

## The Effect of a Reading Program on the Reading Performance of First-Year Students at a Higher Education Institution

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**ABSTRACT** Reading proficiency is an important predictor of academic achievement in higher education and cannot be left to random accomplishment. As a lack of reading skills may contribute to the termination of studies, reading development programs should be high on the priority list of scaffolding processes aimed at first-year students. The purpose of this paper was to determine the effect of the *LectorSA* reading program on the reading performance levels of 120 first-year B.Sc. students in the Access Program. The quantitative research design comprised a quasi-experimental method with a pretest, posttest non-equivalent control group design. Results indicated that first-year students read at distressingly low levels, but eight sessions on the reading intervention program significantly contributed to the improvement of the students' reading performance. Including a reading development program in the scaffolding processes of first-year students may contribute to academic literacy development, which includes reading ability.

### INTRODUCTION

Academic literacy, with special reference to reading and comprehension skills, is a key factor in predicting academic success (Tommaso 2007; Hermida 2009; Olivier and Simasiku 2015). A lack of reading and comprehension skills may cause students to terminate their studies, escalating the already high dropout rate at higher education institutions. Incorporating a scientifically researched, compulsory, well-structured and supervised reading development program may contribute to the alleviation of some of these academic literacy challenges and may enhance academic skills development offered in access programs at higher education institutions (Phillips 2009; Parkinson et al. 2008; Fadel and Elyas 2015).

For the past few years, the researchers have been actively involved in first-year student support and skills training programs, not only as lecturers, but also as coordinators of the access program of the Faculty of Natural and Agricultural Sciences at the Qwaqwa Campus of the University of the Free State. Within modules fo-

cused on science skills and learning development, evidence was found that students struggled to complete tests, examination papers, and assignments on time.

However, time was not the only issue. Simpson and Nist indicate that "85 percent of college learning requires careful reading" (Nel and Nel 2010), while Van Schalkwyk et al. (2009) also emphasize the fundamental role of reading as a central process through which learning occurs. Further observation and discussions with students revealed that they could not always meet the academic expectations set for each module and struggled to read the prescribed nine to ten pages in preparation for each class. During tests and examinations students also struggled to interpret questions correctly and showed a lack of reading comprehension and proper reading skills. A thorough investigation revealed that international, national and local higher education institutions raised similar concerns regarding reading challenges and that it had been publically labeled as a global problem, which signified the importance of addressing the matter comprehensively (Lombard 2010; Marshall 2011). Rose and Hart maintain that, "Reading is not simply an additional tool that students need at university, but it constitutes the very process whereby learning occurs" (Nel and Nel 2010).

### Objectives

The purpose of this paper was to investigate the effect of the *LectorSA* reading program

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on the reading performance of first-year students at a higher education institution. This was done by linking the *LectorSA* reading program to the Scaffolding Academic Literacy (SAL) pedagogy (Hart 2013), which “offers a means to respond to the need for academic programs to integrate academic literacy development into teaching practices and into teaching of content to maximize learning outcomes”. Both interventions include different degrees of scaffolding support, such as preparing before reading by giving an overview of the text, paragraph-by-paragraph reading to identify the sequence of the text and, finally, sentence-by-sentence text marking to highlight the key information. The *LectorSA* program prepares students through different visual exercises, and the three main areas of development include “reading ability and reading speed, cognition and short-term memory and IQ levels and confidence to learn in all subjects” (Hart 2013).

### **Trends Regarding Poor Academic Literacy Skills at Higher Education Institutions**

Internationally higher education institutions raised their concerns pertaining to the lack of academic literacy skills detected in first-year students. Institutions from New England (Rao 2005), Boston (Tommaso 2007), the United Kingdom (Walter 2008), Canada (Hermida 2009), Malaysia (Lombard 2011) and Texas (Simmons 2011), issued reports about the poor reading proficiency of first-year students entering higher education institutions. In South Africa, Stephen et al. (2004) found that poor reading proficiency affected academic performance and, therefore, jeopardized throughput rates.

A number of authors such as Van Dyk (2005), Walter (2008), Hermida (2009), Lombard (2011), Nel and Nel (2010) and Simmons (2011) reported on studies wherein they implemented some form of intervention, such as multiple strategies to improve academic literacy skills, early-detection literacy programs, universal screening and monitoring processes, and, in some cases, even advanced literacy instructional interventions aimed at the improvement of academic literacy skills. It is, thus clear that the poor literacy skills of first-year students cause major concern, and higher education institutions are attempting to correct these. Fisher et al. state that “[t]he scale of the failure and dropout occurring... points to

systemic problems that require systemic responses” and that higher education is a “low-participation, high-attrition system”, which needs to be addressed at the highest possible levels (Hart 2013).

The transformation of education in South Africa poses many challenges to higher education institutions, as indicated in the recently released Green Paper for post-school education and training. The paper reports a national university graduation rate of fifteen percent, and asserts that this low graduation rate is partly due to “a lower quality of schooling in townships and predominantly African rural areas” (Republic of South Africa SA Department of Education 2012). The Minister of Education highlighted the under-preparedness of first-year students as the main reason for the poor achievement at higher education level, echoing the concern of many national and international higher education institutions (Pretorius 2000; Lombard 2011; Nel et al. 2004; Stephen et al. 2004; Van Dyk 2005). He acknowledged various efforts by universities to meet the challenges, but stated that these efforts lacked evidence of what the “most successful routes” were to support the students (Gray 2012).

According to Marshall, the South African government took the first step by introducing a National Reading Strategy. This governmental intervention mainly focuses on primary school learners, but it unmistakably states that the development of reading skills is a lifelong practice which goes beyond secondary school and declares that “[p]oor matriculation results are in part due to the low levels of the students’ reading skills. University students, even those enrolled for the languages and the arts, are not proficient in reading, in terms of international standards. Overcoming these challenges is not going to be an easy task” (Marshall 2011).

An Academic Status Report for the Qwaqwa Campus, 2004 to 2010, compiled by the Directorate for Institutional Research and Academic Planning (DIRAP) of the University of the Free State, identified areas of concern related to students’ poor academic literacy, such as a low general level of education and enrolments with admission point (AP) scores of 20, whereas for mainstream enrolment at the University of the Free State (UFS) a student needs an AP score of 30. The results of the National Benchmark Tests for 2010 and 2011 also indicated that students only

obtained basic levels of academic literacy, which were “well below the minimum level of proficiency required for successful university study” (DIRAP 2012).

### **Reading Literacy Defined as a Core Component of Academic Literacy**

The most commonly used definition of academic literacy is having the ability to read and write (Parkinson et al. 2008). However, in the complex academic world, the definition needs to be contextualized. Academic literacy also entails critical thinking skills to be able to communicate about a topic. Kegley et al. (2002) define academic literacy expected of first-year students as “[a]ll the elements of academic literacy - reading, writing, listening, speaking, critical thinking, use of technology, and habits of mind, that foster academic success”. Layton and Brown (2012) and Chaudhury and Karim (2014) state that academic reading is the primary means of academic learning and that inadequate reading skills will impair the learning process. It is stated that the explicit teaching of reading skills, together with scaffolding programs in schools, can increase the rate of literacy development by twenty percent (Hart 2013).

For the purposes of this paper, the emphasis will be on one of the ‘basic academic literacy skills’, namely reading (Phillips 2009; Beekman et al. 2011; Chaudhury and Karim 2014; Rahim and Megat 2014).

### **Challenges Faced by Higher Education Institutions**

The South African National Benchmark Tests (Higher Education South Africa 2011) have been developed to help determine the literacy levels of first-year students. Reading skills are integrated with academic literacy and the results of the 2011 National Benchmark Test for the Qwaqwa Campus indicated that only 0.9 percent of first-year students showed proficient academic literacy to be successful in degree studies (DIRAP 2012). Students performing at a basic or lower level of academic literacy are unlikely to cope with academic demands of higher education and will need extensive and long-term support (Parkinson et al. 2008; Scott and Yeld 2009; Rahim and Megat 2014). Students with reading difficulties usually are unable to per-

form well in the National Benchmark Tests and consequently are enrolled in access rather than mainstream programs at the UFS. At the Qwaqwa Campus of the UFS, however, no remedial reading development programs are offered, and many students with critically poor reading abilities might never master the essential reading skills without an explicit reading intervention (Fadel and Elyas 2015). One of the most important challenges faced by higher education institutions, especially on the Qwaqwa Campus, is the nine point one percent graduation rate as stated in the Academic Status Report of the University of the Free State (DIRAP 2012).

### **Possible Solutions to Address Insufficient Academic Literacy**

Given the background situation regarding poor academic literacy skills, higher education institutions agree that some sort of support is needed to drastically improve the academic literacy skills of their students. Some of the interventions that have been embarked upon in South Africa warrant mentioning.

A three-tier model was developed by Nel and Nel (2010) to improve the reading literacy of first-year students at the University of North-West. The model comprised an initial reading and learning screening assessment of the students before the onset of official lectures at the beginning of the year. The screening aided in the identification of students who were most likely to have reading and learning difficulties and a profile for each student was compiled. This was followed by literacy reading instructions (the first tier of the 3-tier model), which helped with the early identification of students who were at risk. These students were taken to the second tier of targeted instruction. If needed, students who were most at risk and did not show improvement would go to the third tier of intensive intervention. This model addresses a wide range of aspects regarding the reading process and reading literacy development (Nel and Nel 2010) and highlights the importance of a reading literacy support program for all first-year students. The positive contribution of this model lies in the identification of different levels of support according to the different needs of individual students.

The University of Pretoria utilizes the *LectorSA* Program in the Junior Tukkie initiative for

placement purposes for first-year students (Lombard 2011). After a baseline evaluation has been done, an online reading development intervention takes place and a final evaluation is done to gather data for statistical analysis and interpretation. After only 15 sessions on the *LectorSA* reading intervention program, a group of 188 learners improved their reading speed from 143 to 409 words per minute and their comprehension improved from fifty-eight to sixty-six percent.

In another study, the University of Stellenbosch (Van Dyk 2005) noted the low levels of academic literacy among the first-year students and mentioned the unreliability of current matriculation results. An academic literacy intervention was implemented and the results of the Test of Academic Literacy Levels (TALL) were compared with those of the University of Pretoria and the University of North-West (Potchefstroom and Vaal Triangle campuses). Cautious conclusions after two years indicated an eleven percent increase in reading comprehension due to a reading intervention at the University of Stellenbosch (Van Dyk 2005).

“Bridging the gap of extended foundation programs cannot be done by marginalized programs, “[t]herefore, the ability to learn from reading needs to be integrated into mainstream content teaching” and general and faculty-specific reading development programs “cannot be confined to the first year of the proposed four-year degree structure” (Hart 2013), but should be implemented on a long-term basis to ensure that the reading material adds to the learning process (Fadel and Elyas 2015).

### METHODOLOGY

The study reported here was a quantitative study, conducted from a post-positivistic perspective by means of a quasi-experimental, non-equivalent, pre- and posttest control group design. To determine the reading levels of first-year B.Sc. students in the university’s Access Program, an initial reading evaluation was done by using the *LectorSA* lab-on-line program (*cf.* Marshall 2012). The program functions as a cloud hosted web application ([www.lab-on-line.com](http://www.lab-on-line.com)), optimized for Google Chrome and Mozilla Firefox. It is prearranged at seventeen levels of competency from grade one to grade thirteen and includes four levels of advanced reading skills development. The program automatically records

the different reading measurements and a printable report is available on completion of each session.

The study was aimed at determining whether there was a significant difference in the reading levels of first-year students on the Qwaqwa Campus who participated in a reading intervention program and those who did not.

### Population and Sampling

A convenience sample of 120 first-year B.Sc. students in the Access Program of the Qwaqwa Campus of the University of the Free State was selected. The sample consisted of 120 students of which 60 were male and 60 female. The control and experimental groups were randomly selected including 30 male and 30 female participants each.

### Data Collection and Procedures

The four reading tasks for the pre- and posttests entailed the reading speed, measured as the number of words the student read per minute; text comprehension, presented as a percentile score; reading index, automatically computed by the *LectorSA* program as a combination of the reading speed, the comprehension score and the reading grade level as determined by matching the reading index value to a standardized table supplied by the *LectorSA* program.

The *LectorSA* solutions program for later analysis automatically captured these four levels of measurement. This program monitors the progress of the student and automatically advances the reader to a higher reading speed if the comprehension score is above seventy percent.

The data collection was done in the following phases. All the students in the experimental group and the control group, under supervision of the researcher, wrote the same calibration test, supplied by the *LectorSA* program. Both groups read the same standardized reading text and answered ten comprehension questions. The students read for exactly one minute and marked the last word they were reading. Once they had finished reading the text, they had to answer ten comprehension questions on the content of the text. The data from this evaluation were recorded as the pretest scores for both groups.

With this information as the baseline assessment, the students in the experimental group

were individually registered on the internet-based *LectorSA* reading program. They completed the online placement test and continued with eight sessions on the *LectorSA* reading solutions program under strict supervision of the researcher.

After the experimental group had completed the eight reading sessions, the final standardized evaluation test was done with all students from the control and the experimental groups. The data from this evaluation was recorded as the posttest scores for both groups. Once the scores of the initial and final evaluations were calculated, the data was statistically analyzed using Student's t-test and paired t-test. The data is presented as mean ± SD.

Ethical protocols concerning confidentiality and anonymity were adhered to and maintained throughout the study.

**RESULTS**

The age of the participants was 19.88 ± 1.67 years. The mean age did not differ between the experimental (19.58) and control (20.17) groups and student's t-test (de Winter 2013) showed no significant difference between the mean age of male (20.00) and female (19.75) participants. There also was no significant difference between the two genders of either the pre- and the posttest scores on any of the four tests used.

**Comparison of Test Scores**

The tests for the effect of the experimental intervention were performed on four measures. Students were tested on their reading speed, the text comprehension, the calculated index value and the reading grade, which indicated the level of performance. The ideal situation would be that the experimental and control groups would not differ too much from each other on the variables of interest before the experimental intervention, and that a difference (in the desired direction) between the two groups would show after the intervention.

No significant difference (as indicated in Table 1) between the means of the experimental and control groups was found regarding reading speed, text comprehension, reading index and reading grade level. This indicates that neither groups showed any distinct preexisting advantage or disadvantage, which might influence the outcome of their future posttest scores. It is interesting to notice that the control group did show slightly higher grade scores than the experimental group on all the tests used.

When the posttest scores were compared (as shown in Table 2), two distinct changes were noticed. Where the control group slightly outperformed the experimental group in the pretest scores on all the tests, the experimental group vastly and significantly outperformed the control group on all the tests for the posttest scores.

**Table 1: Pre-test reading scores**

Test	Study group	Mean	Std dev	Std err	Min	Max	t	p
<i>Reading Speed (Words Per Minute)</i>	Control	130.7	36.571	4.721	48	225	1.09	0.279
	Experimental	123.6	34.585	4.465	41	196		
<i>Text Comprehension (Percentile)</i>	Control	6.4	1.777	0.23	2	10	0.1	0.921
	Experimental	6.37	1.877	0.242	3	10		
<i>Reading Index (No Unit)</i>	Control	91.84	25.6	3.305	33.6	157.5	1.09	0.279
	Experimental	86.53	24.209	3.125	28.7	137.2		
<i>Reading Grade Level (No Unit)</i>	Control	2.6	1.933	0.25	0	10	1.44	0.152
	Experimental	2.15	1.448	0.187	0	7		

**Table 2: Post-test reading scores**

Test	Study group	Mean	Std dev	Std err	Min	Max	t	p
<i>Reading Speed (Words Per Minute)</i>	Control	140.8	30.954	3.995	80	250	-9.66	<.0001
	Experimental	215.3	51.139	6.602	90	320		
<i>Text Comprehension (Percentile)</i>	Control	5	2.322	0.3	1	10	-2.87	0.0049
	Experimental	6.07	1.706	0.22	2	10		
<i>Reading Index (No Unit)</i>	Control	98.54	21.662	2.797	56	175	-9.66	<.0001
	Experimental	150.7	35.797	4.621	63	224		
<i>Reading Grade Level (No Unit)</i>	Control	2.95	1.97	0.254	1	12	-9.85	<.0001
	Experimental	8.18	3.615	0.467	1	13		

Another comparison was done by conducting separate paired t-tests between the participants in the control group and those in the experimental group to confirm whether there were statistically significant changes in either of the groups.

Table 3 shows that the improvement in reading speed, although much bigger for the experimental group, was statistically significant for both groups. Although both groups performed worse on the comprehension scores, the decline was statistically significant only for the control group. Regarding the index value and reading grade level, it was again apparent that while the improvement was much better for the experimental group, it was statistically significant for both groups.

### DISCUSSION

Researchers agree that poor academic literacy skills prevent students from coping with academic demands (Rao 2005; Van Dyk 2005; Rahim and Megat 2014; Olivier and Simasiku 2015). A reading speed of 280 words per minute with a seventy percent comprehension is used as a benchmark for proficient reading at first-year level, but it is important to note that a high reading speed is of no value if it is not accompanied by good comprehension (Marshall 2011).

Stephen et al. (2004) report that at the University of Johannesburg (UJ) students read at an average of 174 words per minute, which implies a (school) grade 5 reading level.

In a report from the University of Pretoria (UP), Lombard (2011) indicates that first-year students read at an average level of grade 3 learners, while Pretorius (2000) of the University of South Africa mentions a reading rate of 96.9 words per minute with a 40.4 percent comprehension, which implies reading at grade one level. Phillips (2009) also reports a very low reading

level of first-year students at a private college in the Johannesburg area. A small pilot study at the Qwaqwa Campus revealed an average reading level of grade 2.9, which is way below the expected level of grade 13 (Marshall 2011).

This study found significant improvements in the reading grade scores of students who participated in the intervention program. The mean pretest scores of 2.60 and 2.15 respectively for the control and the experimental group (Table 1) correlated with the findings of Lombard (2011), Marshall (2011) and Pretorius (2000), who reported average reading levels of grade one to grade three. This emphasizes the challenges ill-prepared students with low academic literacy levels and a lack of good reading skills have to cope with to comply with the academic demands of higher education (Nel et al. 2004; Van Dyk 2005; Parkinson et al. 2008; Scott and Yeld 2009; Rahim and Megat 2014).

Despite the statistically significant differences between the posttest scores of the experimental and control groups, a thorough examination of Tables 1 and 2 revealed that the control group actually did show a slight improvement on all the tests with the exception of the text comprehension score. The question then arose as to whether those improvements were significant, and to what extent the improvements differed for the two groups. This was examined by computing a difference score for each test, which was simply the posttest score minus the pretest score. Then these difference scores were also compared.

When the mean improvement per group was examined, the huge differences between the two groups became apparent. For words per minute, the experimental group showed an average improvement of 91.7 words per minute, while the control group only showed an average improvement of 10.1 words per minute.

**Table 3: Paired t-tests for pre- and post-test scores per group**

<i>Test</i>	<i>Study group</i>	<i>Mean</i>	<i>Std dev</i>	<i>Std err</i>	<i>Min</i>	<i>Max</i>	<i>t</i>	<i>p</i>
<i>Reading Speed</i>	Control	10.08	37.19	4.8	-61	125	2.1	0.04
<i>(Words Per Minute)</i>	Experimental	91.72	50.97	6.58	-179	229	13.94	<.0001
<i>Text Comprehension</i>	Control	1.4	3.1	0.4	7	6	-3.5	0.0009
<i>(Percentile)</i>	Experimental	-0.3	2.53	0.33	-7	6	-0.92	0.3614
<i>Reading Index</i>	Control	7.06	26.03	3.36	-42.7	87.5	2.1	0.04
<i>(No Unit)</i>	Experimental	64.2	35.68	4.61	-11.9	160.3	13.94	<.0001
<i>Reading Grade Level</i>	Control	0.35	2.04	0.26	-4	8	1.33	0.1891
<i>(No Unit)</i>	Experimental	6.03	3.34	0.43	0	12	13.99	<.0001

The text comprehension of both groups showed a decline. The experimental group showed a mean decline of -0.3, but the control group performed much worse, with a mean decline of -1.4. Even more alarming is the fact that some students from both groups actually attained worse results in the posttest evaluation. This was not anticipated and a possible explanation could be that students from both groups were probably not coping with the challenges they faced and it might even be an indication that these students had more serious reading problems which might vary from physical disadvantages to possible dyslexia or just bad eyesight. While the control group did show an average improvement of 7.1 on the index value, the experimental group had an average improvement of 64.2.

The reading grade level differences were equally impressive. For the control group it barely changed with a mean improvement of only 0.35, while the experimental group showed a huge mean improvement of 6.03. It was noticed that none of the participants in the experimental group dropped in terms of their reading grade level, while some participants in the control group deteriorated by as much as four reading grade levels from the pre- to the posttest. However, the most remarkable improvements were found in the experimental group for the reading speed and the index values.

The improvements were not entirely unexpected, since it could have been anticipated that students would progress over the course of their studies, and that the students' own efforts also bore fruit. However, when looking at the changes, it is clearly apparent that the experimental intervention led to a much greater improvement than that achieved by the control group.

A statistically significant mean improvement of 6.03 reading grade levels, after eight sessions on the reading intervention program, might look very impressive, but one needs to be reminded that first-year students are supposed to read at grade 13 level. The intervention initiated improvement, but students need more exposure to the program to read at the expected grade 13 level.

### CONCLUSION

The aim of this paper was to investigate the possible effects of a reading development pro-

gram on the reading performance of first-year students. Reading skills have been indicated to be crucial for academic success and should not contribute to the students dropping out of college. This study revealed that the participating first-year students read at alarmingly low levels, a finding which relates to national and international concerns. Many institutions appeal for additional support for first-year students and from the results of this study it appears that a reading development program will make a positive contribution in this respect. This paper suggests that an intensive reading intervention could improve the reading performance of first-year students, which might assist in the processing of the large volumes of reading and research material they need to master for academic success.

In practice, this study emphasizes the need for a continuous reading development program to support students to the point where they reach the expected levels of competency. This competency does not only include reading skills, but the full range of academic literacies as indicated by the National Benchmark Tests. For future research a longitudinal research project is proposed to track the academic performance of the students for the next three years, which could indicate the long-term effect of the reading program on the participants' general academic performance. To be representative of the whole campus all the faculties should be included in such a study.

The theoretical implication of the significant difference in the reading performance of the students involved in the study indicates that more attention should be given to basic skills development. If the average first-year students do not enter a program with the expected academic literacy levels to be successful in their studies, provision should be made for compulsory development modules such as a reading development program.

By registering a student for an academic program, the university implies that the modules offered will be within the grasp of the student. Therefore the implication is that the institution should make an additional effort to support students that have backlogs to overcome the challenges they face in terms of academic success. It is reasonably expected that within four years the university will yield a student who is fully equipped with the necessary skills and knowl-

edge to survive in the corporate world, but statistics on throughput and pass rates sadly do not reflect this commitment.

No longer can the significance of good reading skills for academic success be ignored.

### RECOMMENDATIONS

The following recommendations are made on how to approach the challenges of a reading program for first-year students:

All first-year students' reading proficiency should be assessed to determine the actual reading level they have acquired before entering the institution. This should be done as soon as possible during the first academic semester. The results of the assessment should be interpreted as a direct indication of the amount of support each individual will need and at which level the reading intervention should commence.

Development programs, such as the reading program should be compulsory for all first-year students in all faculties on the campus. When a student reaches the expected proficiency levels on all the criteria of the program he/she should be exempted from attendance.

More research needs to be conducted to minimize the limitations of the current research and to determine the long-term effects of reading intervention programs on the academic success and actual graduation rate of students. The ideal situation will also be that all first-year students, and not only those from natural sciences, be part of the intervention and additional support could be offered to students who do not achieve the expected outcomes. This study only indicated the need for reading intervention programs, not only as part of the access programs, but also for the whole student population.

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