Learner group (total n=624)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=279)	(28) 35,3%	+9,8	(28) 45,1%	Low (did both tests)
	(44) 33,8%	+14,0	(44) 47,8%	High (did both tests)
	(72) 34,4%	+12,3	(72) 46,8%	Low + high (did both tests)
	(211) 31,8%	+15,9	(85) 47,6%	Did either one or both tests
Control learners (n=345)	(98) 38,7%	+12,8	(98) 51,5%	Did both tests
	(254) 36,1%	+14,8	(149) 51,0%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.11:

- The 2008 Grade 9 exit data show that the overall out-performance of control-school learners by project-school learners was not retained from the situation that applied to the 2007 data.
- High-attendance learner gains > low-attendance learner gains by 4,2 %-points (was 1,5 before).
- Project-learner gains ≠> control-learner gains by -0,4 %-points (was 1,0 before).
- High-attendance project-learner gains > control learner gains by 1,2 %-points (was 1,7 before).

This reflects some erratic changes and overall picture regarding the benefits to project-school learners above control-school learners, especially taking into account tuition attendance levels. It appears as if high attendance of tuition here would have been an absolute requirement for experiencing later benefits in learner performance improvement. However, the difference in the difference scores largely remains really low, that is, marginally above one percentage point, with only one exception, making the findings rather inconclusive. In addition, should one look at the data for unmatched learners, that is, everything available, the project-school learners achieved a gain of one percentage point more than the control-school learners.

**Table 4.12: Pre-test (2007) and Grade 9 exit (2008) English First Language scores for learners from Pair 1 (Schools 101 and 206)**

Learner group (total n=136)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=78)	(19) 34,6%	+5,5	(19) 40,1%	Low (did both tests)
	(16) 29,2%	+11,6	(16) 40,8%	High (did both tests)
	(35) 32,1%	+8,3	(35) 40,4%	Low + high (did both tests)
	(58) 30,7%	+9,7	(35) 40,4%	Did either one or both tests
Control learners (n=58)	(27) 28,8%	+14,4	(27) 43,2%	Did both tests
	(43) 29,0%	+13,1	(35) 42,1%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.12:

- The 2008 Grade 9 exit data could not confirm the situation reflected by the 2007 data where the project-school learners out-performed the control-school learners, which became the inverse now.
- High-attendance learner gains > low-attendance learner gains by 6,1 %-points (was 3,0 before).
- Project-learner gains ≠> control-learner gains by -6,1 %-points (was 2,7 before).
- High-attendance project-learner gains ≠> control learner gains by -2,8 %-points (was 4,1 before).

This reflects a reversal of benefits away from project-school learners to control-school learners, while high-attendance learners seemed to have benefited more than before above low-attendance learners. The difference in the difference scores varies around the five percentage-point level, and is slightly greater than the 2,7 to 4,1 range of before.

**Table 4.13: Pre-test (2007) and Grade 9 exit (2008) English First Language scores for learners from Pair 2 (Schools 102 and 205)**

Learner group (total n=210)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=65)	(8) 37,5%	+19,1	(8) 56,6%	Low (did both tests)
	(28) 36,5%	+15,3	(28) 51,8%	High (did both tests)
	(36) 36,7%	+16,2	(36) 52,9%	Low + high (did both tests)
	(54) 35,9%	+16,9	(49) 52,8%	Did either one or both tests
Control learners (n=145)	(68) 42,5%	+12,2	(68) 54,7%	Did both tests
	(71) 42,3%	+11,4	(111) 53,7%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.13:

- The 2008 Grade 9 exit data show the overall out-performance of control-school learners by project-school learners, a situation that did not apply to the 2007 data.
- High-attendance project-learner gains  $\neq$  control learner gains by -3,8 %-points (was -4,6 before).
- Project-learner gains > control-learner gains by 4,0 %-points (was -0,6 before).
- High-attendance project-learner gains > control learner gains by 3,1 %-points (was -3,0 before).

This reflects an increase in the extent of the benefits to project-school learners above control-school learners, a situation that did not apply in 2007. The difference in the difference scores remained low at between three and four percentage points, with the exception of the very slight, if any, advantage in favour of the control-school learners that got turned around.

**Table 4.14: Pre-test (2007) and Grade 9 exit (2008) English First Language scores for learners from Pair 3 (Schools 103 and 207)**

Learner group (total n=139)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=66)	(0) -%	-	(0) -%	Low (did both tests)
	(0) -%	-	(0) -%	High (did both tests)
	(0) -%	-	(0) -%	Low + high (did both tests)
	(46) -%	-	(0) -%	Did either one or both tests
Control learners (n=73)	(1) 39,1%	+21,9	(1) 61,0%	Did both tests
	(71) 38,8%	+22,2	(1) 61,0%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.

Summary of observations from Table 4.14:

- Because of low or zero frequencies in many cells, no comparisons can be made.

**Table 4.15: Pre-test (2007) and Grade 9 exit (2008) English First Language scores for learners from Pair 4 (Schools 104 and 210)**

Learner group (total n=139)*	Pre-test score as mean % (n)	Difference (in %-pts)	Gr 9 exit score as mean % (n)	Tuition attendance level ** (project learners only)
Project learners (n=70)	(1) 32,6%	+16,4	(1) 49,0%	Low (did both tests)
	(0) -%	-	(0) -%	High (did both tests)
	(1) 32,6%	+16,4	(1) 49,0%	Low + high (did both tests)
	(53) 29,3%	+19,7	(1) 49,0%	Did either one or both tests
Control learners (n=69)	(2) 44,6%	+5,4	(2) 50,0%	Did both tests
	(69) 31,6%	+18,4	(2) 50,0%	Did either one or both tests

\* Whereas frequencies (n) in this column indicate the total number of learners having completed at least one performance instrument or contextual questionnaire (and beyond that any mix of these), the remaining frequencies in the table refer to the numbers of learners having completed only the relevant performance assessment instruments listed.

\*\* Low attendance was taken as attending 82% or fewer of the sessions, while high attendance entailed attending more than 82%.



Summary of observations from Table 4.15:

- Because of low or zero frequencies in many cells, no comparisons can be made.

For English First Language, at the overall level and for one of the two project schools where sufficient data were available, the situation of 2007 pertaining to the slight advantage that high-attendance learners enjoyed over low-attendance learners, prevailed up to 2008, although the inverse situation continued for the second school.

However, many inconsistencies apply with regard to the ability of project schools to outperform control schools. In fact, at the overall level and for the learners in the two schools, the situation that had applied in 2007 inverted in 2008. The magnitude of the advantage, wherever it applied, was also erratic. The inability to detect any consistent patterns could be an indication that first-language learners on their own benefit from further learning in subsequent grades because they already possess the minimum foundation for doing so, and additional tuition cannot make any decisive improvements on that.

#### 4.4.4 The sustained effect of additional tuition on performance across the curriculum

In the final part of this section, the richness of also having obtained Grade 9 exit marks for additional learning areas towards the end of 2008 for those learners who had participated in the 2007 project, is explored further and reported on. This, in a similar way to what had been done in the 2007 initial study and its report, as well as to what has been done so far in this report in terms of the original learning areas of Mathematics and English, would continue to investigate the extent, through difference-in-difference analyses, of the effect of the initial intervention over a longer duration of time as well as across the curriculum (or on other learning areas). These additional learning areas comprise:

- Economic and Management Sciences,
- Natural Sciences,
- Technology,
- Afrikaans Additional Language,
- Afrikaans First Language,
- isiXhosa First Language<sup>2</sup>,
- Arts and Culture,
- Life Orientation, and
- Social Sciences.

On the basis of the relationship between the learning matter or curriculum contents of Mathematics and English, on the one hand, and all these additional learning areas, on the other hand, specific links were investigated further. In short, it was investigated whether project-school learners who underwent Mathematics tuition gained more over time compared to control-school learners in terms of their performance at the end of 2008 in the Economic and Management Sciences, Natural Sciences and Technology learning areas, as visible in their Grade 9 exit marks. These learning areas share the use of numbers, arithmetical calculations and other mathematical procedures. On the same basis, because of the underpinning role of language, the link between English tuition in 2007 and learner outcomes in all learning areas a year later, as visible in the 2008 Grade 9 exit marks, was explored.

Although it is technically possible to have reported these resulting analyses in the same way as in Table 4.1 to Table 4.15 above, that would take up too much space and become very tedious and repetitive. As a result, having done all the comparable analyses anyway, reporting was streamlined by giving the overview as reflected in Table 4.16. This summary reports the overall position for all the schools or school pairs (combined) in detail, but not that of school pairs individually, although they are nevertheless indicated by relevant references in the middle column. A final note concerns the fact that the replication of the previous Mathematics-to-Mathematics and English-to-English findings is repeated in summary form in this table to enable easy cross-referencing and consistent comparison. After the table, a further summary is provided to allow one to see general trends more easily, and to provide some pointers as to the schools where trends were consistent.

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<sup>2</sup> As there were only two learners with isiXhosa Additional Language, the marks received were not used in analyses.

Table 4.16: Comparison of gains over time from pre-test to Grade 9 exit score by research group and tuition attendance level (%-point difference-in-difference scores)

Pre-test & tuition 2007	Grade 9 exit 2008	Diff-in-diff for -: [School pairs where gains were in the desired direction] *	Difference	N **
Mathematics	Mathematics	Hi over Lo attendance learners [1,2,3,4]	<b>5,8</b>	91; 63
		Project over Control (Paired scores) [2,4]	<b>5,0</b>	154; 254
		Project over Control (All scores) [2,4]	<b>5,4</b>	197-273; 254-344
Mathematics	Technology	Hi over Lo attendance learners [1,2,3,4]	4,8	91; 63
		Project over Control (Paired scores) [2,3]	1,4	154; 254
		Project over Control (All scores) [2,3,4]	2,5	197-271; 254-344
Mathematics	Natural Sciences	Hi over Lo attendance learners [2,3,4]	0,9	90; 61
		Project over Control (Paired scores) [2,3,4]	<b>5,9</b>	151; 253
		Project over Control (All scores) [2,3,4]	<b>5,9</b>	197-269; 254-343
Mathematics	Economic & Management Sciences	Hi over Lo attendance learners [1,2,3,4]	4,1	90; 62
		Project over Control (Paired scores) [1,3,4]	<b>6,0</b>	152; 253
		Project over Control (All scores) [1,3,4]	4,7	197-272; 254-343
English	English Additional Language @	Hi over Lo attendance learners [1,3,4]	<b>5,1</b>	62; 57
		Project over Control (Paired scores) [1,2,4]	2,4	119; 156
		Project over Control (All scores) [1,2,4]	3,8	211-188; 254-196
English	English First Language #	Hi over Lo attendance learners [1]	4,2	44; 28
		Project over Control (Paired scores) [2]	-0,4	72; 98
		Project over Control (All scores) [2]	1,0	211-85; 254-149
English	Mathematics	Hi over Lo attendance learners [1,2,3,4]	<b>6,5</b>	106; 85
		Project over Control (Paired scores) [2,3,4]	<b>9,3</b>	191; 253
		Project over Control (All scores) [1,2,3,4]	<b>7,8</b>	211-273; 254-344
English	Technology	Hi over Lo attendance learners [1,2,3,4]	<b>7,6</b>	105; 85
		Project over Control (Paired scores) [2,3,4]	4,3	190; 253
		Project over Control (All scores) [2,3,4]	4,9	211-271; 254-344
English	Natural Sciences	Hi over Lo attendance learners [2,3,4]	4,2	104; 84
		Project over Control (Paired scores) [2,3,4]	<b>7,6</b>	188; 253
		Project over Control (All scores) [2,3,4]	<b>8,3</b>	211-269; 254-343
English	Economic & Management Sciences	Hi over Lo attendance learners [1,3,4]	3,6	105; 85
		Project over Control (Paired scores) [1,3,4]	<b>7,7</b>	190; 253
		Project over Control (All scores) [1,3,4]	<b>7,0</b>	211-272; 254-343
English	Afrikaans Additional Language #	Hi over Lo attendance learners [1]	3,9	44; 28
		Project over Control (Paired scores) [2]	3,4	72; 161
		Project over Control (All scores) [2]	<b>5,2</b>	211-86; 254-212
English	Afrikaans First Language # @	Hi over Lo attendance learners	-1,5	10; 25
		Project over Control (Paired scores) [1,2]	3,7	35; 16
		Project over Control (All scores) [1,2]	<b>6,0</b>	211-56; 254-54
English	Xhosa First Language #	Hi over Lo attendance learners [4]	2,3	50; 31
		Project over Control (Paired scores) [3]	3,6	81; 140
		Project over Control (All scores) [3]	3,0	211-129; 254-142
English	Arts and Culture	Hi over Lo attendance learners [1,2,3,4]	<b>7,3</b>	104; 83
		Project over Control (Paired scores) [1,2,3,4]	<b>10,5</b>	187; 254
		Project over Control (All scores) [1,2,3,4]	<b>12,3</b>	211-268; 254-345
English	Life Orientation	Hi over Lo attendance learners [1,2,3,4]	<b>5,4</b>	106; 84
		Project over Control (Paired scores) [1,2,3,4]	<b>9,8</b>	190; 253
		Project over Control (All scores) [1,2,3,4]	<b>11,6</b>	211-271; 254-344
English	Social Sciences	Hi over Lo attendance learners [1,2,3,4]	<b>5,0</b>	105; 86
		Project over Control (Paired scores) [3,4]	-0,5	191; 253
		Project over Control (All scores) [4]	0,4	211-273; 254-344

\* Numbers in bold denote a 5 to 10 percentage-point difference-in-difference score. Numbers are underscored in addition when exceeding 10.

\*\* In the first of the three rows per pre-test (to Grade 9 exit) comparison, the numbers are for learners in tuition attendance groups at levels high; low. In the remaining two rows, the numbers are for project learners' pre-test to Grade 9 exit scores; and control learners' pre-test to Grade 9 exit scores, respectively.

# The comparisons are only applicable to school Pairs 1 and 2 for English First Language, and Afrikaans Home and Additional Language, and to school Pairs 3 and 4 for isiXhosa Home Language.

@ No learners with high tuition attendance remained in Pair 2.

Almost 70% (11 of 16) of the difference-in-difference scores reported in Table 4.16 reflect cases where high-attendance learners gained four percentage points or more with progress of time over low-attendance learners from the relevant pre-test scores and tuition to the relevant Grade 9 exit scores. Good learner attendance at Mathematics tuition especially predicts higher gains for the relevant learners (compared to those with low attendance) towards the end of Grade 9 for Mathematics, Technology and, to some extent, Economic and Management Sciences. English tuition and high attendance levels do the same for 2008 Grade 9 exit performance in English Additional Language, Mathematics, Technology, Arts and Culture, and Life Orientation (with English First Language, Natural Sciences, Economic and Management Sciences, Afrikaans Additional Language, and Social Sciences not lagging far behind). This certainly gives some sense of the extent to which good tuition attendance is a prerequisite should one undertake interventions such as these.

With regard to higher gains to project learners above control learners, and only considering the stricter condition of paired scores (that is, including learners with directly-matched pre-test and Grade 9 exit scores), although unpaired calculation results are also reported, nine out of the 15 cases (60%) prove to have been above four percentage points. For Mathematics tuition, greater gains to project-school learners (compared to control-school learners) were evident in the Mathematics, Natural Sciences and Economic and Management Sciences scores a year to 18 months down the line towards the 2008 Grade 9 exit marks. This is an encouraging finding that signals that assistance in Mathematics may later benefit learners in terms of their performance in other numbers-based learning areas. When exploring the lasting effects of English tuition in the same way, greater (and lasting) gain effects remained for project learners' Grade 9 exit performance in Mathematics, Natural Sciences, Economic and Management Sciences, Arts and Culture, and Life Orientation (with some indications that it could be true for Technology and Afrikaans First Language too). Also this is promising evidence that potentially confirms that earlier extra support with English learning content could assist learners to improve their understanding of and performance in a range of other learning areas across the curriculum.

The effects of Mathematics tuition on later Mathematics and Economic and Management Sciences performance, and English tuition on Technology and Natural Sciences, perhaps also on English and Afrikaans Additional Languages and Economic and Management Sciences, and definitely on Mathematics, Arts and Culture and Life Orientation, were particularly consistent and strong in terms of both the mere fact of, but also level of commitment to, attending additional tuition.

In terms of the schools and school pairs, it was also explored in which cases tuition attendance levels and the mere fact of attending these interventions made a difference. Table 4.17 portrays the outcome. It is largely based on (or a summary of) the information in the middle column of Table 4.16.

The criteria for including schools (or school pairs) in the frequency counts recorded in Table 4.17 were firstly whether or not project-school learners outperformed control-school learners, and high-attendance learners gained more than the low-attendance ones, for inclusion in the main counts (always as the frequency of the sixteen possible sets of comparisons that were made). The additional counts (in bold and underscored bold type, respectively) portray the number of cases where effects were strong, i.e., above five percentage points, and really strong, i.e., above ten. Good tuition attendance in Schools 1 and 4 were particularly influential, while benefiting from the after-school tuition as such, compared to being in control schools, salient in School 2, but also Schools 3 and 4.

**Table 4.17: Indication of schools/pairs benefiting most from tuition interventions and attendance levels**

School (from) pair *	Tuition attendance level			Matched learners only			All scores available		
	High	more than	low	Project	more than	control	Project	more than	control
1	12	8	<u>0</u>	6	3	<u>2</u>	7	5	<u>3</u>
2	10	4	<u>1</u>	12	8	<u>6</u>	12	10	<u>5</u>
3	12	2	<u>0</u>	11	8	<u>5</u>	10	8	<u>5</u>
4	13	13	<u>3</u>	11	10	<u>5</u>	12	10	<u>5</u>

\* All numbers in the table are frequencies (from the possible total of 16 sets of comparisons). Figures in normal typeface indicate the mere truth of the statement in the column heading (therefore including the frequencies in bold and those underscored in addition). Figures in **bold** signify the number of cases where the relevant group outperformed the other by a margin of at least five percentage points (and include any underscored frequency next to it). Figures in **bold and also underscored** signify the first group exceeding the second by ten percentage points on the difference in gain.

Differentiation in terms of the learning areas in which tuition took place, being Mathematics and English, and their respective 4 and 12 sets of comparison, further clarifies the extent of the effects. Tables 4.18 and 4.19 show the same analysis outcomes as reported in Table 4.17, but separate for Mathematics and English tuition interventions.

**Table 4.18: Schools/pairs benefiting most from Mathematics tuition interventions and attendance levels**

School (from) pair *	Tuition attendance level			Matched learners only			All scores available		
	High	more than	low	Project	more than	control	Project	more than	control
1	3	2	<u>0</u>	1	1	<u>1</u>	1	1	<u>1</u>
2	4	2	<u>1</u>	3	2	<u>2</u>	3	2	<u>0</u>
3	4	0	<u>0</u>	3	2	<u>1</u>	3	2	<u>1</u>
4	4	4	<u>1</u>	3	3	<u>2</u>	4	3	<u>2</u>

\* All numbers in the table are frequencies (from the possible total of 4 sets of comparisons). Figures in normal typeface indicate the mere truth of the statement in the column heading (therefore including the frequencies in bold and those underscored in addition). Figures in **bold** signify the number of cases where the relevant group outperformed the other by a margin of at least five percentage points (and include any underscored frequency next to it). Figures in **bold and also underscored** signify the first exceeding the second by ten percentage points on the difference in gain.

With regard to the observed effects of Mathematics tuition (Table 4.18), the consistency of some benefits from high attendance across all project schools is clear, but especially strong in School 4. Learners from School 2 gained most over time in terms of their Grade 9 exit marks from undergoing extra tuition compared to learners from the control schools. However, for Grade 9 exit scores, where such benefits occurred in School 4 (Mathematics and Natural Sciences), these benefits / gains were always very strong.

**Table 4.19: Schools/pairs benefiting most from English tuition interventions and attendance levels**

School (from) pair *	Tuition attendance level			Matched learners only			All scores available		
	High	more than	low	Project	more than	control	Project	more than	control
1	9	6	<u>0</u>	5	2	<u>1</u>	6	4	<u>2</u>
2	6	2	<u>0</u>	9	6	<u>4</u>	9	8	<u>5</u>
3	8	2	<u>0</u>	8	6	<u>4</u>	7	6	<u>4</u>
4	9	9	<u>2</u>	8	7	<u>3</u>	8	7	<u>3</u>

\* All numbers in the table are frequencies (from the possible total of 12 sets of comparisons). Figures in normal typeface indicate the mere truth of the statement in the column heading (therefore including the frequencies in bold and those underscored in addition). Figures in **bold** signify the number of cases where the relevant group outperformed the other by a margin of at least five percentage points (and include any underscored frequency next to it). Figures in **bold and also underscored** signify the first exceeding the second by ten percentage points on the difference in gain.

With regard to the observed effects of English tuition (Table 4.19), the benefits from high attendance are most evident for Schools 1 and 4. Learners from School 2 (but also to some extent Schools 3 and 4) gained most over time in terms of their Grade 9 exit marks from undergoing extra tuition compared to learners from the control schools.

[Note: Underpinning all this section's comparisons of learner performance gains over time is the assumption that random effects applied across the four project and four control schools and their learners in terms of any formal subsequent interventions.]

A final attempt at understanding the effect of the after-school intervention programme, as well as the extent to which good attendance enhanced any effects, would be to establish what the maximum difference would be between the gains made by high-attendance project-school learners over those made by learners from control schools. In Table 4.20, this difference is indicated by having selected only the data for high-attendance learners. The resulting sub-group sizes can be derived easily from the appropriate rows in Table 4.16. In a sense, this is an (upward) adjustment of the project-over-control group gain-difference score (found in the middle row of each of the 16 sets of comparisons), should one consider what would have happened if there were only high-attendance learners in the tuition sessions. Only respondents for whom matched pre-test and Grade 9 exit data had been provided, were included in the analyses.

**Table 4.20: Difference in performance gains over time between project-school learners and control-school learners when selecting only high-attendance learners**

Broader group (pre-test, & intervention)	Grade 9 exit scores in 2008 for	Difference-in difference		Position of school pairs in terms of effect strengths
		Existing*	Adjusted	
Mathematics (with a view to effects on related learning areas)	Mathematics	<b>5,0</b>	<b>7,4</b>	No change
	Technology	1,4	3,4	Becomes [2, 3] *
	Natural Sciences	<b>5,9</b>	<b>6,2</b>	No change
	Ecn/Mgmt Sciences	<b>6,0</b>	<b>7,7</b>	Becomes [1,3,4] *
English (with a view to effects on other language learning areas)	English Addit Lang	2,4	4,9	Becomes [1,4] *
	Eng First Lang	-0,4	1,2	No change
	Afrik Addit Lang	3,4	4,9	No change
	Afrik First Lang	3,7	2,7	No change
English (and effects across numbers-based learning areas)	Xhosa First Lang	3,6	4,5	No change
	Mathematics	<b>9,3</b>	<b>12,2</b>	Becomes [1,2,3,4] *
	Technology	4,3	<b>7,7</b>	Becomes [2,3,4] *
	Natural Sciences	<b>7,6</b>	<b>9,5</b>	Becomes [2,3,4] *
English (and effects across other text-based learning areas)	Ecn/Mgmt Sciences	7,7	<b>9,3</b>	Becomes [1,3,4] *
	Arts and Culture	<b>10,5</b>	<b>13,8</b>	Becomes [1,2,3,4] *
	Life Orientation	<b>9,8</b>	<b>12,2</b>	Becomes [1,2,3,4] *
	Social Sciences	-0,5	1,7	No change

\* As taken from / compared to figures in Table 4.16. (Normal, bold, and underscored bold typeface again respectively reflect difference-in-difference ranges of below 5, 5 to 10, and more than 10 percentage points.)

It is clear from Table 4.20 that nine, or just over half, of the possible comparisons in the end showed an enduring effect of at least five percentage-points learner performance improvement more for high-attendance project school learners compared to control-school learners. The learning areas that benefited were predominantly three of the numbers-based ones from the Mathematics intervention, but also the four numbers-based learning areas, as well as two of the three non-language based learning areas, in the direct sense (i.e., Arts and Culture, and Life Orientation), from the English intervention.

In the case of the outcomes related to the English interventions, it should also be noted that additional English tuition, well-attended, almost benefited participating learners at the level of a five percentage point gain above the control learners in another three cases, all directly language-related, bringing the total to nine out of 12 possible cases.

In seven of the initial (overall) nine cases the performance-gain difference either approached (in four cases) or exceeded (in three cases) the 10 percentage points level. This is seen as quite an encouraging finding in terms of the lasting benefits over longer periods of time and across the curriculum from extra tuition after-school quite a while earlier. These strong effects virtually all, that is with only one exception (Mathematics tuition, and Economic and Management Science performance later), applied in the case of learner performance gains related to the extra classes in English.

#### *Broader learner performance correlations*

Given the interim and follow-up nature of the additional analyses, as well as limitations of time and budget, the work done and reported up to this point more or less cover the intended contribution for now. It also does

not make sense to repeat the various additional findings, conclusions and recommendations that were presented in the 2008 initial report. As a result, in the remainder of the text only very salient issues or arguments are revisited should they be expected to have changed given the new information gained through analysis of learners' progress towards their reported performance levels on the Grade 9 exit marks, or should the researchers have been able to conduct such repeated additional analyses quickly. However, as said before, not much of these finer details would be expected to change. It also would make more sense to replicate the initial calculations in a more definitive sense in three years' time when hopefully these learners' matriculation outcomes would become known.

High-scoring candidates remained just that from pre-tests to Grade 9 exit scores, also across learning areas, broadly speaking. This is to be expected, as better performing learners tend to consistently over time and learning area perform well, and the inverse.

Attendance at both English and Mathematics tutorial sessions continued correlating with Grade 9 exit marks over a wide range, signalling consistent learner commitment.

#### **4.5 The influence of selected contextual variables on the findings**

The broader influence of learner, parent, school, teacher and tutor variables would not be expected to change at this stage. As a result, they were not investigated again in depth.

It is assumed that factors previously shown to contribute to learners' performance levels, or their ability to benefit from the after-school tuition, would remain strong. These would include aspects such as the exposure of learners to reading opportunity, their home language, the facilities and socio-economic status in the home environment, the availability of and way in which learners spend their time, the support they receive, parental qualifications and literacy levels, their reading behaviour, the support they give learners, broader functioning levels in classrooms and at schools pertaining to discipline, time use, and curriculum management, as well as the mere identity of class teachers and tutors. (The original report should again be consulted for more information on the earlier findings.)

With regard to the influence of the identity of both classroom teacher and tutor, the situation became more complex to analyse in the case of English, because of the fact that Grade 9 exit marks became available now separately for Additional and First languages. This rendered many cell frequencies very low, especially when also trying to account for attendance levels at tutorial sessions. As a result the findings here would remain inconclusive.

However, there are some signs that many of the same Mathematics teachers and tutors that had previously been identified in terms of their learners achieving higher performance gains over time than the average, remained identifiable in this way, suggesting some effect from the side of the capacities, qualities and expertise that such persons would have, that would be stronger than other factors (at school or contextual level, for instance). Good tutor characteristics seem to have been related to factors such as their pedagogical approach, proficiency in a learning area, and level of motivation, which may have been decisive in determining whether or not their learners' achievement improved over time. For English, in particular, there were indications that tutors' curriculum management and their assessment/feedback practices had an influence too.

# 5

## Discussion of the implications of the findings

As in all the previous sections, no repetitions are made here of substantive information and arguments that already appear in the original report from 2008 on the 2007 after-school interventions.

The emphasis here is on any new conclusions that could be made, important implications that can be derived from them, and any new recommendations flowing from all of these.

### 5.1 Conclusions

The learner data comprising the Grade 9 exit marks from 2008 of those learners who had participated in the project during 2007 as Grade 8s were of sufficient coverage and quality to enable meaningful analyses, although a number of records (190) could not initially be linked automatically and electronically from the CEMIS records. Of these, the majority (almost 150) were identified as having left school in the meantime, or as not having passed Grade 8 at the end of 2007, while 40 additional matches were made to baseline data. The main reason for the 40 late matches would be slight deviations or errors made by learners when identifying themselves through their learner identity number on the various booklets that they had to complete.

The fact that all the Grade 9 exit marks, beyond only those for the two initial learning areas of interest, namely Mathematics and English, could be provided was a big advantage. This allowed a much more nuanced sense of any sustained effects on learner performance towards the end of the year that followed on the year of initial interventions.

In fact, and understating the value of the new observations, it can be said that much has been learnt about the effects of tuition and tuition attendance on learner outcomes after some time had passed (between 12 and 18 months, really), as well as the strength of some of these effects.

Key conclusions that can be derived from the observations made after data analysis follow.

Learners (within project schools), who had attended their tuition sessions well over a year before, gained more over time than learners who had not done so. Not only does this apply in the cases of almost three-quarters of the comparisons (learning area combinations and/or school pairs), but also in terms of the fact that such learners showed increases in their performance marks of five to almost ten percentage points more than those of learners who had not attended their sessions well.

Learners who had undergone the tuition programme after school also gained more over time in terms of their later performance than those who had not undergone it. This also applies in over half of the combinations, and again is of the order of four to nine percentage points.

When isolating the most beneficial comparison condition, that of establishing how much more those project-school learners that also had attended their tuition sessions well, gained over control-school learners, the effects are even more illuminating.

In three cases, the effects exceeded ten percentage points. In all three cases, it resulted from having undergone the initial English tuition (with high attendance). Two of the resulting learning areas were text-based, being Arts and Culture, and Life Orientation, but one was numbers-based, i.e., Mathematics. So, it does seem as if having attended to aspects of the language and communication proficiency of learners earlier on had the ability to alter these learners' marks in some cases by 12 to 13 percentage points more compared to learners where that had not been the case, as much as by the end of the next year. Indeed no small benefit!

In another five cases, and bringing strong benefits to bear on half of the comparisons (learning area combinations), the effect size was in the 7 to 10 percentage-point range. Here high-attendance project-school learners outperformed their control-school counterparts in terms of performance gain over time by around 8 to 9 percentage points.

In three more cases, the performance gains were 4,9 to 7,0 percentage points more for the project learners than the control learners. Only in five cases were the gain difference lower than 4,9 percentage points, but never negative.

With regard to the relevant learning area combinations where these observations applied, it can be concluded that initial Mathematics tuition had a strong effect in the areas of Mathematics, Natural Sciences and Economic and Management Sciences. However, in all the numbers-based learning areas, also adding Technology, initial English tuition had an even stronger effect. English tuition early on also had a strong effect on the two text-based learning areas of Arts and Culture, and Life Orientation. Interestingly enough, the remaining effects of English were strongest in terms of the two language learning areas when taken by learners as Additional Language (Afrikaans and English). This suggests that the interventions served to remedy such learning areas and contents in which learners were likely to struggle by virtue of these areas being more foreign to them than would be the case if these languages were their first language. The tuition materials may either have been pitched at such levels where learners would be more likely to struggle, or First Language learners would already have been able to sort out some or many of the issues addressed in the tuition sessions by means of wider exposure to competent peers and other speakers of such.

In addition, effects have become more pronounced over time. (This may be perceived as partial confirmation, at least, of the claim that learning begets further learning, and that later knowledge acquisition partly rests on the foundations and toolkit provided by earlier learning.)

The fact that the (this) foundational role of language, also for non-language learning areas, and even numbers-based learning areas, seem to be so strongly evident, is well worth noting and of great practical significance. In this regard, perhaps in the intended future follow-up to or replication of this study, but also in other work, this element should be investigated further. The complex processes related to teaching and learning quality within a school, given its teaching and management corps, its infrastructure and equipment, and the learner and parental context, may also in effect have awakened to a new dynamic that extends beyond the direct effect of the language tuition and its incremental value for concept formation, communication skill, and proficiency in reading and writing, into heightened enthusiasm and critical impetus that stimulate next levels of achievement and gain.

All in all, the links were much more consistent and stronger than those observed at the time of the original evaluation immediately after completion of the intervention programme by November 2007. In fact, in a number of cases the set target gain of ten percentage points for project learners above the gain by control learners, has started to materialise.

## **5.2 Implications of the study**

The key implication at this later point in the evaluation is that delayed and incremental gains seem to be the order of the day. Not only did it take time for the benefits to tutored learners to become evident, but they also became greater than when first observed.

The result is that one could claim with some confidence that the school- (and district-)based development and implementation of an after-school extra tuition initiative, such as the one in PlusTime, is meaningful and will render meaningful (practically significant) results a year to 18 months down the line. It brings hope in terms of the great challenge facing schools at the start of learners' high-school careers, in that some of the backlogs that learners may carry into secondary school with them, could be addressed still.

One would, however, as also pointed out in the first report, have to attend well to the dynamic set of circumstances, conditions and role players in operation within the teaching and learning system, so that decisions to implement such programmes, and how it is done, will be well informed.



There was some sound thinking in trying to retain the management and ownership of such an intervention (materials development and implementation as such) within the school and district context. Although it may be possible to design absolutely top-of-the-range materials, hire only the best experts, and insert all kinds of other sophistication, these would render a programme unaffordable, and also undermine ownership and buy-in. At minimum, what is required is local enthusiasm, common will, and a few key people to coordinate and synchronise the implementation, as demonstrated. This would indeed comprise a very practical and implementable advantage.

The overriding research problem and question should not be forgotten, and activities strengthened, in this regard, to ensure that teaching time within school hours are not compromised, and if required, for instance for reasons of backlog among new-entry learners, additional time could/should be made available with the firm promise of being able to address some of the deficiencies in terms of learners' foundational and other learning area knowledge and understanding.

The next round of findings are herewith again up for debate, so to speak, by everyone having a stake in finding out what gains can be made from them in terms of knowledge, practices and policies.

In terms of the latter, not unlike all other research, it is through policy debate that it is hoped that the influences and recommendations of this study will also filter through gradually into improved practices in many spheres.

### 5.3 Recommendations

It is recommended that the initial intention of having a double-stage follow-up evaluation, of which this present Grade 9 exit marks round was the first, be retained. In view of the very illuminating and positive findings reported here, one should apply maximum effort to obtain as good a set as possible of the learner marks that this cohort of participants would attain at the end of 2011 when completing their matriculation examinations. (This would again entail a rather small expense for quite a good gain in terms of learning something about the long-term effects or sustainability of the PlusTime interventions four years earlier by tracking those learners from both the project and the control schools up to a third post-evaluation point.)

The Department should continue with its existing broad-based interventions that already attend to literacy and numeracy development at the Foundation Phase grades, especially in acceptance of the foundational role that language seems to serve for learners to such a clear and strong degree in terms of performance in other learning areas, now and later, as evidenced by these Grade 9 exit follow-up findings. Funding cuts in this area should be avoided at all cost. (The recommendations from the original report should again be consulted.) Funding agencies should be approached, and may make sound investments if coming on board, to sponsor similar extra tuition in selected schools during the coming years, as such programmes seem to work.

Interventions should be kept as indigenous to schools and teachers as possible (to avoid the many ramifications and implications that may arise pertaining to capacity and funding).

Other related areas of interest, as formulated after the initial evaluation in the relevant original report, remain salient and should be kept in radar view for retention in the Department's broader research agenda, in discussions, and as potential future projects. These would include:

- Piloting the idea of and dynamics behind twinning high schools with their feeder primary schools.
- The process whereby principals and school management teams allocate learning areas to teachers to teach.
- The extent, dynamics and effects of passing learners on to a next grade without having mastered the prescribed curriculum of a current grade.

It is also recommended that this additional set of findings, as with the first round, be disseminated on the websites of WCED, SF and HSRC, and through various submissions and presentations at dedicated management and other meetings, public discussion and releases through local radio stations and newspapers, and other media, through interviews and articles, for instance.

The value of research, through its generation of evidence-based findings, has again been underscored, and this serves as strong encouragement for undertaking future projects of this nature.

## Recommended reading

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