

USING GAME-BASED LEARNING TO IMPROVE SECOND LANGUAGE ENGLISH SKILLS IN SOUTH AFRICA

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Abstract

The D G Murray Trust funded SchoolNet South Africa (SNSA) to track the development of two cohorts of learners and to record learning gains. SNSA provided professional development to teachers on the effective use of the Xbox Kinect and a bank of Intel tablets in Grades R and 1 over a three year period. The professional development programme included a Change Leadership for Technology Integration course, focused on preparing school senior management. Twelve schools in two provinces of South Africa participated in the project, including two control schools. The aim of the study was to test the hypothesis that foundational literacies of primary school learners could improve through the effective use of game-based learning using innovative technologies.

English as the language of learning and teaching (LoLT) is problematic in South Africa, a country with eleven official languages. Low levels of English language competence characterise many rural primary schools. In only one of the LGP projects schools, is English the LoLT in Foundation Phase. Seven of the ten project schools use mother tongue for instruction through the Foundation Phase and then switch to English in Grade 4.

An oral English scripted interview test was conducted over the three years with each learner. All verbal responses and non-verbal actions were recorded on task scripts and scored according to rubrics. We adopted an additional measure to provide identification of Krashen and Terrell's (1995) Oral Language Stage. These stages are: 1. The Silent Stage; 2. The Early Production Stage; 3. The Speech Emergence Stage; 4. The Intermediate Language Proficiency Stage and 5. The Advanced Language Proficiency Stage – Advanced Language Fluency.

Teachers used carefully selected apps and games to identify teachable moments and stealth learning opportunities that targeted specific literacies. These included visual recognition, discrimination and interpretation such as sequencing, and visual memory, fine-motor skills including '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.

Xbox Kinect consoles with data-projectors and TV screens were used 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 movement and object-control. As the apps and games use the medium of English, there was the added benefit that learners acquired oral English skills, almost subliminally. At the heart of the project was the encouragement of attitudes towards motivation to learn, enjoyment of learning and confidence in learning through the focus on play. Teachers were excited to discover that the technology and games were able to assist them to achieve the outcomes listed in the prescribed national curriculum.

In conclusion, the Learning Gains through Play study supports the theory that successful language acquisition occurs through understanding messages and that oral English skills can be improved simply by engaging with the tablet apps and video games, which use English as the medium of communication. This provides a great opportunity to prepare Non-English-speaking, Foundation Phase learners in South Africa to make the transition to learning in English as happens in Grade 4.

Keywords: Oral English Skills, Second Language Acquisition, Technology Integration in Education, Foundation Phase, Learning Gains.

1 INTRODUCTION

One of the most challenging issues facing teachers is the use of English as the language of teaching and learning (LoLT) in South Africa, a country with eleven official languages where low levels of English language competence characterise many rural primary schools. The Learning Gains through Play project targeted Foundation Phase before mother tongue learners have to adapt to English as the LoLT in Grade 4. Research has shown that oral language skills have a profound impact on children's preparedness for Foundation Phase and on their success throughout their academic career. Children typically enter school with a wide range of background knowledge and oral language ability, attributable in part to factors such as their experiences in the home and their socio-economic status (SES). Any gap in their academic ability tends to persist or grow throughout their school experience (Fielding, Kerr, & Rosier, 2007; Juel, Biancarosa, Coker, & Deffes, 2003).

In South Africa "learners who speak English as a second-language clearly perform worse on average than their first-language English counterparts" (Van der Berg, Taylor, Gustafsson, Spaul, & Armstrong, 2011). The NEEDU National Report of 2012 (National Education, Evaluation and Development Unit, 2013) notes that many school principals are facing demands from parents to offer English as the Language of Learning and Teaching (LoLT) even though all the learners speak African languages at home. The report makes the recommendation that "schools must make a special effort to improve the proficiency of learners and teachers in both Language of Learning and Teaching (LoLT) and First Additional Language (FAL)" (p.73). It is noted that across the country evaluators encountered the view that English is the preferred language of instruction for Mathematics from Grade 1 and that some schools are unofficially already adopting this strategy.

Research has shown that oral language skills have a profound impact on children's preparedness for Foundation Phase and on their success throughout their academic career. In the Learning Gains through Play project and control schools in which English oral skills were assessed, Foundation Phase learners are taught and learn in their mother tongue (isiZulu and isiXhosa). In all of these schools, at the start of Grade 4, learners will switch to English as their Language of Learning and Teaching (LoLT). This change will be accompanied by the expansion of the three subjects they began in Grade R to six subjects as they enter Intermediate Phase. It is for this reason that schools assign their most able teachers to tackle the challenges faced by learners transitioning to Grade 4.

Stephen Krashen is a pioneer in the field of language acquisition. Krashen's Second Language Acquisition (SLA) stages of development and his teaching approach, called the Natural Approach, is based on decades of research and his theory, which in his words is: "the central hypothesis of the theory is that language acquisition occurs in only one way: by understanding messages. We acquire language when we obtain comprehensible input, when we understand what we hear or read in another language." According to Krashen, students learning a second language move through five predictable stages: Preproduction, Early Production, Speech Emergence, Intermediate Fluency, and Advanced Fluency (Krashen & Terrell, 1995).

James Paul Gee (a literacy specialist, who in more recent times is known as a gaming expert focusing on the learning principles in video games) proposes that settings which focus on acquisition rather than learning should be stressed if the goal is to help non-mainstream children (low-income, minority children) attain mastery of literacies. In other words, mastery is by subconscious acquisition rather than conscious learning (Gee, 1998). An assumption was made that using the Xbox Kinect and tablet technology would enable English language acquisition and it was decided to include assessment of acquired English oral communication skills.

2 METHODOLOGY

The Learning Gains through Play project involved the implementation of an innovative programme model and therefore, content and some processes were adapted over the course of the three years that the project unfolded. The evaluation followed a similarly developmental approach. We tracked and

analysed data as the project developed, documenting, interpreting and sharing the observations and assessments as we progressed. Schools expressed appreciation of being included in the analysis of the data of their own learner performance and the opportunity to workshop strategies for improvements. A mixed-methods approach was taken with quantitative data collected from learners in both project and control schools. Quantitative and qualitative data was collected from teachers involved in the project schools. Project and control schools were not randomly chosen but allocated by the education district officials after request. The project included ten project schools – five in the Western Cape and five in KwaZulu-Natal. Data was also collected from two control schools, one in each province. These control schools were not provided with any LGP inputs at all. The only activity at these schools was that their learners were assessed in the same manner and at the same time each year as those learners in the project schools. Results from the control schools were compared with the project schools to establish any learning gains achieved by the LGP intervention and its inputs.

Assessment tool design was based on the LGP theory of change, the assumptions about the Xbox Kinect and tablet technology's impact on the acquisition of oral English skills and the Language policy and requirements of the CAPS curriculum for Foundation Phase. An oral English scripted interview test was designed specifically for South African Foundation Phase children for whom English was not the Home Language. The same assessment was conducted with all Foundation Phase learners no matter which Grade they were in as language acquisition rather than language learning is independent of grade level learning. The Acquisition of Oral English Skills Test was conducted as a scripted interview, one-on-one with each learner outside of their classroom. All verbal responses and non-verbal actions are recorded on task scripts and scored according to rubrics.

Rubric scores were collected in MS Excel and an average percentage (out of a total score of 16) calculated for each learner in each school, each province and an overall average for all project schools. An average percentage for each of Listening Skills (out of a total score of 6) and Speaking Skills (out of a total score of 10) were also recorded. The same treatment was made to the control school data. It was decided that, as acquisition of oral English skills was not grade-dependent, for this data set we would extract and use only the data for the learners that we could track and report on individually over the study period. We discarded data where a learner due to absenteeism was not tested each year.

Table 1. Data Sample.

COHORT 1	2014	2015	2016	
LGP Project	Grade R	Grade 1	Grade 2	Same 129 learners tracked over 3 years.
Control	Grade R	Grade 1	Grade 2	Same 37 learners tracked over 3 years.
COHORT 2		2015	2016	
LGP Project		Grade R	Grade 1	Same 82 learners tracked over 2 years.
Control		Grade R	Grade 1	Same 31 learners tracked over 2 years.

The Acquisition of Oral English Skills test and rubric also enabled the LGP team to identify which of Krashen's Second Language Acquisition Stages each learner was at when testing was conducted each year. These SLA stages are:

Stage 1 – The Silent Period

Learners express no verbal expression except their name and may respond by nodding, pointing, gesturing or performing an act.

Stage 2 – The Early Production Stage

Learners can speak in one- or two-word phrases. Can demonstrate comprehension by short answers to simple yes/no, either/or or who/what/where questions. They nod and shake heads and may say "I don't know".

Stage 3 – The Speech Emergence Stage

Learners begin to use dialogue and can ask and answer simple questions. Learners use basic and repetitive patterns of speech. They may produce longer sentences but often with grammatical errors that interfere with communication.

Stage 4 – The Intermediate Language Proficiency Stage

Learners start to make complex statements, state opinions, ask for clarification, share thoughts and voluntarily speak at greater length.

Stage 5 – The Advanced Language Proficiency Stage – Advanced Language Fluency

Learners are now equipped to participate fully in grade-level classroom activities. They may need occasional support but they use grammar and vocabulary comparable to a native speaker.

Learners were recorded on each stage according to their scores on the speaking skills i.e. speaking engagement in the introduction of the scripted interview test and speaking comprehension in the action identification questions of the scripted interview test. The first measure was made in the action identification questions part of the interview half way through the test to accommodate learners who may be shy to introduce themselves at the start of the interview. The introduction was used as a second measure of SLA stage as shown below.

Table 2. Oral English Acquisition Test Score Conversion to SLA Stage.

1st Step Check 3. Action Identification Questions Score	2nd Step Check 1. Introduction Speaking Skills Score	Score Options →	SLA Stage
If score = 0 then	-	(0,0)(0,1)(0,2)(0,3)	SLA stage = 1
If score = 1 and	If score = 0 then	(1,0)	SLA stage = 1
	If score = 1 or 2 or 3 then	(1,1)(1,2)(1,3)	SLA stage = 2
If score = 2 and	If score = 0 or 1 then	(2,0)(2,1)	SLA stage = 2
	If score = 2 or 3 then	(2,2)(2,3)	SLA stage = 2
If score = 3 and	If score = 0	(3,0)	SLA stage = 2
	If score = 1 or 2 or 3 then	(3,1)(3,2)(3,3)	SLA stage = 3
If score = 4 and	If score = 0 or 1 or 2 then	(4,0)(4,1)(4,2)	SLA stage = 3
	If score = 3 then	(4,3)	SLA stage = 4

The test was not designed to distinguish between SLA stage 4 and SLA stage 5 performance.

The percentage of learners on each SLA Stage was calculated and recorded each year to track progress in oral English skills. The same treatment was made to the control school data.

3 RESULTS

Final assessment of the learners was conducted in July to September 2016. Two cohorts of learners were assessed: the 2014 Grade R learners who were tested in Grade 1 in 2015 and were tested in Grade 2 in 2016 (referred to as Cohort 1); and the 2015 Grade R learners who were tested in Grade 1 in 2016 (referred to as Cohort 2). Results were collected, processed, analysed and compared to the previous year. Results were as follows.

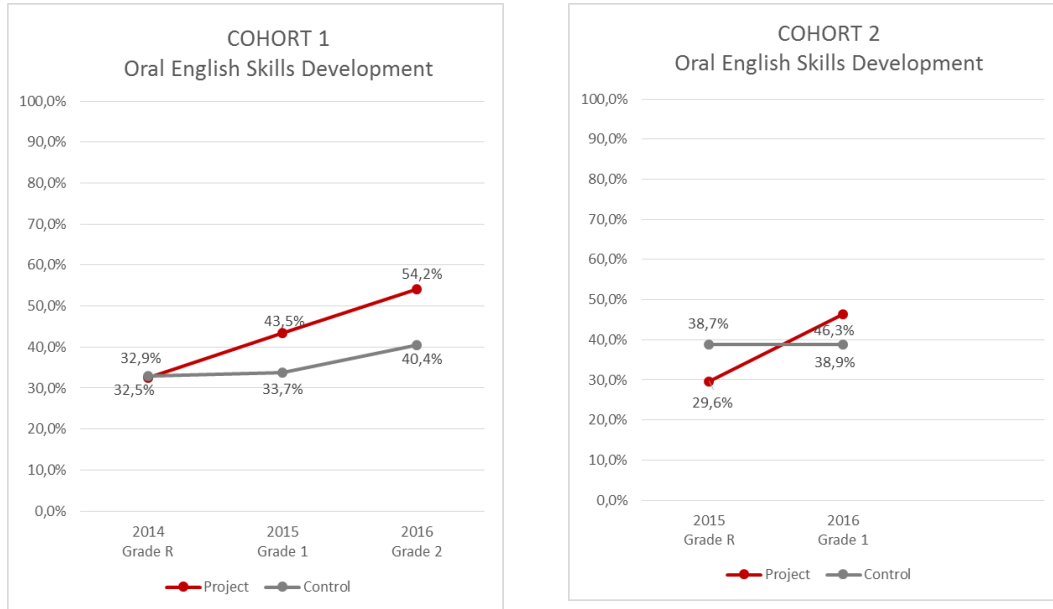


Figure 1. Oral English Skills Development for each cohort over time.

With both cohorts it was clear that the project learners outperformed the control learners. The Grade R to Grade 1 transition of the Cohort 1 control group learners mirrored that of the Grade R to Grade 1 transition of the Cohort 2 control group learners (less than 1% improvement). While the project learners of Cohort 2 were initially weaker than the control learners and weaker than the Cohort 1 learners of the year before, they were able to “catch-up” on the same improved trajectory as the Cohort 1 over the transition from Grade R to Grade 1. Most interestingly, the improvement of Cohort 1 was maintained from Grade 1 to Grade 2. This has not been the case in the other four literacies tested where both project and control learners dropped significantly in Grade 2.

It is interesting to compare the two LGP project cohorts in the different provinces. Cohort 1 in KZN was stronger than cohort 1 in Western Cape. Cohort 2 in Western Cape was stronger than cohort 2 in the KZN. Despite this the pattern of improvement from Grade R to Grade 1 was similar. It is important to remember here that both control group cohorts showed less than one percentile point change from Grade R to Grade 1.

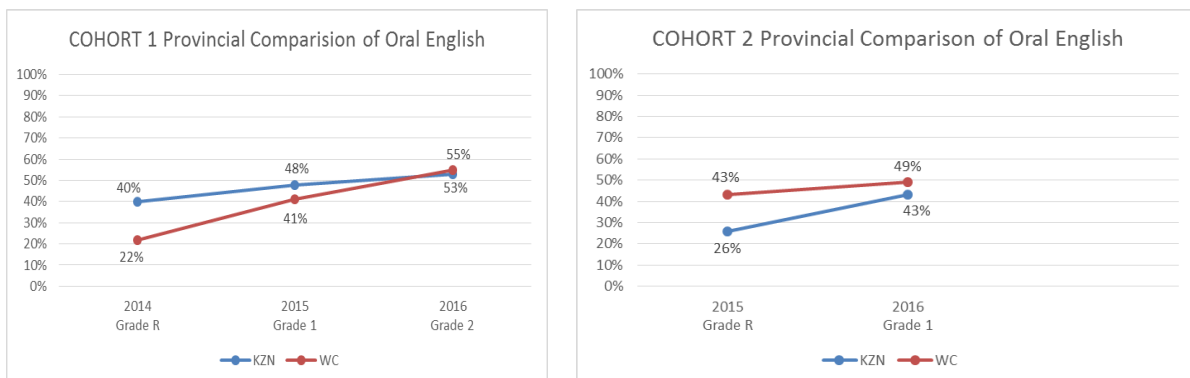


Figure 2. Provincial Comparison of Oral English Skills.

When considering the specific oral skills of listening and speaking, it can be seen that the regular improvement was evident in both skill types in both LGP project cohorts.

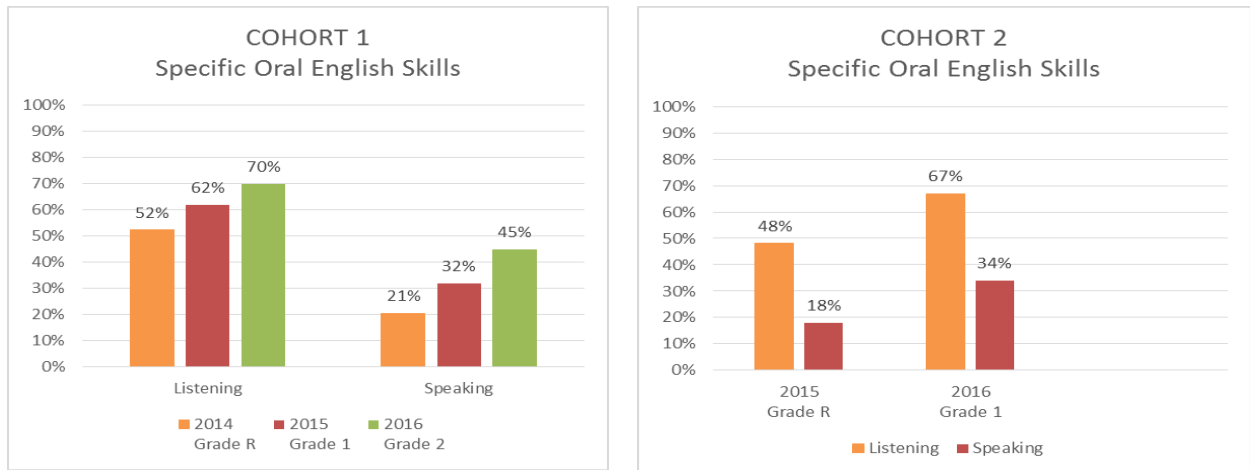


Figure 3. Specific Oral English Skills Performance for each cohort.

A steady improvement in both listening and speaking skills over the progressive grades was measured with a larger regular improvement in speaking skills. Speaking performance more than doubled over the two successive grade measures. Again an improvement was measured from Grade R to Grade 1 in both listening and speaking skills. Again a larger improvement was evident in speaking skills. Speaking performance almost doubled over only one grade measure. When the learners were assessed on the Second Language Acquisition Stages, their progress became even clearer.

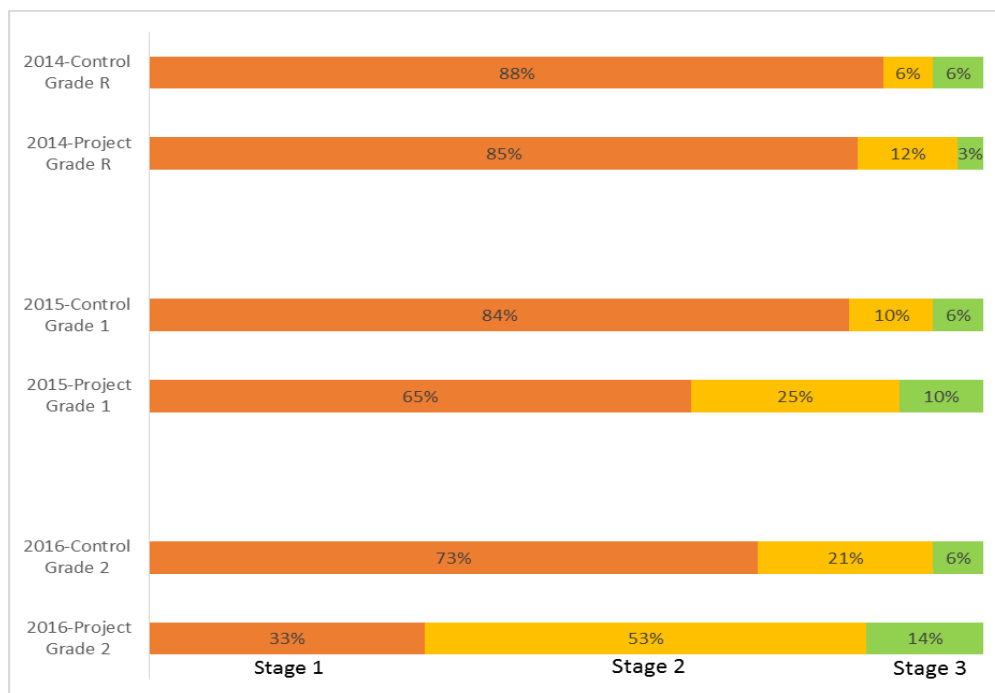


Figure 4. Cohort 1 – Percentage of Learners on each SLA Stage.

When considering Cohort 1’s control group, it could be seen that in Grade R, 88% of learners were on Stage 1 (also known as the Silent Stage), with 6% of learners already on Stage 2 and 6% of learners on Stage 3. After one year, now in Grade 1, 4% of learners progressed to Stage 2 leaving 84% of learners still on Stage 1. The Stage 3 learners had not made any progress. After the next year, a further 11% of learners had progressed from Stage 1 to Stage 2. The original Stage 3 learners had still not made any progress. At the end of the test period, just over a quarter of the learners were above Stage 1.

When comparing with Cohort 1’s project group, we see at the start that 85% of learners were on Stage 1. 12% of learners were on Stage 2 and 3% were at Stage 3. After one year, now in Grade 1, 20% of learners progressed to Stage 2 (five times as many as the control group), while 7% of learners that were on Stage 2 progressed further to Stage 3. After the next year, a further 32% of learners progressed from Stage 1 to Stage 2. A further 4% were able to progress from Stage 2 to Stage 3. At the end of the test period, more than two-thirds of the learners were above Stage 1.

Cohort 2 data showed a similar pattern of a much larger improvement among project schools learners compared to control school learners.

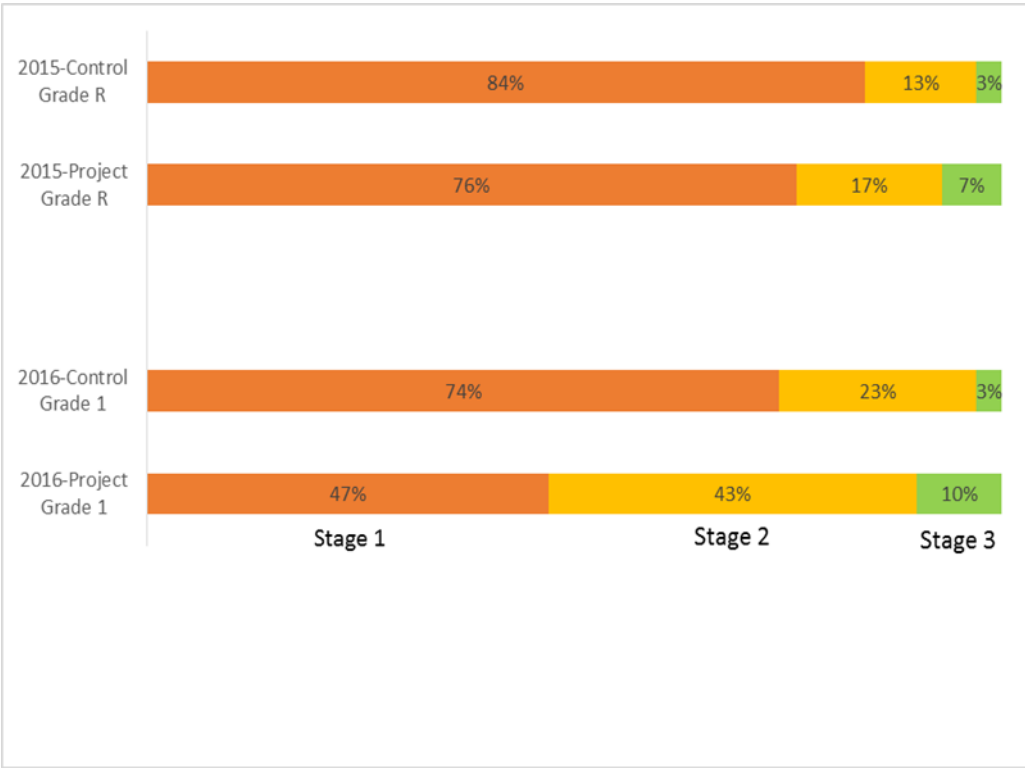


Figure 5. Cohort 2 – Percentage of Learners on each SLA Stage.

The starting situation for the control school group in Cohort 2 had 84% of learners on Stage 1, 13% of learners on Stage 2 and 3% of learners on Stage 3. After one year, now in Grade 1, 10% of learners had progressed from Stage 1 to Stage 2. The learners on Stage 3 had remained on Stage 3.

Comparing the control group with the project group reveals the following. At the start, 76% of the Grade R learners in project schools were assessed as on Stage 1, with 17% on Stage 2 and 7% on Stage 3. After one year, now in Grade 1, 29% of learners progressed from Stage 1 to Stage 2 (almost three times as many as the control group) and 3% progressed from Stage 2 to Stage 3. This resulted in less than half of the learners being on Stage 1 after only one year of intervention.

The improved starting point and overall performance of this cohort of project learners can be attributed to the fact that Cohort 1 Grade R project learners were assessed before receiving the technology in their schools (July 2014). Control groups of both Cohort 1 and Cohort 2 received no technology at all. Cohort 2 Grade R project learners, while they were assessed in July 2015, had access to the technology since the start of their academic year in January 2015. The additional six months of exposure to English through the medium of the tablet apps and Xbox games explains the lower

percentage of learners on Stage 1 when baseline testing was administered (76% compared to 84-88%). It also explains the larger improvement in Cohort 2 from Grade R to Grade 1 (32% of learners improved their SLA stage) when compared to Cohort 1 from Grade R to Grade 1 (27% of learners improved their SLA stage).

Plotting the percentage of learners on SLA Stage 1 over the time of the project showed the same trajectory of improvement off SLA Stage 1 for both cohorts.

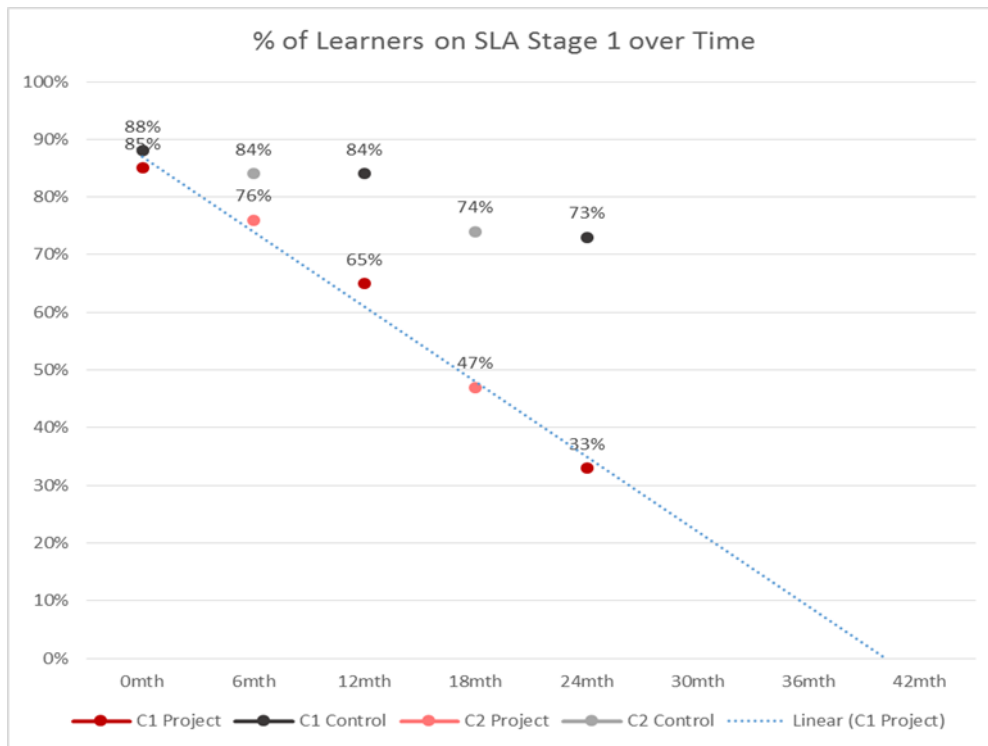


Figure 6. Predicted SLA Advancement.

The data predicted that all learners could have moved up from SLA Stage 1 after 40 months which, with the introduction of tablets and apps at entry to Grade R, could be achieved before the middle of the Grade 3 year. This provided a massive opportunity for preparation to learn in English in Grade 4.

4 CONCLUSIONS

In conclusion, our research supports the theory that successful language acquisition occurs through understanding messages – that making understanding of English in order to play engaging games on a tablet or Xbox console creates the necessary comprehensible input. As Stephen Krashen went further to say: “Language acquisition proceeds best when the input is not just comprehensible, but really interesting, even compelling; so interesting that you forget you are listening to or reading another language.” Our most important finding for the Learning Gains through Play project is that Oral English skills can be improved simply by engaging with the tablet apps and video games which use English as the medium of communication. With this has come further questions:

- With further use of the technology in Grade 3 classrooms, can all of the learners escape up off SLA Stage 1 by the end of Foundation Phase (as predicted by our graph)?

- Can the method of language acquisition raise Zulu and Xhosa learners' English skills beyond Stage 3 or is this the ceiling for acquisition and formal learning is required for further progress?
- Is English at Stage 3 level sufficient to cope with the Grade 4 shift to LoLT in English in South African schools?
- Will the Learning Gains through Play project learners with their improved English oral skills achieve better results than the control learners in Grade 4 in English First Additional Language (FAL) and in their other subjects?

A limited extension of the LGP project to conduct oral English assessments with the same project and control learners in July 2017 may shed more light on these questions.

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