AN INVESTIGATION OF LEARNING STYLE PREFERENCES OF NURSES IN TRAINING AT TWO NURSING SCHOOLS IN PUBLIC HEALTH FACILITIES IN CAPE TOWN

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DECLARATION

I, Gohwa Fisher, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and have used the Harvard system of referencing. I declare that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Signature: *Gohwa Fisher*

Date: 24th August 2015

DEDICATION

This project is dedicated to all nurses especially the categories trained as non- professional nurses in nursing schools in South Africa. These nurses provide a huge contribution to ensuring access to health care for all South Africans. Let the Lamp continue to burn whilst all nurses deliver the best care to all.

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ABSTRACT

An investigation of learning style preferences of nurses in training at two nursing school in public health facilities in Cape Town.

Aim

To investigate the preferred learning styles of learner nurses i.e. enrolled/staff nurses and auxiliary nurses, in nursing schools within public health facilities in the Cape Town Metropolitan district of the Western Cape, South Africa.

Objectives

- To determine individual learning styles of learner nurses registered for a training programme in a school of nursing.
- To establish the differences between the categories of learner nurses with regard to

  the learning style preference.
- To determine a possible relationship between demographic and educational background of the individual and the preferred learning style.

Methodology

Research design: A non-experimental cross-sectional descriptive survey design was conducted, using a self-administered standardised and validated questionnaire.

Population: All learner nurses who were currently registered for training programmes at the nursing schools were eligible to be participants of the study.

Data collection: A questionnaire was used, consisting of two sections. The first section consisted of demographic data comprising eleven closed-ended questions relating to age, gender, educational and nursing experience. The VARK (visual-aural-read/write-kinaesthetic) (version 7.1) learning style assessment tool formed the second section. The questionnaire was piloted with a group of enrolled nurses and nursing auxiliaries who had recently completed the nursing programmes at one of the facilities.

Data analysis: The VARK programme for data analysis was used to classify the learning styles of the participants. The hard copy data was transcribed into electronic form using Excel on a password controlled computer. The data was categorised into three groups of students, namely pupil nurses, bridging course first years and second years respectively. The IBM SPSS Statistics© version 20

software programme was used for the data analysis. Continuous numerical data were analysed for normality. The means, standard deviation and medians (inter-quartile ratios) were calculated.

Ethical considerations: Approval for the study was obtained from the Human Research Ethics Committee of the Faculty of Health Sciences, University of Cape Town. An information letter and consent form was provided to all participants to inform them that the study participation was voluntary. Withdrawal from the study by participants was permissible at any time without penalty. All study information was appropriately coded to ensure that all participants' names or any personal information was not reflected to maintain confidentiality.

Results and recommendations: The results of the study illustrate that most of the study population displayed a multimodal learning style preference with the majority being either quadmodal or unimodal within the multimodal style. This has implications for nurse education curriculum development, teaching strategy and practice. Teaching strategies need to embrace a multimodal approach to engage all sensory learning preferences of learners. The traditional lecture approach may not meet all learner needs, and teaching strategies should engage learners in activities that include kinaesthetic, auditory, visual and read/write aspects. Nursing education needs to be transformed to engage learners in activities that include these aspects.

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LIST OF DEFINITIONS

Bridging course A two year training programme for staff (enrolled) nurses leading to registration as a general nurse (Government Notice Regulation 683 of 14 April 1989) accredited by the South African Nursing Council and presented by accredited nursing education institutions

Learner nurse A person undergoing education or training in nursing must apply to the Council to be registered as a learner nurse; which refers to both bridging course (staff nurse) and pupil nurse (auxiliary nurse) (Nursing Act, No 33 of 2005, 2005:6)

Nursing auxiliary A nurse registered as such with the South African Nursing Council; educated to provide elementary nursing care in the manner and to the level prescribed (Nursing Act, No 33 of 2005, 2005:6)

Nursing Education Institution Any nursing education institution accredited by the South African Nursing Council in terms of the Nursing Act, no. 33, 2005 (Nursing Act, No 33 of 2005, 2005:6)

Pupil nurse A nursing auxiliary undergoing education or training in the direction of nursing care and who is registered as a pupil nurse with the South African Nursing Council (Government Notice R. 2175 of 19 November 1993).

Scope of practice This means the scope of practice of a practitioner that corresponds to the level contemplated in section 30 in respect of that practitioner (Nursing Act, No 33 of 2005, 2005:6).

Staff (Enrolled) nurse A person registered with the South African Nursing Council; educated to practice basic nursing in the manner and to the level prescribed (Nursing Act, No 33 of 2005, 2005:6).

Student nurse Staff (Enrolled) nurse registered as a student nurse in general nursing science (bridging course) with the South African Nursing Council (Government Notice R.683 of 14 April 1989)

LIST OF ACRONYMS

HREC	Human Research Ethics Committee
HSF	Health Sciences Faculty
NLN	National League for Nursing - an organisation that promotes excellence in nursing education in the United States of America.
SANC	South African Nursing Council - a statutory body that controls and regulates the nursing profession in South Africa
VARK	An acronym for an instructional learning style preference assessment scale namely Visual, Auditory, Read/write and Kinaesthetic
WCCN	Western Cape College of Nursing
UCT	University of Cape Town

CHAPTER ONE

INTRODUCTION

1.1 Introduction and background

Nurses, the largest group of health professionals in South Africa, have a unique role in the provision and maintenance of the health of all South Africans (Department of Health, 2013:11). Statistics of various statutory councils for health professionals attest that nursing practitioners are the most and well distributed healthcare workers within the country (Kotze, 2013:61). Nursing education in South Africa is provided through universities, Nursing colleges and Nursing school that are accredited by the South African Nursing Council as Nursing Education Institutions (NEIs). The profession has the responsibility to provide professional development to previously disadvantaged groups whilst simultaneously maintaining high standards which creates many challenges for nursing education (Department of Health, 2008:9). Political pressure exists to increase the number of nurses to be trained despite not being scholastically prepared to cope with the programme (Vasuthevan, 2013:112).

1.1.1 Nursing education in South Africa

Historically there was a need to train nurses whilst the British Empire governed the Cape Colony (South Africa) in the nineteenth century. Sister Henrietta Stockdale established nurse education and training around the 1880's in Kimberley, South Africa (Dolamo & Olubiyi, 2013:14). The training was based on the Royal British Nursing Association curriculum, an apprenticeship model which offered a two year programme followed by an examination. The standards for training white nurse professionals were established by Stockdale; these became the founding charter for the profession (Dolamo & Olubiyi, 2013:14).

The Supreme Medical Committee of the Cape Colony in South Africa was responsible for examination and licensing of midwives and doctors. The candidate was awarded with a certificate in nursing after completing a further three years of nursing practice. The qualified nurse had the option to register voluntarily as a member of the British Nurses' Association (Vasuthevan, 2013:107). Registration for nurses and doctors was enabled under the Pharmacy Act 34 of 1891, which was the first in the world at the time. This ensured the ethical- based teaching of nursing and midwifery (Dolamo & Olubiyi, 2013:15).

African Black nurses were trained from 1870 by Mrs Parsons and Dr Fitzgerald for 20 years but were not awarded certificates. In 1902 formal training for black nurses commenced at the Lovedale Mission Hospital. The first black nurse to register was Cecilia Makawane in 1907 (Vasuthevan, 2013:107).

Nursing was fraught with discrimination on the grounds of gender, colour, class and race during the 1940's. Separate registers were maintained for each race group and only white nurses (European) were allowed to be members of the South African Nursing Council and be in control of the South African Nurses' Association (Dolamo & Olubiyi, 2013:15).

The Nursing Act No. 69 of 1957 set the standard for training and registration on racial grounds. Black nurses had to complete a preliminary training programme based on inadequate foundations in science subjects and English which was regarded as discriminatory (Searle, 2006:19). The rationale for this was to force the educational authorities to provide improved funding and facilities for basic education, specifically in science and the English language (Searle, 2006:19).

Education in South Africa, in particular the public school system, was segregated according to racial boundaries until the mid-1980s and this, combined with the inequitable resourcing of black Schools, disadvantaged the majority of the population; thus the adult learner may have had limited access to skills required for post school education. Currently learners in most of the nine provinces still have to cope with inadequate resources for effective learning, for example libraries and school science laboratories.

Learners who enter nursing training programmes in South Africa and internationally may be traditional school leavers or non-traditional adult learners. Nursing school[1] candidates in South Africa are predominantly adult learners who may or may not have attained a national school leaving senior certificate. Learner nurses may experience challenges to adapt to the tertiary learning environment (Vasuthevan, 2013:107). Their scholastic skills may be limited due to the use of the English language as second language and they may be educationally at risk (Burruss, 2010:1). Levels of English literacy and numeracy are a challenge (Vasuthevan, 2013:112). English is the language of formal communication in both theoretical and clinical teaching for learner nurses in the public nursing school in the Western Cape Province.

Nurse educators in many settings are challenged by diverse learner populations with complex social issues that influence learning. Experience, learning abilities and skills are unique and variable (Rassool & Rawaf, 2008:35). Differences are evident in the ages, languages, education and levels of preparedness for learning and motivation of learners for learning (AlKhasawneh, 2013:1546). Educators need to find strategies to manage the diverse abilities and skills of the learners. The understanding of how learners learn is critical to the delivery of quality nurse education. Identification of learning styles is one strategy to facilitate positive learning outcomes for learner nurses (Frankel, 2009:27).

[1] Nursing school offer training for vocational nursing care programmes leading to enrolment as a nurse who will practice under the supervision of a registered nurse.
Nursing colleges and universities offer diplomas and degrees in nursing which enable practitioners to practice as professional nurses.

1.1.2 Learning styles concepts

Learning styles are described in different ways (Coffield, Moseley, Hall & Ecclestone, and 2004:1). One explanation of a learning style is that it is unique attributes of perception of information and manner in which it is processed and organised (Van Rensburg, 2009:181). Learning styles are defined as a "combination of cognitive, affective and psychological behaviours that create a tendency, on the part of learners, to adopt a particular strategy in learning" (McDonough, 2005:89). A learning style is a specific manner by which the person attains knowledge, skills and attitudes within a learning experience and context (D'Amore, James & Thomas, 2012:418).

Learning styles models are diverse and what and how they measure vary. The models may be based on personality traits, information processing, social interaction or instructional preference (Coffield et al., 2004:9). Application of learning styles assessments range from educational, business, behavioural and cognitive perspectives (Coffield et al., 2004:1). A variety of learning styles may exist within a specific student (Frankel, 2009:24).

Identification of learning styles and their relationship to the demographic attributes of students can facilitate provision of better learning experiences by matching learning style to the teaching strategy (Frankel, 2009:27). Educators' awareness of how demographic differences may influence learning styles will enable them to provide learning support strategies to meet student learning needs (Li, Chen, Yang & Liu, 2011:18). In the multi-cultural context of the South African learners, diverse socialisation processes may influence learning styles (Rassool & Rawaf, 2008:35; Zhang & Lambert, 2008:176).

1.2 Rationale for the study

The South African Nursing Strategy requires nursing education institutions to align their educational programmes to community health needs (Department of Health, 2013:14). Nursing education institutions play an essential role in the provision of well-educated professionals to render comprehensive health care to the nation. There are three types of nursing education training programmes associated with clinical facilities in South Africa and are offered by both public and private sectors, i.e. universities, Nursing colleges or Nursing school (NEI/nursing education institutions). All nurse education is regulated by the SANC, however all NEI's must comply with the minimum requirements for training as determined by the SANC regulations for education and training. Nursing education in South Africa is outlined in Table 1, which indicates the various options for nurse education and training. The provision of access to training for previously disadvantaged learners brings particular contextual and social educational challenges.[2] Learner nurses come from diverse backgrounds which influence their learning.

[2] Table 1 is an illustration of nursing education programmes in a South African context for international readership

Table 1: Nursing education programmes in South Africa

NURSING EDUCATION PROGRAMMES IN SOUTH AFRICA - Leading to Enrolment or Registration as a Nurse			
	University	Nursing college	Nursing school
Programmes	Bachelor's degree in Nursing Science- 4 year programme	Diploma in Nursing Science - 4 year programme	Certificate in Nursing for Enrolment as a Nursing Auxiliary 1 year programme (R2176) ⇓ Certificate in Nursing for Enrolment as a Nurse 1 year programme (R2175) ⇓ Diploma for Enrolled Nurses leading to Registration as a Nurse two year programme (R683)
Educational requirements/ access	Grade 12/matriculation equivalent with university entrance pass	Grade 12/matriculation equivalent with university entrance pass	Grade 10 /12 or equivalent Progression to become a registered nurse requires completion of both R2176 and R2175 programs respectively to access the diploma programme (R683)
Regulatory control (Quality assurance)	Autonomous as per university governance Accredited with the South African Nursing Council as a nursing Education Institution	Autonomous as per Nursing college governance. Accredited with the South African Nursing Council as a nursing Education Institution	Regulated by the South African Nursing Council which acts as the Education and Quality Assurance body
Course requirements	Theoretical and clinical practice components as stipulated by the R425 regulation of the South African Nursing Council and as determined by University Senate	Theoretical and clinical practice components as stipulated by the R425 regulation of the South African Nursing Council and as determined by the College Senate	Theoretical and clinical practice components as stipulated by the specific programme regulations of the South African Nursing Council

School-leavers or adult learners, can access nursing training through the skills development programmes if the admission criteria for nursing college or university programmes are not met. Nursing schools that offer programmes for persons who do not meet the admission criteria of the four year pre-registration nursing programme, are not classified as higher education institutions, but are considered to be in the same category as Further Education and Training (FET) institutions which resort under the Further Education Training Act No. 16, 2006. These schools provide access to nurse training for career and or skills development to persons without a grade 12 or a national school leaving certificate. The programmes are vocational/work-based and skill-focused and lead to certificates and diplomas for two categories of sub-professional nurses, namely nursing auxiliary (one-year certificate programme) and staff/enrolled nurses (two year diploma programme). Nurse education and training is enabled by the Nursing Act No. 33, 2005 and its training regulations.

Many applicants to these programmes may come from schooling environments which have not adequately prepared them for formal post-secondary education. In addition, applicants to these programmes are not all first time school leavers, and may have worked in other forms of employment prior to entering the nursing programme, thus are adult or non-traditional learners.

1.3 Problem statement

The learner nurses who enter the nurse training programmes such the bridging course for enrolled nurses and certificate for enrolment offered at the nursing school are adult learners (non-traditional) with diverse demographic, cultural, educational and nursing experience backgrounds. Learning styles of this group are individual and diverse. Differences may exist with regard to demographic factors, inclusive of educational and nursing experience (Molsbee, 2011:11). There is limited published literature with regard to learning styles preferences of learner nurses within nursing school contexts in South Africa. Identification of their learning styles profiles may be useful and provide insight to both students and nurse lecturers to enhance the learning experience (Marek, 2013:43).

1.4 Aim

The aim of the study was to investigate the preferred learning styles of learner nurses i.e. enrolled nursing students and enrolled auxiliary nursing students, at nursing schools based at two public hospital facilities in the Cape Town Metropolitan district of the Western Cape, South Africa.

1.5 Objectives

1.5.1 To determine individual learning styles of learner nurses registered for a training programme in two nursing schools in the Cape Town Metropolitan district.

1.5.2 To establish the differences between the categories of learner nurses with regard to their learning style preferences.

1.5.3 To determine a possible relationship between demographic and educational background of the learner nurse and the preferred learning style.

1.6 Research question

The research question for this study is: What are the learning style preferences of learner nurses registered for nursing training programmes in nursing schools?

1.7 Research methodology overview

A non-experimental cross-sectional descriptive survey design was selected for this study. This design enabled the researcher to obtain information about the characteristics (phenomenon) of learning style preferences of learner nurses in a nursing school which is the natural setting to observe the phenomenon (Burns & Grove, 2011:256). A total of 188 (N=188) learner nurses from two nursing schools were enrolled in the research study.

The data collection tool was a self-administered survey VARK 7.1 questionnaire (Appendix C), a free online facility. This was downloaded and used with permission from the author Dr Ian Fleming (http://www.vark-learn.com) (Appendix E).

Data collection for the study commenced in June 2014 after the proposal had received ethical approval. The VARK programme for data analysis was used to classify the learning styles of the participants. Data analysis was done utilising the IBM SPSS Statistics version 20© software programme.

1.8 Chapter outline

Chapter one outlines the introduction and overview of the study. It includes the background, rationale for the study, research aim and objectives and a brief overview of the research methodology. Chapter two presents the literature reviewed for the study. This includes learning styles theories, current research both internationally and nationally in the context of nursing education. A detailed description of the research methodology applied to this research study is provided in chapter three. Chapter four presents the results of the study. The discussion of the results is presented in chapter five, as well as limitations, recommendations and the conclusion.

1.9 Conclusion

This chapter outlined the introduction, background and the rationale for the study of learning styles in this group of learner nurses. The aim, objectives and purpose were briefly discussed. An overview of the methodology for the study was provided.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

A learning style can be defined as a way of acquiring knowledge, skill and experience (Weber, 2004:429). Multiple definitions have been described. It is also defined as "an individual's unique approach to learning based on strengths, weaknesses and preferences" (Century Lexicon, 2003: np). Learning is a process of knowledge acquisition or perception, interaction and response to the environment (Vorhaus, 2010:377). Learning styles assessment has been extensively used by nurse educators. It enables learner nurses to understand how they study and apply this to study skills to enhance the learning process (Marek, 2013:49). Limited recent published information regarding learning styles amongst nursing auxiliaries and enrolled nurses training in nursing schools in South Africa is available.

This chapter presents a review of published literature related to learning styles in the context of nursing students and health professional students. The key words utilised to retrieve the literature were adult learner, learning style, student nurses, learning style theories, learning theory, demographics.

2.2 Search strategy

The keywords were used to search electronic databases, EBSCO-host, Google scholar, Science Direct, RSA theses, and proQuest theses, as well as relevant textbooks, see table 2 below.

2.2.1 Inclusion criteria

- Peer-reviewed full text articles
- English language articles
- Period 1997-2014 (the VARK learning styles questionnaire was introduced in 1997)
- Unpublished theses

Table 2: UCT Library Databases

DATA BASE	**RESULTS**	**Number of articles selected based on the keywords**
EBSCO: Academic search premier; Africa-wide; CINHAL; ERIC; MEDLINE; Psych Articles	179	30
Science Direct	2342	15
Google Scholar	26	5
RSA Direct Theses ProQuest theses	104	8

2.2.2 Literature review themes

The adult learner enters the learning environment with life experience that is different to school leavers who may enter tertiary education immediately post school. Learning theories have been extensively researched in adults. A relationship exists between the adult learner, learning theory and the learning styles theory. Figure 1 is an illustration of the review themes identified relevant for learning styles preferences of adult learners.

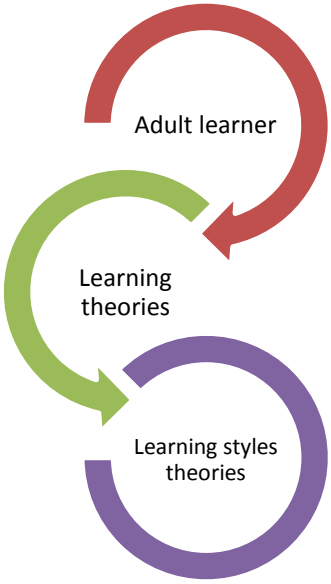

Figure 1 Literature review themes

2.3 The adult learner

The learner nurses enrolled for the programmes at the nursing school s under study are all adult learners, i.e. older than twenty-three years of age and are regarded as non-traditional or adult learners. Knowles' theory of adult learning is based on the assumptions that life experiences are a rich source for learning. Adults are motivated if new knowledge has practical application. Adults become more self-directed in their learning as they mature. Adult learners are not empty vessels but bring embedded knowledge and experience to the learning process (Knowles, Holton & Swanson, 2011: 38). Knowledge has a high level of competence amongst adult learners, as reported by a Malaysian study of undergraduate students. The sample size was 133 undergraduate student respondents. The statistical result for the competency of knowledge was a mean of 4.33 and standard deviation scores of 0.525) respectively (Salleh, Khalid, Sulaiman, Mohamad, Sern, 2015:332).

Learning may be influenced by numerous factors, such as learner interest, motivation, competence, mastery and participation. The affective domain of the learner such as personality, curiosity, embedded knowledge/awareness, emotional state, concern, boredom and incentives may influence the learning

process. Learning styles preferences may influence how learners engage with the learning process (Prithishkumar & Michael, 2014:183).

Learners build on embedded knowledge or previous experience according to the constructivist experiential learning theory (Kolb, 1984:30*).* The embedded knowledge is utilised and validated in the context of the current learning to facilitate the learning process. The Kolb theory of experiential learning is a classic theory of the adult learning. It has been extensively utilised as a learning style measurement tool in nursing education research (see table 3).The learners registered for the training programmes at the Nursing school under study have work experience and existing knowledge. The learning process should enable the learners to link their current learning to their existing knowledge and experience (Hylton, 2005:522).

All of the above factors are crucial for learners to achieve successful outcomes in the learning process. The learners entering the training programs for the skills based learning may not have all the inherent factors that are cited above. Learning style is a key factor to explore and its relationship to the demographic profile of learners.

2.4 Learning theories

Nursing education requires correlation of theory and practice, thus learners engage in experiential learning in the nurse practice settings. Nursing practice utilises different types of knowledge, namely implicit or tacit knowledge. Nursing is practiced from a novice phase and the nurse develops to an expert practitioner as described by Benner's novice to expert theory (Benner, 2001:14). The student enters the training as a novice, is mentored and allowed to practice clinical competencies until competence is achieved under the mentorship of an expert in the form of a preceptor, mentor or ward clinician. Benner's theory posits that learning process in nursing practice is a reflective process. VARK is a model used to measure learning style preferences according to sensory modalities that a learner may utilise in the learning process.

Learners are exposed to concrete experiences, using all senses to assimilate the information through abstract observation to construct knowledge. Learning by means of active experimentation or reflective observation in the practice area can be explained by Kolb's Experiential Learning Theory (Kolb, 1984:30). Learner nurses engage in specific clinical experiences and develop knowledge and skills from an experience to practice nursing care.

The social theory of learning developed by Bandura, integrates cognitive and conditioning behavioural principles of learning. Learning is facilitated by specific elements i.e. attention, retention, motivation to reproduce the behaviour and potential reproduction. In nursing practice, modelling is often used to teach specific principles in practice (Louw & Edwards, 2008:267). Adult learners are diverse in many

different aspects, namely learning styles, readiness to learn, cultural and personality differences which becomes a challenge for teachers (Brookfield, 1998:133).

2.5 Learning Styles Theories

Learning styles can be categorised into four broad areas similar to an onion ring type structure (Curry, 1990:54). The rings are arranged in bands of similar learning styles. The personality-based models form the inner core of this structure which is stable. The Myers-Briggs Inventory tool is a one example of a personality-based learning style. Kolb's Learning Style Inventory was developed based on Kolb's experiential learning theory. It measures cognition/information processing (Kolb, 1984:30). The Honey and Mumford learning style model measures information processing and is based on Kolb's Learning Style Inventory. Information processing forms the second layer from the core and is stable (Cassidy, 2004:423). The Social interaction model forms the third layer of the learning style theory category. The Grasha-Reichmann Student Learning Style Scale is an example of a tool that measures social interaction (Cassidy, 2004:423). The instructional and environmental model forms the outermost layer of the "onion ring" and is regarded as the most unstable layer in the range of learning styles. The Learning Style Profile and VARK are examples of tools used to test this type of learning style or preference.

Different learning style models represent personality type, information processing (cognitive), social interactional and instructional (VARK) type models. The following figure 2 provides a representation of the learning style models available.

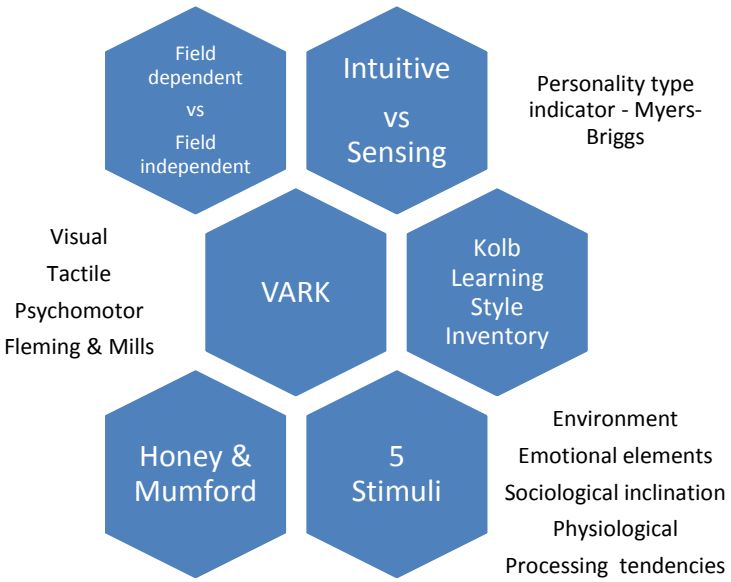

Figure 2: Learning style models

2.5.1 Cognitive or Personality type styles

Cognitive or personality type styles are the most stable type of learning style models (Curry, 1990:54). Two types of learning style models are the field dependent versus the field independent type and the Myers-Briggs personality style model.

2.5.1.1 Field dependent versus field independent learning styles

This is a cognitive personality type style that measures intellectual ability and the psychological competence sense of self (Cassidy, 2004:425). Learners categorised as field dependent learn in a holistic context. Field independent learners use the analytical or single concept approach. The former learners prefer structured learning material, with clear instructions for problem solving, learning and remembering social information and struggle with identifying information. Group activities, organised information and external reinforcement as arranged by the facilitator/teacher, are activities associated with a field dependent type learner. The field independent learner is analytical and is an independent problem solver, loves enquiry and discovery and may require assistance with information of a social nature (Mellish, Brink & Paton, 2009:64).

2.5.1.2 Myers -Briggs personality style

The Myers-Briggs model of learning style is based on the Jung Theory of personality development. The Myers-Briggs tool is a personality-based instrument that measures extraversion versus introversion; sensing versus intuition; thinking versus feeling and judging versus perception types of personality in the learning context (Myers Briggs Foundation, 2003). Studies conducted in Taiwan utilised the Myers-Briggs model, using the Chinese version of the instrument (Li, Chen & Tsai, 2008:74; Li, Chen, Yang & Liu, 2011:21; Li, Yu, Liu, Shieh & Yang, 2014:234); see study findings as illustrated in Table 3.

2.5.2 Information processing styles

2.5.2.1 The Kolb Experiential Learning model and Learning Style Inventory

Kolb (1984:30) developed the information processing style inventory based on his experiential learning theory model. It has four categories, namely assimilator, diverger, converger and accommodator (Cassidy, 2004:431). Prior experience is transformed to construct and organise information into new knowledge, attitudes and skills. It develops from known knowledge and progresses to the unknown area of information. A four way cycle of perception, cognition, emotion/feeling and acting/doing that starts at any point and entry is linked to the learner's current activity. Concrete experience is current and action-focused on knowledge development. Reflective observation involves being objective, reflective, and empathic and quickly grasping the meaning of ideas. Abstract conceptualisation is synonymous with logical thinking and theory development. Active experimentation is a practical concrete activity (doing) with the application of theory in processes such as problem-solving and/or decision-making. Real-life

situations enhance learning for example, clinical practical experiences, discussions, case presentations in the classroom or the clinical environment. The styles may be combined within a learner namely:

- An **Accommodator** type learner uses the concrete experience and active conceptualisation to learn.
- A **Diverger** type learner utilises a concrete experience and reflective observation to construct knowledge such as an activity such as brain storming.
- A **Converger** type learner uses active conceptualisation and active experimentation to develop theory constructs. The learner has an analytical approach to the learning process.
- **Assimilator** type learners use active conceptualisation and reflective observation to construct knowledge (Kolb, 1984:6).

A variety of learning styles exist within a specific student. Nurses in training are often described as assimilators (Frankel, 2009:24). A study conducted on student nurses' learning styles in Korea utilising the Kolb Learning Style Inventory, reported approximately forty three percent of the study sample was that of the diverger type of learner (Gyeong & Myung, 2008:104) . The studies in Table three (p 16), illustrates the diversity of learning style preferences amongst student nurses differing from region to region.

The Kolb Experiential Learning Theory model has been critiqued for its "neglect of other cognitive foundations, such as salience, the hierarchical shape of learning abstractions, cognitive load theory, and priming" (Schenck &Cruickshank, 2015:77). Research in the neuroscience of learning describes how different neuropathways pathways are utilised for the learning process. The Kolb theory fails to address issues like salience. There is not enough evidence to support that all learners will have learning elements as per Kolb Learning Style Inventory in the context of current literature (Schenck & Cruickshank, 2015:80).

2.5.2.2 Honey and Mumford Learning Style

This model is based on Kolb's experiential learning model, evaluating an information processing type of learning style. It is categorised into four types of learning styles, namely activist, pragmatist, theorist or reflector and is learner centred (Honey & Mumford, 2006:2). The Activist type is synonymous with active experimentation, works along with others, and is energetic and open-minded. The Pragmatist is practically oriented and prefers a concrete experience. The Reflector is the reflective observer who uses thinking to reach conclusions. The Theorist is systematic, analytical and logical and uses reason for all activities (Howard, 2009:15). Three studies were conducted in the United Kingdom and Ireland as illustrated in Table 3, see page 15.

2.5.3 Instructional preference/style

2.5.3.1 Dunn, Dunn and Price Model

Dunn, Dunn and Price developed the five stimuli model in 1989 (Cassidy, 2004:435). It is a 100-item self-report questionnaire measuring the following factors in relation to learning: environment, emotional elements, sociological inclination, physiological factors and processing tendencies.

- Environment

The learning space influences the learner's response to learning process, i.e. loud versus quiet, low versus bright light; warm versus cool temperature, formal versus informal seating and this may enhance or impede the learning process.

- Emotional elements

The emotional elements of high motivation versus low motivation such as persistence, responsibility conformity versus non-conformity, structure as opposed to choice, influences how the learner responds to the learning process.

- Sociological inclination

Learning may be influenced by variety versus patterns or routine. The learner may prefer to work alone versus group learning.

- Physiological factors

Auditory, visual, tactile, kinaesthetic, i.e. are sensory and motor activities, may influence the learning process. The time of day when learning happens is a factor in the context of time preference during the learning process. Mobility (motor activity) during the learning process may be a physiological factor that influences how learning takes place.

- Processing tendencies

A global versus an analytical approach influences how information is processed by the learner.

Recognition and acknowledgement of learning styles by teachers will facilitate student learning and the development of a positive attitude to learning. Concentration, process, internalisation, memory of new or difficult academic information is the focus area. Environmental changes (light, noise and seating arrangements) emotional factors (motivation, responsibility) can also influence learning styles (AlKhasawneh, 2013:1547). Sociological issues, for example working alone versus working in groups and sensory variables such as auditory, visual or kinaesthetic activities may influence learning.

2.5.3.2 Visual, Auditory, Read/write and Kinaesthetic modes of learning (VARK)

VARK is an acronym for visual, auditory, read/write and kinaesthetic modes of learning. The senses are used to construct information into knowledge, skill and attitudes. The visual learner acquires information by means of graphs, maps and visuals; the auditory-oriented learner hears or listens to construct information into meaningful concepts and knowledge. The read/write learner uses reading, writing and note-taking to construct meaning from learning material and/or information. A kinaesthetic dominant

learner is a doer or tactile and physically involved in doing activities, for example utilizes practical demonstrations to achieve learning outcomes and construct knowledge. Thus “real-life” experiences enhance learning. The VARK tool, which measures sensory modes as learning preferences, was developed by Mills and Fleming in 1995 (Fleming, 2012: np).

Learners have a strategy to identify their preferred learning style or instructional style and can modify their style based on the most dominant preference. If the visual modality is dominant, the learner will use maps, pictures and graphs to illustrate information to enable learning.

The VARK assessment tool has been used in a number of studies with nursing students including countries such as Jordan, Australia and United States of America (AlKhasawneh, 2008:575; AlKhasawneh, 2013:1547; James, D’Amore, Mitchell, 2011:418; Koch, Salamonson, Rolley & Davidson, 2011:613; Marek, 2012:44; Meehan-Andrews, 2008:26).The learning styles of nursing students were identified in the afore-mentioned studies. The awareness of the preferred learning style mode enabled teachers to either match the teaching strategy with the style or encourage students to use their strengths to enhance learning. Teachers are able to modify learning strategies to match learning styles. The findings of the Jordanian study supported the assertion that learning will be enhanced by diverse instruction strategies as most of the respondents’ had a multimodal learning style preference. The use of problem based curricula; real life examples and interactive learning ensure engagement of all senses in the learning process (AlKhasawneh, 2013:1548).

2.6 Learning styles research

2.6.1 International perspective of health science students

Several studies of the learning styles of health sciences students have used the VARK learning style instrument to identify learning styles. Twenty studies using the VARK learning style tool, conducted in Australia, United States of America, Republic of Iran, India, Sri Lanka, Spain, and Saudi Arabia were reviewed by Khanal, Shah and Koirala (2014:3). The multimodal learning preference was found in the greater percentage of the respondents (more than 60%) as opposed to unimodal learning preference. The most frequent unimodal learning style was kinaesthetic, especially with older students (Khanal et al., 2014:6).

Identification of dominant learning styles to provide support for development of students to increase the number of nurse graduates in the United States of America was recommended by the National League of Nursing (NLN). Through the process of learning styles identification, potential increased number of nurse graduates would also impact and enhance social change to previously disadvantaged population groups (Molsbee, 2011:4). Access to nursing education by non-traditional students or previously disadvantaged groups will promote community transformation and is specifically pertinent in the South African context.

A number of international published studies measuring learning styles have utilised the Kolb's Learning Styles Inventory (D'Amore et al., 2012:509; Gyeong & Myung, 2008:109; Molsbee, 2011:9). The findings of these studies have classified learning styles amongst nursing students to be diverse, however divergers and assimilators constituted the majority of the respondents in these studies.

Learning style identification studies within nursing have utilised a variety of learning style measuring instruments based on the wide range of learning styles theories. The types of tools include personality type, information processing, social interaction and environmental or sensory modes.

Table 3: Learning styles studies of nursing students in alphabetical order

AUTHOR	COUNTRY	YEAR	INSTRUMENT	TYPE	POPULATION	SAMPLE (N)	FINDINGS
Abu-Moghli	Jordan	2005	Autonomous Learner Index (ALI)	Descriptive study	Under graduate (UG)- Baccalaureate degree	420	Independent learners = 44.5% of the sample
Astin, Closs & Hughes	United Kingdom	2006	Honey & Mumford	Retrospective documentary study	Clinical nurse specialist	137	Reflector: n=54 Dual learning style: n=47 No dominant style: n=28 (73.7%) displayed one or two dominant learning styles. Few participants displayed three (7.3%) or four (0.7%) dominant learning styles and 18.2% had no dominant learning style preference
D'Amore, James, & Mitchell,	Australia	2012	KOLB Learning Style Inventory (KLSI)	Cross sectional survey	Under graduate (UG)- Baccalaureate degree	345	Diverger:29.5% Assimilator: 28.8% Accomodator:23.9% Converger:17.9% Relationship between learning style and demographics
El-Gilany, El Sayed Abusaad,	Saudi Arabia	2012	Fisher's Self-directed Learning Scale; Kolb Learning style Inventory	Cross sectional survey	Under graduate (UG)- Baccalaureate degree	275	Converger:35.8% Diverger:25.8% Assimilator: 25.55% Accomodator:13.1% No association between learning style and self-directed learning
Fleming, Mackee & Huntley-Moore	Ireland	2011	Honey & Mumford Learning Style Questionnaire	Non-experimental longitudinal design	Under graduate (UG)- Baccalaureate degree first and final year	166 first year 58 final year	Dual learning style (Activist-Reflector): 35% Reflector learning styles: 24% Final year : Activist: 22%
Fogg, Carlson-Sabelli, Carlson & Giddens	United States of America	2013	KOLB Learning Style (KLSI)	Comparative approach	Under graduate (UG)- Baccalaureate degree	281	Converger:46.2% Assimilator: 31.9% Accomodator:17.6% Diverger:8.6% No statistically significant perceived benefits

AUTHOR	COUNTRY	YEAR	INSTRUMENT	TYPE	POPULATION	SAMPLE (N)	FINDINGS
Fountain, Alfred	United States of America	2009	Self-Confidence in Learning Scale	Survey	Under graduate (UG)- Baccalaureate degree	78	Social learning Solitary learning
Frankel	United Kingdom	2009	VAK Questionnaire (Visual, Auditory, Kinaesthetic)	Survey	Nurses in practice	61	Visual: (n=34) Kinaesthetic: (n=17) Auditory: (n=12)
Gyeong & Myung	Korea	2008	KOLB –Learning Style Instrument	Descriptive correlational study	Under graduate (UG)- Baccalaureate degree	742	Diverger: 43.5% Accommodator: 30.4%
Hallin	Sweden	2014	Productivity Environmental Preference Survey(PEPS) Learning Style Inventory	Descriptive cross-sectional	Under graduate (UG)- Baccalaureate degree	263	Flexible learners High structure : 75% Authority : 40% Auditory/ tactile/ kinaesthetic: 33.3% Visual: 8% Few significant differences between age, assistant nurse graduation
Li, Chen & Tsai	Taiwan	2008	Myers Briggs Type Indicator (MBTI)	Exploratory design	Mixed -diploma, associate; Bachelor degree	425	Sensing Judging : 41.3% Introversion, Sensing, Thinking & Judging (ISTJ): 12.7%
Li, Chen, Yang & Liu	Taiwan	2011	Myers Briggs Type Indicator (MBTI)	Exploratory design	Mixed -diploma, associate; Bachelor degree	331	Introversion, sensing, thinking and judging (ISTJ) were common learning styles. Sensing, Judging = 43% Age was unrelated to learning styles

AUTHOR	COUNTRY	YEAR	INSTRUMENT	TYPE	POPULATION	SAMPLE (N)	FINDINGS
Li, Yu, Liu, Shieh& Yang	Taiwan	2014	Myers Briggs Type Indicator (MBTI)	Exploratory design	Mixed -diploma, associate; Bachelor degree	285	Two common learning styles: Introversion, sensing, thinking and judging (ISTJ) Introversion, sensing, feeling and judging (ISFJ) Sensing, judging =43.3% Academic performance relationship to learning style statistically significant ($p < 0.05$)
Mahmoud	Saudi Arabia	2011	Learning Style Questionnaire	Descriptive study	Under graduate fourth, sixth and eighth level,	102	No statistically significant differences in learning styles in study sample except for the active /reflective learning style. Visual/verbal learning style was highest amongst level six students. No relationship between critical thinking and student's academic achievement A correlation between critical thinking and sensing/intuitive learning style
Rassool & Rawaf	United Kingdom	2007	Honey & Mumford	Survey design	UG :Diploma & Degree	110	Reflector: 48(44%)
Sizemore & Schultz	USA	2005	Barsch Learning Inventory	Survey design	UG bachelor degree Year 1 (1st day)	137	Visual dominant
Zhang & Lambert	China	2008	Index of Learning :Felder & Solomon & KOLB LSI	Survey design	Under graduate (UG)-Baccalaureate degree	100	Sensing_ intuitive was predominant style with sensing =86% Reflective Visual Global

The VARK assessment tool has been used in a number of studies for nursing students in countries such as Jordan, Australia and America as outlined in the Table 4 below. The findings of the studies listed in Table four below were consistent with the data on the VARK website with regard to learning style preference. The website reflects that the pre-dominant learning style is multi-modal. Demographic variables such as age and gender were not significant except in a Jordanian study where 55% of the participants were male (AlKhasawneh, 2013:1547). The multimodal preference was prevalent amongst 55% of the participants, of whom 60% had a kinaesthetic mode preference. The learning methods, for example, lectures using real-life examples and simulation laboratory experience, were preferred by kinaesthetic-dominant learners. Identification and awareness of preferred learning style modes enable learners to strengthen weaker modes and strengthen or maximise preferred modes, to facilitate better learning and academic performance. No published studies were found for South Africa, hence the decision to explore learning styles utilising this specific tool.

Table 4: VARK learning styles studies of nursing students in alphabetical order

AUTHOR	YEAR	COUNTRY	DESIGN	POPULATION	SAMPLE SIZE (N)	FINDINGS
AlKhasawneh	2013	Jordan	Cross-sectional survey	Undergraduate - Bachelor degree: Year 1,2,3	197	Multimodal: n=108 (55%); Unimodal: n=89 (45%)
AlKhasawneh Mrayyan, Doherty & Yousef Docherty	2008	Jordan	Interventional study	Undergraduate Maternity nurses	92	Multimodal: Pre problem solving =54% Post =68%; Unimodal: Pre=46% & post=32%
James, D'Amore, Mitchell	2011	Australia	Cross-sectional survey design	Undergraduate Bachelor degree year 1	334	Multimodal: 78.7% Unimodal: 21.3%
Koch, Salamonson, Rolley & Davidson	2011	Australia	Prospective correlational study	Graduate baccalaureate (Non- Australian degree)	61	Multimodal: 62% -Read/write dominant mode Unimodal: 38 %
Marek	2013	United States of America	Quasi-experimental non-equivalent control group design	Associate degree students	Control: N=9 Experimental: N=7	Control group: n=6(N=7) Kinaesthetic, n=5(N=7) multimodal
Meehan-Andrews	2008	Australia	Quantitative design	Health sciences degree year 1	86	Multimodal: n=40(46%) Unimodal: n=46(54%) -Kinaesthetic n=31(68%)

2.7 Learning styles research in South Africa

The use of learning styles is a strategy to inform both learners and/or their educators regarding the best way to learn within various contexts, such as in the classroom, self-study and clinical practice which includes laboratory and real-life situations. Four studies which reported on learning styles in nursing education were conducted between 1997 and 2002, at three universities in South Africa. Kolb's Learning Style Inventory was utilised to measure student satisfaction of self-study in a simulation laboratory (Govender, 1997: np). The second study, also employing the Kolb framework, compared second and third year undergraduate students' problem-based learning and community based learning within the context of self-directed learning (Mzali, 1997: np). The predominant learning styles were assimilator, followed by converger and the diverger. Accommodator styles were the least favoured style.

In a third study by Van Rensburg (2009:181), the identification of diverse South African nursing students' learning styles was a strategy to inform educators about distance students learning needs and the impact thereof on academic their success. A survey of learning styles amongst first year undergraduate students at the Nelson Mandela Metropolitan University, Port Elizabeth, utilised the Kolb learning Style Inventory (Vawda, Foxcroft & Connelly, 2005:9).

2.8 Summary

The learning styles of adult non-traditional learners in a nursing school have not been reported in the literature. In particular, little is known about the learning styles of nursing auxiliaries or staff nurses (enrolled nurse) registered for nurse training programmes in South Africa. Learning styles have been extensively researched with more than 70 models available to measure learning styles. These models range from personality, cognitive-behaviourist and information processing to environmental style instruments. The Kolb Learning Style Inventory has been utilised as a measurement of learning style in a number of studies published by nurse educators. The classification of learning styles are diverse as published in the studies reviewed for this research. The published research with regard to learning style preference measured by means of the VARK sensory model revealed multimodal preference as dominant learning style preference amongst nursing students. A gap exists in the knowledge of learning style preferences among learner nurses enrolled in nursing schools in the South African context.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the research methodology utilised to determine the learning style preferences of learner nurses studying at a nursing school. The aim and objectives of the study, the design, the participants and the process of data collection and analysis are presented. Measures to ensure validity and reliability of the data collection tools are described. Ethical considerations pertaining to the study are presented.

3.2 Aim

The aim of the study was to investigate the preferred learning styles of learner nurses, i.e. enrolled nursing students and enrolled auxiliary nursing students, at the Nursing school based at two public health facilities in the Cape Town Metropolitan district of the Western Cape, South Africa.

3.3 Objectives

3.3.1 To determine individual learning styles of learner nurses registered for a training programme in a nursing school.

3.3.2 To establish the differences between the categories of learner nurses learning style preference.

3.3.3 To determine a possible relationship between demographic and educational backgrounds of the individual and the preferred learning style.

3.4 Research design

A non-experimental cross-sectional descriptive survey design was selected. This design enabled the researcher to obtain information about the characteristics (phenomenon) of learning styles preferences of learner nurses in Nursing school which is the natural setting for observing the phenomenon (Burns & Grove, 2011:256). A cross-sectional study allows for data collection at one point.

The researcher aimed to determine if a relationship existed between the demographic and educational variables (Brink, van der Walt & van Rensburg, 2012:112). A survey allows the researcher to target a large group of participants in a cost-effective manner. The time required to distribute the

questionnaires is far less when compared to conducting interviews individually or in small groups. A survey allows for multiple variable measurements (Maree & Pietersen, 2012:155).

3.5 Study setting

The SANC accredited Nursing school are satellite campuses of a larger college of nursing and are located within central hospitals in the public health sector in the Cape Town Metropolitan District in the Western Cape Province.

The nursing education training programmes offered at the Nursing school are a two year diploma leading to registration as a nurse (bridging course) and a one year enrolment certificate in nursing. Enrolled nurses are registered for the diploma programme and are the student nurse participants enrolled in the research study. The nursing auxiliaries are registered for the enrolment certificate in nursing and are the pupil nurse participants enrolled in the research study.

The above programmes include theoretical and clinical components. The theoretical component follows a didactic approach. Lectures, group work, case studies and demonstrations are the common teaching methods utilised in the Nursing school and are cost effective strategies to teach large groups of students (Meehan-Andrews, 2009:25). The practicum component of the programme includes clinical procedures and demonstrations in conjunction with case presentations in the clinical area and simulation laboratory.

The classrooms at the respective Nursing school, were used as the research sites after permission was granted by the Human Research Ethics Committee (HREC), Health Sciences Faculty (HSF), University of Cape Town (UCT), (HREC/REF: 304/2014) and the Ethics committees of the Directorate of Western Cape College of Nursing (WCCN) respectively.

3.6 Population and sampling

The population refers to a specific group that is the focus of the research study (Burns & Grove, 2011:290). The learner nurses are nursing auxiliaries and enrolled nurses registered for a SANC accredited training programme at the Nursing school, and were identified as the target population for this study (LoBiondo-Wood & Haber, 2010:222).

3.6.1 Inclusion criteria:

All learner nurses enrolled at the Nursing school in public health facilities are:

- Pupil nurses registered with SANC who are enrolled for training at a nursing school in a public health facility.
- Bridging course student nurses registered with SANC, inclusive of first and second year of training who are enrolled for training at a nursing school in a public health facility.

3.6.2 Exclusion criteria:

The learner nurses who were absent, on vacation or sick leave during the data collection period, were not enrolled into the study.

3.6.3 Sampling

The learner nurse population of 197 at two of the public health nursing school within the metropolitan area were available for inclusion in the study. All learner nurses were eligible for enrolment into the study. Sampling was not done due to the limited available accessible population.

3.6.4 Recruitment/enrolment of participants

Permission to access the nursing school to conduct the research study was obtained from the ethics committee of the Directorate of Western Cape College of Nursing. Potential participants were informed regarding inclusion into the study by means of an information session to explain the process and procedures related to study. The potential benefits and risks were outlined at the information session. The recruitment process commenced at the initiation of data collection until all the potential participants had been approved for enrolment into the study (Burns & Grove, 2011:362).

All learner nurses at the two nursing school were invited to participate, however not all learner nurses arrived to participate in the survey on the day scheduled for the data collection (survey completion). One hundred and eighty eight (188) questionnaire packages were distributed. A total of 188 learner nurses (N=188) were enrolled into the study. The study population comprised of 81 pupil nurses (nursing auxiliaries) and 107 bridging course student nurses (enrolled nurses). The response rate was 100%. The learner nurses who were absent, on vacation, or sick leave were excluded from the study population, as per exclusion criteria.

3.7 Data Collection Instrument

A self-administered survey questionnaire was used (Appendix C). Section A, included ten closed-ended questions on demographic data, namely, age, gender, language, educational and nursing experience background. Section B consisted of the VARK (version 7.1) learning style assessment tool. Fleming & Mills developed the VARK learning style measurement tool in 1992. This was in addition to existing learning styles models available at the time due to the absence of a gold standard to measure learning styles in students/learners (Rogers, 2009:13). According to the VARK website it measures instructional preferences only and does not measure other aspects of the learning process such as personality. The VARK tool is partly based on the Myers-Biggs personality indicator which is a personality type of learning style instrument based on the Jungian philosophy and Gardener's Multiple Intelligence theory. This type of learning style measuring tool is applicable to the health science contexts (James et al., 2011:419).

The VARK questionnaire consists of sixteen multiple choice statements. Each statement is representative of a visual, auditory, read/write or kinaesthetic modality (Fleming, 2012:np). The visual learner prefers concepts to be explained by means of maps, graphs, diagrams or flow charts. The auditory learner prefers listening to lectures, auditory tapes or podcasts of the learning content. The read/write learner prefers using text like textbooks, articles printed or electronic. The kinaesthetic learner is tactile and prefers learning by touching, doing learning activities in a physical manner. Learning is achieved by means of experience and practice which is often how nurses learn their practice (Fleming, 2012:np).

The questionnaire is concise and "real-life" statements are asked. This is easy to read for persons who are not first language English speakers but use English as the language of formal communication. The risk of misinterpretation of questions due to poor language proficiency is possible with this specific population. To limit misinterpretation of questions by respondents, the researcher remained outside the venue to clarify questions should they arise, but this was not required. The respondents could select one to four suitable responses per statement. The scores were totalled with a possible total of 16 to 64 depending of the number of responses per statement.

The tool measures learning preference as well as the information input and output, which is useful to both learner and teacher, due to the flexibility to change or adapt a learning style to a certain context (Koch, et al., 2011:612). The tool can measure up to 23 combinations of learning styles preferences which can further be classified as mild, strong or very strong (James, et al., 2011:418). The single preference is classified as unimodal, which is the single preference sensory mode category. The combinations are named bimodal, trimodal and quadmodal and are usually two, three or four modes combined respectively (Fleming, 2012:np).

Dr Ian Fleming, the author and owner of the trademark instructional learning style tool, has granted the researcher electronic permission to use the tool for this study (Appendix C). The tool was downloaded from the website http://www.vark-learn.com.

3.8 Reliability and validity of the data collection instrument

3.8.1 Internal consistency

The multi dimensionality of the VARK instrument was evaluated by Leite, Svinicki and Shi (2010:325). Each test-let of the VARK tool was examined to verify the reliability score for each sensory modality. It had a Cronbach's alpha (α) index of 0.7 that is within the range of 0.7-0.9 as an acceptable score (Maree, 2012:24). A pilot study conducted on nursing students in a Jordanian university had a Cronbach's alpha index of 0.85 which measured internal consistency of the instrument (AlKhasawneh, 2013:1547). The validity of the VARK tool was measured at 0.86 by means of Kaiser-Meyer-Olkin test and the Cronbach alpha was 0.91 which validates the instrument (Koch, 2011: 614).

3.8.2 External validity

The instrument has been used in several studies in multiple languages across the world which demonstrates the principle of external validity and generalisability. The regularly updated website reflects the number of users internationally which can be viewed on the website, see http://www.vark-learn.com. The instrument has been translated into a variety of languages to ensure that the meaning and context of the questions are maintained (Fleming, 2012:np). Arabic speaking Jordanian nursing students' learning style preferences were assessed during class time and the researcher found the instrument easy to administer (AlKhasawneh, 2013:1547). The findings were a 55% multimodal preference dominance of the sample. A previous study conducted with Arabic speaking students revealed that dominant learning style preference was multimodal with a read/ write preference (AlKhasawneh et al, 2008:577). A study to profile the demographic data and learning styles of undergraduate student nurses in Australia used the VARK tool (James et al., 2011:418).

3.8.3 Content and construct validity

The questionnaire development was informed by the existing literature. Language usage of the questionnaire is concise, uncomplicated and related to everyday activities. The VARK learning style questionnaire was assessed for its usefulness and content validity as confirmed by Leite et al. (2010:325) and Marek (2013:43).

Four nurse educators constituted the panel of experts to evaluate the content and construct validity of the data collection instrument. Two members of the panel were masters and two doctoral prepared respectively. They were employed in a variety of nursing education fields, namely a Nursing school, Nursing college, university and clinical nursing practice. An evaluation tool was utilised (Appendix F) to ensure consistent feedback to inform the validity of the questionnaire (Brink et al., 2012:166).

The evaluation revealed that the instrument was valid in terms of content and construct. The clarity of questions, printing quality, language and instructions were satisfactory. The font of the data collection instrument was revised from Arial 11 to 12 (Appendix C).

3.8.4 Face validity

Face validity was checked through a pilot study that was conducted with former learner nurses prior to data collection to verify questionnaire layout, clarity, accuracy of the questions and to verify the time required to complete the questionnaire (Brink, et al., 2012:166).

3.9 Pilot study

A pilot study was conducted prior to data collection. A total of eight former learner nurses participated in the pilot study, (N = 8) of whom four were ex-bridging course students and four ex- pupil nurses respectively. The respondents were excluded from the accessible study population.

The pilot respondents were provided with the "pilot" questionnaire package which included the Information letter, consent form, study questionnaire and the feedback form (Appendix E). The Information letter was provided to ensure that the participants were informed about the aim, objectives and the relevance of the study.

Consent was obtained prior to the completion of the study questionnaire. This ensured that participation was voluntary and withdrawal without penalty at any time ensured compliance to ethical principles. Completion of the questionnaire occurred when the participants were not on duty and thus did not require authorisation from their employer and did not compromise patient care.

The completed questionnaires were returned to the researcher the following day. The pilot study participants were requested to comment on the time required to complete the questionnaire, clarity of the questions and layout of the questionnaire on the feedback form that was provided (Brink et al., 2012:174). The feedback from the pilot study respondents was that the study questionnaire package required no adjustments. The questions were clear, layout was adequate and the time to complete the questionnaire was approximately twenty minutes. This feedback was valuable to the researcher and no adjustments were made to the questionnaires. The data collected during this pilot study was entered onto an Excel© spread sheet but excluded from the data analysis process.

3.10 Data Collection

Data collection for the study commenced, after ethical approval was obtained from the university and the directorate of the nursing college, see Appendices A and B.

3.10.1 Data collection procedure

Data was collected during an appropriate time when the learner nurses attended class sessions. Voluntary participation ensured adherence to the principle of autonomy. Withdrawal by participants without any form of penalty was permissible at any stage of the study.

Thirty minutes of self-directed learning time was allocated by the heads of the Nursing school to allow participants to complete the questionnaires to limit disruption of class teaching time. The researcher provided information on the procedure to complete the questionnaires.

Questionnaire packages included the consent and information form and the questionnaire, comprising of two sections, namely the demographic data section and the VARK (version 7.1) questionnaire.

The potential respondents were invited to participate once the questionnaire package was handed to them. The information regarding the study was explained. They were informed that participation was entirely voluntary. They were also informed that the information provided by them would be kept in a locked cabinet and not be revealed to any other person, except the researcher and her supervisor. All the data would be coded onto the research documents and the names would not be disclosed in

compliance with the principle of confidentiality. The potential respondents were assured that no penalty would be applied should they choose not to participate. Withdrawal from the study was permissible at any stage of the study process with no penalty. The consent form had to be signed by the participant, researcher and a witness prior to the completion of the questionnaire to ensure that ethical principles were adhered to.

The questionnaire packages were distributed to the learner nurse groups at the two nursing school during the month of June 2014. A total of five data collection sessions were required to reach all potential participants during their various class sessions. A total of 188 questionnaires were distributed to all potential respondents, (N=188) who were available at the time of data collection. Learner nurses who were absent or on annual or sick leave on the day of data collection were excluded from the study. The completed questionnaires were placed in a box marked "University of Cape Town Questionnaires" by the respondents. The researcher collected the box for safe storage in a locked office in a secure access controlled environment. One hundred and eighty eight questionnaires were retrieved from the box that was a 100% response rate.

The researcher remained outside the venue to limit influencing or coercing the respondents during the completion of the questionnaires in accordance with ethical principles (Harrowing, Mill, Spiers, Kulig & Kipp 2010:73).

3.11 Data management and analysis

The demographic data was transcribed from the questionnaires onto an electronic form using Microsoft Excel© on a password controlled computer. The VARK programme for data analysis was used to classify the learning styles of the respondents. The scores were calculated on the VARK website and transcribed onto a data spread sheet. The data was stratified into the two Nursing school groups and the relevant study year. The certificate for enrolment (nursing auxiliary/pupil nurse) and the diploma in nursing for enrolled nurse (student nurse) constituted two groups to facilitate data analysis. Descriptive statistics and inferential statistics were applied to analyse the data. The IBM SPSS Statistics version 20© software programme was used for the data analysis.

3.11.1 Descriptive statistics

The nominal and ordinal data was analysed in categories to answer the primary objective. The continuous data were analysed and the means, medians and standard deviation were calculated. The mean is the mathematical average of all the VARK scores as a measure of central tendency for the descriptive survey. The standard deviation refers to the square root of variance of the data and measures variability in the scores in relation to the means scores (Burns & Grove, 2011:384).

3.11.2 Inferential statistics

Cross tabulation (contingency analysis) and Chi-square test were applied to measure the categories of the respondents in relation to the VARK learning styles sensory modes, to establish if there were differences and/or relationships. The contingency tables of learning styles by category of respondents (learner nurses) was analysed using Chi-square. The Chi-square tests applied were:

- Pearson Chi-Squared test
- Continuity Correction
- Fisher's Exact Test
- Linear-by-Linear Association

The One-way-ANOVA test was applied to assess the relationship of VARK mean scores. Post Hoc tests (Tukey) were applied to do multiple comparisons of VARK scores. The homogenous subsets were also examined and are presented in the results chapter.

There were no statistically significant differences found in the data. The greater percentage of respondents in the nursing school was multimodal (70.2%) with a quadmodal learning style preference.

3.12 Ethical considerations

Research conducted on human participants is governed by the Declaration of Helsinki (Fortaleza version 2013) to ensure that research is authentic and does not violate human rights. It consists of ethical principles to guide the research process (World Medical Association, 2013:np).

The approval to conduct the research study was obtained from the Human Research Ethics Committee, Faculty of Health Sciences, University of Cape Town; HREC/REF: 304/2014 (Appendix A). Permission to gain access to the research sites (Nursing school) and the study population was obtained from the research committee of Directorate Western Cape College of Nursing (Appendix B). The approval letters were provided to the heads of Schools to gain access to the site and study population.

3.12.1 Autonomy

All participants in a research study have the right to respect for persons. Individuals are autonomous, thus have the right to self-determination. The researcher explained the nature, objectives and the full details of the research study to all potential respondents prior to obtaining consent. A consent form and information letter (Appendix G) was provided to all potential respondents to inform them that the study participation was voluntary. The purpose of the study would provide respondents with tools to facilitate learning. This ensured that respondents had adequate information and understanding of the nature of the project to make an informed decision about participation. Voluntary participation

ensured that respondents were not coerced and had exercised their right to choose in compliance with the principle of autonomy (Brink et al., 2012:35).

3.12.2 Beneficence

The principle of beneficence is to promote the well-being of the participant. The respondents would be provided with tools to facilitate better learning. Teaching practices may be matched with learning styles if the learners and the teachers were aware of this. Neither the respondents nor the nursing school were identified by name in any of the research publications to limit any potential harm, thus showing respect for the organisation and its reputation (Brink et al., 2012:36).

3.12.3 Non-maleficence

The principle to inflict no harm was adhered to through the process of voluntary participation and withdrawal without any penalty at any time during the research study period. The study was conducted with permission as described above.

3.12.4 Vulnerability /vulnerable population

Coercion was avoided through voluntary participation and completion of the consent form prior to distribution of the study questionnaire. The completed questionnaires were placed in a box marked "University of Cape Town Questionnaires" to minimise respondent vulnerability.

3.12.5 Confidentiality, right to privacy and anonymity

Confidentiality was maintained by ensuring that all respondents' responses were appropriately coded to ensure that respondent names or personal information was not reflected on any of the raw data. The raw data was stored in a locked cabinet in a secure office and was not available to any person other than the researcher. A master code list which reflected no personal data of the respondents was generated for restricted access and was available only to the researcher and the project supervisor. A contact name and number was included in the participant information sheet to enable the respondents' access to information at any time for the duration of the study.

All raw data and results of the study were stored in a locked cabinet within an access controlled area and will be retained for a period of five years to maintain confidentiality and in accordance with the Declaration of Helsinki, Fortaleza version 2013 (World Medical Association, 2013:np). This ensures that the right to privacy, anonymity and confidentiality will be maintained.

3.12.6 Justice and fairness

Withdrawal from the study by respondents was possible at any time without any penalty in adherence to the principle of justice. Respondents received no remuneration for completing the questionnaire to limit coercion. All potential respondents had an equal chance to complete the

questionnaire and were not excluded on the basis of academic performance or any other criteria (Burns & Grove, 2011:118).

3.12.7 Risks and benefits

No risks were anticipated or encountered due to the nature of the survey. Benefits are that respondents may receive feedback regarding learning style preferences which will inform their learning process. It can potentially influence curriculum development and teaching practices for the nurse educators and thus contribute to the body of knowledge

3.12.8 Referral

All participants were provided with the telephone number of the chairperson of the UCT HREC should they have had any questions or concerns about the study. Arrangements were in place for debriefing should this have been required. This was found not to be necessary.

3.13 Summary

The research methodology was a descriptive survey conducted at two nursing school with learner nurses following a training programme to achieve a certificate or diploma in nursing. There were 188 respondents enrolled in the study. The data analysis included identifying relationships between demographic data, educational background and the preferred learning style. The researcher adhered to all ethical principles. The results are presented in the next chapter.

CHAPTER FOUR

RESULTS

4.1 Introduction

A non-experimental cross-sectional descriptive survey design was utilised to identify the learning style preference categories and to determine any relationship between learning styles and demographic data of the learner nurses training at two Nursing school in the Cape Town Metropolitan area of the Western Cape Province, South Africa.

This chapter presents the results of the study. One hundred and eighty-eight respondents completed the survey, a 100% response rate. The data analysis included descriptive and inferential statistics as appropriate.

The learning styles preferences may be represented as sensory modes which may be visual, aural, read/write or kinaesthetic. The single preference is referred to as unimodal. Two, three or four modes are referred to as bimodal, trimodal or quadmodal and are collectively referred to as multimodal.

The results are presented as follows: In the first section a description of the demographic characteristics of the respondents is provided. This is followed by the presentation of the modal sizes followed by the demographic and educational background and its association with learning style preference.

4.2 Demographic profile of learner nurses

The demographic characteristics of the respondents are shown in Table 5. Most respondents were female, which is in keeping with the democratic profile of nurses in South Africa and elsewhere (James et al., 2011:420; Koch et al., 2011:614).The age range for the respondents was between 23 and 58 years. This is typical of learner nurses who are mature age or non-traditional learners. The age categories were grouped from 23 to 35 years, 36 to 40 years, 41 to 45 years and greater than 46 years to create four groups that were similar in size. Forty-eight percent of the respondents were within the age category of 36 to 45 years.

Almost sixty percent (56.9%) of the respondents had less than four to eight years of nursing experience, thus half of the respondents were fairly inexperienced. Only 31.4% of the respondents had more than eight years of nursing/work experience. Thus the majority of respondents had limited experience reported at less than eight years.

English was the home language for only 9% of the respondents. Afrikaans and isiXhosa was the home language of 39.9% and 35.6% respondents respectively. Thus the English language was predominantly

a second language. The languages were grouped as English/Afrikaans and isiXhosa /other African language for statistical purposes due to the low number of respondents who were English home language speakers.

Table 5: Demographic characteristics of the respondents (n = 188)

VARIABLE		Number (N)	Percentage (%)
GENDER	Female	180	95.7
	Male	8	4.3
AGE	23-35 years	49	26.1
	36-40 years	45	23.9
	41-45 years	46	24.5
	> 46 years	48	25.5
NURSING SCHOOL	School 1	127	67.6
	School 2	61	32.4
STUDY YEAR	2012	50	26.6
	2013	39	20.7
	2014	99	52.7
TRAINING PROGRAM	Certificate for Enrolment as a Nurse	81	43.1
	Diploma in Nursing (Bridging course)	107	56.9
NURSING EXPERIENCE	1-3 years	28	14.9
	4-7 years	101	53.7
	>8 years	59	31.4
LANGUAGE :home	English	17	9
	Afrikaans	75	39.9
	isiXhosa	67	35.6
Grouped	Afrikaans/English/both	101	53.7
	isiXhosa/other African	87	46.3

4.3 The individual learning styles preferences of learner nurses at two public health nursing school

The first objective was to determine the individual learning style preferences of learner nurses registered for a training programme at public Nursing school within the metropolitan district of Cape Town, South Africa**.** The results are presented in tables and figures. The data analysis of the learning styles revealed that the visual mode was not identified as a single/unimodal preference within this population of 188 respondents. The preferences for the single sensory modes, namely aural were significantly lower than the kinaesthetic preference which was 10.6% compared to the 5.9% of the aural learning style preference. The multimodal preference was the predominant learning style preference and constituted 70.2% of the respondents in this study, as outlined in the Table 6.

Table 6: Individual learning styles of learner nurses

Individual learning styles N=188 respondents		
Mode	**Frequency (n)**	**%**
Visual (V)	0	0
Aural (A)	11	5.9
Read/Write (RW)	20	10.6
Kinaesthetic -K	25	13.3
Multimodal (M)	132	70.2

The Individual learning preferences of the study respondents are graphically represented in the pie diagram Figure 3 which shows those learner nurses are predominantly multimodal.

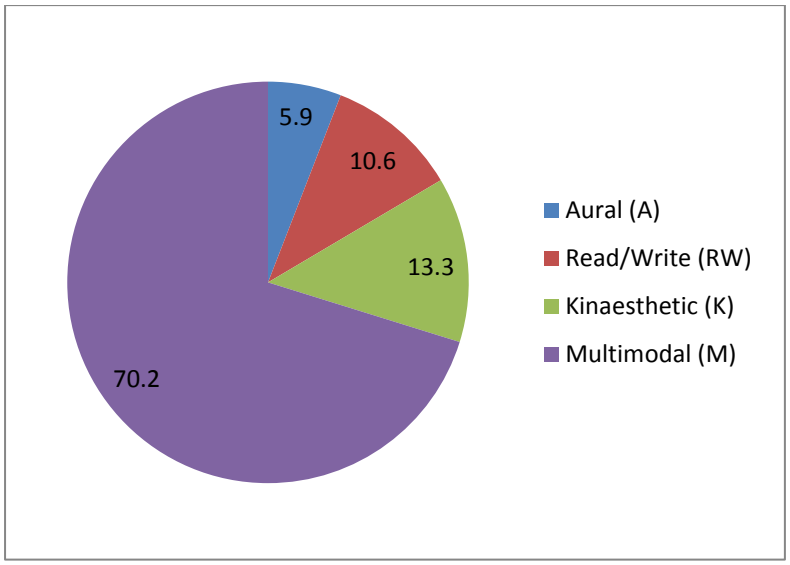

Figure 3: Pie chart diagram of individual learning styles preferences of participants

The distribution of the individual learning styles of the learner nurses at the two Schools are represented as unimodal/ single or multimodal learning style preference as represented in the Table 7 below.

Table 7: VARK - Unimodal vs. Multimodal

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Unimodal	56	29.8	29.8	29.8
	Multimodal	132	70.2	70.2	100.0
	Total	188	100.0	100.0	

The VARK modes were analysed to identify the categories and size within the modal preference and the findings are displayed in Table 8 and a graphic example in the column chart diagram Figure 4.

Table 8: VARK modal size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimodal	56	29.8	29.8	29.8
	Bimodal	33	17.6	17.6	47.3
	Trimodal	37	19.7	19.7	67.0
	Quadmodal	62	33.0	33.0	100.0
	Total	188	100.0	100.0	

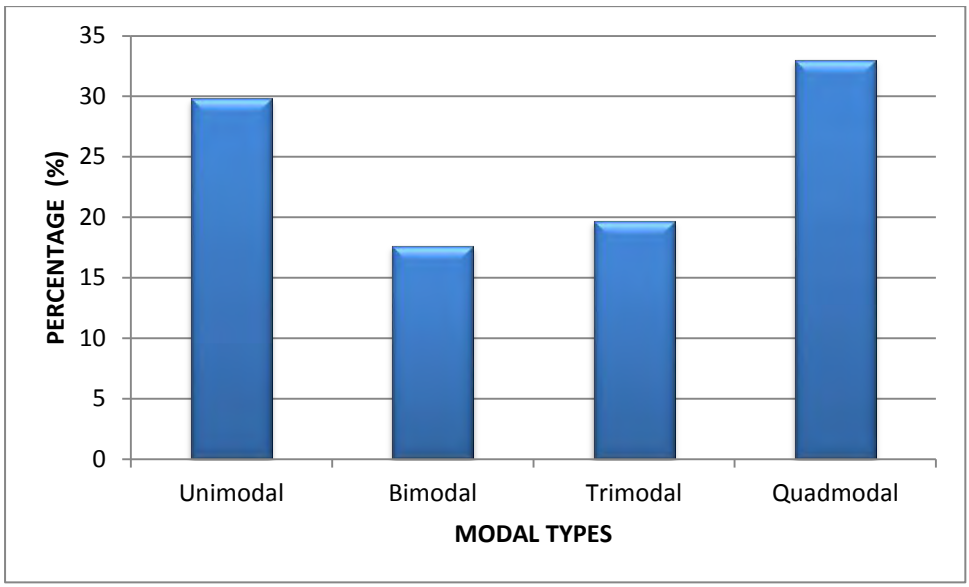

Figure 4: Column chart diagram of VARK modal size

Descriptive statistics were calculated for the VARK scores. The mean, standard deviations and the confidence interval of 95% was used to determine values as illustrated in Table 9.

Table 9: Report – Mean scores Total Sample

	VARK - Visual	VARK - Aural	VARK - Read Write	VARK - Kinaesthetic
N	188	188	188	188
Minimum	0	0	0	0
Maximum	12	14	14	14
Median	4.00	7.00	7.00	7.00
Mean	4.07	6.51	6.99	6.85
Std. Deviation	2.604	2.555	2.892	2.645

The One-ANOVA test which is used to determine relationships revealed no statistical significance as shown in Table 10 and 11.

Table 10: One-way ANOVA- VARK comparison of mean scores

Mode	N	Mean	Standard Deviation	Standard Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Visual	188	4.07	2.604	.190	3.69	4.44	0	12
Aural	188	6.51	2.555	.186	6.14	6.88	0	14
Read/Write	188	6.99	2.892	.211	6.57	7.41	0	14
Kinaesthetic	188	6.85	2.645	.193	6.47	7.23	0	14
Total	752	6.10	2.924	.107	5.89	6.31	0	14

Table 11: ANOVA VARK Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1060.324	3	353.441	49.309	.000
Within Groups	5361.585	748	7.168		
Total	6421.910	751			

To determine the statistical significance of the VARK modes the Post Hoc Tests were applied to do multiple comparisons. The F statistic was 49.309 which was less than the Sum of Squares and not statistically significant. Table 12 provides the description of the results of the Post Hoc test Tukey HSD where the individual sensory modes are the dependent variable as compared to the various VARK modes.

Table 12: Post Hoc Tests Multiple Comparisons - Dependent Variable: VARK Score Tukey HSD

VARK	VARK	Mean Difference (I-J)	Std. Error	Significance.	95% Confidence Interval	
					Lower Bound	Upper Bound
Visual	Aural	-2.441	.276	.000	-3.15	-1.73
	Read Write	-2.920	.276	.000	-3.63	-2.21
	Kinaesthetic	-2.777	.276	.000	-3.49	-2.07
Aural	Visual	2.441	.276	.000	1.73	3.15
	Read Write	- .479	.276	.307	-1.19	.23
	Kinaesthetic	-.335	.276	.618	-1.05	.38
Read/Write	Visual	2.920	.276	.000	2.21	3.63
	Aural	.479	.276	.307	-.23	1.19
	Kinaesthetic	.144	.276	.954	-.57	.85
Kinaesthetic	Visual	2.777	.276	.000	2.07	3.49
	Aural	.335	.276	.618	-.38	1.05
	Read Write	-.144	.276	.954	-.85	.57

The visual mode revealed a slight statistical significance as compared to the other three modes. The homogeneous subsets were compared as illustrated in Table 13, using Tukey with the subset for alpha =0.5.

Table 13: Homogeneous Subsets Tukey HSD

VARK	N	Subset for alpha = 0.05	
		1	2
Visual	188	4.07	
Aural	188		6.51
Kinaesthetic	188		6.85
Read/Write	188		6.99
Significance		1.000	307

4.4 Differences between the categories of learner nurses with regard to learning style preference in the two Nursing school.

The modal preferences of the respondents at both Nursing school were in similar proportions. The Aural preference was the lowest preference at n=7(5.5%) and n=4(6.6%) at School 1 and 2 respectively. The kinaesthetic preference was n=18(14.2%) and n=7(11.5%). The Read/write preference was n=12(9.4%) and n=8(13.1%). The multimodal preference was n=90(70.9%) and n=42(68.9%). The proportions of the learning styles were similar for both Nursing school as graphically displayed, see Figure 5 below.

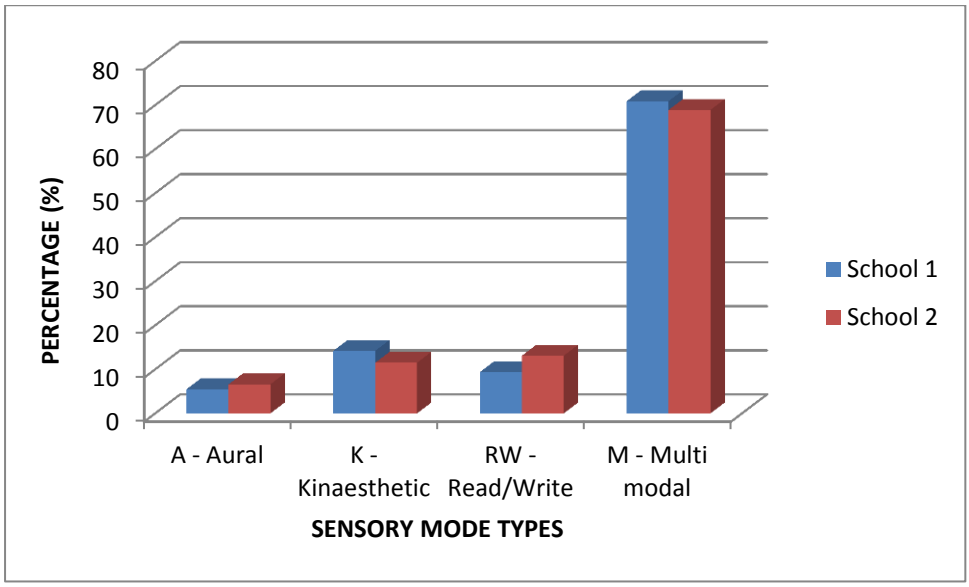

Figure 5: VARK Modal proportions as per Nursing school

Chi-square tests applied to measure statistical significance of the learning styles modes revealed no statistical significance, see Table 14.

Table 14: Chi-Square test results

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.847	3	.838
Likelihood Ratio	.834	3	.841
Linear-by-Linear Association	.165	1	.684
Number of Valid Cases	188		

Cross tabulation and Chi-square tests were applied to determine the difference between the different categories of respondents. The findings were similar for both Schools as is shown in the analysis of individual learning style preference in the primary objective, see Table 15.

Table 15: VARK - Unimodal versus Multimodal Nursing Schools

			School Nursing Studies		Total
			Nursing school 1	Nursing school 2	
VARK – Unimodal vs. Multimodal	Unimodal	Count	37	19	56
		% within School - Nursing Studies	29.1%	31.1%	29.8%
	Multimodal	Count	90	42	132
		% within School - Nursing Studies	70.9%	68.9%	70.2%
Total		Count	127	61	188
		% within School - Nursing Studies	100.0%	100.0%	100.0%

The multimodal preference was the predominant preference at almost two thirds the proportion as compared to the unimodal preference. Figure 6 is a graphic display of the differences of the unimodal and multimodal learning styles preferences between the two nursing schools.

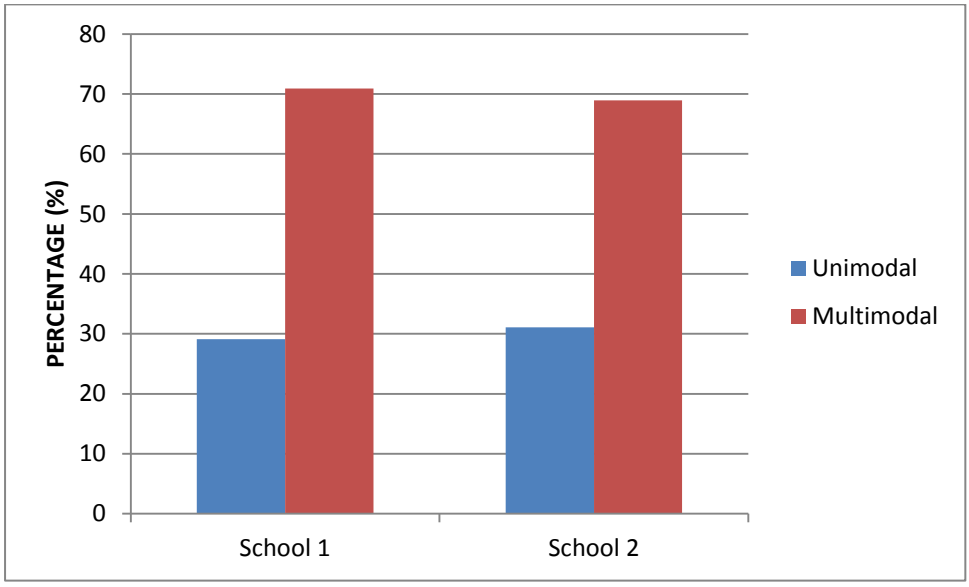

Figure 6: VARK - Unimodal versus Multimodal size of the Nursing school

The Chi-square tests as listed in Table 16 revealed no statistical significance for the VARK modes at the two Schools.

Table 16: Chi-Square Tests – Nursing school

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.080	1	.777		
Continuity Correction	.013	1	.911		
Likelihood Ratio	.080	1	.778		
Fisher's Exact Test				.865	.452
Linear-by-Linear Association	.079	1	.778		
N of Valid Cases	188				

The proportions of unimodal versus multimodal learning preferences according to the year of study revealed that the 2013 group had 20.5% unimodal and 79.5% multimodal preference. The 2012 and 2014 groups revealed similar proportions of multimodal preferences at 70% and 66.7% for 2012 and 2014 respectively. The cross-tabulation and the Chi-square tests yielded no statistically significant findings as shown in Table 17.

Table 17: VARK - Unimodal versus Multimodal Study - Year

			Study - Year			Total
			2012	2013	2014	
VARK - Unimodal versus Multimodal	Unimodal	Count	15	8	33	56
		% within Study - Year	30.0%	20.5%	33.3%	29.8%
	Multimodal	Count	35	31	66	132
		% within Study - Year	70.0%	79.5%	66.7%	70.2%
Total		Count	50	39	99	188
		% within Study - Year	100.0%	100.0%	100.0%	100.0%

Figure 7 is a graphic display of the proportions measured in percentages of unimodal and multimodal preferences according to the different year groups of the respondents.

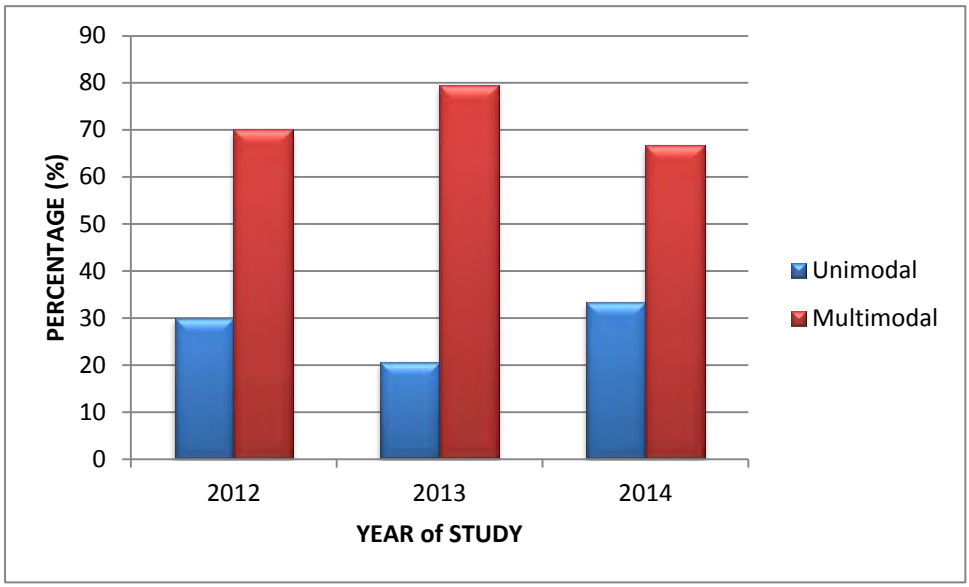

Figure 7: VARK - Unimodal versus Multimodal: Study Year

The multimodal proportion for the 2013 group is greater than the 2014 group, however the Chi-square statistical test applied revealed no statistical significance, see Table 18.

Table 18: Statistical tests - Study Year

STATISTICAL TESTS	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.200	2	.333
Likelihood Ratio	2.307	2	.315
Linear-by-Linear Association	.405	1	.525
N of Valid Cases	188		

The proportions for the respondents in the training program categories for certificate for enrolment and diploma leading to registration as a nurse (bridging course) were similar for unimodal and multimodal as illustrated in Table 19.

Table 19: VARK - Unimodal versus Multimodal preference between certificate and diploma in nursing

VARK - Unimodal versus Multimodal		Certificate Enrolment Nursing (Nursing Auxiliary)	Diploma in Nursing (Enrolled Nurse)	Total
Unimodal	Count	25	31	56
	% within Nurse Education current registration & programme	30.9%	29.0%	29.8%
Multimodal	Count	56	76	132
	% within Nurse Education current registration & programme	69.1%	71.0%	70.2%
Total	Count	81	107	188
	% within Nurse Education current registration & programme	100.0%	100.0%	100.0%

The graph below (figure 8) represents the proportions of the unimodal and multimodal distribution in the sample. The multimodal preference is the predominant preference at almost two thirds the proportion of the unimodal learning style preference in this group of respondents. There is no difference between the categories of respondents.

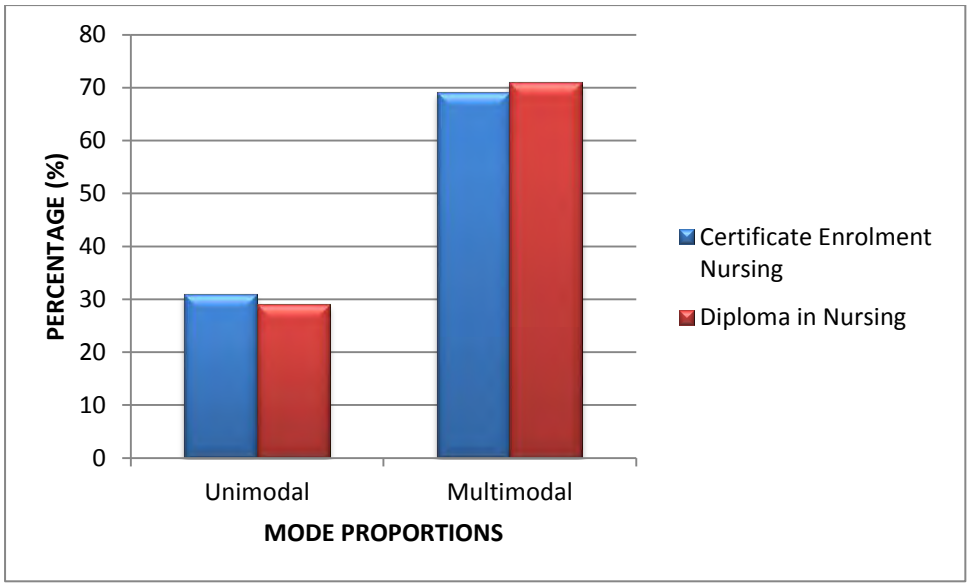

Figure 8: VARK- unimodal versus multimodal proportions of categories of learner nurses

The relationship of the unimodal and multimodal variables in association with the current nursing training program was not statistically significant as illustrated in Table 20.

Table 20: Chi-Square Tests - Unimodal versus Multimodal preference between certificate and diploma in nursing learner nurses

	Value	df	Asymp. Significance (2-sided)	Exact Significance (2-sided)	Exact Significance (1-sided)
Pearson Chi-Square	.079	1	.779		
Continuity Correction	.014	1	.905		
Likelihood Ratio	.079	1	.779		
Fisher's Exact Test				.872	.451
Linear-by-Linear Association	.079	1	.779		
N of Valid Cases	188				

The VARK mode preferences were also sub-categorised into the specific sensory mode and the mode strength. The modes may have been unimodal such as Aural or in various sensory combinations such as bimodal, trimodal or quadmodal/multimodal. Some of the respondents were classified as mild or strong. Table 21 provides the detail of the dominant VARK learning style preferences of the respondents for the two nursing education training programmes namely Certificate in Nursing and Diploma in nursing respectively.

Table 21: Dominant VARK mode preference distribution

MODE [Count (n) / percentage (%)]	A	AK	AR	ARK	K	RK	RW	VAK	VARK	VK	VRK
Certificate Enrolment Nursing (Pupil nurse)	5 (6.2)	4 (4.9)	9 (11.1)	13 (16)	13 (16)	1 (1.2)	7 (8.6)	1 (1.2)	27 (33.3)	0 (0)	1 (1.2)
Diploma Nursing (Enrolled Nurse /Bridging course)	6 (5.6)	4 (3.7)	5 (4.7)	18 (16.8)	12 (11.2)	9 (8.4)	14 (13.1)	1 (0.9)	35 (32.7)	1 (0.9)	3 (1.9)

STATISTICAL TESTS	Value	df	Asymp. Significance (2-sided)
Pearson Chi-Square	9.77	10	0.542
Likelihood Ratio	10.994	10	0.398
Linear-by-Linear Association	1.232	1	0.831
N of Valid Cases	188		

KEY: A= Aural
K = Kinaesthetic
R = Read/Write
V = Visual

The VARK mode preference distribution is graphically displayed in Figure 9 below and highlights the dominance of the quadmodal preference measured at 33.3% and 32.7% for the Certificate in nursing and the Diploma in nursing respondents respectively. The trimodal preference of ARK was in similar proportions for both groups of respondents and measured at 16% and 16.8% respectively. The read/write preference measured 13.1% for the diploma in nursing respondent group. The Kinaesthetic preference was reported as 16% of the certificate group of respondents. The statistical tests applied revealed no significance.

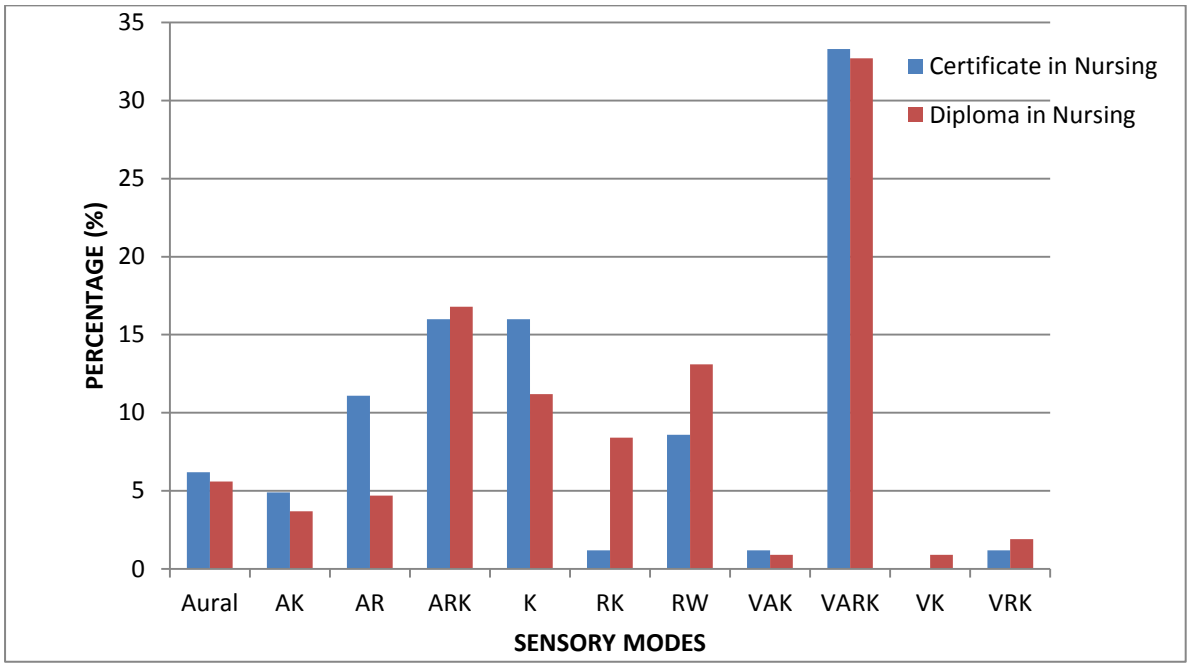

Figure 9: Dominant VARK mode preference distribution

The mode and strength of modal preference was compared for the three different groups of respondents. The findings for the unimodal preferences: Aural mild preference was n= 9(12.7 %) compared to the n=2(3.6%) for the Aural strong preference. The Kinaesthetic mild preference was n= 20(29. %) compared to n= 5(6%) for the Kinaesthetic strong. The Read/write (RW) preference was n=3(3%), Read/write mild n= 12(21.1%) and Read/write strong n=5(7.6%). The multimodal preferences did not reveal strength preferences. Figure 10 is a representation of the sensory modes for the different categories of respondents spread across the three year groups.

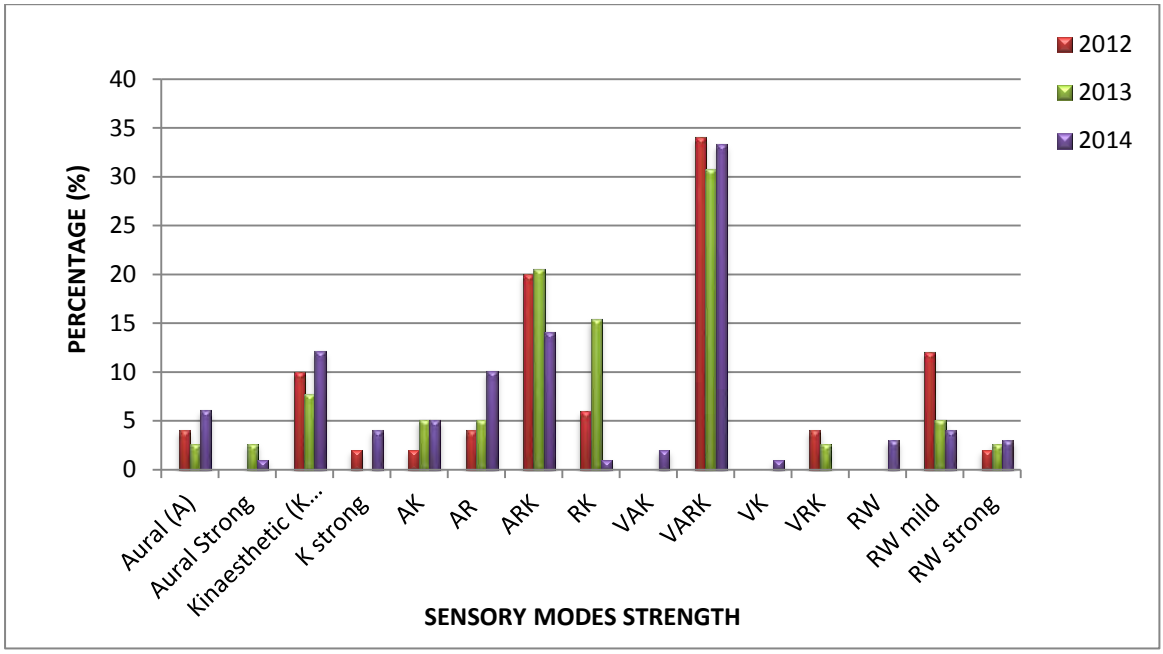

Figure 10: VARK sensory modes strength

The data analysis did not reveal any statistical significant results as listed in table 22.

Table 22: Statistical tests - mode strength

STATISTICAL TESTS			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	31.96	28	0.276
Likelihood Ratio	35.68	28	0.151
Linear-by-Linear Association	2.344	1	0.126
Number of Valid Cases	188		

4.5 Relationship between demographic/educational background of the individual learner and the preferred learning style.

The means scores for age versus the VARK scores were calculated to describe the distribution of learning style mode in relation to the respondent's ages. The VARK visual mode had lower mean scores compared to the aural, read/write, kinaesthetic sensory modes (Table 23). The average read/write mean score (6.99) and standard deviation 2.892 was the highest score, whilst the visual score and standard deviation was 4.09 and 2.604 respectively. The highest mean score for VARK read/write was in the age group 41-45 years, which was reported as a mean score of 7.7 with a standard deviation of 3.577. The kinaesthetic score was second highest in the same age category, and was reported a mean of 7.54 and standard deviation of 2.639.

Table 23: Means scores of VARK versus Age

Age (grouped)		VARK - Visual	VARK - Aural	VARK – Read/Write	VARK - Kinaesthetic
23-35 years	N	49	49	49	49
	Minimum	0	0	1	0
	Maximum	12	11	13	12
	Median	4.00	7.00	7.00	7.00
	Mean	4.41	6.78	6.88	6.80
	Std. Deviation	2.684	2.285	2.455	2.380
36-40 years	N	45	45	45	45
	Minimum	0	1	2	1
	Maximum	10	11	13	11
	Median	3.00	6.00	7.00	6.00
	Mean	3.38	6.04	6.73	6.24
	Std. Deviation	2.259	2.619	2.734	2.673
41-45 years	N	46	46	46	46
	Minimum	0	2	0	2
	Maximum	12	14	14	14
	Median	4.00	6.00	8.00	7.50
	Mean	4.35	6.70	7.70	7.54
	Std. Deviation	2.718	2.715	3.577	2.639
46+ years	N	48	48	48	48
	Minimum	0	2	1	1
	Maximum	11	13	12	13
	Median	3.00	6.00	6.50	7.00
	Mean	4.10	6.50	6.67	6.79
	Std. Deviation	2.668	2.617	2.684	2.805
Total	N	188	188	188	188
	Minimum	0	0	0	0
	Maximum	12	14	14	14
	Median	4.00	7.00	7.00	7.00
	Mean	4.07	6.51	6.99	6.85
	Std. Deviation	2.604	2.555	2.892	2.645

Due to the variation in the mean scores of various sensory modal preferences identified in the study the ANOVA test was applied to test for within and between group variance. The findings are shown in Table 24. The F statistic is less than the appropriate table values and thus not statistically significant (Burns & Grove, 2011:406).

Table 24: VARK versus Age - ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
VARK - Visual * Age (grouped)	Between Groups	(Combined)	30.773	3	10.258	1.525	.209
	Within Groups		1237.328	184	6.725		
	Total		1268.101	187			
VARK - Aural * Age (grouped)	Between Groups	(Combined)	14.798	3	4.933	.752	.522
	Within Groups		1206.181	184	6.555		
	Total		1220.979	187			
VARK – Read/Write * Age (grouped)	Between Groups	(Combined)	31.508	3	10.503	1.261	.289
	Within Groups		1532.471	184	8.329		
	Total		1563.979	187			
VARK - Kinaesthetic * Age (grouped)	Between Groups	(Combined)	38.927	3	12.976	1.881	.134
	Within Groups		1269.600	184	6.900		
	Total		1308.527	187			

A further statistical test for association between the variable of age and the VARK scores for all the sensory modes was applied namely the Eta and Eta squared were measured. The Eta is a correlation ratio that measures the degree of association between the variables. The Eta squared is the correlation ratio squared and measures proportion of variation associated with the variables of Age and VARK sensory modes. Table 26 shows the values of the measures of association which were not statistically significant because the F statistic was less than one (Richardson, 2011:136).

Table 25: VARK versus Age -Measures of Association

	Eta	Eta Squared
VARK - Visual * Age (grouped)	.156	.024
VARK - Aural * Age (grouped)	.110	.012
VARK – Read/Write * Age (grouped)	.142	.020
VARK - Kinaesthetic * Age (grouped)	.172	.030

The same statistical tests were applied to the highest school grade to test the association between the educational background and the VARK learning style modes. The means (M) and standard deviation (SD) had some variation for both the Grade 10 and Grade 12 groups as displayed in Table 26.

Table 26: VARK versus Highest school grade - Measures of Association Highest School Grade

Highest school grade		VARK - Visual	VARK - Aural	VARK – Read/Write	VARK - Kinaesthetic
Grade 10	N	11	11	11	11
	Minimum	1	3	1	3
	Maximum	8	13	14	12
	Median	4.00	9.00	6.00	7.00
	Mean	3.82	8.55	6.27	7.27
	Std. Deviation	2.183	3.205	3.379	3.259
Grade 12	N	177	177	177	177
	Minimum	0	0	0	0
	Maximum	12	14	14	14
	Median	4.00	6.00	7.00	7.00
	Mean	4.08	6.38	7.03	6.82
	Std. Deviation	2.633	2.466	2.864	2.611
Total	N	188	188	188	188
	Minimum	0	0	0	0
	Maximum	12	14	14	14
	Median	4.00	7.00	7.00	7.00
	Mean	4.07	6.51	6.99	6.85
	Std. Deviation	2.604	2.555	2.892	2.645

The F statistic was less than one (1) with a degree of freedom of one (1) and thus the ANOVA test did not show any statistically significant relationship between educational background and the VARK modalities, see Table 27.

Table 27: ANOVA Table VARK versus Highest school grade –Measures of Association Highest School Grade

			Sum of Squares	df	Mean Square	F	Sig.
VARK - Visual * Highest school grade	Between Groups	(Combined)	.736	1	.736	.108	.743
	Within Groups		1267.365	186	6.814		
	Total		1268.101	187			
VARK - Aural * Highest school grade	Between Groups	(Combined)	48.376	1	48.376	7.673	.006
	Within Groups		1172.603	186	6.304		
	Total		1220.979	187			
VARK – Read/Write * Highest school grade	Between Groups	(Combined)	6.000	1	6.000	.716	.398
	Within Groups		1557.978	186	8.376		
	Total		1563.979	187			
VARK - Kinaesthetic * Highest school grade	Between Groups	(Combined)	2.130	1	2.130	.303	582
	Within Groups		1306.397	186	7.024		
	Total		1308.527	187			

The variables were analysed by means of the Eta and Eta squared. This test measures effect size with regard to association and findings were not statistically significant as shown in Table 28.

Table 28: Measures of Association

	Eta	Eta Squared
VARK - Visual * Highest school grade	.024	.001
VARK - Aural * Highest school grade	.199	.040
VARK - Read Write * Highest school grade	.062	.004
VARK - Kinaesthetic * Highest school grade	.040	.002

The means scores for VARK versus language were calculated. The variation of the scores were examined for the relationship of language to learning styles, see Table 30. The analysis did not yield any statistically significant findings.

Table 29: Means –VARK versus Language

Home Language		VARK – Visual	VARK – Aural	VARK – Read Write	VARK - Kinaesthetic
English / Afrikaans or both	N	101	101	101	101
	Minimum	0	2	1	1
	Maximum	12	13	14	13
	Median	4.00	6.00	7.00	7.00
	Mean	4.05	6.60	7.08	7.15
	Std. Deviation	2.471	2.608	2.802	2.508
isiXhosa or Other African language or combination	N	87	87	87	87
	Minimum	0	0	0	0
	Maximum	12	14	14	14
	Median	4.00	7.00	6.00	7.00
	Mean	4.09	6.40	6.89	6.49
	Std. Deviation	2.765	2.503	3.006	2.770
Total	N	188	188	188	188
	Minimum	0	0	0	0
	Maximum	12	14	14	14
	Median	4.00	7.00	7.00	7.00
	Mean	4.07	6.51	6.99	6.85
	Std. Deviation	2.604	2.555	2.892	2.645

The home language namely English/Afrikaans and isiXhosa were analysed according to each sensory mode and the mean scores and the standard deviation were calculated. The Analysis of Variance (ANOVA) statistical tests revealed no significant correlation between language and the VARK sensory modes, see Table 30.

Table 30: Home Language versus VARK mean scores

VARIABLE	VARK MODES	Visual	Aural	Read/Write	Kinaesthetic
HOME LANGUAGE Mean (M) / Standard deviation (±)	Afrikaans/English	M 4.05/ ±2.471	M 6.60/ ±2.608	M 7.08/ ±2.802	M 7.15/ ±2.508
	isiXhosa & African language	M 4.09 / ±2.765	M 6.40/ ±2.503	M 6.89/ ± 3.006	M 6.49 / ±2.770
STATISTICAL TESTS ANOVA					
	Sum of Squares	0.084	1.901	1.762	20.007
	Mean square	0.084	1.901	1.762	20.007
	degrees of freedom	1	1	1	1
	F	0.012	0.29	0.21	2.888
	Significance (P value)	0.913	0.591	0.647	0.91

Language was analysed according to each sensory mode between and within groups (Table 31) but the ANOVA analysis revealed no statistically significant findings. Language is not associated with the learning style preference as was found in this group of respondents.

Table 31: ANOVA Table –VARK versus Language

		Sum of Squares	df	Mean Square	F	Significance
VARK - Visual * Home Language	Between Groups (Combined)	.084	1	.084	.012	.912
	Within Groups	1268.017	186	6.817		
	Total	1268.101	187			
VARK - Aural * Home Language	Between Groups (Combined)	1.901	1	1.901	.290	.591
	Within Groups	1219.078	186	6.554		
	Total	1220.979	187			
VARK - Read Write * Home Language	Between Groups (Combined)	1.762	1	1.762	.210	.647
	Within Groups	1562.217	186	8.399		
	Total	1563.979	187			
VARK - Kinaesthetic * Home Language	Between Groups (Combined)	20.007	1	20.007	2.888	091
	Within Groups	1288.519	186	6.928		
	Total	1308.527	187			

The measures of association were measured by means of Eta and Eta squared but no statistically significant findings were found, see Table 32.

Table 32: Measures of Association

	Eta	Eta Squared
VARK - Visual * Home Language	.008	.000
VARK - Aural * Home Language	.039	.002
VARK - Read Write * Home Language	.034	.001
VARK - Kinaesthetic * Home Language	.124	.015

The means scores for VARK versus nursing experience were calculated. The mean scores and standard deviation for the visual mode was lower than the aural, read write and kinaesthetic modes see Table 33.

Table 33: Means- VARK versus Nursing Experience

Nursing Experience - Number of years since completion of previous course		VARK – Visual	VARK – Aural	VARK – Read Write	VARK – Kinaesthetic
1-3 years	N	28	28	28	28
	Minimum	0	1	0	3
	Maximum	12	11	13	10
	Median	3.00	7.50	7.00	6.00
	Mean	4.04	6.86	6.86	6.50
	Std. Deviation	2.963	2.649	3.385	2.152
4-7 years	N	101	101	101	101
	Minimum	0	0	2	0
	Maximum	11	13	14	12
	Median	4.00	7.00	7.00	7.00
	Mean	4.19	6.54	7.11	6.81
	Std. Deviation	2.497	2.504	2.603	2.618
8+ years	N	59	59	59	59
	Minimum	0	2	1	1
	Maximum	12	14	14	14
	Median	3.00	6.00	6.00	7.00
	Mean	3.88	6.29	6.85	7.07
	Std. Deviation	2.640	2.620	3.145	2.912
Total	N	188	188	188	188
	Minimum	0	0	0	0
	Maximum	12	14	14	14
	Median	4.00	7.00	7.00	7.00
	Mean	4.07	6.51	6.99	6.85
	Std. Deviation	2.604	2.555	2.892	2.645

The number of years since the completion of the previous nursing programme that is the certificate in nursing care to become enrolled nurses or certificate in nursing care to become a nursing auxiliary. The ANOVA tests to measure association between the sensory modes and nursing experience revealed no statistically significant findings see Table 34.

Table 34: ANOVA Table -VARK sensory modes versus Nursing Experience

			Sum of Squares	df	Mean Square	F	Significance
VARK - Visual * Nursing Experience	Between Groups	(Combined)	3.542	2	1.771	.259	.772
	Within Groups		1264.560	185	6.835		
	Total		1268.101	187			
VARK - Aural * Nursing Experience	Between Groups	(Combined)	6.399	2	3.199	.487	615
	Within Groups		1214.580	185	6.565		
	Total		1220.979	187			
VARK – Read/Write * Nursing Experience	Between Groups	(Combined)	3.121	2	1.561	.185	.831
	Within Groups		1560.858	185	8.437		
	Total		1563.979	187			
VARK - Kinaesthetic * Nursing Experience	Between Groups	(Combined)	6.372	2	3.186	.453	.637
	Within Groups		1302.155	185	7.039		
	Total		1308.527	187			

The nursing experience since the years of completion of the previous nursing training program was compared with the VARK sensory modal preference to measure association by means of Eta and Eta Squared. The analysis did not reveal any significant association, see Table 35.

Table 35: Measures of Association of VARK sensory modes and years of Nursing Experience

VARK variable	Eta	Eta Squared
VARK - Visual * Nursing Experience	.053	.003
VARK - Aural * Nursing Experience	.072	.005
VARK – Read/Write * Nursing Experience	.045	.002
VARK - Kinaesthetic * Nursing Experience	.070	.005

4.6 Summary

The results of the investigation of the learning styles of learner nurses at two Nursing school have been reported. The gender of the respondents was predominantly female 180/188(95.7%). This is indicative of the female dominated nursing profession as per gender statistics on the SANC register. The home language of the respondents was predominantly Afrikaans at 75/188(39.9%), followed by isiXhosa at 67/188(35.6%) with only 17/188(9%) being English home language. The majority of respondents 129/188 (68.6%) had one to eight years of nursing (work) experience.

The multimodal learning style preference was predominant with 132/188(70.2%) of the respondents. The multimodal category was further analysed as quadmodal, trimodal and bimodal which

represented four, three or two combinations of the sensory modes. The quadmodal was 33%; trimodal 19.7% and bimodal 17.6% respectively.

The unimodal learning style preference was prevalent in 56/188(29.8%) of the respondents. The Kinaesthetic mode was the most popular single learning style preference at 25/13.3%. The Read/Write followed with 20/188(10.6%) and Aural (auditory) preference at 11/188(5.9%). The visual mode was not identified as a single mode in this group of respondents. The visual mode was slightly statistically significant. The Chi-Square tests namely Pearson Chi-Square; Likelihood Ratio; Linear-by Linear Association with degrees of freedom (df) of 3; 3; 1 respectively with no statistical significance using 2-sided analysis. The cross tabulation of the VARK preference in relation to the demographic variables were not statistically significant. No relationships were found despite the variety of statistical tests conducted.

CHAPTER FIVE

DISCUSSION, IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

The aim of the study was to investigate the preferred learning styles of learner nurses, i.e. enrolled nursing students and enrolled auxiliary nursing students, at the Nursing school based at two public health facilities in the Cape Town Metropolitan district of the Western Cape, South Africa.

5.2. Individual learning styles preferences of learner nurses registered for training programmes at the Nursing school.

The findings of this study revealed that the multimodal preference (70.2%) is the most preferred learning style for the respondents according to the VARK learning style instrument. The unimodal learning style preference proportion was reported as 29.8% of the respondents. This is consistent with the findings by James et al. (2011:420) in an Australian study of first year undergraduate student nurses that reported 78.7% multimodal learning style and 21.3% unimodal preference. The trimodal and bimodal learning preferences proportions of 10.8% and 11.7% respectively, for their study population. The kinaesthetic mode was the dominant learning style preference with higher means scores reported than the mean scores of the sensory modes. A prospective study conducted by Koch et al. (2011:614) reported a 62% multimodal preference and 38% unimodal preference amongst respondents in that study. A quadmodal preference of 56.3% of the multimodal cohort was reported. This is higher than the current study, that reported a 33% quadmodal preference and trimodal and bimodal proportions were 19.7% and 17.6% of the respondents respectively. These authors also found that students' learning styles preference were more visual and less read/write compared to the general public.

Kinaesthetic preferences were reported as dominant as a unimodal and bimodal preference (7.7% and 33%) respectively in medical students in India (Pristhkumar et al., 2014:186). This is similar to medical students in Turkey who also had a dominant kinaesthetic preference (23.3%) as reported by Baykan and Naçar (2007:159). Another Turkish study (Isman & Gundogan, 2009:426) reported the multimodal preference of 77.6% versus 22.4% of unimodal category of learning styles preferences amongst medical students at the Baskent University, Faculty of Medicine. The quadmodal proportion was 24.6% followed by 33.3%; 19.7% for trimodal and bimodal categories respectively, which is similar to the findings in the current study.

The visual mode was not reported as a unimodal preference in the current study which differs to what has been reported in previous studies (James et al., 2011:421; Koch et al., 2011:614; Meehan-Andrews, 2008:27). First year medical students in India were also reported to have no visual unimodal preferences (Pristhkumar et al., 2014:186), which is similar to the current study. Isman et al. (2009:426) also reported no visual mode learning preference amongst males. The Jordanian study of AlKhasawneh (2013:1546) reported a lower score for visual modal preference in their previous study (AlKhasawneh et al., 2008:575). A gender impact on visual preference is noted amongst males in both the Jordanian and Turkish studies described above. The sample population of males was high which is consistent with the male dominant nursing population in that region.

Teaching strategies that utilise extensive visuals such as maps, graphs would not be suitable for learners who lack visual learning style preferences. Strategies that are kinaesthetic, auditory or read-write in nature would be favourable for this type of student. This includes lectures, demonstrations, and hands-on activities in real-life type of learning environments.

The results of this study differ from the Australian study by Meehan-Andrews (2009:27) which reported a multimodal learning style preference proportion of 46% and a unimodal preference of 54% respectively in their study population. The kinaesthetic learning style preference was the dominant single mode (68% of the respondents). The quadmodal, trimodal and bimodal categories in the Meehan-Andrews study were 16%, 10% and 20% respectively which was similar to the study of James et al. (2011: 421). The unimodal preference was reported as dominant (54.1%), a bimodal preference of 38.5% and a multimodal preference of 7.4% with a kinaesthetic preference amongst undergraduate nursing students in Egypt (Shousha & Rahman, 2014:239) which differs from those reported in the current study.

In the current study the dominant learning preference in the multimodal category was the read/write preference as reflected by the mean score of 6.99 and the standard deviation (SD/$\pm$) of 2.892. The respondents in this study were read/write dominant and seemed to prefer text, lectures or tutorials which is in line with rote learning (Pristhkumar et al., 2014:187). Nursing students particular in college settings in South Africa are inclined to memorise and be coached to pass assessments to ensure throughput. Rote learning is surface type learning and thus knowledge and critical thinking skills may be limited in such nurse. Application of knowledge and skills in nursing practice may be a challenge for newly qualified nurses. Consolidation of knowledge and skill may therefore be limited.

This is similar to the results reported by AlKhasawneh et al. (2008:577) who conducted an interventional study. The multimodal preference including read/write means scores were increased in the post test scores as compared to the pre-interventional scores of the study population. Marek (2013:45) reported similar results, that the VARK learning style awareness facilitated student nurses'

understanding of their learning. A comparison of the Jordanian study and the current study is presented in Table 36.

Table 36: Comparison of mean scores for VARK modes

VARK modes Mean / Standard deviation	AlKhasawneh et al. (2008)	AlKhasawneh (2013)	Current study (UCT 2015)
Visual preference	3.4 / 1.74	2.5 / 1.4	4.07 / 2.604
Aural preference	3.7 / 1.88	3.6 /2.0	6.51 / 2.555
Read/Write preference	4.9 / 1.98	3.8 / 1.8	6.99 / 2.892
Kinaesthetic preference	4.4 / 2.02	4.5 / 1.8	6.85 / 2.645

The Koch et al. (2011:614) study reported low scores for visual (M3.6/SD2.5) in non-English speaking learners and read/write (M6.3/SD3.0) dominance in the multimodal category. The James et al. (2011:419) study reported a kinaesthetic modal preference in their study with a mean score of 7.34 and SD of 2.67 and a sensory aural preference with a mean score of 6.30 and SD 2.67. The same authors identified a statistical significance between the kinaesthetic mode and the aural/visual/read write (AVR-trimodal preference).

The findings in this study for the unimodal preference were 13.3% for the Kinaesthetic mode, 10.6% for the Read/Write and 5.9% for the Aural mode with no statistical significance. A study in Australia identified the unimodal category of 54% with a dominant kinaesthetic preference of 68%; Read/Write 17%; Visual preference 11% and Aural (auditory) mode of 4% (Meehan-Andrews, 2009: 27). The Jordanian study by AlKhasawneh et al. (2008:577) reported a 46% unimodal category with a 60% Kinaesthetic preference which is similar to the study conducted by Meehan-Andrews. The learning styles of student nurses in Korea are predominantly divergers, as per Kolb's Learning Style Inventory which can be compared to the kinaesthetic mode of VARK (Gyeong & Myung, 2008:100).

5.3 The differences in learning styles between the different categories of learner nurses.

The differences of learning styles amongst the different categories of learner nurses were accomplished by means of Chi-square tests and cross-tabulations. The One-way ANOVA tests revealed no statistical significance between the categories. The unimodal and multimodal learning style preferences were proportionately similar for both the Certificate in Nursing and the Diploma in Nursing respondents. The respondents were predominantly multimodal as compared to unimodal.

The visual modal learning style preference was not identified as a unimodal preference in the current study and was slightly significant. Low scores for the visual mode was reported in a study in India (Pristhkumar et al., 2014:186). No visual mode learning preference was identified amongst males in the study population as reported by Isman et al. (2009:426). A study amongst Hispanic students also

reported a statistical significance ($p < .0001$) for the visual learning style (Sizemore & Schultz, 2005:345)

The means scores for aural preference verified low scores which are consistent with the scores reflected on the VARK website. Similar findings were reported by AlKhasawneh (2013:1547). The current study was conducted with a homogenous group. The results were very similar for the two Nursing school under study.

5.4 The relationship between demographic and educational background and the learning style preference.

5.4.1 Gender

Gender statistics were not compared due to the low male representation in the population. In Jordan, the ratio of male to female nursing students is higher and gender differences were found to be statistically significant (AlKhasawneh, 2013:1548). The Turkish study reported that the males' unimodal kinaesthetic learning style preference was greater than the female cohort, with a statistical significance of $p< 0.01$ (Isman et al., 2009:426).

Urval, Kamath, Ullal, Shenoy, Shenoy and Udupa (2014:217) using the VARK tool, reported no statistical significant relationship between learning styles and gender in the study of medical students. In the Australian study (James et al., 2011: 418) had 90.1% female respondents and did not report gender as a significant factor associated with learning styles.

5.4.2 Age

The current study did not find any statistically significance between age and learning style preferences. Older persons had a lower unimodal (kinaesthetic) and the bimodal preference as reported by James et al., (2011:420). In the USA (Molsbee, 2011:1) and Taiwan (Li et al., 2011:22), the demographics of nursing students and their association with learning styles, age was found to not be statistically significant.

5.4.3 Language

In South Africa there are eleven official languages and in the current study English was mainly the second or third spoken language (75.5% of respondents). No statistically significant relationship of learning styles for language was found. The two studies in Jordan, an Arabic speaking nation with English as a second language, also reported low mean scores for the visual and aural modes and higher scores in the read write mode (AlKhasawneh et al., 2008:576; AlKhasawneh, 2013:1547).

The Visual and Aural sensory modes in learning style preferences were reported as low scores amongst non-English respondents as compared to English speaking respondents who followed a traditional training programme (James et al., 2011:420; Koch, et al., 2011:615). A statistical

significance between ethnic groups and learning style was identified which can be linked to language because different ethnic groups speak different language as reported by Molsbee (2011:58).

5.5 Strengths and Limitations of the study

The strengths of the study was that it provided a profile of the learning styles of learner nurses registered for nurse training at Nursing school, in a group of nurse learners who have not been previously studied. The study validated that demographic data and educational background does not necessarily influence learning styles in this group of non-traditional learner nurses. The VARK instrument has been not been used on any of the nursing research studies conducted in this country and has been used successfully in the current study.

The limitations of the study was that the population size was relatively small, fairly homogenous and the study was conducted in only one province and only with those learner nurses studying at public health nursing school within the Cape Town metropolitan region. The demographic questionnaire was limited especially with regard to language as it was not able to measure language proficiency, thus data analysis in this aspect was limited. The VARK tool only measures the instructional preference. Other factors that may influence learning styles were not investigated. Study methods or skills, deep learning or surface learning approaches may also provide some insights regarding learning styles which was not investigated in this study.

The school leaving academic grades prior to enrolment for nursing training programmes were not available as part of the data collected for this study. It would have been difficult to determine standardised grades due to the diverse educational backgrounds of the respondents entering the training programmes. The educational background in nursing did not include information about previous academic performance. The study was not able to measure if academic performance had any correlation with learning style preferences.

5.6 Implications, recommendations for education and further research

The assessment of learning styles profiles of learner nurses in this study provided a range of information to guide learning and teaching within this group. A range of individual learning style modes were observed which can be both complex and challenging for the respondents and the nurse educators. The VARK tool was accessible and a simple tool to profile learning styles of learner nurses. It provided a fairly wide range of questions and answer options in a real-life type of questionnaire (Rogers, 2009:14). It stimulated the awareness of learning styles among students, and may provide the educators in the nursing schools with information which will enable them to design strategies to optimise different sensory modes for learner nurses in their learning journey.

Knowledge of student learning styles is an important aid when planning lessons, curricula and even in remedial work with students. Curriculum design must include teaching strategies in real-life situations,

simulation laboratory tasks to engage learning using the kinaesthetic mode. Power-Point slides, pod casts technology can also be used to facilitate teaching and learning. Social media online learning is much in vogue and is a tool to facilitate dissemination of information or useful links to find credible learning sources. Learning styles evolve as the students' progress and thus strategies that may be useful for first year students may not be suitable for older students who more work experience.

Diverse sensory modes may be utilised to achieve learning and nurse educators need to be aware that learner nurses may use one or more modes to learn within any learning context at a given time. Nurse educators may be challenged to determine how to facilitate the use of learning style in a manner to maximise learning. Students need to be encouraged to change and embrace all potential strategies to enhance their learning experience. This implies stretching beyond their comfort zones and maximising the goal of professional development (Mahmoud, 2012: 410).

Further research is required to examine the relationship between learning styles and academic achievement amongst learner nurses. Critical thinking and its relationship to learning styles is an area which also needs investigation.

Nursing education is South Africa is in a new phase of development and recurriculation (SANC website: np). The Nursing strategy highlights the responsibility of nursing education institutions to develop nursing especially amongst previously disadvantaged groups (Department of Health, 2013:11). Educators have to find strategies to develop human resources to provide access to health for the entire population of this country. Strategies which facilitate the academic success of all learner nurses are vital for the development of the profession.

5.7 Conclusion

The study found that the learner nurses registered at the Nursing school have very similar learning style preferences. The predominant learning style preference identified in this study was multimodal. The visual mode was slightly statistically significant in the context of the multimodal preference but was not identified as a unimodal preference in this study. The Read/Write preference was more prevalent than the other sensory modes in the multimodal context. A didactic pedagogy with handouts, text based learning material and lectures are favoured by the respondents in the current study. The current trends in education promote the incorporation of technology into the learning process and self-directed learner-centred learning may be challenging for learners who have only experienced the didactic mode of learning prior to entering nurse training.

Kinaesthetic modal preference was reported by a minority of the study population as a unimodal preference but was part of the quadmodal preference which was the larger portion of the multimodal learning style preference. Learning by being active is in line with the activity required to learn how to become a competent nurse. Multimodal preferences imply that the student has a fairly flexible

learning style, however, not all learning style modes may be used at the same time within all learning contexts. Educators need to be cognisant of this. Nursing training requires a multitude of learning processes in both theoretical and practical components of the curriculum.

The assessment of the learning styles preferences prior to nurse training is a useful strategy for nurse educators to plan teaching strategies and for learners to identify how they learn best. It provides an understanding how learning processes unfold across the learning period. It provides information on how the brain processes information and can promote the development of self-confidence in learners. It enables students to learn and adapt according to their unique individual sensory preferences and achieve academic success.

There is great need to train more nurses for this country and nurse educators will have to find additional methods and strategies to promote development of nursing in an ever changing higher education environment.

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APPENDICES

APPENDIX A: APPROVAL LETTER – UCT, FHS, Human Research Ethics Committee

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room ES2-24 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone (021) 406 6492 • **Facsimile** (021) 406 6411
Email: Sumayah.ariefdien@uct.ac.za
Website: www.health.uct.ac.za/research/humanethics/forms

09 May 2014

HREC/REF: 304/2014

A/Prof P Mayers
Division of Nursing
Department of Health & Rehabilitation Sciences
F-45
OMB

Dear A/Prof Mayers

Project Title: AN INVESTIGATION OF LEARNING STYLE PREFERENCES OF NURSES IN TRAINING AT TWO NURSING SCHOOLS IN PUBLIC HEALTH FACILITIES IN CAPE TOWN-MSc-Nursing Dissertation G Fisher

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC) for review.

It is a pleasure to inform you that the HREC has **formally approved** the above mentioned study.

Approval is granted for one year until the 30 May 2015.

Please submit a progress form, using the standardised Annual Report Form, if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

We acknowledge that the following student:- G Fisher is also involved in this study.

Please note that the on-going ethical conduct of the study remains the responsibility of the principal investigator

Please quote the HREC REF in all your correspondence.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, HSF HUMAN ETHICS

APPENDIX B: PERMISSION LETTER: ACCESS RESEARCH SITE

Directorate WCCN
Date: 2014/06/02
Enquires: Drs E van Wijk and A Truter
Research Ethics Committee Members
021 6841200

Western Cape Government
Health

Ms. G Fisher

Re: Application to conduct research at the Western Cape College of Nursing.

Your proposal titled: "An investigation of learning style preferences of nurses in training at two nursi ng Schools in public health facilities in Cape Town" refers.

After discussion by the members of the WCCN Institutional Research Ethics Committee it was decide d to give you permission.

The WCCN Management wishes you success in your studies and request that on completion of your study you will make the findings known to the establishment.

Sincerely

Dr. A Truter

Member of the WCCN Research Ethics Committee

Klipfontein Road, Heideveld, 7764 Private Bag X2, Surwell, 7762
tel: +27 21 684127 fax: +27 21 637 1317
www.capegateway.gov.za

APPENDIX C: DATA COLLECTION QUESTIONNAIRE

UCT HREC/REF: 304/2014 Code number: _____

Instructions:

- The questionnaire consists of two sections namely:
  - Section A: Demographic data
  - Section B: VARK Questionnaire version 7.1
- This questionnaire consists of 6 pages and will take approximately 20 minutes to complete. You are free to choose to complete the questionnaire. There are no incentives to complete and no penalty if you choose to withdraw or to not participate in the study. All information will be kept confidential and will not be shared with any person other than the supervisor.
- Please answer all the questions by marking your choice with a single X, e.g.:

  Are you a nurse?

Yes	X
No	

- Place the completed questionnaire in the self-sealing envelope provided.
- Post it in the sealed "University of Cape Town Questionnaires" box.

SECTION A: DEMOGRAPHIC DATA

Demographic profile

01 – 02 My gender is:

Male	
Female	

03 My age is:

	years

Language background

04 - 05 English is my first language (mother tongue)?

Yes	
No	

06 - 08 I am proficient in the English language:

	Yes	No
Speaking		
Reading		
Writing		

09 My home language is:

Education background

School

10 -11 My highest passed school grade is

Grade 12/matriculation/ senior certificate or equivalent	
Grade 10 /junior certificate	

Nursing education background

12 - 13 I am registered with South African Nursing council as an

Enrolled nurse	
Auxiliary nurse	

14 -15 Current nursing education programme

My current enrolment for a training programme at the Nursing school is:

Diploma for Enrolled Nurses leading to registration as a General nurse (Bridging course R683)	
Certificate for Enrolment Nursing Care (R2175)	

16 How many years have passed since you completed the enrolled nurse or auxiliary nurse training programme?

Enrolled nurse	years
Auxiliary nurse	years

Nursing career experience

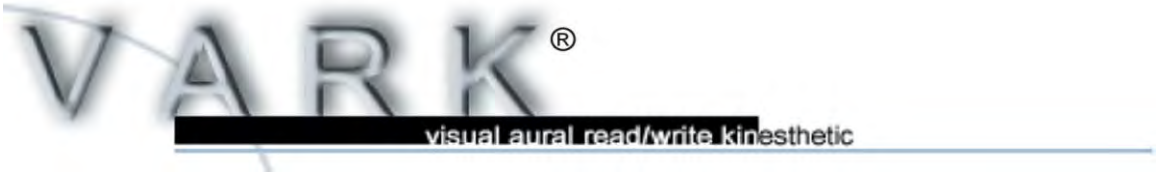
17- 18 How many years of nursing experience do you have as:

Enrolled Nurse	years
Nursing Auxiliary	years

PLEASE PROCEED TO SECTION B:

VARK 7.1 QUESTIONNAIRE

SECTION B: VARK QUESTIONNAIRE (Version 7.1)



How Do I Learn Best?

Choose the answer which best explains your preference and circle the letter(s) next to it.

Please circle more than one if a single answer does not match your perception.

Leave blank any question that does not apply.

1. You are helping someone who wants to go to your airport, the centre of town or railway station.

You would:

a. go with her.

b. tell her the directions.

c. write down the directions.

d. draw, or give her a map.

2. You are not sure whether a word should be spelled `dependent' or `dependant'.

You would:

a. see the words in your mind and choose by the way they look.

b. think about how each word sounds and choose one.

c. find it online or in a dictionary.

d. write both words on paper and choose one.

3. You are planning a vacation (holiday) for a group. You want some feedback from them about the plan.

You would:

a. describe some of the highlights.

b. use a map or website to show them the places.

c. give them a copy of the printed itinerary.

d. phone, text or email them.

4. You are going to cook something as a special treat for your family.

You would:

a. cook something you know without the need for instructions.

b. ask friends for suggestions.

c. look through the cookbook for ideas from the pictures.

d. use a cookbook where you

5. A group of tourists want to learn about the parks or wildlife reserves in your area.

You would:

a. talk about, or arrange a talk for them about parks or wildlife reserves.

b. show them Internet pictures, photographs or picture books.

c. take them to a park or wildlife reserve and walk with them.

d. give them a book or pamphlets about the parks or wildlife reserves.

6. You are about to purchase a digital camera or mobile (cell) phone. Other than price, what would most influence your decision?

a. Trying or testing it.

b. Reading the details about its features.

c. It is a modern design and looks good.

d. The salesperson telling me about its features.

7. Remember a time when you learned how to do something new. Try to avoid choosing a physical skill, e.g. riding a bike.

You learned best by:

a. watching a demonstration.

b. listening to somebody explaining it and asking questions.

c. diagrams and charts - visual clues.

d. written instructions – e.g. a manual or textbook.

8. You have a problem with your heart. You would prefer that the doctor:

a. gave you a something to read to explain what was wrong.

b. used a plastic model to show what was wrong.

c. described what was wrong.

d. showed you a diagram of what was wrong.

9. You want to learn a new program, skill or game on a computer.

You would:

a. read the written instructions that came with the program.

b talk with people who know about the program.

c. use the controls or keyboard.

d. follow the diagrams in the book that came with it.

10. I like websites that have:

a. things I can click on, shift or try.

b. interesting design and visual features.

c. interesting written descriptions, lists and explanations.

d. audio channels where I can hear music, radio programs or interviews.

11. Other than price, what would most influence your decision to buy a new non-fiction book?

a. The way it looks is appealing.

b. Quickly reading parts of it.

c. A friend talks about it and recommends it.

d. It has real-life stories, experiences and examples.

12. You are using a book, CD or website to learn how to take photos with your new digital camera.

You would like to have:

a. a chance to ask questions and talk about the camera and its features.

b. clear written instructions with lists and bullet points about what to do.

c. diagrams showing the camera and what each part does.

d. many examples of good and poor photos and how to improve them.

13. Do you prefer a teacher or a presenter who uses:

a. demonstrations, models or practical sessions.

b. question and answer, talk, group discussion, or guest speakers.

c. handouts, books, or readings.

d. diagrams, charts or graphs.

14. You have finished a competition or test and would like some feedback.
You would like to have feedback:

a. using examples from what you have done.

b. using a written description of your results.

c. from somebody who talks it through with you.

d. using graphs showing what you had achieved.

15. You are going to choose food at a restaurant or cafe.
You would:

a. choose something that you have had there before.

b. listen to the waiter or ask friends to recommend choices.

c. choose from the descriptions in the menu.

d. look at what others are eating or look at pictures of each dish.

16. You have to make an important speech at a conference or special occasion.
You would:

a. make diagrams or get graphs to help explain things.

b. write a few key words and practice saying your speech over and over.

c. write out your speech and learn from reading it over several times.

d. gather many examples and stories to make the talk real and practical.

APPENDIX D: VARK SCORING CHART

The VARK Questionnaire Scoring Chart

Use the following scoring chart to find the VARK category that each of your answers corresponds to. Circle the letters that correspond to your answers

e.g. If you answered b and c for question 3, circle V and R in the question 3 row.

Question	a category	b category	c category	d category
3	K	V	R	A

Question	a category	a category	a category	a category
1	K	A	R	V
2	V	A	R	K
3	K	V	R	A
4	K	A	V	R
5	A	V	K	R
6	K	R	V	A
7	K	A	V	R
8	R	K	A	V
9	R	A	K	V
10	K	V	R	A
11	V	R	A	K
12	A	R	V	K
13	K	A	R	V
14	K	R	A	V
15	K	A	R	V
16	V	A	R	K

Calculating your scores

Count the number of each of the VARK letters you have circled to get your score for each VARK category.

Total number of Vs circled =

Total number of As circled =

Total number of Rs circled =

Total number of Ks circled =

APPENDIX E: PERMISSION LETTER – VARK INSTRUMENT

Dear Ms Gohwa

Thank you for seeking permission to use VARK. We rely on the honesty of people to act in a professional way when using our copyright and trademarked materials. Many don't know that trainers, businesses, government agencies and professional sports groups must be licensed to use them. VARK is free only for use in universities, colleges and high Schools and is not available free for private consultants working in those environments. You may not place VARK copyright materials on any website or intranet. You are welcome to use the VARK materials by linking to our online website, or in paper format, for your research, providing suitable acknowledgement is made. This is the acknowledgement we prefer:

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Education Users

We can gather your data for you. Our VARK Subscription Service does not need any installation on your system. We capture the VARK scores for your class or classes or for your whole institution. You manage the site and have access to the analyzed results that can be downloaded for your use. The Subscription Service is demonstrated on our website. The cost for six months is approximately $US95.

Also available is a "pinged" profile that can be accessed after completing the VARK questionnaire. You or your students will immediately receive, on their browser a PDF file customized to their VARK scores with study strategies as well (Help sheets).

If you are using VARK for research, please note that we have two scoring systems and one is designed specifically for research. The Research spreadsheet is based on standard deviations and is available on application. Provide an explanation of your research and also undertake to provide a copy of your finished paper. The spreadsheet uses a different algorithm from the online version. You should also read our research page for advice about using VARK for research to avoid some of the common errors that researchers make. The advice is at these addresses: http:www.vark-learn.com/english/page.asp?p=advice.

Business Users

Please go to our new VARK Business site at: www.business.vark-learn.com for information and services for your business.

Downloads

You may find the VARK books helpful. They are all available as downloads. The latest book is, "Have your VARKed your Business?" It applies VARK principles to business environments. There is a book that teachers and trainers use for widening their repertoire of strategies; "55 Strategies ." It has 55 practical ideas to use in your next training session. VARK principles are being applied to coaching elite athletes in our book titled "Sports Coaching and Learning" available as a download or as a print book.

Note: The download books are sent immediately payment is made so don't shut down your computer until the book arrives as a PDF on your browser.

To purchase any of these resources (above) you can use a personal check/cheque, a Purchase Order or buy from our secure website with a credit card.

Best wishes for your work.

Neil

Neil Fleming

Designer of the VARK Questionnaire

50 Idris Road, Christchurch 8052

New Zealand

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APPENDIX F: CHECKLIST CONTENT VALIDITY INDEX (CVI) and CONSTRUCT VALIDITY

Validation expert reviewer code number:
CHECKLIST CONTENT VALIDITY INDEX (CVI) and CONSTRUCT VALIDITY SELF-ADMINISTERED STRUCTURED QUESTIONNAIRE

Principal Investigator: Ms Gohwa Fisher
1 B Salmon Street
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Supervisor: A/Professor P Mayers
Division of Nursing & Midwifery
Department of Health & Rehabilitation Sciences
Faculty of Health Sciences
University of Cape Town
OBSERVATORY 7929
E-mail: Pat. Mayers@uct.ac.za
Telephone: 021 4066464

Title of study: "**An investigation of learning style preferences of nurses in training at two Nursing school in public health facilities in Cape Town"**

Dear Sir/Madam

Thank for agreeing to provide an expert review of the data collection instrument for the above titled study.

The validation process for content and construct validity needs to be conducted by a panel of experts. The purpose of the checklist is to ensure a uniform evaluation by all panel members using a structured procedure. The expert (you) will be able to establish the content validity index (CVI) for each item of the questionnaire using a 4 point ordinal rating scale. The index will be derived by taking as a proportion of the items that were rated 3 or 4. In addition to this the whole questionnaire will be judged for its content validity. This will be taken as a proportion of the total items judged content valid. If in your opinion items are omitted, these can be listed in the space provided.

The construct validity checklist will include general layout, format, printing quality, length of questionnaire, readability and comprehension, instructions and the response column.

The completed documents can be returned via electronic mail or in the post.

Should you require further information do not hesitate to contact me or the supervisor.

Yours sincerely

Gohwa Fisher

(MSc: Nursing, FSHGOH001)

1. EXPERT EVALUATION on INDEX of CONTENT VALIDITY

Instructions: Evaluate EACH question of the data collection instrument /questionnaire (Appendix A)

Tick the box with the appropriate ordinal rating scale of 1 -4 below

KEY:

1 = irrelevant	2 = Unable to assess relevance; item revision required or item require revision that would render it no longer relevant	3 = Relevant but item requires minor revision/amendment	4 = Extremely relevant

INDEX of CONTENT VALIDITY				
Section A	**1**	**2**	**3**	**4**
Q1				
Q2				
Q3				
Q4				
Q5				
Q6				
Q7				
Q8				
Q9				
Q10				

OMISSIONS:

COMMENTS:

2. **INDEX of CONTENT VALIDITY** (CVI) of **ENTIRE** DATA COLLECTION INSTRUMENT

1	2	3	4

OMISSIONS:

COMMENTS:

3. EVAULATION of CONSTRUCT VALIDITY

Instruction: Check one box for each statement as it relates to the questionnaire

	Very skillful	Satisfactory	Requires revision	Not acceptable
1. General layout				
2. Format				
3. Printing -quality				
4. Visually easy to read				
5. Visually easy to understand/ comprehension				
6. Length of the questionnaire				
7. Instructions – are instructions at start of questionnaire clear, concise and easy to follow				
8. Response column				

OMISSIONS:

COMMENTS:

References

Bowling, A., Ebrahim, S., editors. 2007. *Handbook of health research methods. Investigation, measurement and analysis.* 1st ed. Berkshire, England: Open University Press.

Kyriacos, U. 2011. The development, validation and testing of a vital signs monitoring tool for early identification of deterioration in adult surgical patients [Unpublished PhD thesis]. Cape Town: University of Cape Town.

APPENDIX G: INFORMATION SHEET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT: "An investigation of learning style preferences of nurses in training at two Nursing school in public health facilities in Cape Town"

HREC REFERENCE NUMBER: HREC/REF: 304/2014

PRINCIPAL INVESTIGATOR: Associate professor P Mayers

MSc: Nursing student Ms. Gohwa Fisher

Department of Health and Rehabilitation Sciences Faculty of Health Sciences

ADDRESS: F45 Old Main Building. Groote Schuur Hospital

Observatory, 7925

CONTACT NUMBER: Telephone: (021) 406 6059

Fax number: (021) 406 6323

Dear participant

You are invited to participate in a nursing education research project. The project is part of the requirements for MSc Nursing by course work and dissertation at the University of Cape Town. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you understand clearly what this research entails and how you could be involved. Your participation is entirely voluntary and you are free to decline to participate. If you say no, this will not affect you negatively, in anyway whatsoever. You are also free to withdraw from the study at any point, even if you do agree to participate.

This study has been approved by the Human Research Ethics Committee of the Faculty of Health Sciences, University of Cape Town (HREC/REF: 304/2014) and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki (Fortaleza, Brazil, 2013), South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

Learning is a dynamic process. All students learn in different ways using a variety of senses to take in information and process it to form new knowledge and skills. This research study aims to investigate the learning style preferences of learner nurses enrolled in nursing schools. The results of this research will be useful to learner nurses and nurse educators, who will then be able, use this information in the design of learning activities.

The study will be conducted at nursing schools in public health facilities in Cape Town; namely, Groote Schuur and Tygerberg Hospital nursing schools which will be the research sites. All the learner nurses who are registered as student and pupil nurses will be eligible to participate in this study.

Why have you been invited to participate?

As a registered student or pupil nurse currently studying at the Nursing school, your input is valuable to determine the preferred learning styles of nurses in training. The knowledge of your learning style preference will enable you to enhance your learning by learning in your preferred learning style.

What will your responsibilities be?

You will be requested to complete a consent form and place it in a sealed envelope into a box marked "Consent forms". After completion of consent, you will be given a questionnaire to be completed and placed in a sealed envelope into a box marked "University of Cape Town Questionnaires". There will be no names affixed to the questionnaire; only a code that is assigned to you by the researcher. A master list with the codes linked to the names will be stored in a locked cabinet (hard copy) and a password controlled computer (electronic copy) by researcher to maintain privacy. This will enable the researcher to provide feedback to you as participants to gain insight about your learning style preference.

Questionnaire

Section A will be demographic data, i.e. age, gender, educational background, nursing education and experience in a questionnaire format. Section B will be the VARK Version 7.1 developed by Dr Neil Fleming. It consisting of 16 real- life multiple choice questions designed to identify your learning style preference. If you require more information please feel free to ask the researcher and or consult the website at htpp://www.vark-learn.com.

Will you benefit from taking part in this research?

The data generated through your participation in this research project will benefit all participants, current and future learner nurses and their tutors (lecturers). It will provide information about learning style preferences which will help educators to use the information in their teaching and students to embrace their strengths in how they learn.

Are there risks involved in your taking part in this research?

There are no risks anticipated. The researcher guarantees that your right to privacy and confidentiality will be maintained as other participants in the study will not have any access to the completed questionnaires. The researcher will ensure that the questionnaires are kept in a locked cabinet in a secure access controlled office to which only the researcher has access.

If you do not agree to take part, what alternatives do you have?

Your participation in this research project is entirely voluntary and if you select not to participate, you will not be penalised in any way.

Who will have access to your information?

The investigator, the thesis supervisor and the Division of Nursing and Midwifery will have access to the information. The information collected will be treated as confidential and protected in a secure cabinet and password protected computer. If it is used in a publication or thesis, the identity of the participant will remain anonymous.

Will you be paid to take part in this study and are there any costs involved?

No, there will be no costs involved for you, if you do take part. You will not be paid to take part in the study but refreshments will be provided.

Is there anything else that you should know or do?

You can contact Professor Pat Mayers (Thesis supervisor) at telephone: 021-4066464 if you have any further queries or encounter any problems. You can contact Professor M Blockman, chairperson of Human Research Ethics Committee, Health Sciences Faculty University of Cape Town at E 52 Room 24, Old Main Building, Groote Schuur Hospital, Observatory, telephone: 021-4066492 if you have any concerns or complaints that have not been adequately addressed.

You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I ……. agree to take part in a research study entitled

"An investigation of learning style preferences of nurses in training at two Nursing school in public health facilities in Cape Town"

I declare that:

I have read or had read to me this information and consent form and it is written and verbally translated in a language with which I am fluent and comfortable. I have had a chance to ask questions and all my questions have been adequately answered. I understand that taking part in this study is voluntary and I have not been coerced to take part. I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

Signed at (place) ..... On (date) …….. 2014.

....

Signature of participant Signature of witness

.....

Signature of investigator

APPENDIX H: PILOT STUDY FEEDBACK FORM

Pilot study participant code number:

UCT HREC/REF: 304/2014

CHECKLIST

PILOT STUDY FEEDBACK

SELF-ADMINISTERED STRUCTURED QUESTIONNAIRE

Principal Investigator: Ms Gohwa Fisher
1 B Salmon Street
Woodstock, 7925
E-mail: gohwafi@gmail.com
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Supervisor: A/Professor P Mayers
Division of Nursing & Midwifery
Department of Health & Rehabilitation Sciences
Faculty of Health Sciences
University of Cape Town
OBSERVATORY, 7929
E-mail: pat.mayers@uct.ac.za
Telephone: 021 4066464

Title of study: "An investigation of learning style preferences of nurses in training at two nursing Schools in public health facilities in Cape Town"

Dear Participant

Thank for agreeing to participate in the pilot study of the above-mentioned research project.

The purpose of the pilot study is to measure the accuracy, clarity of questions and the time it takes to complete the questionnaire. If you have any suggestions please add this at the end of the feedback form.

The completed documents can be returned at the end and posted in the box provided.

Should you require further information do not hesitate to contact me or the supervisor.

Yours sincerely

Gohwa Fisher (MSc: Nursing, FSHGOH001)

FEEDBACK FORM PILOT STUDY

Instruction: Check one box for each statement as it relates to the questionnaire

	Good	Satisfactory	Requires revision	Not acceptable
1. General layout				
2. Format				
3. Printing -quality				
4. Visually easy to read				
5. Visually easy to understand/ comprehension				
6. Length of the questionnaire				
7. Time to complete questionnaire: Is 20 minutes adequate				
8. Instructions – are instructions at start of questionnaire clear, concise and easy to follow				
9. Response column				

OMISSIONS:

Comments:

APPENDIX I: CERTIFICATE FROM EDITOR

Mary A. Cohen
Language Practitioner

Editing and proof reading for academics

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7945
Phone 021 7130397
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21 August 2015

Ms Gohwa Fisher
Student Number: FSHGOH001
1B Salmon St,
Woodstock

The above-named student' thesis titled ***"An Investigation of Learning Style Preferences of Nurses in Training at Two Nursing school in Public Health Facilities in Cape Town,"*** was edited for grammar, spelling, syntax and referencing.