



Green Shoots - a Brief Review Report

Oct 2016



An ETILAB International Report compiled by Prof Dick Ng'ambi and Isabel Tarling

10 October 2016

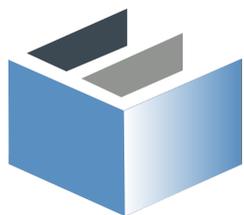
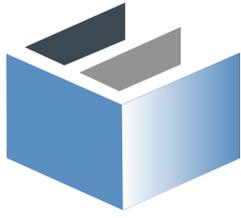


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Executive Summary

This report provides an overview of Green Shoots, a South African Non Profit Company (NPC) established in 2012 with the mission to uplift and empower schools, teachers and learners through innovative interventions that use Information and Communication Technologies (ICTs).

In order to realise this objective, Green Shoots developed a platform called Maths Curriculum Online (MCO). The MCO digitalised the South African CAPs curriculum and augmented it with Brain Quests (i.e. self-paced quizzes with rich per learner data analytics). This real-time personalised per learner tracking data is used to inform planning strategies and decisions to improve Maths teaching and learning. Since 2012, Green Shoots has supported 91 881 learners, 1 968 teachers at 184 schools and after-school centres in South Africa.

At the end of 2015, Green Shoots won the global World Innovation Summit (Qatar Foundation initiative) for Education Accelerator programme (WISE Accelerator). The WISE-accelerator is a programme dedicated to support and develop innovation in education that have a high potential to scale and positively impact learning.

During 2015 they also received funding through Comic Relief to scale up the MCO programme in the Western Cape and the Northern Cape. It is envisaged that 14 500 learners across 32 schools and 300 teachers in the two provinces will be impacted as a result of this. One parent describes her experience with the MCO as:

“MCO is a fun tool to use for the kids and adds great value to their Maths skills. It is also wonderful as a parent to see exactly where your child is: their strengths & weaknesses.” (Sandra Nell, parent of grade 4 & 5 learners using MCO, www.greenshootsedu.co.za)

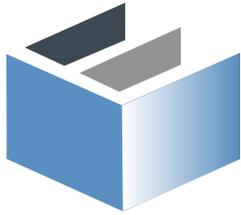
The report concludes that Green Shoots takes a holistic view of education and is one of the few small organisations to have such an impact in a space of three years. Winning of the global WISE accelerator award in 2015 was an international recognition of the unique offerings and impact Green Shoots continue to have. The work done to-date is impressive feat with lessons that can transferred to the rest of South Africa and the continent of Africa in the future.



The primary mission of Green Shoots, established in 2012, is to uplift and empower schools, teachers and learners through innovative intervention that use Information and Communication Technologies (ICTs). Green Shoots develops and designs tech-based education projects that promote systemic change across the education ecosystem, from classrooms to school management to education departments.

Among its various projects, Green Shoots has implemented a CAPS (national Curriculum and Assessment Policy Statement) aligned online maths curriculum to progressively track individual learners and to promote data informed decision making by all role players within the education system. To date, Green Shoots has supported 91 881 learners, 1 968 teachers at 184 schools and after-school centres in South Africa.

In 2015 / 2016, Green Shoots became the only African-based winner of a global EdTech (Global Accelerator Programme) award at the World Innovation Summit for Education (WISE).



Three-pronged strategies

One of the challenges facing the education system in South Africa are low levels of numeracy skills among primary school learners. Green Shoots sets out to address this challenge using a three-pronged strategy: curriculum alignment to online/offline maths activities; real-time personalised per learner tracking; and customised data analysis for education system stakeholders. An overview of this programme is provided in *Figure 1: Green Shoots Model*.

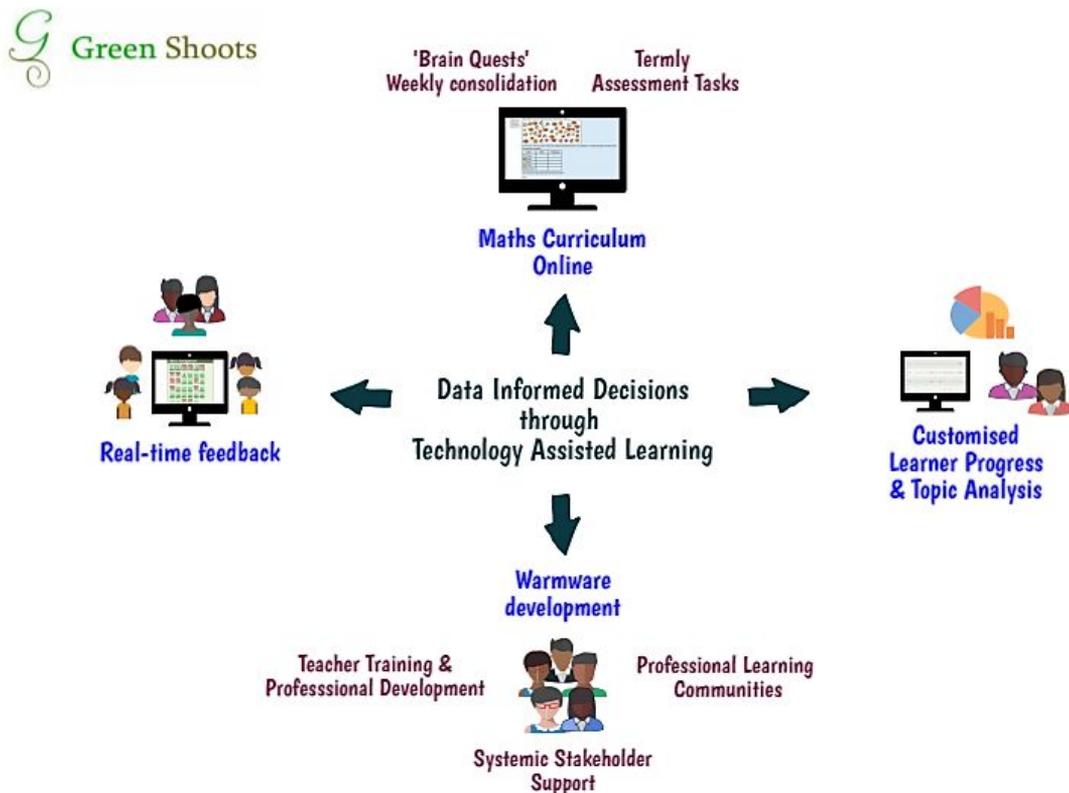


Figure 1: Green Shoots Model

The Green Shoots' Technology Assisted Learning Project is currently in operation in the Western and Northern Cape provinces of South Africa. A primary goal for the project is to improve the quality of teaching and learning of Mathematics in Schools,

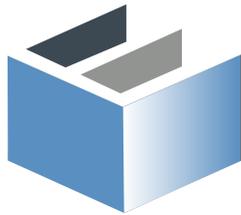
by changing both the teachers and learners attitude towards Maths as a subject, and capacitating school leadership to effectively manage the programme.

Green Shoots provides support to capacitate and develop different role players in the education ecosystem. This strategically involves school management and Education Department officials who through professional development programmes, are capacitated to manage the technology assisted learning project in order to achieve the desired learning outcomes and project goals. The main objective of these training workshops is to encourage school leaders to utilise the real-time personalised per learner tracking data to inform planning strategies and decisions to improve Maths teaching and learning. Teachers are also trained and through various events, Green Shoots works to develop Professional Learning Communities (PLCs) for teachers. These PLCs are also used to gauge teachers' commitment to improve the quality of teaching Mathematics. The PLC is not the only strategy for supporting teachers, Green Shoots ensures that they train a young person at a school whose primary role is to provide some technical support to teachers and to ensure learners become comfortable in using the technology.

Green Shoots' criteria for selecting participating schools take various factors into account. One of these depend on the willingness of a school management to participate in the technology assisted learning project for at least three years and take ownership thereof. Teachers' commitment to participate in the PLCs is another criteria as is the school's willingness to timetable the Green Shoots MCO for all Grade 4-6 learners and allow teachers to engage in the PLCs.

In the past and currently, a number of similar education projects have aimed to achieve similar goals to that of Green Shoots, with varying degrees of success. Green Shoots has drawn various lessons from the implementation and development of these projects, wishing to duplicate 'recipes' for success and avoid pitfalls and mistakes. This has foregrounded the need for measures that include a strong focus on capacity development of teachers through for example PLCs and dependable on-site support for teachers and learners, complemented by an approach aimed at restoring existing computer laboratories and infrastructure (rather than purchasing

everything new it is often possible to restore old or broken computers already at the school). The use of these strategies has alleviated some of barriers in the introduction of technologies in schools, particularly in resource constrained environments.

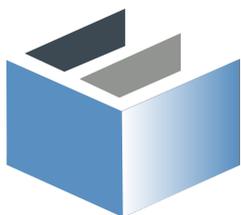


Data driven improvements to practice

The primary mission of Green Shoots is to improve Maths results for learners and the quality of Maths teaching among teachers. These goals are enacted within the constraints of resource-poor environments where learners have limited access to computer laboratories, and where some can only access computers a maximum of once or twice a week for an hour or two.

Green Shoots has digitalised the South African CAPs curriculum on a Moodle platform, and developed self-paced quizzes using Brain Quest. These online / offline tools track learner performance and progress. Data from these are used to provide layers of big data analysis to different education stakeholders.

While the platform is used to scaffold a learner, teachers are provided with useful performance statistics that is able to influence their teaching. At school level, the platform provides a school level summary of performance, hence pointing to areas that still require more work. The same statistics are able to inform Curriculum Advisors where interventions are required in reasonable time to ensure corrective measures can be put in place towards achieving the developing needed for each learner.



Maths Curriculum Online

Specialising in 'technology assisted learning' and innovation within the ICT education environment, Green Shoots developed a Maths Curriculum Online (MCO) (<http://gsesmaths.co.za/mathsonline>) for Grades three to nine that has the capacity to track individual learner progress as they engage in the programme throughout the year.

The MCO was conceptualised as a means to improve Maths achievement through the use of Educational Technologies. It blends structured online Maths courses and assessments to provide learners and their teachers with real-time tracking and regular performance analysis. The programme supports the development of 21st Century Skills as well as skills in the effective and meaningful use of Information and Communication Technologies (ICTs) in teaching and learning. It targets schools, farm centres and after school centres in communities previously disadvantaged by apartheid located and in low income areas. The MCO typically runs on desktop computers, tablet or e-reader computers loaded with the Green Shoots learning materials.

The professional development of teachers is a priority and the programme supports teacher to improve the range and quality of pedagogic methods. Towards this end professional learning communities are developed to equip teachers to confidently use ICTs to deliver Maths and change their pedagogic practices in classroom Maths teaching and learning.

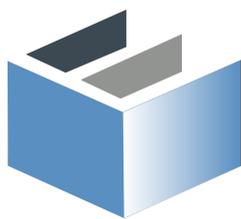
Teaching and learning takes place within a community of a school, and therefore school management becomes a further target for development. A mentorship programme guides principals and school leaders to improve the effectiveness with which the school provides infrastructural support to the Green Shoots MCO as well as ongoing support for teachers and learners in its implementation and delivery.

Since its inception the MCO programme has dramatically increased in size and scope. In July 2012 it provided learning support for only Grade 6 learners (11-12 year olds); barely six months later it had expanded to provide Grade 3 - 6 online materials, assessments and teachers support for the CAPS Maths curriculum in both Afrikaans and English. Since then the MCO has grown to support Gr 3 - 9 learners

and teachers in schools, to supply online resources to after-school centres and children learning on their own through the Maths @ Home initiative. Having developed the core curricular materials, trialed and tested these across Western Cape schools, the Green Shoots MCO programme is now ready to scale its efforts across a greater geographic area to reach far more learners and impact their teaching and learning in a deep and meaningful way.

Starting with the first Grade 6 learners who participated in the MCO in its first year of operation, there appears to be a marked improvement in the Maths outcomes and pass-rates of learners who participated in the programme and equivalent results of learners in the previous year when the programme was not on offer.

When compared to the average increase in outcomes for schools that started the Green Shoots programme in 2012, it appears the increase is dramatic in the first year, and far outperforms comparable national and provincial improvements.



Integrated Maths Programme

The Integrated Maths Programme (IMP) is divided into four components: Curriculum Support (MCO programme, training, in-class support, and PLC sessions); Technical Support (weekly maintenance, issue resolution, remote support); Management Support (customised data analysis, principal meetings and WCEP meetings); and the Youth Support (TTA & ITT, training sessions, in-school mentoring).

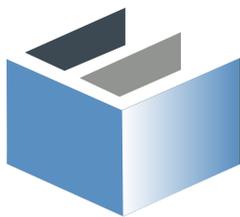
As a programme, IMP describes Schools that use the Maths Curriculum Online Programme and learner performance analytics. Between September 2013 to December 2015, the IMP was used in five (5) schools in the Franschhoek Valley involving 1,636 learners, 33 teachers, 10 school management, 5 schools and 9 youth development posts. In the study of the ANAs and Systemic results for the period of 2013-2014, IMP helped increase the Grade 6 pass percentage in both National ANAs and provincial exams.

In an anonymous survey of 113 primary school Maths teachers from the IMP, 81% (91 teachers) report to have increased the number of methods they use to teach mathematical concepts; and 80% (90 teachers) report that the programme made teaching mathematics more interesting. However, only 58% (65 teachers) report to have improved their confidence in teaching mathematics. This finding is significant in that it suggests a need to understand how IMP teachers build confidence in teaching mathematics.

In another survey involving 162 primary school teachers, in response to a question on what improvements teachers had seen in their learners since they started to use IMP, 50% report to have observed that most learners engaged with more concentration when using the technology 'to do sums', 49% of most learners engaged more in Maths, but only 37% of most learners had confidence to try new questions/concepts.

It would appear that factors that contribute to low confidence among learners to explore new questions/concepts and low confidence among teachers to teach Maths, still need to be understood in greater depth.

One of the significant impacts of the IMP is on how that data from the IMP has changed interaction with peer-teachers concerning Maths: identifying problems in learning within their Grade (93%); reviewing class progress within a Grade using data (88%); reviewing learner progress within a Grade using the data (87%); and regularly sharing strategies / ideas (86%). It could be inferred from this data that the primary use of the IMP is to ensure that identified problems are resolved, hence it may be more productive to support learning activities more so than supporting the sharing of ideas or teaching strategies in PLC.



Current and Ongoing Projects

The Green Shoots programme has supported learning in a number of school districts and education funded initiatives. Working with the Rupert Education Foundation, Green Shoots worked in five Franschoek valley schools, providing the MCO programme, training, classroom support and PLC sessions for teachers. Its technical support provided weekly maintenance, issued resolution and remote support; while the management support provided customised data analysis to key role players at principal and WCED meetings. The youth development initiative created posts for Technical Teacher Assistants and IT Technicians who received in-school mentoring as part of their ongoing development. In total 1636 learners, 33 teachers and 10 management staff at 4 primary and 1 high schools were reached, and 9 youth development posts created.

The Zisukhanyo Schools project (ZSP) in 2013 / 2014 saw the Green Shoots MCO implementations in 16 schools, reaching 8427 learners and 152 teachers, while creating a further 25 youth development posts. An external evaluator of this project noted:

“The ZSP approach and technology support are now institutionalised in all schools visited. Clearly the learning process and teacher professional lives have changed for the better as a result of ZSP. With regard to the learners, there is strong evidence that the ZSP has resulted in real improvements in numeracy...it can be concluded that the ZSP has resulted in significant improvements in Grade 6 numeracy levels.”

Dr J. Miller, External Examiner for the ZSP project.

Through the Million Rand Challenge in 2013, a further 1422 learners and 28 teachers in 3 schools were reached.

At the end of 2015, Green Shoots won the global WISE-Accelerator award for the Green Shoots MCO project. The global World Innovation Summit (Qatar Foundation initiative) for Education Accelerator programme (WISE Accelerator) is a programme dedicated to support and develop innovation in education that have a high potential to scale and positively impact learning. (www.wise-qatar.org/wise-accelerator).

During the same year they also received funding through Comic Relief to scale the MCO programme to 14 500 learners across 32 schools and 300 teachers, in the

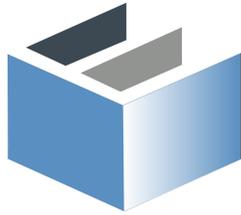
Western Cape and the Northern Cape provinces of South Africa. The project started in 2016.

The aim of this project is to implement technology assisted learning to improve the quality of Maths education in 32 schools¹. In the 36 months in which the project will be operational (2016-2018), 14 500 learners and approximately 300 educators will benefit, with at least eight youth development posts created to support the implementation thereof. The Green Shoots Comic Relief Project (GSCR) consists of four key components: a) curriculum and pedagogic training and support for educators; b) youth development in terms of eight created support posts; c) the provision of technical support to resolve issues; and d) the provision of the online maths curriculum (MCO). Thus 14 500+ learners in 32 schools will access the MCO, complete weekly (or regular) online tasks relating to the required CAPS outcomes, which will be auto-marked and results immediately made available. They start with a baseline assessment and are formally assessed once a term. All results are available to teachers and/or professional learning communities, school management and Education Department officials as customised progress reports.

In total, the Green Shoots MCO programme through the four main project areas, have impacted 47 schools, 486 teachers, more than 22 500 learners and created approximately 42 youth development posts. This is illustrated in the table below:

Project	Rupert Education Trust	Zisukhanyo Schools Project	Million Rand Challenge	Comic Relief Project	Total
Schools	5	16	3	32	47
Teachers	33	152	28	300	486
Learners	1 636	8 427	1 422	14 500	22 509
Youth Development Posts	9	25	0	8+	42+

¹ <http://www.greenshootsedu.co.za/comic-relief.html>

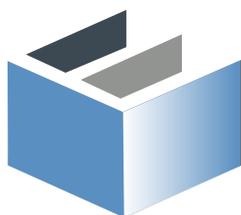


Limitations and challenges

Although Green Shoots generates rich data per learner that has potential to influence and enhance decision making at both district and school level, the exploitation of this data by district officials and principals is not yet fully realised.

While there is a growing uptake of the Green Shoot initiatives in schools and by teachers, there are no instruments to measure impact. For example, anecdotal evidence shows that schools that use the MCO performed better in the ANAs than schools that did not, but improvement in ANA results is not purposely targeted as an intended outcome, and therefore baseline data is not gathered for subsequent comparison purposes. Also the improvement in learners' outcomes who participate in the Green Shoots MCO, is reflected in the overall ANA and/or WCED Literacy and Numeracy standardized scores. Hence comparing Green Shoots data purely to these scores may be problematic.

Green Shoots frequently conducts surveys among teachers and learners, but questions in these surveys have not been effective in uncovering why things work the way they do, which makes it difficult to use these results to inform a scaling up strategy. There is therefore a need for a guiding framework to inform feedback surveys.



Conclusion

This report has provided an overview of Green Shoot's innovative initiatives that leverages existing technologies in schools to support both teachers and learner with providing rich decision making data analytics. Given the government's drive to improve the quality of Mathematics education, limited support for Maths teachers,

and inadequacies of both School and District managers to have access to learner based performance data, the work of Green Shoots is poised to make key contributions to the changing education landscape in South Africa.

In the space of little more than 4 years (2012-2016+) Green Shoots has impacted through its various collaborative projects, 91 881 learners, 1 968 teachers in 184 schools. Its three-pronged strategy that capacitates school leaders through mentoring and support teachers' professional development through PLCs, whilst providing technical and on-site support, distinguishes Green Shoots from technology deterministic approaches that fronts technologies as a panacea for education challenges. This is evidenced through the provision of more than 40 youth development posts, employing unemployed young people and upskilling them to manage the MCO and provide onsite, dependable support for teachers and learners.

Another key initiative has been Green Shoots' provision of an after school programme, extending the existing provision of services from the MCO to the Maths @ Home program and involving parents and other key role players wherever possible. It can be inferred from these strategies that Green Shoots takes a holistic view of education and is one of the few small organisations to have such an impact in a space of three years.

The winning of the global WISE-Accelerator award in 2015 was an international recognition of its unique offerings and impact it continues to have.

Finally, the work reported here is an impressive feat especially considering that the company is only in its fourth year of existence, with plans to impact the rest of South Africa and the continent of Africa in the future.

LAST UPDATE: 28 October 2016 @ 08:30