

# What made the difference?

## Background

SchoolNet South Africa is a non-profit organisation whose goal is to create communities of teachers and learners using ICTs to enhance teaching and learning. SchoolNet believes in improving existing pedagogies by providing innovative classroom activities that harness new technologies, which promote higher order thinking skills, and ignite a spirit of enquiry among learners.

The Learning Gains through Play (LGP) project focuses on the development of foundational literacies in Grades R and 1 through the innovative use of technology-enabled, learner-centred play in ten schools from the two provinces of KwaZulu-Natal and the Western Cape.

The purpose of this learning brief is to share the findings of the first evaluations of learner performance one year since the baseline findings and to relate these findings to the factors that could have influenced learning gains. We consider the extent to which teachers have been engaging learners in the use of technology and whether this 'dosage' of exposure has influenced learning outcomes as well as the ultimate aims of the project. We document the extent of professional development undertaken by teachers in project schools and try to establish whether the dosage that they have received thus far is sufficient to already have had a positive effect on learning gains.

## Rationale for LGP

*"... if the rudiments of reading, writing and calculating are not firmly entrenched by the end of Grade 3, then both learning opportunities and the larger life chances of young citizens will be curtailed."*[1]

A lack of meaningful learning in Foundation Phase results in conceptual gaps which widen with each successive year and prevent progress and success in Intermediate Phase, Senior Phase and beyond. Research on the acquisition of these literacies is available from this link. <https://goo.gl/sZEK9>

In the Learning Gains Through Play project, Intel tablets loaded with carefully selected apps are integrated in learning activities to stimulate and enhance: visual literacy skills (such as visual recognition, discrimination, interpretation such as sequencing, and visual memory); fine-motor skills ('new' skills such as pinching, dragging, stretching and pinpointing to improve traditional skills such as drawing and handwriting); and early number sense and numeracy skills using specific target apps. Xbox Kinect game consoles use data-projectors and TV screens to engage learning through play and provide further opportunities to develop, practice and consolidate these important 21st Century skills along with gross-motor skills of locomotor and non-locomotor movement and object-control skills. As the apps and games use the medium of English, there is the added benefit of the acquisition of oral English skills, which is vital for the transition from Foundation Phase to Intermediate Phase. The attitudes of motivation to learn, enjoyment of learning and confidence in learning are sought through the project's focus on the use of play.

## Teacher Professional Development

All Grade R and Grade 1 teachers from project schools in both provinces attend clustered training sessions at central venues. There are 53 teachers, 30 in the Western Cape and 23 in the KwaZulu-Natal. The course being studied is the ICT4RED Teacher Professional Development with Tablets.<sup>1</sup> There is one Games-Based learning module designed specifically around the effective use of the Xbox Kinect. Teachers have completed 8 modules. By the end of 2015 they will have completed all 10 modules. This slow workshop dosage has been deliberately incremental, allowing for ongoing classroom visits and teacher support from the project team.

Due to the late delivery of learner tablets, teachers were able to become familiar with their own tablets over a longer than expected period before they had to manage the use of learner tablets. This was an unplanned advantage. During the baseline data collection, teachers were surveyed on their exposure to technology. Few teachers had heard of 'tablets' let alone touched one. There are now many teachers who confess that they cannot live without their tablets.

*".. I am 52 years old and had never touched a tablet before the project came to the school. Now I am using it all the time and for everything such as email, taking photos and videos. I really enjoy making collages of photos."* [Ms Noxolo Buyeye, Solomon Qatyana Primary, Western Cape](#)

*"It was my first time to experience technology ... I was scared but now I am becoming comfortable and I can perform certain things using my tablet like making a video, making a slideshow of pictures (...) and music ... I have found Share it App very useful to transfer from my tablet to learner tabs."*  
[Ms Nomawethu Mpite, Nomsa Mapongwana Primary, Western Cape](#)

*"This project has changed my life, since I'm new as a grade 1 teacher, I'm able to find suitable Apps for learners which makes my planning much easier. I have found out that there is a link between their*

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<sup>1</sup> CSIR, ISCT4RED *Professional Development with Tablets* (2013)

*school work and the Apps available in my tablet.* [Ms Zandile Khafula, Christmas Tinto Primary, Western Cape](#)

## **Learner Performance in Year 2 of the Project**

A detailed summary of the findings following the analysis of learner testing in 2015 will be published as soon as it has been shared with the schools concerned.

Baseline data was collected from June to September 2014 for literacy skills of Grade 1 and Grade R learners in the 12 schools. These first tests targeted the following skills: visual literacy skills including emotional literacy, English oral communication skills, gross-motor skills and fine-motor skills. Follow up testing was conducted in the same schools in year 2, from June to September 2015 but an additional test for numeracy was included. The numeracy test was included because it had started to become clear that the use of the technologies was influencing improvement in performance across a range of literacies.

In both years of the project, we have tested Grade R and Grade 1 learners and in 2016 Grade 2 learners will be added. There can obviously be variations in the skill levels of cohorts of learners from year to year because they are different children. Therefore the one cohort that will have been tested in each year of the project will be Grade R learners in 2014 who were in Grade 1 in 2015 and who will be tested when they become Grade 2 in 2016.

### **Visual Literacy**

Although results were compared from different groups of children, Grade 1 in 2014 and Grade 1 in 2015, it was interesting to notice that the baseline average of both project schools and controls schools was the same. If we follow our cohort of Grade R from year 1 to Grade 1 in year 2, it might be expected that there would be improvement from Grade R to Grade 1 as a natural progression without the intervention of learning technologies. It might also be expected that this improvement would be most marked between Grade R and Grade 1 as formal reading of text begins in Grade 1. The fact that the average achievement in project schools and control schools in 2014 was the same in the baseline test, highlights the 2015 improvement in visual literacy in the project schools. In overall visual literacy, these same learners improved by 28.7% compared to 16.7% in the control schools over the course of the year. There is no doubt that there have been large and important learning gains in visual literacy. It could be said that there are more opportunities to increase visual literacy skills using the technologies of tablet apps and Xbox games.

### **Oral English Acquisition**

Seven of the ten project schools use mother tongue for instruction through Foundation Phase and then switch to English in Grade 4. We anticipate that the acquisition of English through the use of the tablet apps and Xbox games could make this language transition easier. If we follow our cohort, all schools showed improved oral English skills from Grade R to Grade 1 which was expected. However the overall English oral skills measured in the project schools improved by 11.5% compared to an improvement of only 5.2% in the control schools.

If we consider the oral language stages<sup>2</sup>, the project cohort shows more than twice the improvement than the control cohort shows. The number of children rising up to a new oral language stage in the project schools has more than doubled. The Learning Gains through Play project in 2016 offers the opportunity of enabling more learners to reach the Stage 3 Speech Emergence Stage before they switch to learning all of their school subjects in English.

### **Gross Motor Skills**

Gross-motor skills are assessed through observing the learners performing physical tasks. These CAPS prescribed tasks involve body awareness and control, spatial awareness and orientation, static and dynamic balance, laterality, coordination and rhythm. From 2014 to 2015 project school learners showed an increased improvement (11.4%) in gross-motor skills compared to the control school learners (4.8%). These gains were largely due to the KZN schools whose learners improved by 17.4% compared to the Western Cape learners who improved by 6.2% (and the control school learners by 4.8%). Analysing these gross-motor skills in further detail shows that the same patterns are evident across all learners but the project learners are mostly out-performing the control learners.

### **Fine Motor Skills**

Even when comparing different groups of learners, it is interesting to see that both 2015 project school groups (Grade R and Grade 1) showed increased achievement from 2014 to 2015, while the control schools results were the same as the year before. Considering the cohort we followed from 2014 to 2015, the control group gives an indication of what that expected improvement might be. For both project and control groups, the improvements were in fine-motor execution (the lower level ability to perform the skill), rather than fine-motor quality (the higher level quality of the performed skill). The improvement in fine-motor skill execution in project schools of 18.6% is better than the 14.4% improvement in control schools. Fine-motor skill quality remained constant for both project and control learners in the successive grade. It will be interesting to assess this next year when learners are in Grade 2 as it may be normal developmental progress that produces improvement in fine-motor execution at the expense of fine-motor quality at this age.

### **Numeracy Skills**

Numeracy skills were added to the project evaluation only in 2015. This was because a wealth of learning opportunities afforded by the technology had become apparent. Surprisingly this baseline reflects some progress already achieved by schools that have been using the technologies. It is noteworthy that unlike the baseline tests conducted in 2014 in the other foundational literacies, the project school learners are achieving better than the control school learners in all areas except communicating numbers. This area involves the writing of recognizable number symbols, and significantly this is the only numeracy skill that is not developed by the tablet apps and Xbox games.

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<sup>2</sup> Cruz Corina, (2007). [https://www.youtube.com/watch?v=Eoca1Ou\\_6TE](https://www.youtube.com/watch?v=Eoca1Ou_6TE) Fordham University and Krashen, S <https://www.youtube.com/watch?v=WIRIUIQRx5M> Language Acquisition Theory ( 2012)

## So, what has made the difference?

To evaluate changes in teacher professional development we used a Classroom Observation, Lesson Plan Rubric and Teacher interview instrument. Teacher interviews indicated that the frequency of technology use during the year in class had varied from school to school but overall had increased over the duration of the project. There are a number of factors that have influenced this usage:

1. **Peer support** - Teachers who struggle but receive support from their peers become motivated to continue using technology,

*"I have difficulties in quickly grasping what was learnt from the workshops however my colleagues (Zandile Khafula & Mr Mzwandile Nkohla) support and assist me to catch up."*

[Kholeka Mamile, Christmas Tinto, Western Cape](#)

2. **Teacher Professional Development workshops** - As teachers have been learning about new teaching strategies which promote 21<sup>st</sup> century learning, they have been successfully incorporating these strategies in their teaching, thus resulting in improved pedagogical skills. Their behaviour at workshops has also changed; they are more eager to share ideas and are keen to be exposed to different ways of teaching and doing things. Increased opportunities to present their work has boosted their confidence.

*"I used to be scared to present and to share or show what I have done with other people, but now I feel confident due to the opportunities created for us during LGP workshops. When we had DGMT visitors I feel that I was fully equipped and wasn't scared or intimidated by their presence."*

[Thembe Tafeni, Solomon Qatyana, Western Cape](#)

3. **Project team school visits** - School visits to support teachers in various ways have clarified any misunderstandings, assisted teachers with the technology skills, provided alternative methods of resolution to challenges they have faced, gained a better understanding of individual teachers in order to meet their specific needs.

*"In the TPD workshops, we were confused on a lot of things when we started and it appeared as though we are not serious or interested... Themba and Hlengiwe are the only people who give us hope when they are here at school."*

[Lizeka Maphelo, Nomsa Mapongwana Primary, Western Cape](#)

4. **School Management support** - General observations of specific school results suggest that those teachers which indicated in interviews that they feel supported by their School Management Teams correlated with schools which performed better and are more motivated to use technology.

*"The new Deputy Principal has shown great interest in the project though she is not in the foundation phase. Our HOD Mrs Mshengu is very supportive too, for example in the mornings when we had planned to use technology she comes to help us setup and also gives us pedagogical ideas, the previous day. She also sits with us when we do our lesson preparation to listen to the ideas we got for a particular lesson."*

[Ivy Motau, Qhamukile Primary, KwaZulu Natal](#)

5. **Regular use of technology** - It is observed that teachers who use their tablets more often and out of school become more familiar and feel comfortable and more confident to use technology with their

learners. Teachers who take time to explore and practice various Xbox games and tablet Apps are able to make connections with the curriculum and thus encourage more frequent use among their learners.

*“At home there are technology devices including Wi-Fi but I wasn’t using it before the project. Having attended the TPD workshops, I have found interest in using the gadgets at home as I am able to use them i.e. accessing Wi-Fi, using email, using my tablet to research a topic of an interest as well as to download interesting apps for my learners.”*

Nthabi Hlela, Nogqaza Primary, KwaZulu Natal

Cohort	Gross-Motor Skills Improvement from Grade R (2014) to Grade 1 (2015) as %
CONTROL	+ 4.8%
Qhamukile	+ 20.5%
Thembelihle	+ 15.4%

From the teacher interviews it is clearly discernable which teachers are using the technology regularly. In KwaZulu-Natal, Qhamukile and Thembelihle teachers are spending more time on the Xbox than other schools. Their learner performance results show a greater improvement in gross-motor skills than in other schools. Qhamukile showed a quadrupled achievement and Thembelihle tripled achievement compared to the control schools.

*“Learners finish their classes early, I use the afternoons to prepare what I’m going to teach the following day which includes selecting Apps that I’ll incorporate in my lesson. Learners (Grade R) are motivated to learn and they now master concepts quickly e.g. writing letters.”*

Thandazo Ndlovu, Triandra Primary, KwaZulu Natal

**6. Additional Xbox games and categorised Apps** - Learners can become bored when repeating the same games; they enjoy new challenges. The wide range of games and Apps that are available for teachers to choose from has motivated teacher usage; they have not felt limited.

*“What I’ve noticed is that learners like the tablets more than workbooks such that they’d go to other things that I’ve not taught them – they are curious, they are not scared to explore. I’ve also noticed that if given a chance, they want to do things that are meaningful to them. These learners can show me things that I didn’t know they exist in the tablet – it opens their minds!”*

Zinhle Zondo, Cedara Primary, KwaZulu Natal

**7. Technology time table** - Where the timetable is in place for sharing technology it not only gives direction but encourages teachers to plan lessons which integrate technology on the day/s that have been allocated to them.

*“I use tablets twice a week (started in May when Ms Buyeye drafted a technology time table for us), before that we were using but not weekly.”*

Zolisa Sophazi, Solomon Qatyana, Western Cape

Solomon Qatyana showed greater improvement in fine-motor skills than in any of the other schools. If one cross-references this finding to the dosage of use at Solomon Qatyana it can be seen that teachers are using tablets and apps with learners more frequently (twice a week) than at any other school.

**8. Change of attitude towards technology** - some teachers initially felt that they were too busy to 'play with the technology'. There has now been a realization through the workshops that technology can be used to achieve CAPS outcomes.

*"I hated technology a lot to an extent that I didn't want to hear a thing about it, BUT now I feel it is opening my mind in a positive manner. The reasons I hated this technology is because I didn't know how to use it and it was threatening. Now that I am able to use it, I feel more confident."*

[Kholeka Mamile, Christmas Tinto Primary, Western Cape](#)

## Conclusions

Many NGOs working with teachers devote considerable planning time to professional development, its design, the nature of the content, the training approach and how much is enough – namely, the dosage. In the Learning Gains through Play project we have provided teachers with a degree of professional development that has resulted in varied gains, depending on the individual teachers concerned. The extent to which teacher behaviours changed as a result of the workshops was identified only by conducting class visits and teacher interviews. Similarly, the extent to which teachers use technology in class has been strongly influenced by their own confidence and familiarity with the technologies. We were fortunate that the technology-contact-time dosage at the start allowed most teachers to become comfortable with the technology. This confidence facilitated a mind shift in the adoption of technology. Thereafter through experimenting and practising, familiarity and confidence grew further. Teachers then became motivated to fulfil the same technology dosage for their learners. This relationship between teacher use and learner use will be explored further in the final year of the project. It has been clear that the current dosage of exposure, to technology-enabled, play-driven learning, has resulted in the measurable learning gains reflected in the learner performance measured at this second year milestone of the project. This moderate dosage appears to hold considerable potential for improving a broad range of literacies.

Oral English acquisition can be enabled by both tablet and Xbox use. Improvements in learner performance was inspiringly positive across all project schools except one. This is the school that was sceptical initially and felt there was not time to play with the technologies, not realising that CAPS were being readily achieved through the effective use of technology.

The considerable improvement in the visual interpretation skills of visual sequencing and emotion knowledge can be directly attributed to the use of the specific apps designed to target these literacies. These specific apps were promoted in the teacher development workshops and thus used confidently by teachers thereafter. If learning gains have been clearly evident in the majority of schools then the dosage

of professional development and exposure to technology must be sufficient. These findings confirm that the project team should further pursue the sourcing of specific apps for targeted curriculum-required skills and that the proposed publication, reviewing specific Xbox Kinect games and android apps to develop and improve the vital Foundation Phase skills, will provide a valuable resource for other teachers and thus fulfilling a knowledge-sharing legacy for the project. Teacher professional development in the 3rd year of the project will be devoted to a peer coaching approach which will require fewer centralised workshops and rather involve the whole school in a sustained and ongoing staff development programme around the effective use of technologies to achieve learning gains across literacies.

