Pharmaceutical Education in the South African Multicultural Society

Rob Summers[a,*], Coryce Haavik[**], Beverley Summers[a], Farhana Moola[a], Mariette Lowes[b] and Gill Enslin[c]

[a]School of Pharmacy, Medical University of Southern Africa; [b]Faculty of Health Sciences, Technikon Pretoria; [c]School of Pharmacy, Technikon Pretoria

In 1995, South Africa commenced the implementation of a new quality assurance program at all educational levels, which promotes outcomes-based education. Degree programs and academic institutions have to be accredited by the South African Qualifications Authority through discipline-specific Education Training and Quality Assurance bodies. In response to these changes in education structure, the South African Pharmacy Council has developed outcomes-based competency standards for entry-level pharmacists. On the basis of these standards, the School of Pharmacy of the Medical University of Southern Africa, which served a non-white population during the apartheid era, and the Technikon Pretoria, which served a predominantly white student population, have jointly established an integrated, problem-based BPharm curriculum. The student intake on the program reflects the South African demographic composition. The course is designed to meet both the competency requirements and the needs of historically disadvantaged sections of the community. It is now in its third year, with encouraging pass rates.

INTRODUCTION

One of the major challenges facing the new South Africa has been that of devising a system to ensure acceptable and uniform standards in education at all levels, while concurrently promoting access to education for the country's historically disadvantaged population. The ethnic and cultural diversity in the country, combined with a historical distrust among various constituencies, has required that steps to address this challenge be taken slowly, with the development of consensus at each step.

In 1995, the country embarked on a quality assurance program applicable to all levels of education(1). The program promotes outcomes-based education by establishing outcome competencies for every educational level and academic discipline. Virtually immediately, the South African Pharmacy Council implemented a program to design outcome competencies for entry-level pharmacists, which resulted in the publication of the Unit Standards for entry-level pharmacists(2). This definition of competencies for pharmacists was one of the catalysts for the development of the new, problem-based learning Bachelor of Pharmacy degree program described in this paper. Other factors were the quantum increase in information available on pharmacy and medical care, particularly on the Internet, changes in pharmacy practice towards a more patient-oriented approach, the need to train pharmacists for the 21st Century who must be able to deal with rapid change, and to encourage lifelong learning among pharmacy graduates. The new degree program is integrated, thematic, modular and outcomes-based, which is unique in the South African context. "Integrated", in this context, refers to the way in which the course material is presented in thematic modules. The content of each module integrates all the relevant subjects, and the modules are integrated one with another (see Figure 1). Ultimately, all educational offerings in South Africa will be outcomes-based.

Currently, the general approach to pharmaceutical education in South Africa involves a basic science first year, followed by three years of professional studies. Successful completion of this university-based academic program leads to a one-year structured internship. Pharmacy graduates who completed their internship prior to the year 2000 were able to register as pharmacists with the South African Pharmacy Council. They were then free to practice in any sector of pharmacy. Graduates undertaking their internship in 2000 and subsequent years are required to complete a year of remunerated community service in the public sector after they have completed their internship before they can go onto the full register.

In December 1999, 10,205 pharmacists were registered with the South African Pharmacy Council(3). The career choices open to a pharmacist in South Africa are similar to those in most countries.

Community pharmacy provides the practice setting for most pharmacists. It includes the mix of professional and commercial activities found in community pharmacy in most developed countries. There were 2,683 retail (community) pharmacies registered in South Africa in December 1999(iii). Just over 50 percent of all registered pharmacists worked in community pharmacy in 1998(4). Community pharmacies are individually owned by pharmacists, under current legislation,

* *Corresponding author address:* School of Pharmacy, P.O. Box 218, MEDUNSA, 0204, Rep. of South Africa, e-mail: rsumm@medunsa.ac.za

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YEAR	MODULES						EXTERNSHIP
1	1.1 Orientation Induction	1.2 Tasks and challenges in health care	1.3 From atoms to molecules	1.4 From molecules to medicines	1.5 Micro-organisms: Man and medicines	1.6 Nutrition & Gastro-enterology	1.7 Experiential learning and research methodology (PHC clinic attachment)
2	2.1 Biopharma-ceutics & pharmaco-kinetics	2.2 Cardio-vascular pharmacy	2.3 Respiratory and related sensory systems	2.4 Pharma-ceutical production	2.5 Industrial pharmacy practice		2.6 Experiential learning: Industrial pharmacy attachment
3	3.1 Preparation of medicines for patients	3.2 Community-based pharmaceu-tical care	3.3 Biotechno-logy, biologicals, immunology and virology	3.4 Endocrine & reproductive pharmacy	3.5 Musculo-skeletal, skin conditions and pain management		3.6 Experiential learning: Community pharmacy attachment
4	4.1 Neurological and psychiatric pharmacy	4.2 Specialist areas of pharmacy	4.3 Hospital-based pharmaceutical care	4.4 Research metho-dology (advanced)			5 Experiential learning: Hospital pharmacy practice

Fig. 1. Overview of the curriculum.

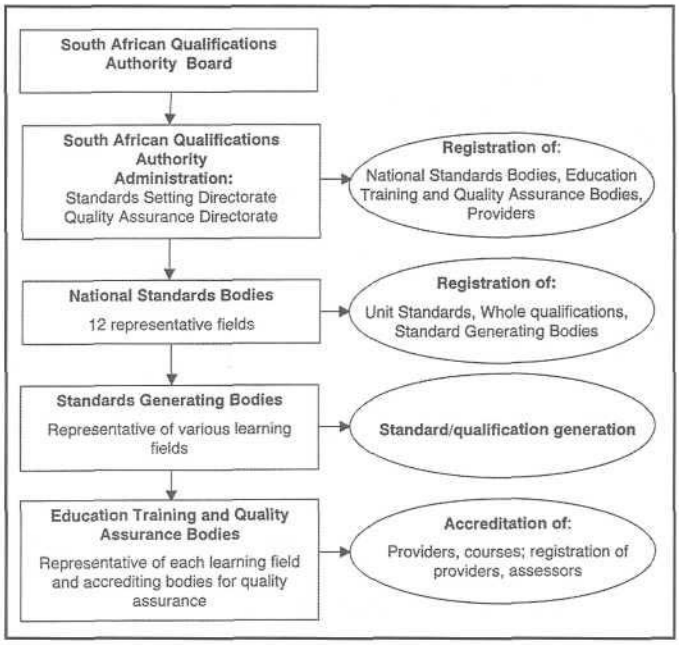

Fig. 2. Relationships between SAQA and other bodies.

although a number of franchises exist. The main pharmaceutical activity conducted in community pharmacies is dispensing for private sector patients, who, in the main, are funded by medical insurance schemes. Pharmaceuticals currently account for approximately 30 percent of medical insurance reimbursement(5), a situation which is also fuelled by the approximately 9,000 dispensing doctors in the country(6).

Hospital pharmacy is divided between the public and private sectors. Public sector hospitals serve approximately 80 percent of the 40 million people in the country, but are staffed by only approximately 11 percent of the registered pharmacists(*iv*). There were 384 public hospital pharmacies registered with the Council in December 1999(*iii*). This number is not representative of all the government hospitals, as the state is currently not subject to the Pharmacy Act, and public sector hospitals are not specifically required to register. Public hospitals that offer training do register(iv). Staff shortages and the poor utilization of support staff inhibit the provision of clinical pharmacy services in all but the main tertiary care hospitals. Private sector hospital pharmacists concentrate on the dispensing function. They are also involved in cost control and monitoring and provide drug information. In some instances clinical services such as participation in cancer management teams, patient education programs on specific conditions such as asthma, or formulation of total parenteral nutrition solutions are offered.

Although many of the major multinational pharmaceutical manufacturing companies and a number of South African companies operate in the country, opportunities in manufacturing itself are relatively few. In this sector, pharmacists are employed in management, product registration, clinical trials coordination and medical information. Other career opportunities for pharmacists are found in pharmacy schools, the drug regulatory agency, pharmaceutical distribution and pharmaceutical benefit management. The register of the South African Pharmacy Council comprised 403 wholesale/distribution pharmacies and 94 manufacturing pharmacies in December 1999(iii). It is clear then that the main purpose of pharmaceutical education in South Africa is to prepare a general practice pharmacist.

REGULATORY STRUCTURE

From its inception in 1974, until the South African Qualifications Act was passed in 1995(7), the South African Pharmacy Council (SAPC), an independent statutory body, established by an Act of Parliament(8), and its predecessors, had sole statutory responsibility for quality assurance standards in undergraduate pharmacy education. The policy changes of 1995, along with additional changes incorporated into the 1997 Higher Education Act(9), have now created a complex regulatory structure that requires the programs offered by pharmacy schools to be registered and approved by two different agencies, namely SAQA, for educational purposes, and the SAPC, for professional purposes.

The South African Qualifications Authority (SAQA)

The nine Schools of Pharmacy in South Africa, eight of which are public university schools, with the ninth situated at an advanced technical education institution linked to one of the universities[1], offer programs which will require registration by SAQA, as the body responsible for formulating, publishing, and implementing educational standards(10). SAQA meets the regulatory and accrediting aspect of this responsibility by establishing and delegating authority to a number of quality assurance bodies that have regulatory authority for specific aspects of quality assurance. These Education Training and Quality Assurance (ETQA) bodies are authorized to accredit individual academic institutions and degree programs(11). Relationships between SAQA and other organizations are illustrated in Figure 2.

The functions of the ETQAs are carried out concurrently in three sectors of education, *i.e.* a social sector, which is concerned with programs for community welfare, an economic

[1]The Schools of Pharmacy in South Africa are situated at the following institutions: University of the Western Cape, Potchefstroom University, Rhodes University, University of Durban-Westville, University of the North, University of the Witwatersrand, University of Port Elizabeth, and the Medical University of Southern Africa (MEDUNSA), in partnership with Technikon Pretoria.

sector, and an education and training sector. Pharmacy education is subject to regulation by the economic sector.

For professional education, the corresponding statutory bodies are responsible for establishing and overseeing standards for education and registration (licensure) to practice. During the past seventy years, the South African Pharmacy Council, and its predecessors, have played a major role in monitoring pharmacy education. The Council has recently applied to SAQA for recognition as the ETQA for pharmacy education and training.

An additional factor in this already complex picture is the recent establishment of a Health and Welfare Sector Education and Training Authority (HWSETA) by the Department of Labour. As involved stakeholders, the statutory Councils for the health professions, including the SAPC, are represented on the SETA.

The National Qualifications Framework

SAQA oversees the development of national educational standards through the National Qualifications Framework(xi). The objectives of this Framework are to:

1. facilitate access to, and mobility and progression within, education, training, and career pathways;
2. enhance the quality of education and training;
3. accelerate the redress of past unfair discrimination in education, training, and employment opportunities; and
4. contribute to the full personal development of each learner and the social and economic development of the nation at large.

The National Qualifications Framework (NQF) is divided into eight educational levels and 12 fields. Pharmacy education falls within the Health Sciences and Social Services field. It is placed within two educational bands on the NQF. Pharmacists' Assistants (pharmaceutical technicians in other countries) are placed at levels 3 and 4 of the further education band. Pharmacy degree programs are placed at level 7 on the higher education band. Also included in the Health Sciences and Social Services field are medicine, nursing, and allied health programs. This field is subdivided into four sub-fields: preventive health, promotive health and developmental services, curative health, and rehabilitative health services. All education and training in this field is identified with one of these four sub-fields.

DEVELOPMENT OF COMPETENCY STANDARDS

Role of the Pharmacy Council of South Africa

The underlying philosophy of the newly created organizational structure governing South African educational programs is that education should be outcomes-based, in common with international moves in pharmaceutical education(12). The Pharmacy Council of South Africa responded to this change in philosophy by initiating and developing Unit Standards (Competency Standards) for entry-level pharmacists and for basic-level and post-basic-level pharmacists' assistants. In each case, the occupational role and scope of practice, as well as the activities performed within the scope of practice, were analyzed, examined in detail, and developed into outcome statements of the competence required. For pharmacists this process resulted in the establishment of seven unit standards(ii). In terms of these standards, the pharmacist should be able to:

1. organize and control the manufacturing, compounding and packaging of pharmaceutical products;
2. organize the procurement, storage, and distribution of pharmaceutical materials and products;
3. dispense and ensure the optimal use of medicines prescribed to the patient;
4. provide pharmacist-initiated care to patients and ensure the optimal use of medicines;
5. provide education and information on health care and medicines;
6. promote community health and provide related information and advice; and
7. participate in research to ensure the optimal use of medicines.

The Unit Standards describe the specific purpose of that standard, the capability and outcomes (performance criteria), embedded knowledge, critical outcomes which are cross-field generic capabilities, and their assessment criteria and ranges. SAQA has also identified eight critical cross-field outcomes, in which all graduates are expected to achieve competence, including pharmacists. These cross-field outcomes cover capability in problem-solving, team work, self-organization and management, information evaluation, communication, use of science and technology, understanding of the inter-relatedness of systems, and learner and societal development.

Under the new legislation, Unit Standards may themselves be used as the basis for registering a qualification, or the outcomes described may be used to guide a program provider, which can then choose to register its whole qualifications. The majority of universities have chosen to follow the latter path. Nevertheless, the Council has widely publicized these outcomes-based standards because they represent a ground-breaking approach for health care professionals in the country. A number of meetings and workshops have been held nationwide to encourage their adoption by the schools of pharmacy, which are currently re-designing their curricula to comply with the country's new educational requirements.

In terms of the Pharmacy Act(viii), the objects of the Council include the promotion and maintenance of appropriate standards in pharmaceutical education and training. Previously, it functioned, without the specific designations, both as a Standards Generating Body and an Education Training and Quality Assurance Body (ETQA), particularly in regard to Pharmacists' Assistants. As this situation is no longer possible under the SAQA Act, under which the Council will now function as an ETQA, it has a positive interest in the establishment of a Standards Generating Body for pharmacy. Progress toward adoption of the Unit Standards is being assessed during the regularly scheduled four-year educational audits of pharmacy schools by the Council.

An additional element of the Council's approach to quality assurance is the recent introduction of a pre-registration evaluation. Currently the process and results of this examination are being used to advise pharmacy schools about problem areas with their curricula. It is anticipated that within the next five years, or sooner, successful performance in this evaluation will be used as a prerequisite for registration as a pharmacist (licensure).

A NEW PROBLEM-BASED BPHARM CURRICULUM IN A MULTICULTURAL SOCIETY

Institutions

Based on the standards described above, a new Bachelor

of Pharmacy program is being offered jointly by the schools of pharmacy at the Medical University of Southern Africa (MEDUNSA) and the Technikon Pretoria (TP). The MEDUNSA School of Pharmacy opened in 1983. It concentrated on offering continuing education, postgraduate, and outreach programs during its first 15 years. In 1997, MEDUNSA received approval from the national Department of Education to offer a BPharm degree program in partnership with Technikon Pretoria. In South Africa, all degree programs must be accredited through the Department of Education, which is a cabinet-level department.

The Pretoria College of Pharmacy, formerly part of the Pretoria Technical College, and its successor, Technikon Pretoria, offered full-time pharmaceutical education and training from the 1960s until 1994. In 1994, it and three other pharmacy schools in the country were closed in a move to "rationalize" pharmacy education. One outcome of these closures was a serious shortage of pharmacists throughout the country. In 1998, a new school of pharmacy was established at Technikon Pretoria, to work with MEDUNSA in offering the new degree program.

Student Selection

Students are selected on the basis of prior academic achievement, personal interview, an assessment questionnaire, and a group of computerized tests designed to measure potential for success in a career in pharmacy. The computerized test battery, developed by the TP Student Counseling Services, is a modification of that developed by Erasmus(13). The purpose of these multiple components to the selection process is to give disadvantaged applicants, who would otherwise be rejected on academic grounds alone, an opportunity to demonstrate motivation and potential for success in a career in pharmacy. In the first year (1999), the different components were weighted as follows: Academic record 15 percent, assessment questionnaire 22.5 percent, potential tests 40 percent, interviews 22.5 percent. Prior to student selection for the year 2000, these tools and their weighting were discussed by staff and the student selection committee. The questionnaire was excluded as a result, and the other instruments re-weighted to academic record 20 percent, potential tests 40 percent and interview 40 percent. The process of continuous review of the selection process and weightings will continue, so that changes may continue to be made, as has been done elsewhere(14). Final selection resembles the country's demographic profile, so that a microcosm of South African society is created within the schools[2]. Analysis of the validity of each component of this selection process is underway, in an effort to identify factors that contribute to success in the program, and thus validate the admissions process.

The Academic Program

This degree program is based on accepted PBL principles. Learning methods include scenarios, workshops, individual projects, individual and group presentations, computerized exercises and simulations, tutorials, and site visits. Students approach these activities by following the standard seven-step analytical process. Each student's mastery of the educational material is assessed throughout the academic year.

Evaluation of the Program

During the inaugural years of the program a Pharmacy Council team will visit the two schools annually. In addition to these visits, the Schools are applying an informal process of evaluation through periodic "reflection" sessions. These sessions, which take place approx. every two weeks, are attended by students and staff. They identify difficulties, facilitate responses and communication, and track progress. Once the full four-year program has been initiated, the Council is likely to conduct an audit every four years, as is the normal practice. A comprehensive research project is being implemented to evaluate the program.

DISCUSSION

Until the end of the apartheid era in 1993, academic institutions in South Africa were segregated to a large extent. Those serving the non-white population were seriously under-funded. MEDUNSA fell into this category. Technikon Pretoria previously served a predominantly white student population. One outcome of the discriminatory educational policy prior to 1993 was an inadequate number of health care providers, including pharmacists, throughout rural areas of the country.

During the past five years, however, significant attention has been directed toward the new structure and process requirements that affect education in South Africa. The Pharmacy Council, which registers pharmacists, and pharmacy support staff from all sectors of pharmacy, has a leadership role in the development of competency standards applicable to accreditation of educational programs in pharmacy and to registration of pharmacists. The Council's vision of the future of pharmacy as one that encompasses both scientific and social responsibility has provided it with the credibility needed to work effectively with the Department of Education and with a broad spectrum of professionals and other stake-holders in the field of pharmacy. The Council's policy and implementation documents are now being used by other health professions in South Africa as models for development of their own policies and standards.

The successful implementation of these measures to improve the competence of pharmacists will assist in alleviating the critical manpower shortage in pharmacy in South Africa by ensuring that the pharmacists of the future practice efficiently and effectively. During a 1994 restructuring of the nation's educational system a number of pharmacy schools were closed. Since then the number of pharmacy graduates entering the profession has been significantly lower than that needed to maintain a stable level of practicing pharmacists. Additional factors contributing to this problem are the high drop-out rate in undergraduate pharmacy programs and plans of the Department of Health to establish 1,900 new clinics in rural areas during the next decade(15).

In 1996 there were 9,197 registered pharmacists in South Africa, only 64 percent of the calculated number required. It has been projected that by the year 2020 population growth and improved health care services to rural areas will result in the need for community and hospital pharmacists to have increased 2.4-fold(xv). This manpower shortfall can only be met if the pharmacy schools accept, retain, and graduate a significantly larger number of students. In order to meet this challenge innovative changes in pharmacy education will be

[2]According to the latest population census, which took place in 1996, the population of South Africa had the following racial and ethnic composition: Black 77 percent, White 11 percent, Coloured nine percent, Indian/Asian three percent. Of the country's 11 national languages, those most widely spoken as a first language are isiZulu (23 percent), isiXhosa (18 percent), Afrikaans (14 percent) and English (nine percent).

required, changes which ensure high academic standards and professional competency, while responding to the needs of the complex multicultural society of South Africa.

An example of a program which aims at meeting these requirements is the new problem-based BPharm course offered jointly by MEDUNSA and Technikon Pretoria. It is based on the competency standards described by the Pharmacy Council. At the same time, it attempts to cater for the needs of the historically disadvantaged section of the student population. Some applicants come from homes without electricity or running water; most of them come from minimally educated families, with many from families which live below the poverty level. Although South Africa has 11 official languages, higher education programs are conducted in English. English is a second language for most applicants to this program. Their competencies vary significantly, as a function of the quality of their prior education.

Among the most important needs of these students is that to develop the courage and self-confidence needed for analytical, independent thought. It is in an attempt to meet these special needs that the Problem-based learning (PBL) program has been developed. The underlying principles of PBL are that students take responsibility for their own learning, cooperate with others, and function as members of a team. These principles are particularly applicable to students in the historically disadvantaged institutions, and to the need to redress past intolerance within the racially mixed population of South Africa.

Promotion from the first to the second year has the highest failure rate in South African pharmacy schools(xv). By contrast, at the end of the first offering of the first year of the new program in 1999, 29 of the 30 students in the group were promoted to the second year. This rate was very encouraging. Each of the Year 1 modules was revised for use with the second entering class in 2000. The high pass rate was maintained for the past year when all 29 second-year students were promoted to the third year. Of the second intake, 32 of 36 first year students were promoted to the second year of the course. The program has enjoyed the support of the administrations of both MEDUNSA and TP. With this support, and with objective measures of outcomes-based competencies of graduates, we anticipate that the program will succeed academically and provide new educational opportunities for the disadvantaged sections of South Africa's population.

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