

JUNE 2021



2019 Evaluation Report of the High School Academic Programme (HSAP)



Western Cape
Government
Cultural Affairs and Sport

Table of Contents

| | |
|---|----|
| 1. Executive Summary | 2 |
| 2. About the High School Academic Programme (HSAP) | 4 |
| 2.1 HSAP summary | 4 |
| 2.2 Relevance of the Programme | 4 |
| 2.3 HSAP Theory of Change | 5 |
| 3. About the 2019 Evaluation | 7 |
| 3.1 Main aim of the 2019 evaluation | 7 |
| 3.2 Evaluation design | 7 |
| 3.3 Methodology | 7 |
| 3.4 Limitations | 8 |
| 4. Outputs from the 2019 HSAP | 9 |
| 5. Emerging evidence for outcomes | 11 |
| 6. Impact: The evidence | 12 |
| 6.1 HSAP has a significant positive impact on academic performance in Grade 9 | 12 |
| 6.2 HSAP will help to motivate learners to take pure Mathematics in Grade 10 | 14 |
| 6.3 HSAP will help produce learners with better marks in Grade 12 | 14 |
| 7. COVID-19 Response | 16 |
| 8. Sustainability | 17 |
| 9. Conclusion | 17 |
| 10. Acronyms | 18 |

Figures

| | |
|--|----|
| Figure 1: HSAP Theory of Change diagram | 4 |
| Figure 2: Map of school locations from test and control groups | 6 |
| Figure 3: Relative change in Maths and Language marks (from Grade 6 to Grade 9) for HSAP and control learners | 12 |
| Figure 4: Comparison of average change from Grade 6 to Grade 9 per individual school on the HSAP Programme | 13 |
| Figure 5: Average Matric 2019 and 2020 results for Language, Pure Maths and Math Literacy | 15 |
| Figure 6: Percentage of learners who achieve a pass mark at 30% and 40% and those achieving excellence | 15 |

Tables

| | |
|---|----|
| Table 1: Summary of HSAP partners, schools and runtimes | 4 |
| Table 2: Distribution of learners on the Programme by grade and school (showing number of learners and average R&CA) | 10 |
| Table 3: Significance testing on average change from Grade 6 to Grade 9 for each group | 13 |
| Table 4: Percentage of learners in test and control groups who take Pure Maths | 14 |

1. Executive Summary

The High School Academic Programme (HSAP) is a partnership between the Western Cape Government and several NGOs that aims to improve learning outcomes in quintile 1 to 3 secondary schools. The Programme has run since 2016, offering after-school academic support to grade 8 and 9 learners.

HSAP is a ground-breaking initiative powered by cross-sector partnerships, leveraging university students as tutors and role models; low-cost and accessible ed-tech; robust monitoring, evaluation and learning (MEL) and strong partnerships with schools and provincial government departments. The initiative demonstrated remarkable adaptivity in response to COVID-19, and was able to harness technology and strong relationships between tutors and learners to keep learners engaged and learning under lockdown.

By connecting learners to university students from their own communities, who fulfill roles as tutors, mentors and role-models, the Programme creates a pipeline of dreams and the support to realise them. By shifting perspectives of what's possible, the Programme has the potential to build growth mindsets – through peer-to-peer support, learners are more likely to improve their performance, and gain confidence to select maths for matric, knowing that they will get the support they need to achieve.

HSAP offers a blended approach, with both face-to-face and online learning, leveraging curriculum-aligned ed-tech content, just-in-time feedback and assessments.

HSAP has delivered extremely encouraging and significant evidence of impact in contexts where gaining improvements in academic performance (and especially in mathematics) is notoriously tough.

Specifically, the evaluation found that enrollment in HSAP led to:

- Significant positive impacts on performance in the grade 9 Systemic Assessments for both maths and (to a lesser extent) language.
- Increased enrollment in pure maths in grade 10.
- Better performance in grade 12.

Using data from the grade 6 and 9 systemic tests, and National Senior Certificate (NSC) exam results, the study was able to create comparative datasets for analysis. Quasi-control groups were created comprising learners attending the same schools but not enrolled in HSAP, and learners attending similar schools where HSAP isn't operating. A small qualitative component (interviews with key Programme implementers) was added to provide context to the analysis.

The evaluation found that learners achieving regular and consistent attendance (R&CA) at HSAP performed better in languages and mathematics than their counterparts at the same schools not attending HSAP, and at other schools without HSAP. The change in mathematics marks is significantly better for HSAP learners compared to learners from both their own school and other schools. While all learners' Maths marks tend to drop between grades 6 and 9, HSAP learners show only a small drop of between 4-6% while other learners drop between 10-11%. HSAP learners with two years of support show the best mathematics results at the end of grade 9. HSAP learners are twice as likely (36%) than other learners (18%) to write pure Maths for matric, while 43% of learners who participated in HSAP over two years wrote grade 12 pure maths. They also performed significantly better than their counterparts in both matric maths and maths literacy. This is a similar finding to that of the previous evaluation of the 2016-2018 cohorts.

HSAP demonstrated a remarkably adaptive approach to lockdown and school closures. The implementing partners quickly shifted to WhatsApp tutoring, and OLICO launched a WhatsApp Maths hotline, available to learners from 9am to 9pm, reaching many more learners beyond the Programme, with capacity to reach millions across the country. HSAP's accelerated learning approach is well-suited to addressing learning backlogs and losses, and is well-positioned to do so for many more learners as the system deals with ongoing rotational timetabling and increasing heterogeneity in classrooms.

Poor academic performance in quintile 1 to 3 schools, and particularly in mathematics, is driving inequality in South Africa. There is an urgent need to dramatically increase the number of learners selecting maths for matric (as opposed to maths literacy), and improving performance in the NSC. The better learners perform in matric maths, the more eligible they are to access tertiary education and fields of study that lead to employment opportunities for which there is high demand and good remuneration. To redress racial and class inequality, and build a strong society and economy, South Africa desperately needs literate, numerate, and mathematically adept citizens to become parents, teachers, employees, customers, policymakers, scientists, engineers and entrepreneurs. However, with just over 40,000 learners from quintile 1 to 3 schools *across the entire country* achieving mathematics scores over 50% *before* COVID-19, the country is currently haemorrhaging its much-needed talent.

This pilot has demonstrated not only that the HSAP model can help learners defy these odds, but that it can continue doing so in the face of school closures and increased learning losses. Thanks to the strong cross-sector partnerships; innovative use of ed-tech; robust and responsive MEL; and strong buy-in and support from schools, HSAP is now poised for scale and well-positioned to address some of the biggest challenges facing the education ecosystem.



2. About the High School Academic Programme (HSAP)

2.1 HSAP summary

The High School Academic Programme (HSAP) is a partnership between the Western Cape Government and several NGOs. The Programme offers after-school academic support, focused predominately on grade 8 and 9 learners in Western Cape schools. In 2019 the Programme was delivered by the following NGOs, working in partnership with the Western Cape Education Department (WCED), to provide the Programme in seven schools:


| Delivery partner | School | Runtimes |
|--|-------------|---------------|
|  | Manyano | Twice a week |
| | ID Mkhize | |
| | Intshukumo | |
|  | Inkwenkwezi | 3 days a week |
|  | Rosendaal | Twice a week |
| | Heideveld | Twice a week |
|  | Phoenix | 4 days a week |

Table 1 Summary of HSAP partners, schools and runtimes

The 2019 the Programme consisted of two components, mathematics (maths) and literacy.

Mathematics: The implementing partners followed, or strongly aligned, to the OLICO mathematics Programme. This Programme includes a blend of tutoring and technology to support mathematics education by building on the foundational understanding of mathematics and improving number fluency. While still curriculum aligned it is not homework support.

Literacy: The literacy component was much smaller and focused on fostering a love for reading rather than being curriculum related language education. This include sharing stories, discussing the stories (like a book club) and doing reading comprehension. This Programme also involved a blended approach of online and in-person support.

2.2 Relevance of the Programme

The South African Education system, even prior to the recent shock it received due to the COVID-19 lockdown, was described as “Broken and Unequal” by a 2020 Amnesty International report. The report concludes that the South African education system, characterised by crumbling infrastructure, overcrowded classrooms, and relatively poor educational outcomes, is perpetuating inequality. In fact, it goes as far as condemning the South African education system for violating its own constitutional, as well as international human rights obligations¹.

The education system’s challenges have long been documented, particularly regarding performance in mathematics. According to the recent 2019 Trends in International Mathematics and Science Study (TIMSS), which assesses the maths and science knowledge of fourth/fifth and eighth grade learners around the world, South Africa continues to be one of the

¹ Broken and Unequal: The state of education in South Africa. Amnesty International 2020.
https://amnesty.org.za/wp-content/uploads/2020/02/FINALBrokenAndUnequal_FULLREPORTredu_compressed.pdf

lowest performing. TIMSS found that just over a third of grade 5 learners have acquired basic mathematical knowledge, and just 28% have basic science knowledge².

Along with the falling marks in mathematics, the introduction of math literacy as a choice over “pure maths” has further reduced the pool of students who could be studying Programmes in mathematics and science. While the 2019 matric results were celebrated for its overall increase in pass rate, Shay³ points out that mathematics performance itself declined. First, there was a reduction in students writing Pure Maths, from 270,516 in 2018 to 222,034 in 2019. Secondly, only 54.6% of the pupils who wrote the exam passed it. This pass rate is down from 58% in 2018. This further decreased in 2020 to 53.8%. Unfortunately, due to the extremely high levels of inequality in the system, the far majority of these maths passes emerge from quintile 4 and 5 schools, despite over 70% of learners being enrolled in quintiles 1 to 3.

The problems with mathematics education are not being addressed sufficiently at a National Level. The average maths scores of 374 found in TIMSS 2019 is not better than the 376 from the TIMSS 2015. Interventions in the field of maths and science are greatly needed.

2.3 HSAP Theory of Change

The HSAP Programme Theory of change (ToC) holds that the provision of regular academic after school support to learners in grades 8 and grade 9, focusing on building number fluencies, comprehension of foundational concepts and enjoyment of reading, leads to better mathematics and language skills. In addition, the personal connections formed with tutors promotes an increase in self-confidence, improvements in attitudes towards learning, and a decrease of risky behaviour.

These outcomes are expected to lead towards better academic performance, particularly in mathematics (but could have further impact in other subjects), as well as decreased likelihood of school dropout. Ultimately, the longer-term impacts include better performance on the NSC.

Figure 1 shows a visual representation of the ToC

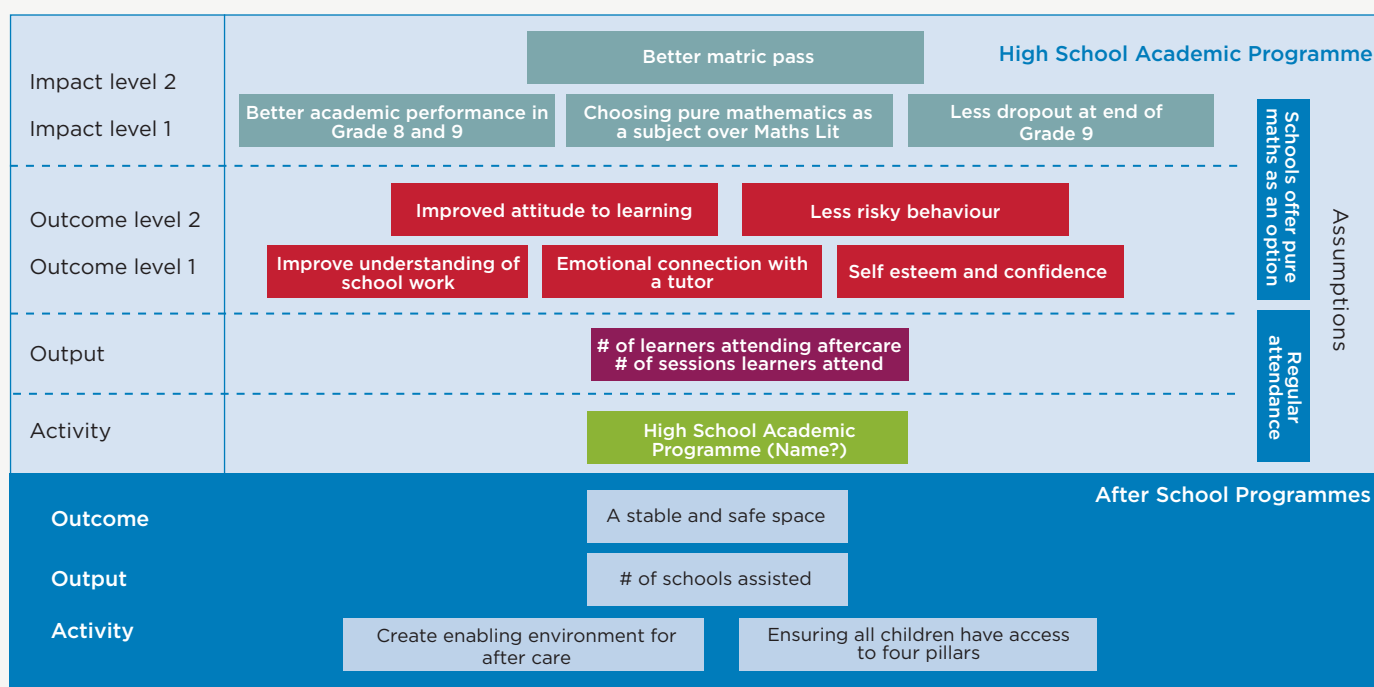


Figure 1: HSAP Theory of Change diagram

² <http://www.hsrc.ac.za/en/media-briefs/general/timss-2019-grade5-study>

³ <http://www.news.uct.ac.za/features/teachingandlearning/-article/2020-01-10-why-south-africas-declining-maths-performance-is-a-worry>

Implementing partners OLICO and Ikamva Youth both strongly believe that to effect a change in matric maths marks, learners need assistance from at least grade 8 or 9. At this stage, learners might still be able to catch up on key mathematics concepts they may have missed in primary school.

In overcoming learning backlogs in grade 8 and 9, OLICO adopts elements of “accelerated learning” as opposed to pure remediation, by focusing on a selection of key concepts and core fluencies to make grade 8 or 9 maths accessible to learners. In the acceleration approach one takes a grade level topic area and tracks back to the prerequisite and foundational material required for that topic. This foundational material is then taught coherently connected to the current grade level topic. This involves getting to grips with the thorny problem of determining and addressing foundational concepts, key ideas and pedagogical approaches. It also means identifying which aspects of grade 4, 5, 6, or 7 maths can be backgrounded while still ensuring learners with poor preparation in primary school can access high school mathematics.

In addition, young learners establish good habits in terms of after school commitment to academic work. During the interviews with these partners, they expressed the opinion that younger learners are not as attuned to the importance of academic performance, and careers are still far from their minds. Yet this is an important time to bring their academic performance up to standard. University students, who are the tutors on this Programme, act as role models and shift learners’ aspirations and perceptions about the importance of schoolwork.



3. About the 2019 Evaluation

3.1 Main aim of the 2019 evaluation

The main purpose of this study is to examine the evidence of HSAP's ability to create positive impact in terms of academic performance in grades 9 and 12.

Three main hypotheses are tested in this study:

- HSAP has a significant positive impact on academic performance in grade 9.
- HSAP motivates learners to select pure maths in grade 10.
- HSAP helps learners perform better in grade 12.

A fourth research question, exploring whether HSAP helps motivate children to stay in school, was considered but could not be included owing to a lack of available data.

3.2 Evaluation design

As the evaluation's main goals are centred around the impact level, the study falls in the sphere of an impact evaluation. This summary report therefore only touches lightly on the outputs and outcomes levels of the ToC, in sections 3 and 4. Section 5 of this report contains the bulk of the findings and addresses the three main hypotheses. Section 6 presents a brief view on the sustainability of the Programme and the report concludes with issues for consideration going forward.

3.3 Methodology

Quantitative data was used to investigate the main research questions. A small qualitative component was added to provide context to the analysis.

Quantitative analysis

To test whether an initiative helps to improve academic scores, having pre- and post-intervention academic performance for both the test group and a control group/s are ideal. While this data is not available in the traditional format (i.e., tests specifically conducted for this purpose), the systemic tests written by Western Cape learners in grades 6 and 9, and matric final exam data do provide easily accessible and comparable sources of data that can be used to test the study's hypotheses.

- **Measuring academic progress at the end of Grade 9**

The WCED introduced systemic testing in mathematics and language in 2001 but were updated in 2011 with the help of the Centre for Evaluation and Assessment (CEA). The tests are internationally benchmarked and administered, marked, and moderated externally to ensure objectivity and to provide a credible and relevant benchmark for evaluation.

- **Measuring likelihood of taking pure mathematics over mathematic literacy**

The choice to select pure maths as a subject rather than mathematical Literacy is made by grade 9 learners going into grade 10. As this evaluation was unable to access grade 10 data, NSC data were used instead. The percentage of learners from the HSAP participating group who write pure mathematics in matric is compared to that of the overall percentage for the Western Cape. The matric data from 2019 and 2020 are used in this study.

- **Determining if HSAP learners receive a better Matric pass**

The 2019 and 2020 NSC results for mathematics and languages were compared between learners enrolled in HSAP and learners not enrolled in HSAP.

The counterfactual

Data was available for two control groups: (1) learners attending the same schools but not enrolled in HSAP, and (2) learners from different but similarly-performing schools. The figure below plots the HSAP schools, from which control groups 1 and 2 were drawn. Grade 9 systemic data and 2019 and 2020 matric data were obtained for most of these schools.

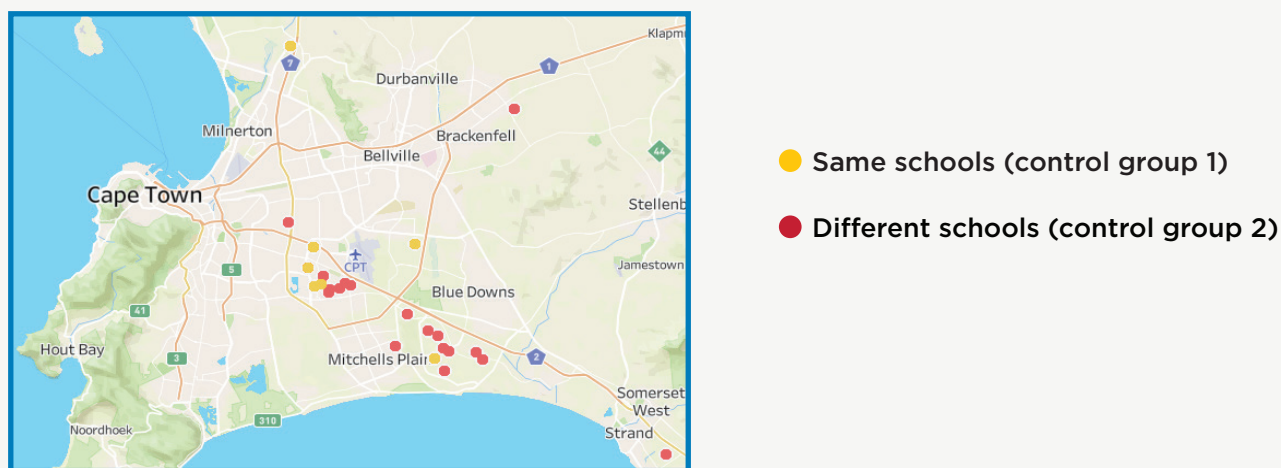


Figure 2: Map of school locations from test and control groups

Qualitative research

The qualitative research took the form of in-depth interviews with the two main implementing partners involved in the projects in 2021, namely OLICO and IkamvaYouth. Four interviews were conducted at management and school coordinator levels. The interviews centred on the relevance of the Programme, the key success factors, and changes in the Programme over time. The findings from these interviews are integrated throughout this report.

3.4 Limitations

While the criteria for being considered as “on the Programme” is set at 6 sessions over the course of the year, learners do not always participate in the Programme throughout the entire year. Some drop out after one or two terms, while others join halfway through the year. The effect of this will be tested by examining the results relative to various levels of attendance.

Further, only learners for whom CEMIS numbers are recorded can be included in the analysis as these unique registration numbers allow linking of academic results to attendance on the Programme. As the Programme monitoring data sometimes fail to report CEMIS numbers, some of the learners in the test group are excluded from the analysis, effectively reducing the sample size.

Systemic grade 6 data received from WCED contains data for only the HSAP learners and a random selection of other primary schools. This limits the number of test and control school learners – who are all now in high school – for whom grade 6 data can be obtained. As the grade 6 systemic data comprise the “pre-test”, this reduces the sample for comparative analysis.

Similarly, as data is only available for learners enrolled in HSAP schools and a limited set of other schools, the study is unable to draw conclusions about HSAP learners who were not in the matric data set.

4. Outputs from the 2019 HSAP

In 2019 the HSAP served a total of 773 learners over the course of 2019. In total, 455 grade 8 learners were assisted, and 294 grade 9 learners. While the Programme focuses on these two grades, a few grade 10 learners were enrolled in Heideveld and Phoenix.

Depending on the Programme and the implementing partner, learners can attend between 2-3 sessions a week during the school calendar. Multiplying the learners by the sessions held, a total of 28005 touchpoints were created by HSAP. Each of these touch points allowed a child to engage with academic content, mentors, and their peers.

KEY STATISTICS

773 learners helped in 2019

In total **28 005 touchpoints** with learners

85% of learners attend for at least half the year and

4 in 10 attends for a full year

Participation in the Programme is voluntary, and learners might leave the Programme when they want to. In addition, when learners show insufficient commitment to the Programme, they might be asked to leave to make space for others. Hence, not all learners attended the entire Programme throughout the year. HSAP schools record daily attendance per learner, allowing for the calculation of Regular and Consistent Attendance (R&CA). R&CA is an index of attendance that takes consistency into consideration, as well as the absolute number of sessions attended. R&CA is calculated by taking the number of weeks that 2 sessions were attended on the Programme, expressed as a percentage of available sessions (set at 24 weeks in a year).

The number of learners on the Programme, and the average R&CA for each school is shown in Table 2 below.

The Programme tends to attract more girls than boys. In the grade 9 sample this is a 65% female to 35% male split. In addition, girls tend to have a higher attendance record than boys. The Programme implementors explained, during the qualitative interviews, that some boys in grades 8 and 9 are not yet particularly focused on their academic success and that sports, such as Rugby, compete for their time after school. There is less competition for girls' time after school at this age.

The following additional key factors drive attendance:

- Safety concerns: some schools are in less safe areas and learners are concerned about walking home alone later in the afternoon.
- Parent support: not all parents support their children's need to improve their academic marks by staying after school or understand the need for regular attendance.
- The tutor: it is important that the learners and their tutors get along well. As the Programme is voluntary, an abrasive or less personable tutor might cause learners to drop out. Learners "vote with their feet" explains one interviewee.

The grade 9 HSAP cohort is comprised of learners who return after participating in the Programme in grade 8, as well as those who join the Programme only in grade 9. In 2019, nearly half of the grade 9 learners (49%) returned after having participated on the Programme in grade 8. This cohort is analysed separately and referred to as HSAP Multi-year. While late joiners are generally discouraged as a fuller year of the Programme is more desirable, late joiners in grade 8 are more accommodated given that they can continue into grade 9.

| | Grade 8 | | Grade 9 | | Grade 10 | |
|--------------------|------------|--------------|------------|--------------|-----------|--------------|
| | # | Average R&CA | # | Average R&CA | # | Average R&CA |
| Intshukumo | 60 | 45% | 43 | 45% | | |
| Heideveld | 70 | 62% | 34 | 62% | 17 | 47% |
| ID Mkhize | 58 | 61% | 57 | 61% | | |
| Inkwenkwezi | 60 | 36% | 60 | 36% | | |
| Manyano | 58 | 63% | 40 | 63% | | |
| Phoenix | 80 | 60% | 21 | 60% | 7 | 85% |
| Rosendaal | 69 | 51% | 39 | 51% | | |
| Grand Total | 455 | | 294 | | 24 | |

Table 2: Distribution of learners on the Programme by grade and school (showing number of learners and average R&CA)



5. Emerging evidence for outcomes

According to the Programme ToC, HSAP learners can be expected to gain a better understanding of academic work, grow in self-confidence, form a connection with tutors, improve their attitude towards learning and engage in less risky behaviour. These changes should then lead to better learning outcomes. While these aspects of the ToC should be more deeply investigated going forward, the qualitative research yielded interesting insights on several of these aspects.

- **The emotional connection to tutors improves outcomes and impact**

This is one of the outcomes most strongly supported by the interviews. The fact that tutors need to connect emotionally with learners has long been considered by implementing partners as a necessity for success. The role of the tutor really came into focus around 2017/2018 when the implementing partners shifted from using volunteers from Programmes such as YearBeyond, whose volunteers are matriculants, to recruiting university students and graduates with a strong understanding of mathematics and to whom these students could look up to.

Tutors are recruited not only for their mathematics abilities but also for personality compatibility. Tutors might even be replaced when they do not get along with a certain cohort of learners. Tutors are recruited as role models for learners, so that learners might see themselves going on to study at university.

Evidence of the strong connection that learners can make with their tutors lies in the fact that some shared sensitive personal information with their tutors. Additional training is needed to ensure tutors know how to deal with this, and have the appropriate information for referrals.

While COVID-19 forced most of the communication between learners and tutors onto WhatsApp during 2020, it appears that the personal connection with tutors were maintained during this time.

Paying tutors a stipend ensures that the same tutors are able and motivated to return, and therefore able to create a deeper connection with learners.

- **Self-confidence**

One participant commented that by improving learners' understanding of the academic content, learners are more willing to participate in class, and ask questions of teachers as well. Peer engagement during these sessions also help to build self-confidence, as a safe space is created for learners to discuss schoolwork with their friends without feeling embarrassed about any lack of understanding.

As the study did not include any interviews or research with learners themselves, no evidence was found in this study to support the assumptions relating to improved attitudes towards learning and less engagement in risky behaviour.

Additional insights which emerged from the interviews that could be considered for inclusion in the ToC include:

- **Computer literacy:** The Programme includes an online component, which affords many learners their only opportunity to work with computers.
- **Training future teachers:** in some instances, the tutors are university students studying to become teachers. Their involvement in the Programme assists them to become better teachers. They might be able to transfer some of the methodologies and approaches used in the program to their classrooms and reach more learners.

6. Impact: The evidence

6.1 HSAP has a significant positive impact on academic performance in Grade 9

To test whether HSAP has a significant positive effect on academic performance, the grade 9 systemic tests results offer the opportunity to compare HSAP learners to other learners. To ensure that the improvement can be attributed to the Programme, and not perhaps to having academically gifted children join the HSAP (our test group), comparing the relative change from grade 6 to grade 9 for different groups of learners provides the most accurate assessment.

Due to the limited grade 6 systemic data available, as outlined above, the test sample contains 108 learners, which is compared with control groups of 485 learners from the same school, and 1734 learners from different schools.

Figure 3 below provides a comparison of test and control groups on the average grade 6 and grade 9 marks, as well as the average change between these two test points. The HSAP learners are split between grade 9 learners from 2019 who were on the Programme in 2018 as well (when they were in grade 8), and those in grade 9 only on the Programme in 2019.

The data shows that learners from the HSAP Programme were able to achieve a greater improvement in their Language marks than other learners in the same school. While still higher, the improvement in Language marks is not as large compared to learners from different schools.

The change in mathematics marks is however significantly better for HSAP learners compared to learners from both their own school and other schools. While the maths marks of all learners tend to drop from grade 6 to grade 9, HSAP learners show only a small drop of between 4-6% while other learners drop between 10-11%. Those HSAP learners with two years of support show the best mathematics results at the end of grade 9.

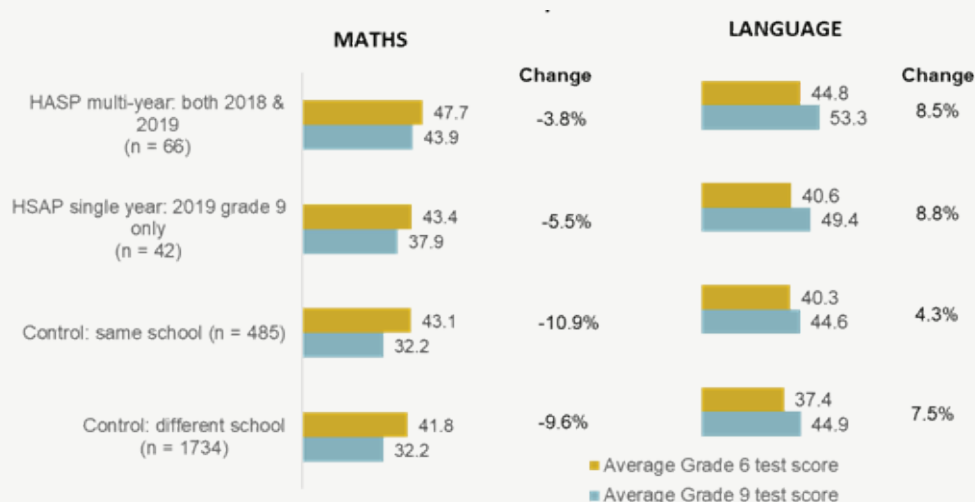


Figure 3: Relative change in Maths and Language marks (from Grade 6 to Grade 9) for HSAP and control group learners

While the two HSAP groups (multi-year and single year) do not differ significantly from one another, the trend is clearly evident that better academic performance is possible with more years of support.

Table 3 provides a summary of the significance tests. The p-values of the independent sample t-tests conducted, between each of the groups, are shown in the table as well as a colour code showing the strength of the test result. Green indicates a larger difference between the groups, and yellow cells are significant at the 90% confidence level. Those not highlighted are not significant.

| | Language | | Maths | |
|------------------------|-------------------|--------------------|-------------------|--------------------|
| | HSAP (Multi-year) | HSAP (single year) | HSAP (Multi-year) | HSAP (single year) |
| Control Same school | p = 0.018 | p = 0.037 | p = 0.000 | p = 0.015 |
| Control Different year | p = 0.581 | p = 0.534 | p = 0.004 | p = 0.046 |

Table 3: Significance testing of average change from Grade 6 to Grade 9 for each group

Figure 4 presents a comparison, at the school level, of the average change from grade 6 to grade 9 for HSAP learners and learners from the same school, but not on the Programme. Phoenix and Rosendaal had too few records to report on.

The study conducted in 2020 on the 2016-2018 HSAP data found similar results, showing a muted result for language and a stronger result for maths. This study also looked at the impact of starting academic level, as per the learners' systemics grade 6 scores. The Programme was found to benefit even those who enter at a low level, although more dramatic improvements are apparent when learners have a slightly better base understanding in maths to work from.

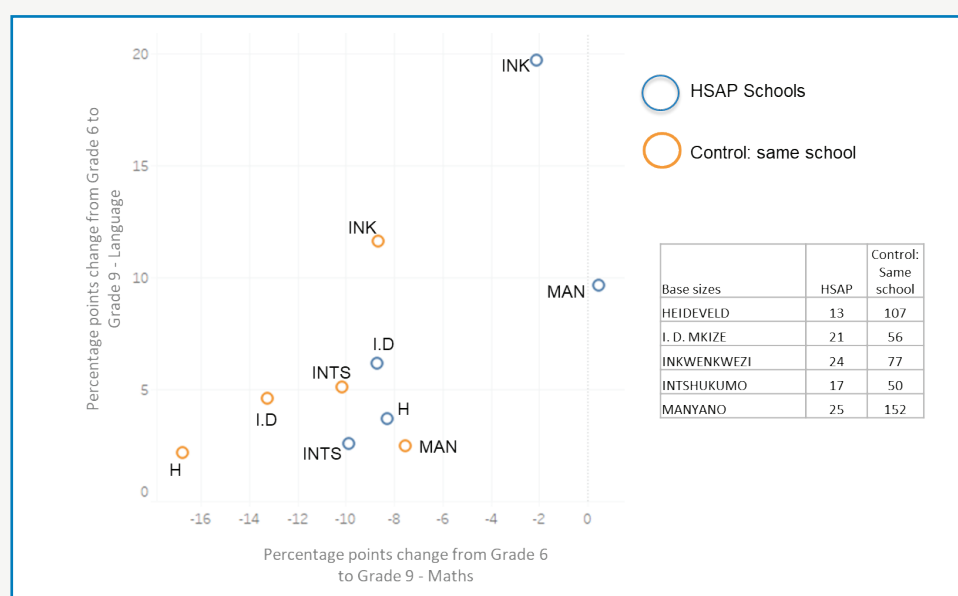


Figure 4: Comparison of average change from Grade 6 to Grade 9 per individual school on the HSAP

In all schools, HSAP learners performed better than their peers, especially with regards to mathematics. An “at school level” comparison is interesting as learners in each school are exposed to the same resources (such as teachers etc.) and probably share additional context.

The study found that both boys and girls benefitted from the Programme by showing an improvement in grade 9 academic performance.

The relationship between R&CA and academic performance was explored through a correlation analysis. A significant positive correlation was observed between mathematics marks and R&CA ($R = 0.296$; $p = 0.002$). This correlation shows that with more regular and consistent attendance, even greater improvements in academic performance are observed.

6.2 HSAP will help to motivate learners to take pure mathematics in Grade 10

HSAP learners from previous years, who could reasonably be expected to matriculate in 2020 and 2021, were compared against learners in the same school as well as to a set of learners from a different school. Of the 302 HSAP learners who were matched to the matric data, 109 learners (36%) wrote the pure maths exam in matric. This is made up with learners on the programme for a single year and those on the programme for multiple years. This compares to 18% among learners of the same school and 19% of learners in the set of different schools. For HSAP learners who joined the Programme in both 2018 and 2019 (multi-year HSAP) this value rises to 43%.

| | Wrote Pure Maths exam in Matric | Total number of learners in group | Taking Pure Math expressed as a percentage |
|----------------------------|---------------------------------|-----------------------------------|--|
| Control: Different schools | 870 | 4 533 | 19% |
| Control: Same schools | 152 | 845 | 18% |
| HSAP single year | 72 | 216 | 33% |
| HSAP multi year | 37 | 86 | 43% |

Table 4: Percentage of learners in test and control groups who take Pure Maths

One of the ways in which HSAP promotes choosing pure maths over math literacy is through improved grade 9 maths results. The data shows that, irrespective of which group a learner is in, learners who wrote the pure math exam in matric had an average of 40-45% on their systemic test at the end of grade 9. Naturally, with better marks in grade 9, confidence in one's ability to pass maths in later grades rises.

The qualitative research findings also indicate that HSAP learners have more confidence to take pure maths, as they know that support is available for them in later grades if they struggle.

Learners who choose pure maths in grade 10 may switch to maths literacy down the line, and so the numbers of learners electing to take pure maths is likely understated in the findings; it is a real testament to the programme's impact that more HSAP learners make it to the finish line in pure maths in matric.

6.3 HSAP will help produce learners with better marks in Grade 12

Not only did proportionally more HSAP learners take pure maths, but they also achieve a better matric pass than their peers. The average matric mark for pure maths is 39% (for those with two years of HSAP support), compared to 32% for their classmates from the same school. Those taking maths literacy also do better than their classmates and learners from the control sample in different schools (44-48% compared to 38-42%). These learners essentially had the same starting averages in grade 6 but ended matric with a slightly better mark in language/literacy and a much stronger pass in pure maths and maths literacy.

Nationally, 54% of the country's matrices achieved a pass mark of at least 30% in 2019. In the schools where HSAP operates, this is down to only 47%. 65% of HSAP learners who were on the Programme for two years were able to achieve this milestone, with 80% of the boys in the Programme achieving this pass mark.

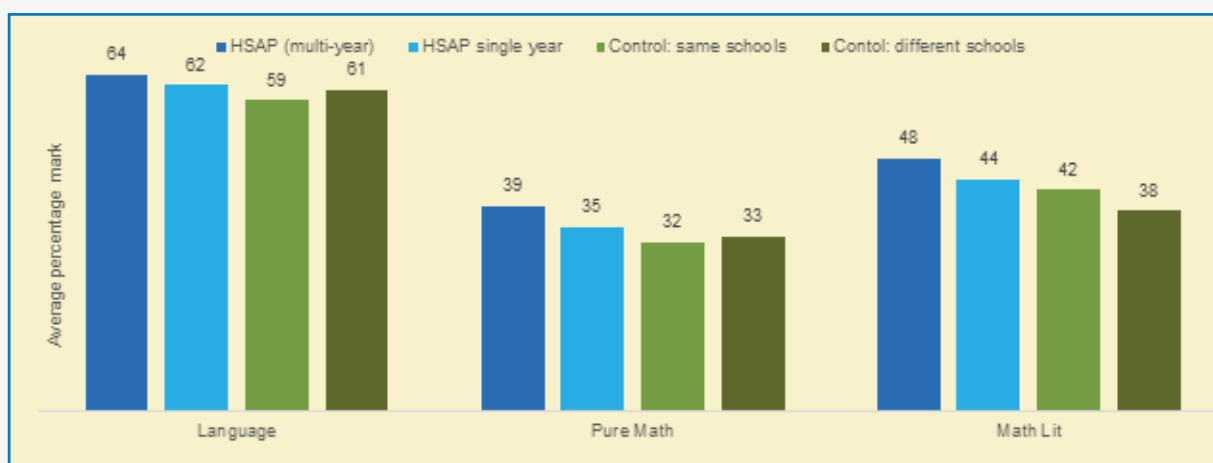


Figure 5: Average matrix 2019 and 2020 results for Language, Pure Maths and Math Literacy

Of all the maths candidates only 2% (4,415) achieved distinctions nationally in 2019. A distinction is a score of 80%-100%. This was down from 2.5% in 2018. In the HSAP schools, and control schools, this value is even lower, and it is at around the 75% mark where learners start to meet the national average. In the HSAP cohort 7% were able to achieve this higher mark of 75%.

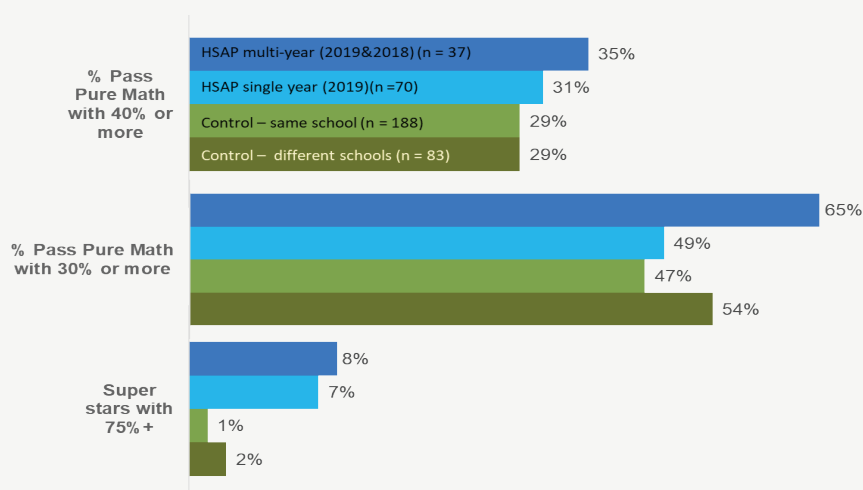


Figure 6: Percentage of learners who achieve a pass mark at 30% and 40% and those achieving excellence



7. COVID-19 Response

HSAP demonstrated a remarkably adaptive approach to lockdown and school closures. HSAP's accelerated learning approach is well-suited to addressing learning backlogs and losses, and is well-positioned to do so for many more learners as the system deals with ongoing rotational timetabling and increasing heterogeneity in classrooms.

HSAP's innovative use of ed-tech and low-cost online engagement is impressive. The implementing partners quickly shifted to WhatsApp tutoring, and OLICO launched a WhatsApp maths hotline, available to learners from 9am to 9pm, reaching many more learners beyond the Programme, with capacity to reach millions across the country. The hotline allows learners to post questions to tutors, many of which relate to homework, which helps the tutors to keep requests for homework assistance from infringing on the delivery of the formal Programme during contact sessions. Currently this WhatsApp line is open to all learners in the school and not only HSAP learners. While it cannot replace the face-to-face Programme, which provides a certain depth of support and important relationship development between learners and tutors, it does help to provide a scalable solution to mathematics assistance for learners. It seems especially helpful in providing a "just in time" response, at the moment when a learner might be doing homework and gets stuck on an issue, the tutors' responses can help remove blockages and allow progress.

OLICO created an avatar of each tutor which looked like a cartoon character, and encouraged the tutors to use a lot of emojis during their communication with learners. This helped to keep learners engaged. IkamvaYouth was able to keep learners connected to their academic work during this time by providing them with smartphones and data that to continue the online portion of the Programme and remain in WhatsApp contact with tutors.

Tutors were able to adapt to the uncertainty and fluctuation of school hours as they themselves received flexibility from the University (for example, their classes were recorded for viewing at home). Even after the hard lockdown eased, scheduling challenges remain as learners do not all attend school on the same day and dismissal times might vary.

As government departments and donors build their plans for catchup, remediation and accelerated learning, the HSAP model provides an effective, scaleable, responsive and adaptive approach to addressing some of the greatest challenges facing the education system, with significant evidence of improved learning outcomes even in 2020.



8. Sustainability

The Programme's sustainability is impacted by school support, availability of funding, and safety and security issues. By 2021 the Programme was only being offered in 5 schools, supported by OLICO and IkamvaYouth. In 2019 Rosendaal decided to stop offering pure maths, impeding the intention of the HSAP. Shawco also stopped offering the Programme, and Pheonix dropped out. Some of the challenges to sustainability that HSAP may face include:

- **School support of the Programme and mathematics:** Principles need to work closely with the HSAP. implementors and align the Programme's objectives with the school's strategy
- **Funding partners:** Consistent and continued support is needed from funders to ensure that Programmes can continue in schools.
- **Safety:** Safety of learners, tutors and the ICT equipment can be a challenge in some areas. In unsafe areas, learners feel pressure to return home shortly after school when the bulk of learners walk home, while tutor safety can be affected by strikes around the school area and even by incidences on the school grounds. Equipment is also not always safe, and some implementing partners go as far as funding security for schools.

However, despite these challenges, there appears to be a silver lining to the havoc wreaked by the pandemic, which has the potential to boost the Programme's sustainability: Donors are now actively looking for interventions that help to reduce unequal learning outcomes and support learners in no and low-fee schools. HSAP has effectively demonstrated its adaptability and flexibility to address challenges on the ground across multiple sites, promoting sustainability in the long run.

9. Conclusion

HSAP is a ground-breaking initiative that has shown what can be achieved when government departments, schools and NGOs collaborate and coordinate. By leveraging university students as tutors and role models to build a pipeline of dreams; low-cost, accessible and innovative ed-tech; robust MEL and evidence-based iteration and design, this programme has been able to deliver improved learning outcomes in contexts where it is notoriously difficult to do so. The initiative demonstrated remarkable adaptivity in response to COVID-19, which is a testament to the partners' commitment and capacity for innovation. Thanks to the strong relationships between implementing partners, schools, government departments, teachers, tutors, parents and learners, HSAP was able to keep learners engaged and learning under lockdown, with impressive results. These results need to be scaled up to many more schools and learners, and the HSAP model presents an exciting opportunity to redress unequal learning outcomes in South Africa's low and no-fee schools.

10. Acronyms

| | |
|-----------------|---|
| CEA | Centre for Evaluation and Assessment |
| CEMIS | Centralised Educational Management Information System |
| COVID-19 | Coronavirus |
| HSAP | High School Academic Programme |
| MEL | Monitoring, Evaluation and Learning |
| NSC | National Senior Certificate |
| NGO | Non-Governmental Organisation |
| R&CA | Regular and Consistent Attendance |
| ToC | Theory of Change |
| TIMSS | Trends in International Mathematics and Science Study |
| WCED | Western Cape Education Department |

