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Research Article

Learning Styles of National University of Lesotho Nursing Students: Foundation in Improving Teaching-Learning Process

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Abstract

Background: Learning style preference impacts on how well groups of students respond to their curricula. The nursing educator's goal is to creatively develop education techniques that are companionable with the preferred learning styles of students. **Purpose:** The purpose of this study was to determine the learning styles of the National University of Lesotho (NUL) nursing students and the findings will form a basis in improving the teaching-learning process. **Methods:** This study followed a quantitative cross-sectional design. The study took place at the National University of Lesotho which envisages being a vibrant African University, nurturing thought leaders. The English version of the VARK questionnaire was administered to 149 undergraduate nursing students in second, third, fourth, and fifth levels of study to determine their learning style preferences. Descriptive statistics were used to identify the learning styles of students. **Results:** There were more nursing students who preferred a unimodal learning styles (80.6%) than those who preferred a multimodal learning styles (19.4%). The bimodal learning style was the preferred style among multimodal learners in total sample and in each study level separately. Within the unimodal learners, 34.9%, 25.1%, 21.2%, and 18.8% of the nursing students were Kinaesthetic (K), Reading/Writing (R), Aural (A), and Visual (V) learners, respectively. **Conclusions:** The present study concluded that students have varied learning styles. The kinaesthetic is the predominant learning style among NUL nursing students. This preference jointly with the read/write preference suggests that teaching strategies that include hands-on experience and activities will be the most successful.

Key words: Learning preference, learning styles, National University of Lesotho, student nurses, VARK.

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Introduction

Teaching, like nursing, is both an art and a science. When it comes to the health professions, making sure that students have both the core content and the ability and skills to be life-long learners is imperative.[1] Adult education assumes, though not in all instances, that students at higher learning institutions have developed effective study skills and have acquired appropriate learning strategies to adapt their learning to the lessons and tutoring methods used by educators.[2] Given the very different and diverse nature of students, studies show the importance of teachers adapting pedagogy and didactics to students' preferences.[3] Through this adaptation, the teacher may choose compatible instructional strategies that may be used in teaching suited to the styles of the learners. This adaptation may also be the basis of choosing learning activities that will suit to their preferred learning styles to further improve their performance. When nursing students have studied with strategies congruent to their learning style preferences they have been motivated, felt responsibility, and achieved high grades.[4,5] Hillan[2] notes that learning style theories assume that students may all learn, though in different ways, at different levels, and in different settings. This study was therefore conducted to identify the most dominant learning

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style of the NUL nursing students. Previous to this study, the learning style preferences of Lesotho nursing students were not known. This lack of empirical information means the development of pedagogy and didactics have been based on instructors' preferences without due regard of learners' preferences. Developing knowledge of the different learning styles will help nurse educators to develop curricula and adopt teaching methods that will be enjoyable to students and likely impact their learning environment.

Background

Context of the study

Lesotho's health care services are delivered primarily by the Government of Lesotho and the Christian Health Association of Lesotho (CHAL). With 23.2% of the population infected with HIV, Lesotho is among the top three countries in the world most severely affected by HIV/AIDS.[6] HIV sero-prevalence is higher in urban areas than in rural areas, with an average prevalence of 31.1% and 22.2%, respectively.[7] Like many countries in Southern Africa, nurses and midwives are the frontline health care workers in the country, providing services to adults and children at all levels of the healthcare system. Within the similar context, in the year 2000 the Ministry of Health proposed to the National University of Lesotho to establish the Faculty of Health Sciences (FoHS). The Faculty of Health Sciences, with its four departments; nursing, pharmacy, nutrition, and environmental health, aims to supply the country with competent professionals who are thought leaders. There are four nurse training institutions that are affiliated to the NUL through the Faculty of Health Sciences being the government-owned National Health Training College (NHTC) and the three colleges that are owned and operated by the CHAL-Scott School of Nursing, Maluti, and Roma Colleges of Nursing while Paray School of Nursing being the fifth nurse training institution is affiliated with the University of Free State. NHTC and the four CHAL training institutions all offer a three-year diploma in general nursing. Midwifery is a post-basic qualification requiring an additional year of study beyond the diploma in general nursing with the exception of NUL where there is a three year completion Bachelor of Nursing Science in either community health nursing, Primary Health Care and Adult Health Nursing, and a five-year degree program (with the first year being a common year for all BSc students) that leads to a Bachelor's degree in nursing and midwifery. Master of Nursing Program was also introduced at NUL in 2018. Any successful graduate may apply to work in either CHAL or Ministry of Health (MOH) facilities, placement occurring at hospital or health-center level.[8] Throughout time, every culture, generation, and profession differs in how it prefers to teach and learn. Internationally, regionally and at NUL, nursing educators want to support their students to become the kind of nurses who practice with competence and confidence to meet the emerging health needs. The university course structure and content of most nursing and midwifery bachelor degrees are very similar and are accredited by the appropriate local professional body;[4] Lesotho Nursing Council in our case. The degree courses are run using a combination of theoretical approaches and experiential approaches. The fundamental purpose of nursing and midwifery pre-service training in Lesotho is to ensure that graduates are competent in the nursing and midwifery skills they will need to safely care for patients in their professional career.[8]

Learning styles

A learning style is defined as the characteristics, strengths, and preferences in the way how people receive and process information.[9-11] Reid[12] put forth that learning styles generally operate on a continuum or on multiple, intersecting continua. Learning styles are generally considered as characteristic, cognitive, affective, and psychological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to a learning environment. Even though there are various definitions of learning styles which are unique and steady, methods of effective learning and information processing are widely accepted.[13]

A match between teaching style and the learning styles of health and nursing students had been advocated by researchers from many parts of the world.[14-17] This is consistent with the view of Fletcher *et al*.,[18] who stated that "an understanding of the preferred learning style of an individual provides an insight into the teaching methods that are likely to be effective for that individual."

Yet, the literature continues to disclaim learning styles as a valuable educational construct. There continues to be a lack of evidence to any benefit in matching instruction to learners' preferred learning style or that understanding one's learning style improves learning.[19] Researches also continue to question the reliability and validity of learning style assessments.[20] Some authors[19,21-25] argue that the sustained usage of learning styles is, in theory, associated with a number of harms. The authors contend that learners may be assigned courses according to invalid criteria, for instance, a kinaesthetic learner may be discouraged from pursuing subject which do not appear to match their diagnosed learning style or may become overconfident in their ability to master subjects perceived as matching their learning Style. Other proposed harms include wasting resources on an ineffective method, undermining the credibility of education research or practice, and the creation of unrealistic expectations of teachers by students.

However, it has been generally accepted that individuals' learning styles have an impact on their performance and achievement of learning outcomes.[26] A 2014 survey reported that 76% of UK school teachers used learning styles and most stated that doing so benefited their pupils in some way.[27] A study of Higher Education faculty in the USA showed that 64% agreed with the statement "Does teaching to a student's learning style enhance learning?"[19]

A study by Newton and Miah[28] demonstrated that research papers about learning styles, in the higher education research literature, overwhelmingly endorsed their use despite the lack of evidence described above. Research on learning styles and academic achievement has shown that teaching learners how to learn, monitor, and manage their own learning styles is crucial to their academic achievement.[29] Many studies strongly suggested that there are relationships between certain learning styles and students high academic achievements.[30]

There are several instruments available to determine learning style preference. Some tools focus on the personality of the participant or their current strengths. Two of the most popular learning style tools used by nurse researchers are the Kolb's Learning Style Inventory[31] and the VARK Learning Styles Inventory[32] which is used in this study. Other models of learning styles used in nursing populations include the following: Learning Styles Inventory;[33] Myers-Briggs Type Indicator;[34] Felder-Silverman Learning Style Model;[35] Grasha-Reichmann Student Learning Style Scale;[36] and the Theory of Multiple Intelligences.[37] These learning style models were delineated and studied in an article by Anderson.[38]

VARK is an abbreviation for the four key sensory modalities used to experience new information: Visual (V), Aural (A), Read/Write (R), and Kinaesthetic (k).[32] Visual learners tend to have a preference for information presented in a visual way, such as through graphs, diagrams, and charts. Aural learners prefer to hear information presented to them. Read/write learners favor information presented as words in textbooks and hand-outs. Kinaesthetic learners prefer to learn through simulation and real-life experiences.[39]

Since the development of the VARK tool, studies have used it to examine learning styles of students.[15,17] Several studies have identified such nursing students as multimodal learners, with a strong preference towards kinaesthetic learning modes.[40,41] One study, examining learning styles of nursing students in an accelerated nursing program, also identified that most students were multimodal learners.[42] However, in the same study, students showed a preference for the Read/Write learning style, instead of kinaesthetic.[42]

The identification of learning styles of learners is extremely important for each of the curriculum planners, teachers, and learners themselves, where it contributes to re-build and design of curricula and courses, and chooses the content and experiences, teaching methods and means, and diversification which are commensurate with the different learning styles of learners. Hence, the importance of such study in that it provides educators at universities with knowledge about learning styles and their role in achieving effective learning. This article, therefore, reports findings of a study, conducted during the second semester of 2019/2020 academic year, which had an overall aim of understanding the learning styles of the NUL nursing students using the VARK tool.

Materials and Methods

This study followed a quantitative cross-sectional design. The study was conducted at the National University of Lesotho Department of Nursing. The study participants were students from the four (II, III, IV, V) levels of Bachelor of Science in Nursing and Midwifery. A total of 149 participants were conveniently sampled from a population of 189 nursing students. All students met the inclusion criteria and were in the second semester of their course in 2019/2020 academic year. The researcher adhered to Helsinki declaration by obtaining voluntary written informed consent after explaining the study purpose and objectives. Ethical approval to conduct the study was obtained from the university's research ethics committee (NULSTAFF-01/19). At the end of a scheduled lecture for each level of study, all students present were invited to participate in the study by the researcher. The students were provided with an explanation (verbal and written) of the study and the survey tool was distributed by the class representatives. Participation was voluntary and consent was implied through the return of a completed survey; identified by code numbers to ensure anonymity. The VARK version 7.0 questionnaire was used in this study. The free VARK Questionnaire (www.vark-learn.com) consists of 16 statements that provide a profile of an individual's preferences for how information is received and processed.[43] Each statement has four choices that describe a situation and allows the responder to choose one or more response that they would take. Each action corresponds to one of the four VARK learning dimensions, which are visual, aural, reading/writing, and kinaesthetic. Respondents may select multiple options for each statement, so it is possible to score high in a single area or in multiple areas, which is noted as being multimodal.[43] The VARK questionnaire is easy to administer with free online availability. It is an excellent tool to alert the student and teacher to the variety of learning preferences in a class.[41] The VARK Questionnaire can be self-administered online via the Website or on paper. Once completed, scores are automatically tallied, or the VARK can be scored using the provided rubric.[43,44] VARK learning style inventory was tested for reliability coefficients, which were found to be adequate.[45] The distributions of the VARK preferences were calculated according to the guidelines given in the VARK website by counting the number of each of the VARK letters (V, A, R, K) circled or ticked for each item to obtain the total score for each VARK category. The percentage for each VARK modality and possible combinations of modalities according to the number of students who preferred each learning style was divided by the total number of students. Statistical analysis was done using SPSS version 21 (New York, USA).

Results

A total of 149 out of 189 nursing students completed the questionnaire accounting for a 78.8% response rate. Of the 149 nursing students who completed the questionnaire,

Table 1: Frequency of learning styles

Measure	Learning styles														
	V	A	R	K	VA	VR	VK	KA	AR	KR	VAR	ARK	VRK	VAK	VARK
*nR	236	267	316	438	35	43	46	64	30	35	14	3	7	17	9
%	15.1%	17.1%	20.3%	28.1%	2.2%	2.8%	2.9%	4.1%	1.9%	2.2%	0.9%	0.2%	0.4%	1.1%	0.6%

*Number of responses

24.2% (n = 36) were males, 69.1% (n = 103) females and 6.7% (n = 10) did not indicate their gender. In terms of level of study, 31.5% (n = 47), 26.9% (n = 40), 20.1% (n = 30) and 21.5% (n = 32) were from level II, level III, level IV and level V, respectively. A further biographical data analysis indicated that 22.1% (n = 3) were aged between 15 and 20 years, 73.2% (n = 109) were aged between 20 and 25 years, 4.0% (n = 6) were aged between 25 and 30 years whereas there were no students aged between 30 and 35 years but there was only one (0.7%) aged above 35 years.

Nursing students' preferences for how they receive and understand information can be unimodal, bimodal, trimodal, or all quatrimodal. Table 1 shows the frequency of different learning style preferences. Among the National University of Lesotho nursing students, the most preferred learning style was the K (28.1%), followed by the R (20.3%) learning style, with the A (17.1%) and V (15.1%) learning styles being on third and fourth positions, respectively. The least preferred learning style is a combination of A, R, and K (0.2%).

A combination of all the learning style accounted for only 0.6% (n = 9) of the students who participated in the study. In this study, 80.6% of the students preferred unimodal learning styles while the remaining 19.4% preferred multimodal learning styles. Of the students who preferred the unimodal learning styles, 18.8%, 21.2%, 25.1%, and 34.9% preferred the visual, aural, read/write, and kinaesthetic, respectively [Table 2]. This shows that the kinaesthetic learning style followed by the read/write learning style were preferred among the unimodal learners. Of the multimodal learners, the bimodal learning style was 85.5% followed by the trimodal learning style with 13.5% with the quatrimodal learning style being the least preferred style with 3.0%. The results indicate that the bimodal learning style was the most preferred style among the multimodal students.

Within the bimodal students, KA was dominant with 25.3% of students preferring it, followed by VK, VR, AV, KR, and AR with each securing 18.2%, 17.0%, 13.8%, 13.8%, and 11.9% respectively [Table 3]. The study further revealed that; of the students who preferred trimodal learning styles; 41.5% were VAK, 34.1% of the students were VAR, and 17.1% were VRK while the remaining 7.3% were ARK [Table 4]. The current study's results further demonstrated that unimodal learning style was preferred over the multimodal learning styles across all the levels of study.

Table 2: Unimodal learning styles

Measure	Unimodal learning styles			
	V	A	R	K
*nR	236	267	316	438
%	18.8%	21.2%	25.1%	34.8%

Table 3: Bimodal learning styles

Measure	Bimodal learning styles					
	AV	VR	VK	KA	AR	KR
*nR	35	43	46	64	30	35
%	13.8%	17.0%	18.2%	25.3%	11.9%	13.8%

Table 4: Trimodal learning styles

Measure	Trimodal learning styles			
	VAR	VAK	VRK	ARK
*nR	14	17	7	3
%	34.1%	41.5%	17.1%	7.3%

The prevalence of visual learning style within the unimodal styles from the second level to fifth level of study was 15.2% for both level III and level V while Level II and IV scoped 15.0% and 15.1% respectively.

While the prevalence of Aural learning style from second to fifth level of study was 17.2% and 17.1% for level II and level III, respectively, level IV and V each secured 17.1% and 17.0% respectively. The read/write learning style prevalence was 20.2% for level II, 20.1% for level III, 20.3% for level IV, with level V getting 20.4% from this category. Level II got 28.1% on Kinaesthetic learning style, level III and V each got 28.0% on Kinaesthetic learning style while level IV got 28.4% from this segment. Table 5 indicates that Kinaesthetic learning style is the most dominant learning preference among all study levels of the National University of Lesotho nursing students; followed by the read/write style.

Discussion

Learners have diverse learning styles-characteristic strengths and preferences in the ways they take in and process information.[11] Certain learners tend to pay attention on facts, data, and logarithms; others are more relaxed with theories and mathematical models. Some retort strongly to visual forms of information like pictures, diagrams, and schematics-others get more from verbal forms written and

Table 5: Learning styles per level of study

Learning style	Level of study							
	II		III		IV		V	
	*n*R	%	*n*R	%	*n*R	%	*n*R	%
V	75	15.0%	64	15.2%	47	15.1%	50	15.2%
A	86	17.2%	72	17.1%	53	17.1%	56	17.0%
R	101	20.2%	85	20.1%	63	20.3%	67	20.4%
K	140	28.1%	118	28.0%	88	28.4%	92	28.0%
VA	11	2.2%	10	2.4%	7	2.3%	7	2.1%
VR	14	2.8%	12	2.8%	8	2.6%	9	2.7%
VK	15	3.0%	12	2.8%	9	2.9%	10	3.0%
KA	21	4.2%	17	4.0%	13	4.2%	13	4.0%
AR	10	2.0%	8	2.0%	6	1.9%	6	1.8%
KR	11	2.2%	10	2.4%	7	2.3%	7	2.1%
VAR	4	0.8%	4	0.9%	3	1.0%	3	0.9%
ARK	1	0.2%	1	0.2%	0	0.0%	1	0.3%
VRK	2	0.4%	2	0.5%	1	0.3%	2	0.6%
VAK	5	1.0%	5	1.2%	3	1.0%	4	1.2%
VARK	3	0.6%	2	0.5%	2	0.6%	2	0.6%

spoken explanations.[46] Some prefer to learn actively and interactively; others function more introspectively and individually. This study was conducted to identify the most dominant learning style of the NUL nursing students and to identify learning style preferences per level of study. In general, the findings of this study provide insight of the preferred learning style by our nursing students. The knowledge of learning styles of learners is extremely important for nursing curriculum planners, teachers and learners themselves, where it contributes to reconstruct and design of curricula and courses, and choice of content and experiences, teaching methods and means, and diversification which are commensurate with the different learning styles of learners. We found that among the unimodal learning styles, the predominant learning style on the VARK tool was kinaesthetic. Consistent with our finding, James *et al*.[41] and Meehan-Andrews[17] found that first-year Australian nursing students preferred kinaesthetic learning. In a cross-sectional survey, McKenna *et al*.[47] found that kinaesthetic was the predominant learning style among Australian accelerated postgraduate preregistration nursing students. AlKhasawneh[40] also found a majority of Jordanian nursing students in traditional courses preferred kinaesthetic learning. The distribution of the nursing students' responses for the kinaesthetic preference further appeared to be consistent with other nursing students' studies.[1,46] Furthermore, this finding corresponds with the learning styles of the health science students at Monash University[16] but inconsistent with similar studies conducted in students from other medical professions[48-52] though of those who had a strong preference for a specific, kinaesthetic was the most commonly chosen.[53] However, our finding is inconsistent with another Australian study of accelerated graduate entry nursing students by Koch *et al*.[42] who found that majority of students preferred Read/write. Therefore our findings suggest that teaching strategies that include hands-on experience and activities will be the most successful. Having the kinaesthetic preference as dominant learning style indicates the significance of using teaching methods such as simulated laboratories, field trips, field tours, lectures using real-life examples, and previous exam papers.[54,55] Murphy *et al*.,[52] reiterate that such methods would be successful strategies that can be used with students who have the kinaesthetic preference. In the Koch *et al*.[42] study, the second preference was aural, whilst in the current study, the second preference was read/write which is in line with McKenna *et al*.[47] and Meehan-Andrews[17] studies.

The current study, in line with Stirling,[1] Johnston,[46] AlKhasawneh,[40] and Meehan-Andrews,[17] showed that the majority of the students preferred unimodal learning style on the VARK tool. Contrary to this finding, Koch *et al*.[42] found that 62% of the students had more than a single mode of learning preference. Furthermore, Hong-rui *et al*.[56] established that the multimodal learning style was the most popular among bachelor degree nursing students, while associate degree nursing students liked the unimodal learning style best. Unimodal learners are less adaptable to teaching strategies that do not suit their style preference; hence a variety of strategies are required to ensure all students' preferences are accommodated.[47]

The finding that a very small percentage of students in the current study like in Meehan-Andrews,[17] preferred aural modes of information presentation raises questions; an example of this mode is the classic lecture dominantly used by educators in the NUL's department of nursing. This communicates a mismatch between the students' learning styles and the teaching strategies used by educators in the

NUL's department of nursing. Learning preferences of nursing students in the current study did not differ from Level II to level V of studies. Contrary to this finding, Meehan-Andrews[17] asserts that learning styles develop while at university. The first year students may prefer kinaesthetic modes of information presentation while second and third-year students may develop or mature in their learning to prefer visual, aural, or read/write modes. Our findings are also inconsistent with the findings of a study which revealed that learning preference of students in higher education may shift if the student perceives it necessary to master the learning objectives and needs.[57] AlKhasawneh[40] also found the difference between the three levels of students on several VARK dimensions; the results reported that students at third year were multimodal with kinaesthetic preference as the most dominant among other levels. The current study exposed that KA was dominant bimodal learning style with VAK overriding in the trimodal category and very few students preferred the VARK learning style. Recognizing that students have different learning styles, and understanding the different styles, encourages educators to reflect on the effectiveness of lecture methods and prompts academics to consider adopting different teaching approaches to accommodate differing learning preferences as a means of enhancing student learning.

Conclusions

The present study concluded that students have varied learning styles. The responses from the study participants indicated that kinaesthetic is the predominant learning style among NUL nursing students; therefore, addressing the student's learning preference can enrich the learning environments. Consequently, this preference jointly with the read/write preference would suggest that teaching strategies that include hands-on experience and activities will be the most successful.

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