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RUNNING HEAD Reading development programmes for first-year students.

KEYWORDS Reading skills, academic literacy, Access Programmes

ABSTRACT Reading proficiency is one of the most important predictors of academic achievement in higher education and cannot be left to random accomplishment. As some students terminate their studies due to a lack of reading proficiency, reading development programmes should be high on the priority list of scaffolding processes aimed at first-year students. The main purpose of the study was to determine whether the *LectorSA* reading programme would have an effect on the reading performance levels of first-year students at the Qwaqwa Campus of the University of the Free State. The quantitative research design comprised a quasi-experimental method with a pre-test, post-test non-equivalent control group design. The target population was 120 B.Sc. students in the Access Programme. Results indicated that first-year students read at distressingly low levels, but that an eight-session reading intervention programme significantly contributed to the improvement of students' reading performance and should therefore be considered for inclusion in the Higher Education Access Programme on the mentioned campus. By doing so, the institution will

take responsibility for the preparation and support of first-year students in terms of academic literacy, which includes reading ability.

INTRODUCTION

Academic literacy, with special reference to reading and comprehension skills, is a key factor in predicting academic success (Hermida 2009; Tommaso 2007). A lack of reading and comprehension skills may cause students to terminate their studies, escalating the already high drop-out rate at higher education institutions. Incorporating a scientifically-researched, compulsory, well-structured and supervised reading development programme may contribute to the alleviation of some of these academic literacy challenges and may enhance academic skills development offered in access programmes at higher education institutions (Parkinson, Jackson, Kirkwood and Padayachee 2008; Phillips 2004).

For the past few years the researchers have been actively involved in first-year student support and skills training programmes, not only as lecturers, but also as coordinators of the access programme of the Faculty of Natural and Agricultural Sciences on the Qwaqwa Campus of the University of the Free State. Within modules focussed 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 (in Nel and Nel 2010: 2) indicate that "85% of college learning requires careful reading", while Van Schalkwyk, Bitzer and van der Walt (2009) also emphasise 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 labelled as a global problem which signified the importance of addressing the matter comprehensively (Lombard 2010b; Marshall 2011; Twinton 2007). Rose and Hart (in Nel and Nel 2010:1) maintain that "Reading is not simply an additional tool that students need at university; it constitutes the very process whereby learning occurs

The purpose of this study was to investigate the effect of the *LectorSA* reading programme on the reading performance of first-year students at a higher education institution. This was done by linking the *LectorSA* reading programme to the Scaffolding Academic Literacy (SAL) pedagogy (Hart 2013: 3) which "offers a means to respond to the need for academic programmes to integrate academic literacy development into teaching practices and into teaching of content to maximise 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* programme 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: 6).

Trends regarding poor academic literacy skills at higher education institutions

International higher education institutions raised their apprehensions pertaining to the lack of academic literacy skills detected in first-year students. Institutions in Boston (Tommaso 2007), New England (Rao n.d.), Canada (Hermida 2009), Texas (Simmons 2011), Zimbabwe (McGinley 1984), the United Kingdom (Walter 2008), and Malaysia (Lombard 2010a) issued reports about the poor reading proficiency of first-year students entering higher education institutions. In South Africa, Stephen, Welman and Jordaan (2004) found that poor reading proficiency affected academic performance and, therefore, jeopardised through-put rates.

A number of authors such as Fouché and De Vos (2002), Hermida (2009), Lombard (2010a), McGinley (1984), Nel and Nel (2010), Simmons (2011) and Walter (2008) reported on studies in which they implemented some form of intervention, such as multiple strategies to improve academic literacy skills, early-detection literacy programmes, 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 and Scott (cited in Hart 2013: 1) state that "[t]he scale of the failure and drop-out 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.

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 15%, and asserts that this low graduation rate is partly due to "a lower quality of schooling in townships and predominantly African rural areas" (RSA 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 (Lombard 2010a; Pretorius 2000; Nel, Dreyer and Klopper 2004; Van Dyk 2005; Stephen et al. 2004). He acknowledged various efforts of universities to meet the challenges, but stated that these efforts lacked evidence of what the "most successful routes" were to support the students (RSA Department of Education 2012: 42).

According to Marshall (2011: 5) the South African government took the first step by introducing a National Reading Strategy. This intervention mainly focuses on primary school learners, but it unmistakably states that the development of reading skills is a life-long practice which goes beyond secondary school and declares that "[p]oor matriculation results are in part due to the low levels of 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".

An Academic Status Report for the Qwaqwa Campus, 2004 - 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 16 and below (for mainstream enrolment at the UFS a student needs an AP score of 30+). The results of the National Benchmark Tests (2010-2011) 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: 15).

Reading literacy defined as 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, Simpson and Viswanathan (2002: 2) define academic literacy expected of first-year students as "[all] the elements of academic literacy - reading, writing, listening, speaking, critical thinking, use of technology, and habits of mind that foster academic success". Hart (2013) and Layton and Brown (2012) 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 programmes in schools, can increase the rate of literacy development by 20% (Rose, Rose, Harrington and Page, cited in Hart, 2013).

For the purposes of the study reported here, the emphasis will be on one of the 'basic academic literacy skills' (Beekman, Dube and Underhill 2011; Phillips 2004), namely reading.

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% 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 (Jansen 2012; Parkinson et al. 2008; Scott and Yeld 2009). Students with reading difficulties are usually unable to perform well in the National Benchmark Tests and are consequently enrolled in access rather than mainstream programmes at the UFS. On the Qwaqwa campus of the UFS, however, no remedial reading development programmes are offered, and many students with critically poor reading ability might never master the essential reading skills without an explicit reading intervention. One of the most important challenges faced by higher education institutions, especially on the Qwaqwa Campus, is the 9.1% graduation rate as stated in the Academic Status Report of the University of the Free State (DIRAP 2012).

A reading speed of 280 words per minute with a 70% 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. According to this study, a very low percentage of the first-year students at UJ read at an independent level, that is, with 60% comprehension and no additional assistance. The majority, 67%, read at 'frustration' level, which implies reading with less than 40% comprehension (Stephen et al. 2004).

In a report from the University of Pretoria (UP), Lombard (2010a) 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% comprehension, which implies reading at grade one level. Phillips (2004) also reports on very low reading levels of first-year students which need urgent attention. A small pilot study at the Qwaqwa Campus revealed an average reading level of grade 2.9, which falls well into the mentioned 'frustration' level and is way below the expected level of grade 13 (Marshall 2011).

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 instruction (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 programme 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 utilises the *LectorSA* Programme in the Junior Tukkie initiative for placement purposes for first-year students (Lombard 2010a). After a baseline evaluation has been done, an on-line 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 programme, a group of 188 learners improved their reading speed from 143 to 409 words per minute and their comprehension improved from 58% to 66%.

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 (final school year) 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 11% increase in reading comprehension thanks to a reading intervention at the University of Stellenbosch (Van Dyk 2005).

"Bridging the gap of extended foundation programmes (Hart 2013) cannot be done by marginalised programmes, "[t]herefore, the ability to learn from reading needs to be integrated into mainstream content teaching". General and faculty-specific reading development programmes "cannot be confined to the first year of the proposed four-year degree structure" (Hart 2013: 12), but should be implemented on a long-term basis to ensure that the reading material adds to the learning process.

METHODOLOGY

The study reported on here, was a quantitative study, conducted from a post-positivistic perspective by means of a quasi-experimental, non-equivalent, pre- and post-test control group design. To determine the reading levels of first-year B.Sc. students in the university's Access Programme, an initial reading evaluation was done by using the *LectorSA* lab-on-line programme (*cf.* Marshall 2012, 2013). The programme functions as a cloud hosted web application (www.lab-on-line.com), optimised for Google Chrome and Mozilla Firefox. It is pre-arranged on seventeen levels of competency from grade one to grade thirteen and includes four levels of advanced reading skills development. The programme 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 programme and those who did not.

Population and sampling

A convenience sample of 120 first-year B.Sc. students in the Access Programme 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 post-tests entailed: 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 programme 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 standardised table supplied by the *LectorSA* programme.

These four levels of measurement were automatically captured by the *LectorSA* solutions programme for later analysis. This programme monitors the progress of the student and automatically advances the reader to a higher reading speed if the comprehension score is above 70%.

The data collection were 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* programme. Both groups read the same standardised 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 pre-test scores for both groups.

With this information as baseline assessment the students in the experimental group were individually registered on the internet-based *LectorSA* reading programme. They completed the on-line placement test and continued with eight sessions on the *LectorSA* reading solutions programme under strict supervision of the researcher.

After the experimental group completed the eight reading sessions the final standardised evaluation tests was done with all students from the control and the experimental groups. The data from this evaluation were recorded as the post-test scores for both groups. Once the scores of the initial and final evaluations were calculated, the data were statistically analysed using Student's t-test and paired t-test. Data are 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 ± 1.67years. The mean age did not differ between the experimental (19.58) and control (20.17) groups and Student's t-test showed no significant difference between the mean age of male (20.00) and female (19.75) participants. There was also no significant difference between the two genders of either the pre- and the post-test 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.

INSERT Table 1: *Pre-test reading scores*

No significant difference (as indicated in table 1) between the mean of the experimental and control group was found regarding reading speed, text comprehension, reading index and reading grade level. This indicates that neither group showed any distinct pre-existing advantage or disadvantage which might influence the outcome of their future post-test 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.

INSERT Table 2: *Post-test reading scores*

When the post-test scores were compared (as shown in Table 2), two distinct changes were noticed. Where the control group slightly out-performed the experimental group in the pre-test scores on all the tests, the experimental group vastly and significantly out-performed the control group on all the tests for the post-test scores.

The experimental intervention has therefore led to a significant increase in test performance, improving the reading grade level from 2.15 to 8.18. For the control group the reading grade level also increased, but only from 2.6 to 2.95.

Changes from pre-test to post-test

Despite the statistically significant differences between the post-test scores of the experimental and control groups, a thorough examination of Table 1 and Table 2 revealed that the control group did actually 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 post-test score minus the pre-test score. These difference scores then 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. The text comprehension of the experimental group showed a mean decline of -0.3, but the control group performed much worse, with a mean decline of -1.4. 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 grouped showed a huge mean improvement of 6.03. It was noticed that none of the participants in the experimental group dropped in reading grade level, while some participants in the control group deteriorated by as much as four reading grade levels from the pre- to the post-test. However, the most remarkable improvements were found in the experimental group for the reading speed and the index values.

Once again, the difference in scores between the two groups was statistically significant. The improvement is not entirely unexpected, since it can be anticipated that students will progress over the course of their studies, and it means 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 on their own.

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

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

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 keeping up with academic demands (Rao n.d.; Van Dyk 2005). This study found significant improvements in the reading grade scores of students who participated in the intervention programme.

The mean pre-test scores of 2.60 and 2.15 respectively for the control and the experimental group (table 1) correlate with the findings of Lombard (2010a), Marshall (2011) and Pretorius (2000), who reported average reading levels of grade three. This emphasises the challenges of ill-prepared students with low academic literacy levels and a lack of good reading skills to cope with academic demands of higher education education (Nel *et al*. 2004; Van Dyk 2005; Scott and Yeld 2009; Parkinson *et al*. 2008; Twinton 2007).

The text comprehension of both groups showed a decline and even more alarming is the fact that some students from both groups actually attained worse results in the post-test 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 have more serious reading problems which may vary from physical disadvantages to possible dyslexia or just bad eyesight.

Despite the decrease in the reading comprehension scores, the reading grade level of the experimental group improved significantly (from 2.15 to 8.18). A mean improvement of 6.03 reading grade levels, after eight sessions on the reading intervention programme, might look very impressive, but need we 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 programme to read at the expected, grade 13, level.

CONCLUSION

The aim of this study was to investigate the possible effect of a reading development programme on the reading performance of first-year students. Reading skills has been indicated to be crucial for academic success and should not be cause for students to "drop out of college". This study revealed that the participating first-year students read at alarmingly low levels, which correlates with 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 programme will make a positive contribution in this respect. This study 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 emphasises the need for a continuous reading development programme 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 programme 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 programme 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 programme.

By registering a student for an academic programme, 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 knowledge to survive in the corporate world, but statistics on through-put 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 programme 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 programmes such as the reading programme should be compulsory for all first-year students in all faculties on this campus. When a student reaches the expected proficiency levels on all the criteria of the programme he/she should be exempted from attendance.

More research need to be done to minimise the limitations of the current research and to determine the long-term effect of reading intervention programmes on the academic success and actual graduation rate of students. The ideal situation will also be that all first-year students can 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 programmes not only as part of the access programmes, but also for the whole student population.

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TABLES

Table 1: Pre-test reading scores (DF = 118 in all cases)

Test	Study group	Mean	Std Dev	Std Err	Min	Max	t	p
Reading speed (words per minute)	Control	130.7	36.571	4.721	48	225	1.09	0.279
	Experimental	123.6	34.585	4.465	41	196		
Text comprehension (Percentile)	Control	6.4	1.777	0.23	2	10	0.1	0.921
	Experimental	6.37	1.877	0.242	3	10		
Reading index (no unit)	Control	91.48	25.6	3.305	33.6	157.5	1.09	0.279
	Experimental	86.53	24.209	3.125	28.7	137.2		
Reading grade level (no unit)	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 (DF = 118 in all cases)

Test	Study group	Mean	Std Dev	Std Err	Min	Max	t	p
Reading speed (words per minute)	Control	140.8	30.945	3.995	80	250	-9.66	<.0001
	Experimental	215.3	51.139	6.602	90	320		
Text comprehension (Percentile)	Control	5	2.322	0.3	1	10	-2.87	0.0049
	Experimental	6.07	1.706	0.22	2	10		
Reading index (no unit)	Control	98.54	21.662	2.797	56	175	-9.66	<.0001
	Experimental	150.7	35.797	4.621	63	224		
Reading grade level (no unit)	Control	2.95	1.97	0.254	1	12	-9.85	<.0001
	Experimental	8.18	3.615	0.467	1	13		

Table 3: Paired t-tests for Pre-test and Post-test scores per Group (DF = 59 in all cases)

Test	Study group	Mean	Std Dev	Std Err	Min	Max	t	p
Reading speed (words per minute)	Control	10.08	37.19	4.8	-61	125	2.1	0.04
	Experimental	91.72	50.97	6.58	-179	229	13.94	<.0001
Text comprehension (Percentile)	Control	1.4	3.1	0.4	7	6	-3.5	0.0009
	Experimental	-0.3	2.53	0.33	-7	6	-0.92	0.3614
Reading index (no unit)	Control	7.06	26.03	3.36	-42.7	87.5	2.1	0.04
	Experimental	64.2	35.68	4.61	-11.9	160.3	13.94	<.0001
Reading grade level (no unit)	Control	0.35	2.04	0.26	-4	8	1.33	0.1891
	Experimental	6.03	3.34	0.43	0	12	13.99	<.0001