

Prerequisites Included in Selection Criteria: A Contribution to Student Success in Nursing

Onica Mankebe Ndwambi

<https://orcid.org/0000-0003-1262-6396>
University of South Africa
Onica.Ndwambi@gauteng.gov.za

Lizeth Roets

<https://orcid.org/0000-0001-9537-212X>
University of South Africa
roetsl@unisa.ac.za

Abstract

The low throughput rates of basic nursing students could be indirectly associated with the shortage of nurses in the nursing profession. Various factors could be related to the poor academic performance in tertiary education, with specific reference to nursing students. One of these factors is the selection and recruitment requirements for entry into nursing programmes. The objective of this article is to share the results of a study that was conducted in South Africa to describe whether background knowledge of grade 12 Life Sciences and English Language Proficiency influenced the academic performance in the Biological and Natural Science module of first-year student nurses. A quantitative research study was conducted. Baseline data were gathered by means of a checklist to collect data from first-year student admission records (193), and questionnaires to collect data from second-year students (147). The data demonstrated a positive association between the academic achievement of the Biological and Natural Sciences module and background knowledge of grade 12 Life Sciences and between the academic achievement of the Biological and Natural Sciences module and grade 12 English Language Proficiency. Students, but especially students who comply with specific prerequisites, thus a pass mark of grade 12 Life Sciences and evidence of adequate grade 12 English Language Proficiency, must be recruited to enhance the throughput rates of nursing students to help reduce the nursing shortage.

Keywords: language proficiency, life sciences, prerequisites



African Journal of Nursing and Midwifery
<https://upjournals.co.za/index.php/AJNM/index>
Volume 22 | Number 2 | 2020 | #6013 | 11 pages

<https://doi.org/10.25159/2520-5293/6013>
ISSN 2520-5293 (Online)
© The Author(s) 2020



Published by Unisa Press. This is an Open Access article distributed under the terms of the Creative Commons Attribution-ShareAlike 4.0 International License (<https://creativecommons.org/licenses/by-sa/4.0/>)

Introduction and Background Information

Sub-Saharan Africa needs 600 000 more nurses to meet the average density coverage for low-income countries in order to achieve the UN's Sustainable Development Goals (WHO 2013, 1) – in particular, goal number three: good health and well-being. In order to achieve this goal in South Africa, more nurses are needed to align with the National Health Insurance model to promote health and prevent illness. The ratio of registered nurses (RNs) in South Africa is 5:1 000, but when the country's refugees and illegal immigrants are taken into account, the ratio may escalate (Becker 2017, 1). This ratio is of concern when compared to the WHO standard of 1:200 (WHO 2013). It is therefore necessary for nursing institutions to produce more nurses to curb the shortage.

According to a report on higher education in the twentieth year of democracy, the South African government aims at increasing the learner enrolment rate from 17.3 per cent to 25 per cent (950 000 to 1.6 million) by 2030. Unfortunately, the graduation rate of undergraduate students remains low at 50 per cent to 53 per cent (Department of Higher Education 2011, 21). Thus, improved throughput rates in nursing colleges will most probably translate into an increase of the nurses in practice. Therefore, the nursing colleges will have to review their selection criteria in order to recruit candidates who had a better probability of being successful in their academic performance (Allos, Caranto, and David 2015, 5).

Admission requirements for various nursing programmes in South Africa are diverse. Admission into diploma nursing programmes appears to be much lower than for entry into degree programmes at universities. For example, universities require 50 to 59 per cent for English Language Proficiency but colleges require 30 to 39 per cent, thus a 20 per cent lower achievement in the language of instruction or learning, as required by the Department of Health (2011, 23).

Although admission criteria including prerequisites to enter nursing programmes are very diverse, it is expected that the throughput rates need to be improved owing to specifically the dire need of more RNs to reduce the shortage (CHRE 2012, 7). Academic success and performance are influenced by multiple factors such as prior knowledge of subjects related to the nursing career path (Life Sciences) and English Language Proficiency (Allos, Caranto, and David 2015, 5).

Prior knowledge and previous experience are well-known factors that contribute to performance and success (Aliakbari et al. 2015, 5). Students most often use their prior knowledge for reasoning, building theories and dealing with cognitive conflict when there are conflicting ideas between what is known and what is being taught (Van Blakenstein et al. 2013, 733). This principle is no different in the higher education context. Although grade 12 Life Sciences, previously known as Biology, lays a foundation for a Biological and Natural Sciences (BNS) module, an essential part of the curricula in nursing and health-related programmes, it is not currently a prerequisite for entry into all nursing programmes at college level (Department of Health 2011, 12). The

principles of prior knowledge and language proficiency as prerequisites to enhance students' success are ignored by some institutions, or not regarded as important, as reflected in their selection criteria.

In order for students to succeed academically in any form of study, they should be able to read, write and understand the concepts (Kola 2014, 278). Individuals' writing skills in a language are built on their ability to speak, read and write that language. Good English language results should be used as an essential prerequisite for admission to higher education as reading and writing skills in the language of instruction contribute to success (Kola 2014, 278). According to the Council on Higher Education, among the challenges facing education in South Africa is that 30 per cent to 40 per cent of all new students enrolling in tertiary institutions are not ready to read and write at a higher level (Department of Higher Education 2013, 57). A poor ability to read and digest course material and literature has a negative impact on students' performance as comprehension is critical to fostering the analysis and evaluation of any information (Berndt, Petzer, and Wayland 2014, 31; Bharuthram 2012, 205, 210). Students must be able to read and understand what they read in order to learn effectively. At some colleges, however, an achievement of only 30 per cent in English Language Proficiency in grade 12 is required to enter into a nursing programme despite the fact that many of the students are African whose home languages are vernacular (Berndt, Petzer, and Wayland 2014, 31). The above-mentioned factors might have an effect on the many students currently extending their training to five and six years, or dropping out due to poor progress (college statistics 2010).

Statement of the Research Problem

Failing the BNS 100 module contributes to the high number of professional nurses who complete their studies after five to six years instead of the minimum of four years. Background knowledge of grade 12 Life Science and language proficiency in the language of instruction might be factors that influence the academic performance of students enrolled in the BNS 100 module in basic nursing studies and needed to be investigated, in order to make recommendations regarding possible implications for selection and recruitment of students into college nursing programmes.

Purpose of the Study

The purpose of this article is to share the results of a study that was conducted to describe the performance of students who enrolled in a BNS module and who have passed grade 12 Life Sciences with at least ≥ 50 per cent and to compare them to those students who did not study or who obtained a grade 12 mark of below ≤ 49 per cent in Life Sciences – thus to assess whether prior knowledge is indeed a factor that influence student success. Another aspect considered was whether language proficiency in the language of instruction was a profound factor in student success.

Research Method

A descriptive quantitative design (Brink, Van Der Walt, and Van Rensburg 2018, 96) was used to gather data by means of checklists and questionnaires. The checklists were used to collect data from the students' admission records. Aspects included in the checklists were gender, age, private or public school attendance, the grade 12 Life Sciences or standard 10 Biology pass grade, the grade 12 English Language Proficiency pass grade and the BNS 100 examination mark. The admission records of the first-year students (193 records) were perused from 1 June to 12 June 2015 to collect data on the admission point score, with the aim to analyse (1) the performances in grade 12 Life Sciences, (2) English Language Proficiency as a medium of teaching and learning, and (3) the performances of those students who did not study Life Sciences, and to compare the data with their academic performances in the BNS module. All-inclusive sampling of the 193 available records was done.

A self-developed questionnaire requiring information on demographic data, academic performance in grade 12 (English Language Proficiency and Life Sciences) and performance in BNS 100 was assessed. The questionnaire was piloted on 10 third-year basic nursing students because they already passed BNS 100 and BNS 200. Five students' records were perused to complete the information for the pilot study and those records were excluded from the main study. Self-developed questionnaires were used to collect data on 14 August 2015 from the respondents (147 second-year students) about their perceptions of the impact of grade 12 Life Sciences on their performance in the BNS module. All-inclusive sampling was done. The collected data were analysed to justify and evaluate the academic performance in the BNS module and its relationship with the background knowledge of grade 12 Life Sciences and English Language Proficiency.

The ethical principles required as stipulated in the Nuremberg Code (Bless, Higson-Smith, and Sithole 2014, 29) were adhered to. Permission to conduct the study was requested from and granted by the South African Ministry of Health and ethical approval was obtained from the Research and Ethics Committee of the Department of Health Studies, Unisa (HSHDC/322/2014). Every respondent provided informed written consent before completing the questionnaires.

Data Analysis

The respondents were aged between 18 and 34, and 167 ($f = 86$, 53%) were females and 26 ($f = 13$, 47%) were males. More females seem to be registering for a nursing career than males, but gender did not seem to have an impact on the academic performances in BNS 100. The data were managed and analysed using Stata 14. Descriptive statistics using frequencies were used to describe the data and the chi-square test was used to measure associations. The associations between grade 12 Life Sciences results (passed with at least 50%) and academic achievement in BNS, and BNS achievement and

English Language Proficiency were measured. The 95 per cent level of confidence (95% CI) and a probability of $p < 0.05$ were used to define the level of significance.

Discussion of the Research Results

Grade 12 Life Sciences

The study results revealed that of the 193 respondents, 77 had background knowledge of grade 12 Life Sciences, and 62 ($f = 80, 5\%$) passed the examination, with only 15 ($f = 19, 5\%$) who failed. Of the 116 respondents who did not have prior knowledge of grade 12 Life Sciences, 68 ($f = 58, 6\%$) passed and 48 ($f = 41, 4\%$) failed (see Table 1).

Table 1: Respondents' BNS 100 academic achievement and prior knowledge

Grade 12 Life Sciences	Passed BNS 100		Failed BNS 100		Total	
	Frequency	%	Frequency	%	Frequency	%
Prior knowledge	62	80.5	15	19.5	77	100
No prior knowledge	68	58.6	48	41.4	116	100
Total	130	67.3	63	32.7	193	100

The data thus indicated that students who studied and passed grade 12 Life Sciences had a significant greater chance of passing the BNS module. Fisher's exact test measured the association at = 0.002 significance (see Table 2).

Table 2: Fisher's exact test for prior knowledge

Category	Key	Failed BNS	Passed BNS	Total
Life Sciences ≥ 50	Frequency	15.00	62.00	77.0
	Row %	19.48	80.52	100.0
	Column %	23.81	47.69	39.90
Life Sciences ≤ 49	Frequency	48.00	68.00	116.0
	Row %	41.38	58.62	100.0
	Column %	76.19	52.31	60.10
	Total	63.00	130.00	193.0

Grade 12 English Language Proficiency

It was evident from the study findings that students who obtained an average of between 50 per cent and 60 per cent in English Language Proficiency, performed better in the BNS 100 examination even though they did not have prior knowledge of grade 12 Life Sciences. Those students who were allowed to a re-examination in BNS 100 also performed better than those who had an average of 49 per cent and below in English

Language Proficiency in grade 12. All students who had an English Language Proficiency grade of below 50 per cent in grade 12 and had no prior knowledge of grade 12 Life Sciences failed both the BNS first examination and the re-examination. Students who obtained 60 per cent in grade 12 English Language Proficiency and achieved above 50 per cent in grade 12 Life Sciences – thus had prior knowledge and were language proficient – passed the BNS examination on their first attempt with an average of 60 per cent (see Table 3).

Table 3: Respondents' English Language Proficiency and academic performance in BNS 100

Grade 12 English Language Proficiency	Passed BNS 100		Failed BNS 100		Total	
	Frequency	%	Frequency	%	Frequency	%
Obtained \geq 50%	100	65.4	53	34.6	153	100.0
Obtained \geq 40–49%	1	4.2	23	95.8	24	100.0
Obtained \geq 30–39%	0	0.0	12	100.0	12	100.0
Obtained \leq 29%	0	0.0	4	100.0	4	100.0
Total	101	52.3	92	47.7	193	100.0

There was also a correlation between prior knowledge of grade 12 Life Sciences and performance in BNS, and between English Language Proficiency and academic performance in the BNS 100 examinations. Proficiency in the language of instruction places students at a high level of understanding when content is taught (Mbah 2015, 32). Hence those respondents without background knowledge of grade 12 Life Sciences but with adequate English Language Proficiency were able to pass the BNS 100 examinations.

The study findings support the cognitive theory of reception. The cognitive theory suggests that new material must be consistent with students' prior knowledge to enhance learning (Aliakbari et al 2015, 5). Learning is an inductive process, starting with a primary understanding of general concepts and continuing to understand the specific details, and it has a close relationship with the students' previous knowledge and the current cognitive structure (Papageorgiou 2017, 1). Thus, students' prior knowledge in their career pathways should be a prerequisite (Bless, Higson-Smith, and Sithole 2014, 29).

Owing to the very nature of the nursing profession, nursing programmes evidently require from students to have knowledge and understanding of the physiology and anatomy of the human body as it is of utmost importance to provide quality care to patients (Brown, White, and Power 2017, 57). It is important for nurses to understand the human anatomy and physiology, as researchers indicated that knowledge of human anatomy and physiology serves as the common language origin within physiology in which a mutual understanding of clinical terminology and medical definitions may underpin the appropriate strategies to enhance quality patient care delivery (Brown,

White, and Power 2017, 58). Westin, Sundler and Berglund (2015, 9) are of the view that knowledge of human physiology will help nurses to pay greater attention to patients' needs and that of their relatives during service delivery. Grade 12 Life Sciences forms the background for human anatomy and physiology and therefore serves as the foundation and continuity from where students left off in grade 12.

The findings of the study (see Table 1) are supported by findings described in the literature which also provided evidence that background knowledge plays a significant role in students' understanding of any new vocabulary and increases the retention and application of new information (Wessels 2012, 1), thus a very important factor in students' academic performance. The respondents ($f = 40\%$) perceived that their own lack of background knowledge negatively influenced their academic performance. It thus remains an open question on why nursing education institutions, despite the low throughput rates of their nursing students, do not adapt recruitment and selection criteria that will require from all new students to have background knowledge of anatomy and physiology and adequate language proficiency in the language of instruction before enrolling in a nursing programme.

The importance of language proficiency at a higher education level can never be underestimated as it has a positive influence on students' academic performance (Sadeghi et al. 2013, 2316). Papageorgiou (2017, 1) and Madoda (2015, 329) confirmed a positive correlation between English language proficiency and academic performance. Of the 153 ($N = 193$) respondents who passed English Language Proficiency in grade 12 with ≥ 50 per cent, 100 ($f = 65, 4\%$) passed the BNS examination; of those who passed English Language Proficiency with 40 to 49 per cent ($n = 16$), only 1 ($f = 4, 2\%$) passed the BNS examination; and all the respondents who obtained 39 per cent and less in grade 12 English Language Proficiency failed the BNS module (see Table 3).

Nursing education institutions, particularly those that do not require prior knowledge that is subject-specific and evidence of English language proficiency, should revisit the prerequisites for entry into nursing programmes.

Conclusion

The findings of this study support the notion that the selection criteria of nursing institutions, specifically but not limited to colleges, need to be revisited if the throughput rates in the minimum time required were to be improved to ensure that more qualified professional nurses are produced for the profession. Candidates that have a higher chance of completing their studies need to be selected. Prior knowledge of Biology (Life Sciences) can contribute to passing the BNS 100 module or similar modules in other institutions. The admission point score should be at least 30; that is, a calculation based on a candidate's achievement in six recognised subjects, by using the National Senior Certificate ratings – the one to seven scale of achievement (Department of Education 2014). This implies that students will also have to be proficient in English as discussed.

Recommendations

The nursing profession is in dire need of more qualified nurses who are competent and can provide quality nursing care to the community they serve. Recruitment and selection policies should contribute to the enhancement of throughput rates and decrease the level of student attrition in nursing programmes. Candidates that have a higher chance of completing their studies need to be selected. Selection criteria should include Biology (Life Sciences) as a grade 12 subject as is the case with the selection criteria for nursing programmes in universities and nursing colleges in other countries around the globe (Alusukunya 2013, 1; NAB 2015).

Provision must, however, be made to help students who do not comply in order to give them a chance to enter the nursing profession and enhance their chance of success. Students who apply for entry, and who did not achieve ≥ 50 per cent in Life Sciences in grade 12 as part of the background knowledge requirements, will not be excluded, but supported as they can enrol in a 6-month introductory or bridging module. Students are more likely to succeed if provided with short courses to close the gap in the lack of prior knowledge in a particular module (Kridiots, Bezuidenhout, and Raubenheimer 2016, 209). The short course or module will provide them with background knowledge that will enable them to write an examination similar to the principles of recognition of prior learning. If they pass the examination, they can enrol in the nursing programme, knowing that they now have the background knowledge that will provide them with a significantly better chance to achieve academic success.

Similarly, students who did not achieve at least ≥ 50 per cent for grade 12 English Language Proficiency or the language of instruction should first write a language proficiency test. If they fail this test, they should enrol in a compulsory 6-month English language module to provide them with language proficiency skills and the opportunity to rewrite the language proficiency test before registering for the nursing programme. Six months is a sufficient time for a short course to upgrade the English knowledge of the candidates.

It is recommended that the study be conducted with a larger sample, including more colleges and universities that offer nursing programmes to confirm or contradict the findings.

Limitations of the Study

This study was limited to only one public nursing college; thus the findings cannot be generalised to nursing colleges in the rest of the country. These findings might therefore support motivations to include English Language Proficiency and Life Sciences (Biology) as prerequisites in the selection criteria for nursing programmes in this and other colleges of nursing in South Africa, in line with the current global tendency.

Acknowledgements

The authors want to express their sincere gratitude to the students of the nursing college for availing themselves to participate in the study and also to the South African Provincial Department of Health for the opportunity to conduct the research.

References

- Aliakbari, F., N. Parvin, M. Heidari, and F. Haghani. 2015. "Learning Theories Application in Nursing Education." *Journal of Education and Health Promotion* 4 (1): 2–11.
- Allos, B. S., L. C. Caranto, and J. J. T. David. 2015. "Affecting the Academic Performance of the Student Nurses of BSU." *International Journal of Nursing Science* 5 (2): 60–65.
- Alusukunya, O. 2013. "World Education News and Reviews. Admission Requirement in Tertiary Institutions, Nigeria." Accessed 18 April 2015. <http://www.wes.org/Africa>.
- Berndt, A., D. Petzer, and J. Wayland. 2014. "Comprehension of Marketing Research Textbooks among South African Students: An Investigation." *South African Journal of Higher Education* 28 (1): 28–44. <https://doi.org/10.20853/28-1-321>.
- Becker, E. 2017. "A Cry for Help the Nursing Sector." Business News. *The Citizen*. Accessed 22 January 2020. <http://citizen.co.za/business-news/1530237/cry-help-nursing-sector>.
- Bharuthram, S. 2012. "Making a Case for the Teaching of Reading across the Curriculum in Higher Education." *South African Journal of Education* 32 (1): 205–214.
- Bless, C., C. Higson-Smith, and S. L. Sithole. 2014. *Fundamentals of Social Research Methods: An African Perspective*. 5th ed. Lansdowne: Juta.
- Brink, H., C. van der Walt, and G. van Rensburg. 2018. *Fundamentals of Research Methodology for Healthcare Professionals*. 4th ed. Cape Town: Juta.
- Brown, S. J., S. White, and N. Power. 2017. "Introductory Anatomy and Physiology in an Undergraduate Nursing Curriculum." *American Physiological Society* 41 (1): 56–61. <https://doi.org/10.1152/advan.00112.2016>.
- CHRE (Council for Healthcare Regulatory Excellence). 2012. *Strategic Review of the Nursing and Midwifery Council Final Report*. London: Nursing and Midwifery Council. Accessed 30 January 2015. https://www.professionalstandards.org.uk/docs/default-source/publications/special-review-report/strategic-review-of-nmc-2012.pdf?sfvrsn=85757f20_4.
- Department of Education. 2014. *South African Higher Education in the 20th Year of Democracy: Context, Achievements and Key Challenges*. Pretoria: Department of Education.

- Department of Health. 2011. *Gauteng increases Intake of Student Nurses*. Pretoria: Department of Health. Accessed 22 February 2015. <https://www.sanews.gov.za/south-africa/gauteng-increases-intake-student-nurses>.
- Department of Higher Education. 2013. *Council on Higher Education Annual Report 2013/2014*. Pretoria: Government Printers.
- Department of Higher Education and Training. 2011. *Annual Report 2010/2011*. Pretoria: Department of Higher Education and Training. Accessed 11 February 2015. https://www.gov.za/sites/default/files/gcis_document/201409/dhetanrpt2010-2011.pdf.
- Kola, A. J. 2014. "The Influence of English Language on Students' Academic Performance in Physics in Colleges of Education." *Asian Academic Research Journal of Social Sciences and Humanities* 1 (23): 272–281.
- Kridiots, C. A., J. Bezuidenhout, and J. Raubenheimer. 2016. "Selection Criteria, in South Africa Predictors for Academic Success in the 1st Year of Study." *Science Direct* 20 (6): 206–213. <https://doi.org/10.1016/j.hsag.2016.01.005>.
- Madoda, C. 2015. "English Language Proficiency as a Predictor of Academic Achievement among Primary English first Additional Language." *International Education Science* 9 (3): 325–333. <https://doi.org/10.1080/09751122.2015.11890322>.
- Mbah, B. A. 2015. "Effects of Prior Knowledge of Topics and the Instructional Objectives on Students' Achievement in Literature-In-English." *Journal of Education and Practice* 6 (20): 31–34.
- NAB (National Accreditation Board). 2015. "Minimum Requirements for Admission to First Degree Programmes." Accra: Ministry of Education. Accessed 7 March 2015. http://nab.gov.gh/admin1/accreditation_document/5eee1d5686ffb6.94145558.pdf.
- Papageorgiou, E. 2017. *Accounting Students' Profile versus Academic Performance: A Five Year Analysis*. Johannesburg: University of the Witwatersrand. <https://doi.org/10.20853/31-3-1064>.
- Sadeghi, B., N. M. Kashanian, A. Maleki, and A. Haghdoost. 2013. "English Language Proficiency as a Predictor of Academic Achievement among Medical Students in Iran." *Theory and Practice in Language Studies* 3 (12). <https://doi.org/10.4304/tpls.3.12.2315-2321>.
- Van Blakenstein, F. M., D. H. J. M. Dolmans, C. P. M. van der Vleuten, and H.G. Schmidt. 2013. "Relevant Prior Knowledge Moderates the Effect of Elaboration during Small Group on Academic Achievement." *Springer* 41 (1): 729–44. <https://doi.org/10.1007/s11251-012-9252-3>.
- Wessels, S. 2012. "The Importance of Activating and Building Knowledge." University of Nebraska – Lincoln. Faculty Publication. Department of Teaching. <https://doi.org/10.4148/2637-4552.1104>.

Westin, L., A.J. Sundler, and M. Berglund. 2015. "Students' Experiences of Learning in Relation to Didactic Strategies during the First Year of Nursing Programme: A Qualitative Study." *BioMed Central* 15 (1): 1–15. <https://doi.org/10.1186/s12909-015-0338-x>.

WHO (World Health Organization). 2013. *The Millennium Development Goals Report*. Geneva: WHO. Accessed 12 July 2016. https://www.un.org/millenniumgoals/pdf/report-2013/mdg-report2013_pr_global-english.pdf.