AN (AUTO)-BIOGRAPHICAL ACCOUNT OF NURSING TRANSFORMATION: 1970-2018

INAUGURAL LECTURE

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SUMMARY OF LECTURE

This lecture provides a description of how nursing education and practice, research and technology has transformed over the past 48 years. The information provided in this lecture is based on personal experience and own research, and research of various other authors. The first part of the lecture provides an overview of the era in which I trained and is used as a benchmark to compare current day practices.

The changes in nursing education and practice with regard to the Nursing Act and regulations over the past 48 years are highlighted, depicting the number of times that the different nursing acts and regulations were amended with regard to all basic nursing qualification programmes. This lecture also includes a brief discussion of the new nursing education programme that will be implemented soon, as well as its opportunities and challenges.

A detailed description is provided with regard to how nursing research has evolved over the past 48 years because of the dedication and vision that nurse leaders have for the profession. A national nursing strategy has been developed to enhance collaborative, rigorous scientific enquiry that builds a significant body of knowledge in order to improve the health of the people of South Africa. It is envisaged that the research strategy will contribute significantly to directing future nursing research development in South Africa.

It is evident in this lecture that the use of technology in nursing has truly evolved and can be seen as a major driver of changes in the nursing profession. There are huge shifts in how patient records are maintained, how medications are tracked and ordered, how care is passed from one provider to another, how blood and X-ray results are retrieved and how information is being accessed at the point of care in nursing. In today's healthcare system technology is the foundation of the future. Today's nurses must not only know how to care for patients, but how to use technology safely and appropriately in their day-to-day work.

It is evident that nursing has transformed in many ways since 1970 and that nurses have always been the drivers of nursing transformation.

INTRODUCTION

Nursing is one of the most rapidly evolving professions in the health sciences. Over the past 48 years, the practice has evolved at many levels in terms of nursing education, technology and research. Changes in health care have shifted the entire practice of nursing. In this lecture we will be looking at an (auto)-biographical account of nursing transformation over the past 48 years i.e. from 1970 to 2018 with regard to nursing education and practice, research and technology. The content of this lecture is mainly derived from my own experience and research, and research conducted by various other authors.

DEFINING TRANSFORMATION

Transformation is a term that comes to mind when I think of where I started in the nursing profession and where we are today with regard to education and practice, research and technology. There are many factors such as fragmentation, access problems, unsustainable costs, suboptimal outcomes, disparities (Salamond & Echevaria, 2017:12) and the burden of disease that drive healthcare transformation. Increasing the quality and relevance of health professional education strengthens health systems and improves health outcomes (WHO, 2016), therefore health professional education is integral to positive transformations of health care (Frenk, Frenk, Chen, Bhutta, Cohen, Crisp, Evans, Fineberg, Garcia, Ke, Kelly, Kistnasamy, Meleis, Naylor, Pablos-Mendez, Reddy, Scrimshaw, Sepulveda, & Zurayk, 2010). The nursing profession is not immune to the transformation agenda of the environment in which nursing occurs. The concept of transformation in a nursing context could be understood to be a process of profound and radical change that turns the profession in a new direction and takes it to an entirely different level of effectiveness. Transformation implies a basic change of character and little or no resemblance with the past configuration or structure.

CONTEXT OF NURSING IN THE 70s

I would at this point like to provide some context to the era in which I began my nursing career. I started my nursing career in June 1970 at Livingstone Hospital Nursing School. I trained under a block system where we spent about two months in block and the rest of the time in practice. Our first block was called the PTS block and if you failed this block you were excluded from nursing. We were never given any scope because we wrote SANC exams and our lecturers also only got to see the examination paper for the first time in the examination room. When we were on block, we would first report to different wards at 06:45 each morning to assist the ward staff with full washes of patients who were unable to wash themselves. We also assisted with bed-making before returning to the classroom at 07:50. Our training was mainly focused on curative health care. The student occupied a post under the jurisdiction of the nursing services who was also the head of the school. The college was a department with its own budget and was independent of the head of nursing services, but the latter held the whip for she controlled the student. The dichotomy between college and hospital authorities inevitably resulted in a never-ending tug of war between the two authorities (Searle, 1991:298).

I remember the clinical areas being clean with no odors except for the smell of anti-septic. We strictly adhered to Florence Nightingale's Hygiene Theory- unlike today where I have experienced the degree of cleanliness and odors to be unbearable at times in the public hospitals. We did high and low damp dusting every day. We would even clean the extension electrical cords and the white rubbers of the legs of the beds with vim when they were dirty.

Nurses at that time lived in the nurses' homes at the hospitals where they received their training and were not allowed to live at home for at least the first three years of their training. Strict control was exercised with regard to visitors. No visitors were allowed beyond a certain point. One could only sleep at home two nights per week when you had your day offs. Your curfew every night was 21h00, and you dare not come in after 21:00. You were allowed one late night per month which was until 23:00. As junior nurses, one slept in eight to ten bedded dormitories and after passing your first year of nursing you would move into a room which you shared with one of your peers.

During my training years emphasis was placed on etiquette and professionalism. Nurse training today is more focused on the academic side. Strict discipline was implemented on and off duty which moulded us in becoming well-groomed, responsible, professional practitioners. We were expected to stand up when a doctor or any senior person entered the room and had to roll down our sleeves of our crisply starched white uniform as a sign of respect when accompanying them into the ward. We wore a clean white cap every day, stockings, highly polished, laced, brown leather shoes which could be easily cleaned when any body fluids, medicines or chemicals spilled on the shoes. Unlike today where tackies made of various types of fabric that are not so easy to clean are sometimes worn and could be a source of infection. The white uniform and cap instilled a sense of pride in the work and a sense of peace among patients. These clothes made a lasting, positive impact on our society. These days, the only time you will see a nurse in a white uniform, cap and stockings is at fancy dress parties. Nurse uniforms and dress codes have changed considerably since the time that I worked in practice. Since the 1980s and 1990s, nursing uniforms have transformed and scrubs seem to be on the incline in hospitals and clinics. They appear to be popular among some nurses because they are comfortable, come in many patterns and colours, they are crease resistant, and new fabrics make them easy to clean. Although many praise the modern uniforms, some lament the fall of the standardised white nursing uniform because they are of the opinion that it exuded the dignity and professionalism that all nurses possess. It is now harder to tell the difference between registered nurses, nursing auxiliaries, technicians, and other personnel (Ameritech, 2016).

As a senior nurse on night duty, we were placed in charge of 65 bedded wards for two to three months with an enrolled nurse and two junior nurses. This prepared us to take charge of a ward as a professional nurse upon completion of our studies. This experience taught us to be responsible practitioners and it also assisted us in developing critical thinking and judgement skills. We would only call a registered nurse or doctor when the need arose. We were held accountable for our acts and omissions. The senior nurse on night duty was not allowed to leave the ward upon completion of her shift until she gave the day staff a comprehensive report of each patient with regard to what transpired during the night. My basic training truly prepared me for practice

and contributed to me becoming a compassionate, caring, dedicated and competent professional nurse practitioner.

Many aspects of nursing education and training, research and technology have transformed over the past 48 years, providing nurses with much more autonomy and mobility than before. The role of the nurse has expanded and the scope of practice varies internationally. This changing role has resulted from a shortage of health personnel and poor coverage of services being provided. In order to ensure that care and services are still covered commendably, nurses take on extra tasks to their own, and also facilitate delegation of tasks to other available staff according to their category and training (Ugochukwu, Uys, Karani, Okoronkwo & Diop, 2013:119). Nurses are being trained to a higher level of care more than ever before. There is now more specialisation in nursing, allowing students to follow paths in advanced primary health care, nephrology nursing, intensive care nursing, advanced psychiatric nursing, forensic nursing and many more.

NURSING EDUCATION AND PRACTICE

In South Africa, there are three categories of nurses. Firstly, there are professional (registered) nurses with four years of training or two years of bridging (upon completion of the two year training for enrolled nurses); secondly, enrolled nurses with two years of training; and thirdly, nursing assistants or auxiliaries with one year of training.

The Nursing Act which underpins all levels of nurse training was revised several times over the past 48 years. The main aspects of the Nursing Acts prior to 2005 included:

- the control over nursing education and training;
- registration or enrolment a prerequisite for practicing;
- keeping of registers and rolls;
- removal of names from register or roll and restoration thereof;
- custody and publication of registers and rolls; receipt as proof;
- limited registration;
- registration of additional qualifications;
- registering of student nurses and midwives;
- Enrolment of pupil nurses and pupil nursing auxiliaries;

- refusal of registration or enrolment, and
- the use of certain titles.

I commenced my general nurse training under the Nursing Act, No 69 of 1957 which was based on racial lines, with certain amendments made by the nursing Amendment Act, No 31 of 1970 and the Nursing Amendment Act No 14 of 1973. The most significant of these amendments were the inclusion of auxiliary nurses under the statutory control and finally the inclusion of nursing assistants, making nursing a closed profession (Kotze, 1995:21) and eliminating the “Sarah Gamps”. Sarah Gamp is a nurse in the novel Martin Chuzzlewit by Charles Dickens depicted as an incompetent poorly qualified nurse. So as student nurses we often jokingly used the term for persons who were not qualified in nursing but were practicing as independent practitioners in some parts of the country. In 1978 the Nursing Act No. 50 of 1978 was passed which was a red letter day for the members of Council which enabled non-white nurses to serve as full members of Council and the right to elect members to the Council (Searle, 1991:). The aforementioned Nursing Act was amended several times as follow:

Table 1: Nursing Act No 50 of 1978 Amendments

Amendment	Act No
Nursing Amendment Act, 1981	Act No. 71 of 1981
Nursing Amendment Act, 1982	Act No. 70 of 1982
Nursing Amendment Act, 1987	Act No. 56 of 1987
Nursing Amendment Act, 1992	Act No. 21 of 1992
Nursing Amendment Act, 1993	Act No. 145 of 1993
Nursing Amendment Act, 1995	Act No. 5 of 1995
Nursing Amendment Act, 1997	Act No. 19 of 1997

The Nursing Act No 50 of 1978 was replaced by the Nursing Act No 33 of 2005. The main aspects of this Act are to bring nursing education and training in line with the National Qualifications Framework (NQF) and related legislation. Section 39 of the Act stipulates the conditions relating to continuous professional development and Section 40 of the Act stipulates who must do community service and that the Minister may, after consultation with the Council, make regulations concerning the place at which

such service is to be performed and the conditions of employment pertaining to persons who perform such service (Nursing Act, No 33 of 2005:29).

The regulations for nursing education and training also underwent many changes over the past 48 years. The regulations, on the other hand, stipulate conditions for: the approval of nursing schools; admission criteria; registration, restoration, termination and completion of the course; duration of the course; the curriculum, exemptions, examinations, examination marks and re-assessment; admission to the examinations, promotions; Re-admission to the examinations; dates of examinations, applications for admission and readmission and examination fees; examination centres; and registration and application of regulations. The various regulations and amendments for basic qualifications for General Nursing, Midwifery and Psychiatry are depicted in the table below:

Table 2: Regulations and Amendments for the basic qualifications in Nursing

Regulations	Amendments	Dates
R.3792 of 28 November 1969 -Diploma for Registration as a General Nurse	R.1381	08/71
	R.1779	10/72
	R. 258	2/75
R.879 of 02 May 1975 - Diploma for Registration in General Nursing	R.2316	12/75
	R.1570	8/77
	R.1666	8/79
	R.2190	10/80
	R.1422	7/83
R.84 of the 16 January 1970 - Diploma for Registration in Midwifery	R.1379	8/71
	R.1739	9/72
R.254 of the 14 February 1975 - Diploma for Registration in Midwifery	R.479	3/78
	R.2212	10/80
	R.1424	7/83
	R. 2553	11/85
	R. 1141	5/87
	R. 2180	11/93
	R. 55	1/97
R.8 of the 02 January 1970 - Diploma for Registration in Psychiatric Nursing	R.1383	8/71
	R.252	2/75
R.880 of the 02 May 1975 - Diploma for Registration in Psychiatric Nursing	R.2318	12/75
	R.1569	8/77
	R.1923	8/79
	R.2191	10/80
	R.1423	7/83
	R.2318	12/75
R.45 of 09 January 1970 – certificate for enrolment as a nurse	R.1377	8/71

Regulations	Amendments	Dates
	R.1736	9/72
	R.253	2/75
R.1664 of the 03 August 1979 – Certificate for Enrolment as a Nurse	R.2194	10/80
	R.1443	7/83
R.2175 of the 19 November 1993 – Course leading to enrolment as a Nurse	R.58	01/97
R.1834 of the 20 October 1972 – Certificate for enrolment as a Nursing Assistant	R.1796	10/74
	R.1575	8/77
R.2176 of the 19 November 1993 – Course leading to enrolment as a nursing auxiliary	R.59	1/97
R. 683 of 14 April 1989 - minimum requirements for a bridging course for Enrolled Nurses leading to registration as a General Nurse or a Psychiatric Nurse	No. R. 8	1/93
	No. R. 63	1/99

In 1961 Charlotte Searle reported to the Council that it was of the utmost importance to have as many nurses as possible who are able to function in a multi-skilled capacity in a large and sparsely populated country like ours. She was of the opinion that multi-skilled nurses are able to give better, safer and quicker service to the patient who needs such care, than the singly qualified nurse. At the same time multi-skilled preparation safeguards nurses against practicing outside their scope of practice (Searle, 1961 in Searle, 1991:303). The first two integrated nursing programmes were the diplomas in General Nursing and Midwifery, and in General Nursing and Psychiatry. The Council further gave attention to developing a more comprehensive integrated programme for more than 25 years before the integrated course for general, psychiatric and community nursing and midwifery was introduced (Searle, 1991:303), which could be either completed through a nursing college diploma or a university degree (Blaauw, Ditlopo & Rispel, 2014:15). The Council's inspectors had discussed this with persons in the training schools who believed this was the way to develop nursing education (Searle, 1991:303). In 1986 all nursing colleges were required to become affiliated with a university-based nursing department, which placed them officially within the higher education system (Blaauw et al, 2014:15). The following regulations were developed for the integrated courses:

Table 3: Regulations and amendments for the basic integrated courses in nursing

Regulations	Amendments	Dates
R.3793 of the 28 November 1969 - Diploma for Registration in General Nursing and Midwifery	R.1380	8/71
	R.1768	10/72
	R.256	2/75
R. 881 of the 02 May 1975 - Diploma for Registration in General Nursing and Midwifery	R.1573	8/77
	R.1668	8/79
	R.1292	10/80
	R.1426	7/83
R.2016 of the 10 November 1972 - Diploma For Registration in General and Psychiatric Nursing	–	–
R.882 of the 02 May 1975 - Diploma For Registration in General and Psychiatric Nursing	R.1574	8/77
	R.205	2/79
	R.1667	8/79
	R.2193	10/80
	R.1425	7/83
R.425 of the May 1985 - Regulations Relating to the Approval of and the Minimum Requirements for the Education and Training of a Nurse (General, Psychiatric and Community) and Midwife leading to Registration	R.1312	06/87
	R.2078	09/87
	R.753	04/88

The Council was the only authority legally authorized to conduct nursing examinations for courses admitting nurses and midwives to the registers for students who were registered at the nursing colleges for their nurse training with the exception of the R425 programme. The examination system was controlled by the personnel of the SANC head office. There were preliminary examinations and final examinations for general nurses, midwives, mental nurses and nurses for mental defectives. The Council still remains the only authority legally authorized to conduct nursing examinations for the certificate courses as indicated in Table 2 above. The Council established a panel of examiners that were drawn from the nursing colleges.

Since the advent of South Africa's democracy in 1994, there has been a renewed focus on nursing education as part of the post-apartheid transformation of both the health and higher education sectors. The nursing education policy reforms have included the rationalisation of nurse training institutions, changing the scope of practice of nurses, and revising nursing qualifications (Blaauw et al, 2014:15). The first

phase of the reform process occurred between 2001 and 2009 and was primarily concerned with aligning existing nursing qualifications with the NQF. These were the so- called legacy qualifications inherited in 1994 for the:

- four year degree or diploma for Professional nurse (R.425 of 22 February 1985)
- two year certificate for enrolled Nurse (R.2175 of 19 November 1993)
- One year Certificate for enrolled Auxiliary Nurse (R.2176 of 19 November 1993)
- Two year Bridging Diploma for enrolled nurses leading to registration as a General Nurse (R.683)

SAQA defined specific processes for this process that involved the establishment of a Nursing Standards Generating Body (SGB). The Nursing SGB produced various draft qualifications between 2002 and 2004 but the process stalled because of lack of resources (Blaauw et al, 2014:18). The SGB came into conflict with SANC which had previously been the only body responsible for the regulation and development of nursing qualifications and was disbanded. A further difficulty was the change from NQF to HEQF which meant that the work done so far had to be revised. SANC took over finalising the registration of the legacy qualifications with SAQA eventually completing the task in 2009.

Nurse educators dominated the second phase of reform from 2008 to 2013 which dealt with the development of a completely new Nursing Qualifications Framework, also aligned with the HEQF which was meant to be led by SANC. The new Qualifications Framework included two fundamental changes (see Fig 1).

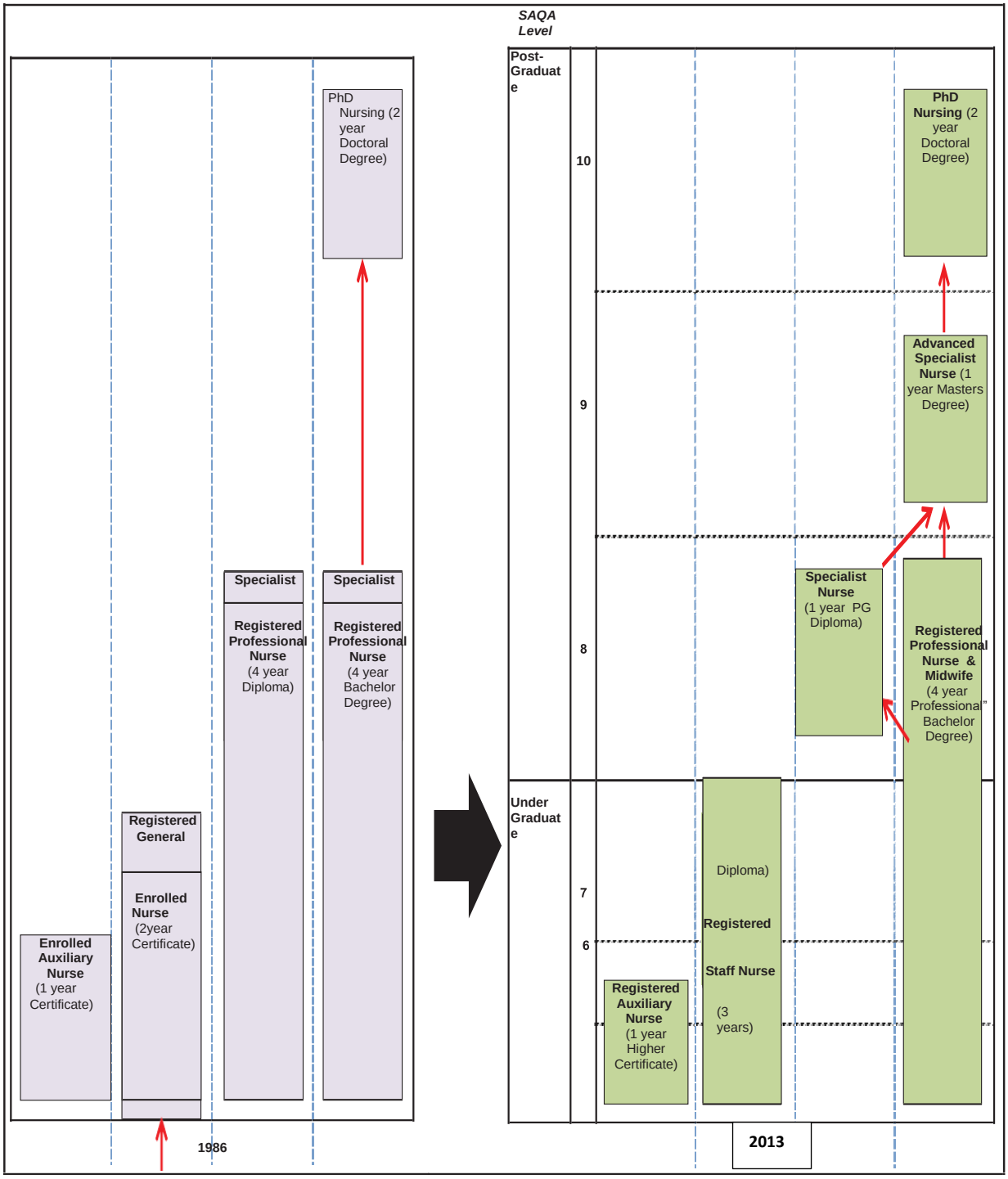

Fig 1: Changes in the Nursing Qualifications Framework (Blaauw et al (2014:7)

First, registration as a professional nurse will now require completion of a four-year bachelor's degree at a university. The bridging course has been withdrawn so there is only one pathway to becoming a professional nurse instead of three. Second, the

enrolled nurse has been replaced by a staff nurse with a three year college diploma at an HEQF level of 6 because a 2 year diploma is not permissible in the revised HEQF. The scope of practice of the new staff nurse has been broadened so that they will be able to work more independently and provide basic nursing care to uncomplicated patients (Blaauw et al, 2014:15). The new qualifications are as follow (SANC):

- Four year Bachelor degree for Professional nurse (R.174 of 8 March 2013)
- Three year Diploma for Staff Nurse (R.171 of 8 March 2013)
- One year Diploma for Midwifery (R.254 of 14 February 1975
- One year Higher Certificate for Auxiliary nurse (R.169 of 8 March 2013)

According to the SANC Circular No. 3/2010, the implementation date for these new qualifications was June 2015, and the NEIs were given time to have their last intake of legacy programme students. This did not materialise because the university nursing schools and all the nursing colleges did not have an accredited programme, curriculum or space. In 2014, SANC resolved to extend the intake for the professional nurse legacy programme (R.425) to 2018 (SANC Circular 8-9-10/2013). Timeframes were not adhered to and despite an initial deadline of 30 June 2010 being set for the phasing out of the legacy qualifications, the process has continually been extended. The new deadline is now 2019.

There are both opportunities and concerns for the introduction of the new qualification. The opportunities could include:

- Making curricula more congruent with knowledge, expertise and skills needs of a changing society and economy
- Achieving the requirement for nurses to be highly trained and well educated critical thinkers
- Enabling nurses to make complex clinical decisions

The following concerns need to be addressed:

- The scope of practice
- The pace of the accreditation process of NEIs and programmes
- Uncertainty about the new qualifications versus the legacy qualifications

RESEARCH

Research was never part of the curriculum when I did my Diplomas in General Nursing Science (1970-1973), Midwifery (1974-1975), Community Nursing Science (1978), Nursing Administration (a post basic Diploma in 1984) and the Baccalaureus Institutionis et Administrationis Degree (a post basic degree in nursing in 1989), even though the need for research was identified in 1954 by the South African Nursing Association. The SA Nursing Association came to an agreement with the University of Pretoria in 1955 (who by then had already introduced a basic degree course in Nursing) whereby masters and doctoral nursing degrees would be introduced so that research relevant to nursing could be conducted. By these means, the initial steps in developing nursing research were realised (Evertse, 1988:301). It was only when I did my B Cur Honors Degree in the early nineties, that I completed a research methodology module and a treatise that was externally examined. Today, a research essay is being completed for an honours degree which is internally examined.

Evertse (1988:302) in her doctoral thesis stated that one of the most serious drawbacks which the profession of nursing faces in South Africa is the lack of trained personnel who are able to undertake research into the social, administrative and education nursing fields. These problems cannot be solved satisfactorily unless remedial measures are based on proven facts. We are now at the stage where the effective growth, status and efficiency of the profession are dependent on sound research into the manifold problems which beset the profession.

The importance of research in nursing is particularly evident in the changes to nurse education made in recent years. An increasing number of nurses are involved in research activities such as research supervision, mentoring junior researchers, examining and reviewing research, utilizing research findings in practice and conducting sophisticated quantitative and qualitative studies (van Rooyen, Ricks and Morton, 2012:2). The Nursing Act No 33 of 2005 for the first time included the regulation of research in nursing in Section 41 of the Act which stipulates that the council may take appropriate disciplinary action against persons who act in contravention of the prescribed ethical conduct pertaining to research in nursing practice.

In 2012, van Rooyen, Ricks and Morton conducted research on the *"Status of research-related activities of South Africa's university nursing schools"* for the National Nursing Research Advisory Committee (NNRAC). The study provided an overview of the status of nursing research in South Africa and determined the overall research outputs for the various South African nursing schools.

The data were collected through a structured self-administered questionnaire. The survey was distributed to all 22 university nursing schools in South Africa of which 17 completed surveys were returned (77% response rate). The nursing dean was expected to verify all information submitted. Data collected reflects the years 2008-2010.

The research findings revealed that only 23.54% of nurse academics in South Africa had doctoral degrees, thus impacting on the throughput rates of doctoral and master's degree students. There are high intakes for doctoral and master's degree programmes with limited availability of research supervisors. The results also revealed that almost half (46%) of the academics employed at nursing schools are employed in a full-time contract position. In South Africa, each year 4.7 articles per nursing school per year are published in accredited journals.

It is evident from the results that there is an increase in the output of publications and funding for research, but that the output rate of postgraduate students has shown nominal improvement, especially regarding doctorates. Problems affecting research outputs included writing challenges, a lack of stability or constant change in management in many nursing schools, as well as a shortage of experienced supervisors. Unrealistic workloads were also singled out as challenges that impact on research outputs. However, support programmes at various nursing schools have been established to support researchers, and this seems to have had a positive impact.

The Forum for University Nursing Deans in South Africa (FUNDISA) has been actively promoting nursing research since its inception, but more rigorously now as the nursing profession moves into Higher Education Institutions (HEIs) where research is a priority. Since the development of research programmes is a relatively novel phenomenon amongst nurse researchers in developing countries, FUNDISA

introduced the PLUME project in 2012 which is a structured support programme for nurse researchers. The programme is designed to support nursing schools to develop research programmes. The project, in partnership with the National Research Foundation (NRF), aims to develop lead researchers who will not only create research intensive programmes in their schools, but also enhance their own skills, working towards NRF scientific rating.

Overall success of this project has been evidenced through the following achievements:

- Fortified research capacity of nursing faculty
- Improved quality of postgraduate supervision.
- Enabling platforms for research development and training of postgraduate students.
- Increased outputs in terms of research publication.
- Expansion of research collaborations and networks.
- More nurse researchers working to attain NRF rating.

A National Nursing Research Advisory Committee (NNRAC) was elected to draft the National Research Strategy for South Africa for the relevant stakeholders involved, such as, Universities, Nursing Schools, Public and Private Nursing Colleges, Health Services and Professional Societies. The aim of this research strategy is to enhance collaborative, rigorous scientific enquiry that builds a significant body of knowledge in order to improve the health of the people of South Africa. The objective of this strategy will be achieved by building a research culture in nursing, building nursing research capacity and building research programmes across the country. It is envisaged that the research strategy will contribute significantly to directing future nursing research development in South Africa (van Rooyen, 2014:2).

It is evident that a lot of progress has been made with regard to nursing research, but there is still a lot of room for improvement.

TECHNOLOGY

Forty eight years ago when I started my nursing career, very limited technology was used in nursing. Syringes and needles were re-usable because we made use of glass syringes and high quality stainless steel needles that were sharpened on whetstones and sterilised. We packed all dressing and procedure packs which were sterilised in the autoclave in the Central Sterilising Department. Intravenous (IV) bags did not exist, but IV glass bottles did. Gloves were reusable. We washed, powdered and packed the gloves which were also sterilised. Disposable syringes and needles and plastic IV bags were later introduced. Modern medicine today is a throw away culture, based on disposable gloves and all sorts of items which is a major source of pollution.

Our lecturers used the blackboard when I was busy with my basic training. I was introduced to the overhead projector when I did nursing administration at UPE in 1982. The transparencies were all hand written using different colour transparency pens. Sometimes the lecturers would use a stencil if their handwriting was not neat and legible. Today, use is being made of computers, data projectors, smart boards, document cameras and many more.

Our skills were mostly demonstrated to us on live patients in the wards as simulation manikins were not so advanced as they are today. There were a few skills such as bed baths, back and pressure areas, mouth care, dressings and female catherisation that were demonstrated to us in the clinical instruction classroom where we had one manikin, Mrs Jones. Simulation technology is rapidly expanding today and nursing programs are making large investments in this technology, which has great potential for undergraduate nursing programs. Unfortunately, this potential is underestimated and underused. With simulation technology, undergraduate students can gain and improve skills in a safe, non-threatening, experiential environment that also provides opportunities for decision making, critical thinking, and team building (Medley& Horn, 2005:31-34).

In today’s healthcare system technology is the foundation of the future. Changes in technology are a major driver of changes in the nursing profession. Huge shifts in how patient records are maintained, how medications are tracked and ordered, how care is passed from one provider to another, how blood and X-ray results are retrieved and

how information is being accessed at the point of care, are causing ripple impacts throughout nursing. There is a general divide between people who embrace new technology and those who do not. Some older nurses are uncomfortable with new technology for various reasons and this tendency is slowing down the adoption of these new methods in certain circumstances (Cassano, 2018:2).

Modern nursing care has been called a mixture of high tech and high touch, a way to describe the traditional nurturing and compassion of a nurse in combination with the advanced health care technology of the 21st century. Many of the applications nurses use are wireless. Today's nurses must not only know how to care for patients, but how to use technology safely and appropriately in their day-to-day work (Greenwood, http://work.chron.com/technology-registered-nurses-use-4282.html. Accessed 01 August 2018).

Medical advancements and information technologies of the twentieth century have not only changed the face of nursing – they have become part of the intricate fabric of the field of nursing. What are the technologies responsible for this monumental transformation? According to Maria (2012), there are many technologies that have changed nursing forever. These could include:

- **Electronic IV monitors**

In my time IV infusions had to be administered with a nurse's constant attention to ensure a steady flow. Manual IVs were highly sensitive to a patient's movement and the flow of the IV could be sped up or slowed to a crawl by a subtle movement. To prevent this, nurses had to directly administer an IV from beginning to end since we only had one IV pump in the ward. With the advent of IV pump infusion and electronic monitoring, nurses are freed up to initiate an IV and allow a machine to monitor and regulate the process. If there is an error, the system tries to correct it, and otherwise contacts the nurse via remote monitoring.

- **The Sphygmomanometer**

The sphygmomanometer is simply a fancy term for electronic blood pressure cuffs that also measure heart beat rate automatically. Gone are the days when a nurse had to measure blood pressure manually and take the pulse manually. This technological change makes the biggest daily difference. I remember the days when our ears were

so sore of the stethoscope when you were down for checking of blood pressures in the ward as a student and later as a professional nursing working in the Hypertensive out- patients' clinic.

- **Information management**

As computer technologies become the primary means of managing patient information, nurses have had to adapt their record-keeping practices and increase their computer skills. Nursing informatics is a specialty that has emerged, combining IT skills and nursing science.

- **The portable defibrillator**

Manual CPR can only do so much and for the longest time this was the only method available to many nurses for reviving someone's heart. Now, even school nurses stand a fighting chance to save the life of a person whose heart has failed. The few minutes after heart failure are critical, and the portable defibrillator allows for immediate resuscitative action.

- **The sonogram/ultrasound**

Ultrasound devices provide nurses working with pregnant patients the ability to see inside the womb. Ultrasound has been nothing short of revolutionary in the field of women's health and pregnancy, allowing nurses and doctors to noninvasively identify the health of the baby throughout pregnancy. Now, with the advent of 4-D ultrasound, unprecedented detail is available for diagnosing foetal well-being. In addition to pregnancy monitoring, sonogram technology also offers many other new diagnostic advances such as the ability to easily identify cancer tumours in the bladder, and to tell whether the liver is enlarged.

- **Local wireless telephone networks**

These systems significantly reduce communication delays. Not only is this type of communication technology being utilized between nursing staff, but also between patients and staff, changing the dynamics of the relationship between patients and their nurses.

- **Patient remote monitoring**

In addition to high-tech and ultra-sensitive vital signs monitoring equipment, web cams and other technologies make the close monitoring of multiple patients much easier, changing how environments are staffed and operated.

- **Drug management technologies**

High-tech systems of medication retrieval and delivery, such as bar coding and verification, have greatly reduced the potential for dangerous error. Infusion equipment advances have made the delivery of slow-administer drugs much easier, with computerized machines able to control dosages and rates.

- **Learning technologies**

The availability of individual and off-site learning opportunities and degree programs, via specialized software and online classes, allows for more rapid career advancement.

- **Video conferencing**

The ability to interact with nursing professionals throughout the world, through such means as video conferencing, offers advantages and opportunities like never before, both in terms of the further development of the nursing profession and the continued improvement in patient care outcomes.

- **Mobile technology**

Mobile technology including smartphones and tablets are transforming how hospital-based nurses deliver bedside care. Rather than relying on computers, pagers and landline phones to access health information and to communicate with colleagues, nurses can use these mobile solutions from any location, at any time, to deliver immediate care.

In 2008, the Department of Nursing Science was approached by AED-SATELLIFE (a Boston based NGO) to become a collaborative partner in an intervention project that involved various stakeholders. The aim of the project was to develop a mobile library as an app on a smart phone that could enable nurses to access information at the point of care for clinical decision making. The university was approached to conduct

the relevant research necessary for the implementation of the project. I became the principal investigator for this project which comprised three phases:

- Phase One comprised a health information needs assessment which was conducted amongst 136 registered nurses at the PE Hospital Complex to establish the types of information needed to enhance clinical nursing practice.

- Phase Two comprised developing the mobile library app based on the research findings of Phase one. Fifty registered nurses were randomly selected and included in the implementation. They received training on how to use the app on the smart phone. They used the app for approximately nine to ten months prior to conducting Phase Three.

- Phase Three comprised determining whether access to information at the point of care did in fact enhance nursing practice through a formal evaluation study.

The findings of Phase One reflected the registered nurses' current access to information, the main sources of information accessed, ways in which current accessed information was used in practice as well as the information needed at the point of care by registered nurses. The most common topics that the registered nurses required information on included extremely drug-resistant TB, HIV, multi-drug resistant TB, anti-retroviral drugs, mother to child transmission of HIV, sexually transmitted infections, non-communicable diseases, family planning, maternal health issues, immunisable diseases and diarrhoeal diseases. All the information needs expressed by the professional nurses were evident of South Africa's burden of disease (Ricks & ten Ham, 2015).

The findings of Phase Three of the study indicated that clinical nursing practice was enhanced by providing relevant up- to- date and correct information to their patients, empowering patients with knowledge of their own illness, enhancing their own knowledge so that they may recognise the side effects of drugs, recognise various conditions, and update their knowledge on the management and treatment of various illnesses (Benjamin & Ricks, 2011).

A masters student also conducted a qualitative study to explore and describe how the registered nurses who participated in the abovementioned study experienced using

the smart phone for accessing information at the point of care. This study revealed (Ricks, Benjamin & Williams (2015):

- By participating in the initial study, it opened a whole new world to registered nurses because it allowed them to develop computer skills because they were taught how to conduct web searches for information, send and receive electronic mails, use the key pad to type, to download information from the web and to perform calculations.

- Support groups were important for the registered nurses for diagnosing some of the most technical problems that they experienced.

- The registered nurses indicated nursing is a dynamic profession which requires keeping up-to-date with constant changes and the need to update themselves constantly, but that they did not always have the opportunity to attend formal courses. The registered nurses indicated that the smart phone provided them with an opportunity to update themselves with knowledge without having to leave their workplaces, thus enabling them to upgrade themselves.

A further study was conducted in 2013 titled: "*Developing a mobile health information system for accessing information at the point of care for medical doctors and professional nurses".* This study was conducted in the rural areas amongst 123 participants. Both the medical practitioners and professional nurses found the information provided on the smart phone or tablet to be very useful and easy to access. They indicated that having access to information at the point of care assisted them in many ways to make correct clinical decisions which impacted on the care that they provided to their patients (Ricks, 2013).

In 2015 I was awarded an NRF grant to conduct a similar project for student nurses. I have conducted all the baseline studies for the information needs required by students for clinical decision making and found that there is a definite need to develop such an app for student nurses. The development of the app is in progress.

Further information with regard to these studies could be found in the following research reports and publications.

Table 4: Research reports and publications

Researchers	Title	Research output
2009 Ricks & W Ten-Ham	Health information needs of professional nurses required at the pint of care	**Publication in Curationis** 38(1), Art. #1432, 8 pages. http//dx.doi. org/10.4102/curationis. v38i1.143
2010 V Benjamin & EJ Ricks	Evaluating the training received on accessing information at the point of care of the patient via mobile computing devices and the extent to which the latter enhanced nursing practice	Honours treatise
2014 V. Benjamin, EJ Ricks & M Williams	Experiences of registered nurses in accessing information at the point of care	Masters dissertation & publication in **Curationis** 38(2), Art. #1498, 9 pages. http://dx.doi. org/10.4102/Curationis. v38i2.1498. http://www.curationis.org.za/index.php/curationis/article/view/1498
2013 EJ Ricks	Developing a mobile health information system for accessing information at the point of care for medical doctors and professional nurses"	Ricks, E. Extent to which access to information at the point of care impacts on health care practitioners' clinical decision making. ANEC, Olive Centre, Durban. September 2015.
2016 A. van Rooyen, E. J. Ricks & P. Jordan	Experiences of medical practitioners regarding the accessing of information at the point-of-care via mobile technology for clinical decision making at public hospitals	Masters dissertation
2017 N. Lindi, E.J. Ricks & M. Williams	Experiences of professional nurses regarding the use of mobile technology for accessing information at the point of care in clinical decision making at rural clinics	Masters dissertation
2017 N. Maganto, E. J.Ricks & M Williams	Perceptions of nurse educators regarding the information required by undergraduate nursing students for clinical decision making at the point of care.	Masters dissertation Podium presentation: Perceptions of nurse educators regarding the information required by undergraduate nursing students for clinical decision making at the point of care. Chi Xi at-Large Chapter (STTI). First Biennial Conference, Royal Swazi Convention Centre, Swaziland, 10 August 2017
2018 M. Williams, M. Williams & E.J. Ricks	Information needs of undergraduate nursing students at the point of care for clinical decision making	Masters dissertation

CONCLUSION

It is evident that nursing has transformed in many ways since 1970 with regard to education and training, research and technology. Nurses have always been the drivers

of nursing transformation because we are smart and can solve the most ponderous problems with our creativity and initiative. Unfortunately, there appears to be a lot of outside interference and dissatisfaction among nurses today with regard to the progress made with the new nursing curriculum and research in nursing. Nurse leaders have engaged in this country in difficult times for the cause in which they believe. It is vital that this passion for and commitment to the justness in their cause should be strengthened, because it is exactly this that harbours the essential seeds for change to meet the needs of the country and its communities. I therefore appeal to my young colleagues not to allow non-nurses to decide the future for nurses, but to stand together and not to shy away from leadership positions. I have noticed over the last few years that the strong nurse leaders are moving into non-nursing leadership roles leaving a gap in nursing with regard to leadership. This could be due to the fact that nurses are very comprehensively trained and able to fit in anywhere.

In closing I would like to state that we need a clear vision of how we would like to transform nursing in the next 10-15 years. Having a vision creates unity. Failing to have a vision is a slow trip to irrelevance. You become whatever the times dictate, you fragment your educational system, you turn over your autonomy to outsiders, fight with each other (Wieck, 2000). It is time for us to develop a vision for nursing in the 21st century in order to take it to new levels.

“Transformation is an ongoing process that tends to appear ordinary, when, in fact, something extraordinary is taking place” (Unknown).

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