Using content analysis software to compare pharmacy support qualifications in South Africa

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Abstract

The training of pharmacy support personnel (PSP) differs considerably across the world; however, the question of whether the training of PSP meets the needs of the scope of practice in each country must be considered. This article considers a methodology employed to determine if qualifications for PSP in South Africa provided the knowledge and practical skills required by the prescribed scope of practice. A content analysis was performed in three steps, using Atlas Ti software to manage the textual information. The same basic format used in all qualitative content analysis was utilised, including preparing and organising, exploring, developing themes, reporting, and interpreting data. Content analysis can be a helpful tool in analysing large volumes of information. Despite the process being time-consuming, it allows for the trustworthiness of data. Breaking the analysis into three steps made the process more manageable, allowing a single researcher to do the analysis.

Introduction

A mid-level cadre of healthcare professionals has been suggested to alleviate the shortage of higher qualified healthcare professionals and address the maldistribution of healthcare professionals in developing countries to meet the World Health Organisation's health-related millennium goals (Lassi *et al.,* 2013). Mid-level workers were defined by Lehmann (2008) as healthcare providers who are not professionals but who render health care in communities and hospitals. They have received less (shorter) training and have a more restricted scope of practice than professionals have. In contrast to the community or lay health workers, they have a formal certificate and accreditation through their countries' licensing bodies. Some may work under the direct or indirect supervision of professionals, while others work independently and can even lead health care teams, particularly in primary and community care (Lehmann, 2008, p. 1).

Based on this definition, pharmacy support personnel (PSP) can be described as mid-level workers in the pharmaceutical environment.

A systematic review conducted by the World Health Organisation in 2011 suggested that well-trained and regulated mid-level workers can provide quality health care comparable to traditional health care models, given the necessary guidance and supervision. The use of mid-level workers could fill the gap in rural and remote areas that lack the services of higher qualified professionals (Lassi *et al.,* 2013). Training and the standardisation of training are, therefore, critical to the success of the use of mid-level workers to perform specific tasks within a profession and relieve the technical and administrative workload of professionals. For this reason, it is imperative that training and transferability of skills and knowledge are quality assured to meet workplace needs.

PSPs are used in many countries to fulfil similar tasks; however, their practice, regulation, and training environments differ vastly.

United States

Although pharmacist assistants have existed in the United States since the nineteenth century, recognition and development of pharmacy technicians as an

occupation only started in the 1970s. Pharmacy technicians have no standardised scope of practice, as practice and licensure fall under state or local government. In general, however, there are three recognised levels of the pharmacy technician: entry, advanced, and specialised (American Society of Health-System Pharmacists, 2016).

Entry-level technician roles are limited to dispensing, compounding and stock management. More advanced functions include checking other technicians' work to prevent non-clinical errors, supervising other technicians, assisting in medication therapy management, administering immunisations, community outreach, and adverse drug reporting activities, to name a few. Specialised technicians can work within a specialisation, such as nuclear pharmacy, provided they have the required training (American Society of Health-System Pharmacists, 2016; Bolster & Koyle, 2018).

It is not clear how closely a pharmacist must supervise pharmacy technicians; however, the American Society of Health-System Pharmacists advocates that all pharmacy tasks performed by a pharmacy technician be conducted under the supervision of a licensed pharmacist and that both pharmacists and technicians are held accountable for the quality of pharmacy services provided (American Society of Health-System Pharmacists, 2016).

Australia

Although Australia has both pharmacy technicians and pharmacy assistants, assistants are not involved in dispensary activities. They may only carry out customer service and sales roles (Pharmacy Guild of Australia, 2004). Pharmacy technicians provide services to support the pharmacist in community and hospital settings. These tasks include dispensing medicines, supplying some over-the-counter medicines, doing basic administrative tasks in a community pharmacy, assisting with dispensing the supply of ward stock, manufacturing, aseptic compounding, and administrative functions in a hospital setting (Moles & Stehlik, 2015).

PSPs work under the supervision of a pharmacist, but registration with the Australian Pharmacy Board is not required (Moles & Stehlik, 2015; International Pharmaceutical Federation, 2017).

United Kingdom

Before 2011, pharmacy technicians existed, but their practice was unregulated. Pharmacy assistants are not regulated, but it is the responsibility of the pharmacist under whose supervision they work to ensure they are competent to perform their required tasks (John & Brown, 2017).

Pharmacy technicians work predominantly in community and hospital dispensaries, with their primary role being the preparation and supply of medicines (Rosado *et al.,* 2015). Although their role in community pharmacy is restricted to the needs of the business, there is an extended role for pharmacy technicians in a hospital setting. Over the last 15 years, pharmacists have been driven to take on a more clinical, patient-focused role, requiring pharmacy technicians to take on more responsibility. Pharmacy technicians in the United Kingdom are often found managing hospital dispensaries, assessing patients' "own" use medicine for the duration of their hospital stay, doing medicine reconciliations on admission, and checking another technician's dispensing for non-clinical accuracy. Some technicians are responsible for training new pharmacy technicians, and more experienced technicians accompany pharmacists on ward rounds (Boughen *et al.,* 2017; Boughen & Fenn, 2020).

Another defined role is that of the primary care pharmacy technician. These technicians support pharmacists who work directly with general practitioners in primary care settings and advise on the evidence-based use of medicines, medication safety, and prescribing budgets. With pharmacists required to work more closely with patients, many of these responsibilities now fall on the pharmacy technician and tasks are allocated based on the technicians' skill level (Rosado *et al.,* 2015; Boughen *et al.,* 2017).

There are different roles for pharmacy assistants in the United Kingdom. Dispensary assistants can work in community or hospital settings and have varying roles and responsibilities. Over-the-counter medicines can be sold by medicine counter assistants supervised by a pharmacist with a limited scope. These assistants must advise patients on minor ailments and identify when a patient needs to be referred to a pharmacist (Rosado *et al.,* 2015). While pharmacy assistants constantly work under the supervision of a pharmacist, technicians can work autonomously depending on the requirements of the workplace (Rosado *et al.,* 2015).

Malawi

Before 1999, Malawi only had a cadre of PSPs referred to as pharmacy assistants. These were untrained personnel required to perform specialised pharmaceutical tasks and management. In 1999, the Malawian government determined that formal training programmes for pharmacy technicians and pharmacists be developed to boost the severely under-serviced healthcare system. For some time, the category of pharmacy assistant was neglected. In contrast, pharmacy technicians were trained to play a crucial role in the public health care system as managers of dispensaries in district hospitals,

responsible for efficient and accurate dispensing and medicine supply management. In 2012, the pharmacy assistants were re-introduced with a training programme due to the dire need for more pharmacy personnel in rural pharmacies and health centres. The role of this cadre was to strengthen medicines management, improve dispensing to and counselling of patients, and reduce the administrative load of medicine logistics for non-pharmacy staff working at the health centres (Larsen-Cooper *et al.,* 2017).

Although the pharmacist's responsibility is to support and supervise pharmacy technicians, the extreme lack of pharmacists, 200 pharmacists for a population of 17 million people, makes it an impossible task (Scott, 2017). Pharmacy assistants in rural health centres are overseen by pharmacy technicians managing district health centres (Larsen-Cooper *et al.,* 2017).

Denmark

In Denmark, PSPs are referred to as pharmaconomists. The name change from pharmacy assistant to pharmaconomist occurred in 1999 due to the increased responsibility placed on this cadre of PSP. Pharmaconomists are primarily employed in either hospital or community pharmacies, with the majority being employed in community pharmacies. However, few of them work in the manufacturing sector (Hansen & Brown, 2017).

The role of pharmaconomists has developed from a compounding focus to a medicines information role. Pharmaconomists have similar authority to pharmacists in handling prescriptions, dispensing and counselling patients. They can receive the prescription and collect a medical and medication history from the patient; they may prepare medicines for dispensing, conduct the final checks and counsel a patient. Although only a pharmacist may own a community pharmacy by law, and a pharmacist must be present in the pharmacy, pharmaconomists can work independently. (Hansen & Brown, 2017; The Pharmacists' Defence Association, 2019) In the case of a branch pharmacy, where a pharmacist is not required to be on the premises, they must be reachable by telephone. Pharmaconomists are liable for any errors in dispensing that may occur or if incorrect information is provided to patients (Hansen & Brown, 2017).

Singapore

Singapore has two cadres of PSPs, pharmacy assistants and technicians. Although the pharmacy assistant cadre is being phased out, the role of the pharmacy assistant is limited to picking and packing. However, with the advancements in dispensing technology and automated

dispensing units, the need for a picker/packer has become redundant. This cadre can upskill to a pharmacy technician by completing additional training (Chew *et al.,* 2017).

A 3-level career framework exists for pharmacy technicians, i.e., basic, intermediate, and advanced. The entry-level roles of a pharmacy technician include processing prescriptions and dispensing medications, counselling on the use of medication, stock management and distribution, and extemporaneous compounding. The pharmacy technician executives (intermediate) and senior executives (advanced) have increased responsibilities, including managing the dispensing process, supervision and training of junior pharmacy technicians, medication management and patient education, and managing pharmacy operations depending on their experience (Chew *et al.,* 2017; Parrish & Chew, 2018; Skills Future Singapore, 2018). PSPs work in various sectors, including hospitals, outpatient clinics, polyclinics, and retail pharmacies (Skills Future Singapore, 2018).

Pharmacy technicians are not currently regulated in Singapore, and they must work under the direct supervision of a pharmacist. However, there is a call for pharmacy technicians to be incorporated within the regulatory framework of pharmacy practice (Parrish & Chew, 2018).

South Africa

There are two cadres of PSP in South Africa, pharmacist's assistants (basic) and pharmacist's assistants (post-basic). The focus of both cadres is to assist the pharmacist and work under the direct supervision of a pharmacist. The only deviation is that a pharmacist's assistant (post-basic) can work under the indirect supervision of a pharmacist in a primary healthcare facility. The pharmacist's assistant (basic) role is focused mainly on assisting with compounding and manufacturing non-sterile medicines and stock management, with little to no interaction with patients, except to give health advice. The pharmacist's assistant (post-basic) has an extended scope of practice and can, in addition to that of a basic assistant, assist in the dispensing process and assist in compounding and manufacturing sterile medicines. PSPs are regulated by the South African Pharmacy Council (SAPC) and are viewed as an essential part of the pharmacy workforce in South Africa (Boschmans *et al.,* 2015; Boschmans *et al.,* 2017).

When reviewing the role of PSPs in these countries, it is evident that PSPs are employed to assist the pharmacist in carrying out their duties so that the pharmacist can be involved in more advanced clinical roles. However, pharmacy technicians also have a strong call to evolve an

identity of their own as a professional with career pathing and be allowed to work autonomously for specific tasks. Countries that do not currently regulate PSPs will need to incorporate them into a regulatory framework to achieve this. Table I summarises the terms used, regulatory status, and supervision requirements for each country discussed.

Table I: Terms used, regulation, and supervision of pharmacy support personnel

Country	Term	Regulated	Direct Supervision
United States	Pharmacy Technician	State dependant	Yes
Australia	Pharmacy Technician	No	Yes
	Advanced Pharmacy Technician		
United Kingdom	Pharmacy Assistant	Yes	Yes
	Pharmacy Technician		No
Malawi	Pharmacy Assistant	Yes	Yes
	Pharmacy Technician		
Denmark	Pharmaconomist	Yes	No
Singapore	Pharmacy Assistant	No	Yes
	Pharmacy Technician		
	Pharmacy Executive		
	Advanced Pharmacy Executive		
South Africa	Pharmacist's Assistant (Basic)	Yes	Yes
	Pharmacist's Assistant (Post-Basic)		Indirect supervision in Primary Health Care clinics for PAPB's

Despite the scope of practice varying between countries, the common thread is to relieve the pharmacist of technical tasks to focus on more cognitive functions, including providing advanced clinical services to patients in the community and hospital settings. In all countries, the presence of a pharmacist is required where PSPs work, except for Denmark, Malawi, and South Africa in more informal or rural settings, where they are supervised remotely. Only in Denmark and in some circumstances in the United Kingdom can PSPs work independently. The lack of regulation of PSPs, including pharmacy assistants and pharmacy technicians, is of concern in many countries, although there is a global call for PSPs to be regulated. The regulation of PSPs will assist in the cadre becoming recognised in their own right as a profession.

Education of PSPs

With the regulation of PSP being called for globally, it stands to reason that education programmes and providers should also be considered within each country with the goal of standardising education. Some countries have formal programmes that PSPs must complete to practise, while others only require a licence application and formal certification examination. For example, in the United States, different states have different requirements for the training and licencing of pharmacy technicians. Generally, pharmacy technicians apply for a licence to train, referred to as a trainee licence and can then complete either in-service training or formal training before sitting for a national certification examination. Upon passing the certification examination, the trainee is referred to as a certified pharmacy technician (CPhT) and receives a full licence to practise. Certification must be maintained by completing continuous professional development, evaluated every two years (Pharmacy Technician Certification Board, 2021).

Pharmacy technicians in the United Kingdom must complete a level three accredited vocational training programme comprising two qualifications in pharmacy services to register with the General Pharmaceutical Council (GPhC) (NHS Careers, 2017). The two qualifications are completed simultaneously: a knowledge-based diploma and a competency-based pharmacy service skills diploma (Rosado *et al.,* 2015). Accredited institutions, approved against the GPhC's Initial Education and Training Standards and Criteria, provide training for pharmacy technicians. Consistency in education standards is ensured across providers from England, Scotland, and Wales, regardless of the sector in which the technician trains. Once qualified, they can migrate between the various pharmacy sectors (John & Brown, 2017). To achieve standardisation of education, the GPhC awarded three franchised skills development providers, Pearson, City and Guilds, and the Scottish Qualifications Authority, the right to approve courses delivered by Further Education Colleges. The three skills providers are also responsible for ensuring quality assurance of assessments as external stakeholders. Interestingly, the providers are not involved in the physical inspection of training providers and sites of

training as part of the quality assurance process. However, it provides direct accreditation to private providers who present a distance learning model of the qualification. (Rosado et al., 2015)

In Malawi, pharmacist assistants and pharmacy technicians are trained through a two-year certificate or three-year diploma programme, respectively. Both curricula involve traditional face-to-face teaching and workplace-based training in a hospital or healthcare site. Both cadres register with the Malawi Pharmacy, Medicines, and Poison Board. The board is also responsible for the accreditation of the curricula and training of the PSP (Larsen-Cooper *et al.,* 2017).

In Denmark, the training of pharmacy assistants started in 1958. In 1999, their name changed to pharmaconomists. Training of pharmaconomists takes place over three years using a blended learning approach, including traditional face-to-face lecturing and workplace-based training. Pharmaconomists work predominately in community or hospital pharmacies and must have a certificate of qualification or approval from the Ministry of Health to practice (Hansen & Brown, 2017).

Despite the lack of regulation of pharmacy technicians in Singapore, a task team appointed by the Ministry of Health has developed a career path. By completing an entry-level certificate, pharmacy technicians can enter the workforce in public healthcare institutions. The entry-level three-year diploma allows for the specialisation of pharmacy technicians in different fields, e.g., clinical trials or forensics. Entry-level training can be followed by an 18-month advanced diploma for pharmacy technicians to extend their role into the areas of distribution services, technical services, patient-care services, and quality assurance services (Chew *et al.,* 2017).

In South Africa, PSPs are work-based trained by continuing education and training providers, although the system will be transitioning with a new qualification published in 2019. Historically, PSPs were trained in a pharmacy registered as a training facility with the South African Pharmacy Council, where they were employed. The supervising pharmacist has to be registered as a tutor with the Council. The learner then registers with a programme provider and completes work-based training, with limited contact sessions, for a one-year duration for each level (Boschmans et al., 2017). The system will be transitioning, requiring the provider to adopt more responsibility in PSP training, relieving the time pressure placed on pharmacists in the workplace. The programme will no longer be work-based and, therefore, anyone who meets the entry requirements can be accepted to complete the training programme. The programme will have three components:

knowledge, practical, and work-based modules. The provider will also be responsible for placing learners in pharmacies that have been A-graded by the South African Pharmacy Council for the work-based learning component (South African Qualifications Authority, 2019a, 2019b). The South African Pharmacy Council is responsible for the accreditation of providers and quality assurance of programmes, alongside the Quality Council for Trades and Occupation (QCTO), who together set the standards for the qualifications (Quality Council for Trades and Occupations, 2019).

Scopes of practice and education are interdependent, and therefore, understanding how people learn is necessary when developing curricula to meet the needs of the scope of practice of a profession. The following section briefly considers learning domains since they form the framework of the content analysis methodology considered in this paper.

Learning domains

The learning domains include the cognitive, psychomotor, and affective domains. The cognitive domain refers to knowledge and the development of intellectual skills through a process that builds from a basic level of remembering and understanding through applying and analysing information to more complex thinking where evaluating and creating new information occurs. This hierarchy of thinking processes is well known as the revised Bloom's taxonomy of educational objectives (Anderson *et al.,* 2001). The term knowledge can refer to a factual, conceptual, procedural, or metacognitive understanding of a subject (Anderson *et al.,* 2001; UNESCO - IBE, 2013). For this study's purposes, factual and procedural knowledge was defined within the knowledge domain required by PSP qualifications. Factual knowledge is the "basic elements students must know to be acquainted with a discipline or to solve problems in it" (p46), and procedural knowledge is the "knowledge of how to do something" (p52) (Anderson *et al.,* 2001). Factual knowledge includes knowing the technical terminology associated with achieving the learning outcomes and knowledge of specific details, such as a particular treatment for a particular medical condition. Procedural knowledge is about the methods or skills needed to perform discipline-specific tasks. (Anderson *et al.,* 2001) In an occupational qualification, such as that of the PSP, this is essential since the learner must be knowledgeable about performing occupation-specific tasks, such as dispensing medicines or compounding an ointment.

Barnett and Coate (2004) refer to factual and procedural knowledge as propositional knowledge and experiential

knowing. They explain that knowledge acquisition should move from factual content to problem-based, case scenario type analyses. The role digital technology plays in knowledge acquisition is that it is readily available, but information gleaned is superficial. The authors suggest that students want to know more about how to solve a real-world problem than the foundational factual knowledge associated with the problem. They argue that knowledge is less concerned with acquiring knowledge and more about using knowledge to perform a skill. (Barnett & Coate, 2004) In this study, the knowledge domain considers the technical knowledge and practical skills a learner must have to work within their scope of practice in a pharmacy. In the work-based qualification, the learners' knowledge of a subject is played out in the workplace, performing tasks and solving case scenarios daily.

The psychomotor domain refers to physical or manual skills. Simpson (1966) developed a taxonomy for the psychomotor domain, expanding the work of Bloom, followed by similar taxonomies by Dave (1970) and Harrow (1972). Each taxonomy is arranged from simple to complex categories and describes the progression of developing a physical skill. While Harrow (1972) defines reflex, basic, and complex movement, Simpson (1966) focuses on the coordination of movement and motor skills. However, the taxonomy by Dave (1970) is the most quoted regarding adult learning. The most superficial level of Dave's (1970) taxonomy involves observing others' actions to imitate, followed by replicating the activity from memory. Once the simple levels are mastered, the higher levels of precision (no intervention necessary), articulation (integrating skills), and naturalisation (skill done without mental exertion, automatically) can take place.

Analysing the processes involved in learning a physical skill is not an objective of this study since only the qualification documents are analysed; however, classifying which learning objectives require a physical skill is central. Qualification documents identify skills that need to be performed but not the learning processes involved. The providers who write the curriculum, based on the qualification, need to consider the processes of learning new skills. Therefore, as discussed earlier, this study considers practical skills under procedural knowledge.

Barnett and Coate (2004) distinguish between three different skill sets, subject-specific skills, transferable skills (generic), and employment-related skills. Subject-specific skills are linked to procedural knowledge since the learner needs to know what the process or action is to perform a task and then acquire the actionable skill through the process of learning. Transferable skills include communication, word processing, presentation

skills, time management, and group work skills, to name a few. These skills are not necessarily part of a programme learning outcomes but have been built into the delivery or assessments of the outcomes. Some of these skills may integrate with subject-specific skills; for example, in interprofessional teaching, an assignment that considers the management of a patient's condition requires learners from different courses to contribute to the outcome of the assignment, and in so doing, they learn to work together as a team and manage their time. The identifiable characteristic of a generic skill is that it can transcend various occupational contexts. The skill application may differ in each context, but the principles of the skill are generic. Employers identify transferable skills as skills they most want in an employee because they have high value in the labour market (Barnett & Coate, 2004). In their literature study of labour market demands in the twenty-first century, Suarta and colleagues (2017) categorise communication skills, critical thinking skills, teamwork skills, and personal qualities as high demand generic skills. The UNESCO framework for transversal competencies identifies information and communication technology literacy and social and cultural competencies as necessary skills required by the twenty-first-century job market (UNESCO Bangkok Office, 2015).

For this study's purposes, subject-specific skills were included within the knowledge domain (procedural knowledge), and transferable skills were extracted into the skill domain to analyse the qualifications.

Employment-related skills are defined by Barnett and Coate (2004) as those skills dictated by the industry, profession, or stakeholders to curricula providers. In the case of PSP programmes, the SAPC as the regulatory body is the most significant stakeholder. Learners must uphold professional standards and work according to an ethical code published and regulated by the SAPC. Knowing how to learn and having a level of independence is also viewed as an employability skill. These skills require self-reflection and thus begin to overlap with the notion of being and speak to the affective domain (Barnett & Coate, 2004).

The affective domain involves attitudes and behaviours and includes managing emotions. Bloom and colleagues (1964) presented the processing of feelings in a hierarchical arrangement from passively receiving information to actively responding to what is said or done. The active response is followed by attaching worth to the information before organising it and reconciling it with existing values. Internalising the information is the final level, and Blooms explains that it involves adopting new values and forming a belief system based on those values (Bloom *et al.,* 1964; Bates, 2019).

Barnett and Coate (2004) believe in a "curriculum for life", a curriculum that affects the whole being for prosperity and builds resilience; this equates to the final levels of the affective domain described by Bloom and colleagues (1964), namely conceptualise and internalise. It is the most challenging domain to integrate, implement, and assess as part of a curriculum, but it is essential so that learners can fend for themselves in ever-changing circumstances in the workplace (Barnett & Coate, 2004; Bates, 2019).

Methods

The methodology described in this article is from Phase 1 of a broader study that aimed to determine if qualifications for PSP in South Africa have provided the knowledge and practical skills required by the prescribed scope of practice. The objective of Phase 1 of the study was to consider the intended curriculum defined by Billett (2006) and analyse the various iterations of PSP qualification. The research question posed was: What gaps exist/ed in each of the iterations of the qualification when the scope of practice is considered?
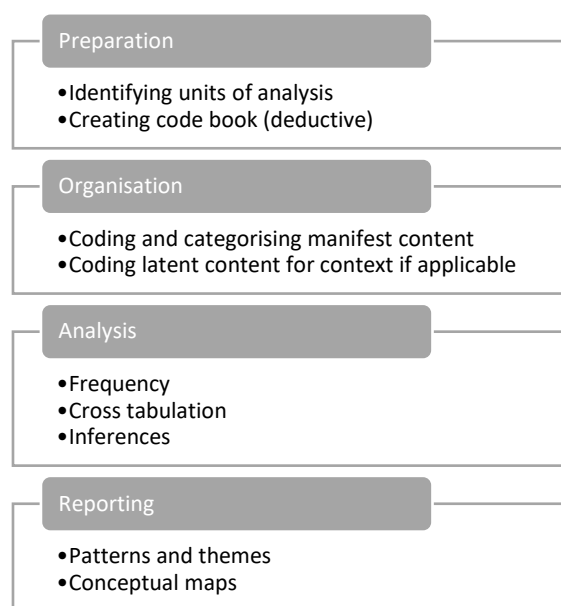
A summative content analysis of three iterations of pharmacy assistant (post-basic) qualifications was conducted to identify the differences in each iteration's content and technical requirements to answer the research question. This paper describes the methodology employed.

The process for all types of qualitative content analysis is similar in that the steps taken to achieve results follow the same basic format. These include preparing and organising the data, exploring the data, describing and developing themes from the data, representing and reporting the data, interpreting the data, and determining the trustworthiness of the findings (Creswell, 2015). Despite that, the central focus of content analysis is the systematic categorising of textual data to make sense of it, as to how categories are generated and applied to data, analysed, and reported differs (Hsieh & Shannon, 2005; Forman & Damschroder, 2007; Bengtsson, 2016). The research objectives thus determine the choice of application of content analysis.

The method applied was summative content analysis. This technique was chosen to compare different iterations of the qualifications for PSPs to meet, in part, the study's primary aim, which was to determine if qualifications for PSP in South Africa have provided the knowledge and practical skills required by the prescribed scope of practice.

In a summative approach to content analysis, identifying the unit of analysis is the first step. After that, a deductive approach is taken, where expected codes and

categories are identified. The manifest content is then coded and categorised, followed by a latent level of coding if applicable (Hsieh & Shannon, 2005; Kleinheksel *et al.,* 2019). The summative content analysis thus integrates quantitative and qualitative research characteristics by initially counting word or phrase frequency then taking the analysis to the next level of interpretation of the context in which the words or phrases are being used. Word counts and cross-tabulation of words and phrases appearing in the text are used to explore usage rather than infer meaning. Inferences are then made to contextualise the content (Hsieh & Shannon, 2005). The quantification and analysis process can be done manually, but software can facilitate the analysis of larger quantities of text. Atlas Ti (a qualitative data analysis software) was used in this study. Following quantification and analysis, reporting of themes and patterns occurs, and results are displayed as networks or conceptual maps (Patton, 2015). Figure 1 summarises the steps of the content analysis employed in this study.

Preparation
- Identifying units of analysis
- Creating code book (deductive)

Organisation
- Coding and categorising manifest content
- Coding latent content for context if applicable

Analysis
- Frequency
- Cross tabulation
- Inferences

Reporting
- Patterns and themes
- Conceptual maps

Figure 1: The method employed for content analysis

Preparation

The unit of analysis is loosely defined as the study sample by Creswell (2015) and Bengtsson (2016). The researcher needs to decide whether the whole unit of analysis will be used or just part thereof (Bengtsson, 2016). In this study, the unit of analysis was the scope of practice for pharmacist's assistants (post-basic) and the various iterations of the qualifications. Table II summarises the documents used in the content analysis to determine if qualifications met the scope of practice requirements.

No documentation for the first iteration, administered by SAPC, could be sourced. The basic and post-basic qualifications were both included because the basic qualification is a pre-requisite for entry into the post-

basic qualification. Keywords were identified in the scope of practice document, and a basic codebook for word counting was created.

Table II: Units of analysis used in the content analysis

Iteration	Document
Scope of Practice	GNR.1158 of 20 November 2000: Regulation relating to the practice of pharmacy
2nd iteration	SAQA ID: 82026 National Certificate: Basic Level Pharmacist Assistance SAQA ID: 82027 National Certificate: Post-Basic Level Pharmacist Assistance Unit Standards PAB and PAPB
3rd iteration	SAQA ID: 72049 National Certificate: Pharmacist Assistance (Basic) SAQA ID: 72050 Further Education and Training Certificate: Pharmacist Assistance Unit standards PAB Unit standards PAPB
4th iteration	SAQA ID: 112811 Occupational Certificate: Pharmacist's Assistant (Basic) SAQA ID: 112807 Occupational Certificate: Pharmacist's Assistant (Post Basic) Curriculum document

Organisation

The organisation of data occurred in three stages. Firstly, a quantitative word count of manifest content was carried out using the scope of practice document. The word count was followed by a more detailed analysis of

technical information using the SAQA qualification documents. Thirdly, the unit standards for the second and third iterations and curriculum document for the fourth iteration were added, and a final coding process was completed (Figure 2).
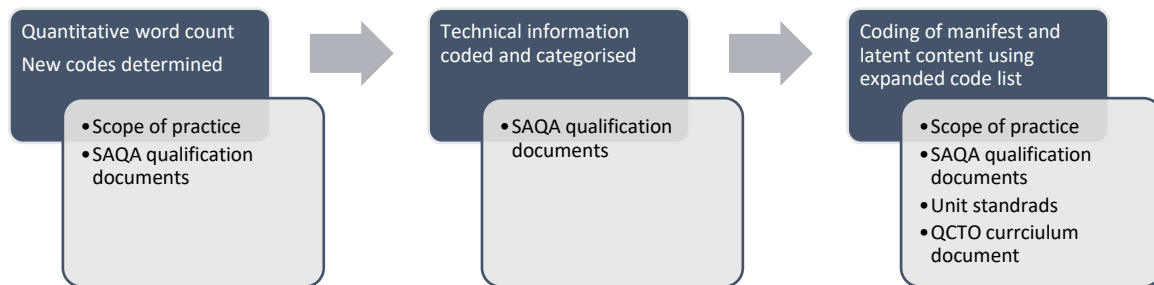
Figure 2: Stages of categorisation and coding

The scope of practice document was used to complete an initial quantitative word count. Words were identified within the scope document, and an auto-coding process was completed using Atlas Ti. Each qualification document was then read again and re-coded, taking the identified words and context into account. The codes were removed from some words or sections of the document, and others were added where applicable. Synonyms, variations of the code word, and phrases in a context equated to code words were identified and coded to be included in the quantitative analysis. Code words were assigned to code

groups that linked to occupational tasks as they appeared in the scope of practice regulations.

The information gained from the initial analysis was then used to create more specific codes for the knowledge and practical components of the qualifications. The Unit Standards of the second and third iterations and the curriculum document of the fourth iteration were coded in the third stage to identify curriculum content changes and compare the content of each iteration to the scope of practice.

Analysis

Occupational tasks were derived from the scope of practice document to facilitate data analysis. These tasks are reported in Table III. For each occupational task, activities to complete the tasks were identified using three principal sources; the Good Pharmacy Practice Standards of the South African Pharmacy Council (2017), the tasks and responsibilities document of the South African Pharmacy Council (n.d.), and a practice analysis for mid-level pharmacy workers by Boschmans et al. (2015). Table IV provides an example of the background knowledge components and workplace activities required to complete the occupational task of "Sale of schedule 1 (S1) and schedule 2 (S2) medicines".

Table III: Occupational tasks derived from scope of practice document

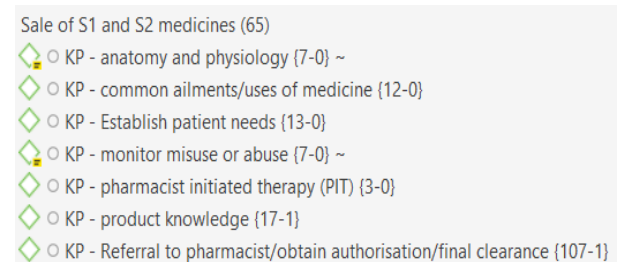| Occupational tasks |
| --- |
| • Sale of S1 and S2 medicines |
| • Extemporaneous compounding |
| • Manufacturing of sterile and non-sterile medicines |
| • Re-package medicines |
| • Distribute and control stock |
| • Order medicines under supervision |
| • Dispense medicines |
| • Provide instructions on the use of medicines |
| • Provide information to promote health |
| • Practice ethically within a legislative framework |
| • Provide housekeeping and administrative support |
| • Work under indirect supervision in a Primary Health Care dispensary |

Table IV: Core knowledge and workplace activities required to perform the occupational task of "Sale of S1 and S2 medicines"

Activities
• Anatomy and physiology
• Establish patient needs
• Procedure for referral to a pharmacist
• Appropriate health information provided
• Update records
• Recommend S0, S1 or S2 medicine in consultation with a pharmacist
• Knowledge of products
• Follow-up and advise referral to a medical practitioner
• Monitor abuse potential

For step 1 of the analysis, a word count was conducted, and a code-document table was used to compare word usage between the different qualifications. The word count guided the development of more descriptive codes and categories used in the next two steps of the content

analysis. The second step of the content analysis focused on the technical information provided by the qualification documents and setting codes to compare the knowledge and practical skills components. During the third step of the content analysis, only the intended curriculum content was coded. No technical information about the qualifications was coded during this step, as a complete analysis was possible during the second step.

Although the focus of the third part of the content analysis was on the knowledge and practical skills required by the scope of practice, all three learning domains were considered. The third step involved linking the knowledge and practical skill codes to activities within the occupational tasks. The code groups in Atlas Ti were the occupational tasks, and thus a deductive approach was used; the work-based skills and attributes were coded inductively. Figure 3 provides an example of the codes in the code group for the occupational task "Sale of S1 and S2 medicines". Determining generic and employability skills and attributes required more meaningful engagement by the researcher. Some skills were easy to identify, e.g., if calculations are part of the occupational task and the factual and procedural knowledge is covered by the qualification, a mathematical skill is required to do the type of calculation needed; however, others skills required more inference from the researcher. This also applied to coding attributes when the attribute of adaptability was not explicitly stated, for example. In this case, the researcher determined the implicit requirement of needing to be adaptable from a quote that referred to dealing with interruptions.

Sale of S1 and S2 medicines (65)
◇ ○ KP - anatomy and physiology {7-0} ~
◇ ○ KP - common ailments/uses of medicine {12-0}
◇ ○ KP - Establish patient needs {13-0}
◇ ○ KP - monitor misuse or abuse {7-0} ~
◇ ○ KP - pharmacist initiated therapy (PIT) {3-0}
◇ ○ KP - product knowledge {17-1}
◇ ○ KP - Referral to pharmacist/obtain authorisation/final clearance {107-1}

Figure 3: Codes in the code group for the occupational task "Sale of S1 and S2 medicines"

Reporting

The reporting of the content analysis results was done in three sections as described in the "organisation" of data. The initial quantitative word count, which identified word and phrase usage patterns, was displayed in tables. Table V shows the codes' frequency relevant to each occupational task and activity. Each occupational task was further analysed to consider the frequency of codes within each occupational task linked to relevant activities within the task. The results are available upon request.

Table V: Frequency distribution of codes per task

Occupational tasks	Scope		Second iteration		Third iteration		Fourth iteration		Totals	
	No of codes	Row-relative	No of codes	Row-relative	No of codes	Row-relative	No of codes	Row-relative	No of codes	Row-total
Sale of S1 and S2 medicines	2	16.67%	4	33.33%	3	25.00%	3	25.00%	12	100.00%
Extemporaneous compounding	41	24.12%	23	13.53%	7	4.12%	99	58.24%	170	100.00%
Manufacturing of sterile and non-sterile medicines	33	21.15%	22	14.10%	13	8.33%	88	56.41%	156	100.00%
Re-package medicines	2	20.00%	2	20.00%	0	0.00%	6	60.00%	10	100.00%
Distribute and control stock	8	8.42%	19	20.00%	22	23.16%	46	48.42%	95	100.00%
Order medicines under supervision	9	26.47%	5	14.71%	3	8.82%	17	50.00%	34	100.00%
Dispense medicines	26	23.85%	20	18.34%	12	11.01%	51	46.80%	109	100.00%
Provide instructions on use of medicines	1	16.67%	3	50.00%	1	16.67%	1	16.67%	6	100.00%
Provide information to promote health	4	16.00%	10	40.00%	10	40.00%	1	4.00%	25	100.00%
Practice ethically within legislative framework	2	2.94%	13	19.12%	23	33.82%	30	44.12%	68	100.00%
Provide housekeeping and administrative support	0	0.00%	2	14.29%	1	7.14%	11	78.57%	14	100.00%
Work under indirect supervision in a Primary Health Care dispensary	4	100.00%	0	0.00%	0	0.00%	0	0.00%	4	100.00%
Totals	132	18.80%	122	17.38%	95	13.53%	353	50.28%	702	100.00%

Note: Row-relative refers to the frequency of occurrence of the task in each document relative to the total number of occurrences of that task when all documents are considered

The technical information analysed in the second step of the content analysis was reported with the assistance of concept maps. A concept map is described by Maxwell (2013) as a "visual display" of information used to illustrate a theory, explaining that a concept map has two elements, i.e., "concepts and relationships among these", where these relationships are shown by connecting labelled circles or boxes with arrows or lines (Maxwell, 2013). Concept maps are presented as networks in Atlas Ti. A representation of what the results will look like using Atlas Ti is illustrated in Figure 4.

As defined in the literature review, the domains of learning were used to report the data analysed in the content analysis of the intended curriculum.

The focus was on the cognitive domain and comparing the three iterations of the qualification in terms of gaps in factual and procedural knowledge components against the occupational tasks required as derived from the scope of practice. Initially, this section was analysed using networks in Atlas Ti, but afterwards, the information was tabulated to identify gaps.

Table VI provides an example of the activities and codes for the occupational task "Sale of S1 and S2 medicines". A gap in the activity "Follow-up and advise referral to a medical practitioner" can be seen in all three qualifications. The process was repeated for each occupational task.

Conclusion

Content analysis can be a helpful tool in analysing large volumes of information. However, the process is time-consuming, and the networks become broad and challenging to manage in Atlas Ti. One of the study's limitations was that the provider curricula were not available for analysis. Therefore, although there may appear to have been gaps in the qualifications, the provider curricula could have compensated for these. The advantage of using content analysis as a methodology is that it added to the trustworthiness of data since every line and sentence of the documents was considered and coded. The analysis was broken down into three stages, making the process more manageable, and a single researcher could do the analysis. The project's aim was fulfilled in that recommendations were made for the development of future programmes and ensuring that qualifications and curricula cover learning domains required for success within the workplace.
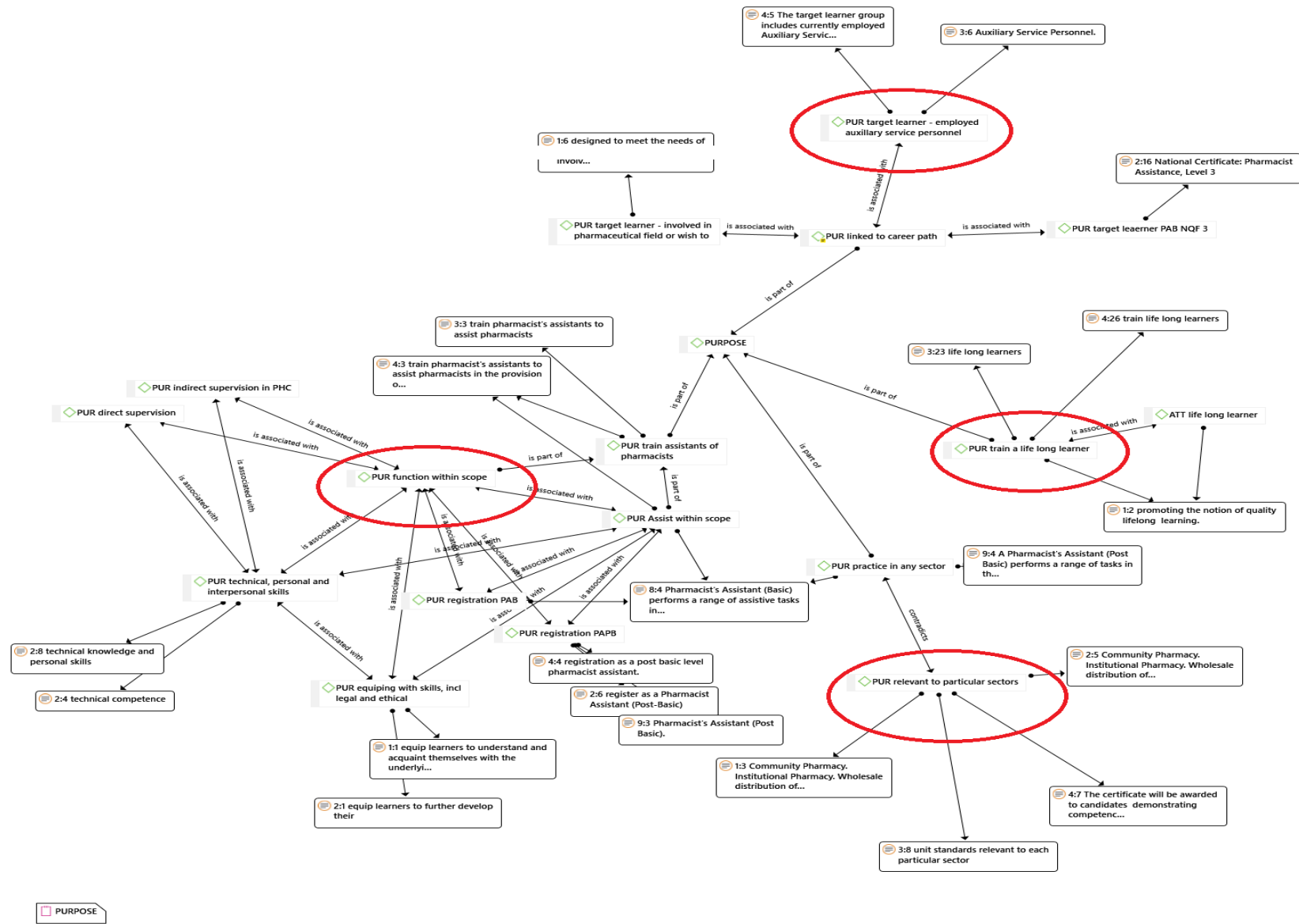
Figure 4: Concept map identifying the PURPOSE of each iteration of the qualification

Table VI: Activities and codes linked to the occupational task "sale of S1 and S2 medicines"

Activity linked to task	Second iteration	Third iteration	Fourth iteration
Anatomy and physiology	Basic aspects of human physiology (4:33)	The systems of the human body are anatomically described (8:175) The physiological functions of the systems of the human body are explained (8:176)	Identify anatomical structures (11:509) Anatomy, physiology & pathophysiology (11:268)
Establish patient needs	Establish the consumer's needs (4:7) Obtain information to establish the consumer's needs correctly (4:14)	Appropriate information is elicited from a client (8:186) Clients with special requirements are identified and examples are given (8:183)	Collect information pertaining to the patients' health care needs (11:490) Communicate with patients professionally in terms of sensitivity to patients' needs and diversity (11:436)
Procedure for referral to a pharmacist	Refer a customer to Pharmacist (4:9) Refer to the authorised person if advice and/or information cannot be given by the pharmacists' assistant (4:20) Identify and record excessive drug usage and requests and report to the pharmacist (4:283)	Client requests which fall outside the Scope of Practice are referred to the appropriate health professional (7:251)	Consult with the pharmacist to determine whether the symptoms may be associated with a serious condition (11:491) Advise the patient to consult the pharmacist should the symptoms persist beyond the period as stated in patient information leaflet/package insert (11:469)
Appropriate health information provided	*See task 9*	*See task 9*	*See task 9*
Update records	*No specific quote for task – refer to Legislation and scheduled registers*	Update and maintain the customer's information (7:100)	*No specific quote for task - refer to Legislation and scheduled registers*
Recommend S0, S1 or S2 medicine in consultation with pharmacist	Provide product: Offers a range of products according to the needs of the consumer where appropriate, assists the consumer in the selection of the product, provides the consumer with the required pharmacy product (4:19)	Common minor ailments are identified and described (8:182)	Assist with Pharmacist Initiated Therapy (PIT) (11:429) OTC medicines (11:496) Aetiology and epidemiology of the common acute conditions (11:482)
Knowledge of products	Product knowledge according to pharmacological drug classifications (4:357) Product names where appropriate (4:71)	Features and benefits of products offered are explained or demonstrated according to the product characteristics (7:247) Alternative products are offered where the original product does not meet the client's needs (7:248) Different product categories are defined, and examples are given of each (7:136)	Classification of pharmaceutical products (11:29) Top 200 medicines based on usage (11:270) Clinical uses of Top 200 medicines (11: 278)
Follow-up and advise referral to medical practitioner	*No specific quote for task*	*No specific quote for task*	*No specific quote for task*
Monitor abuse potential	Record excessive drug usage and requests in accordance with requisitions, and report to the authorised person (4:59)	Appropriate interventions, where misuse of medication is suspected, are described with practical examples (7:161)	Identify and monitor potential misuse, overuse and abuse of medicines (11:494)

References

American Society of Health-System Pharmacists. (2016). ASHP statement on the roles of pharmacy technicians. *American Journal of Health-System Pharmacists, 73*, 928-930. https://doi.org/10.2146/ajhp151014

Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., Raths, J., & Wittrock, M. C. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. Longman

Barnett, R., & Coate, K. (2004). Engaging the currciulum in higher education. Society for Research into Higher Education & Open University Press

Bates, B. (2019). Learning theories simplified: ... and how to apply them to teaching: 130+ theories and models from great thinkers. SAGE

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open,* **2**, 8-14. https://doi.org/10.1016/j.npls.2016.01.001

Billett, S. (2006). Constituting the workplace curriculum. *Journal of Curriculum Studies,* **38**, 31-48. https://doi.org/10.1080/00220270500153781

Bloom, B. S., and Committee of College, & University Examiners. (1964). Taxonomy of educational objectives (Vol. 1). Longman

Bolster, L., & Koyle, M. (2018, September 28). The evolution of pharmacy technicians: Traditional and emerging advancement opportunities. Pharmacy Times. Retrieved 20 May 2020 from https://www.pharmacytimes.com/publications/issue/2018/September2018/the-evolution-of-pharmacy-technicians-traditional-and-emerging-advancement-opportunities

Boschmans, S. A., Fogarty, T. L., & Brown, A. (2017). Technicians and other pharmacy support workforce cadres working with pharmacists: South African case study. *Research in Social and Administrative Pharmacy,* **13**(2), 294-296. https://doi.org/10.1016/j.sapharm.2016.10.009

Boschmans, S. A., Fogarty, T. L., Schafermeyer, K. W., & Mallinson, R. K. (2015). Practice Analysis for mid-level pharmacy workers in South Africa. *Pharmacy Education,* **15**(1), 31-38

Boughen, M., & Fenn, T. (2020). Practice, skill mix, and education: The evolving role of pharmacy technicians in Great Britain. *Pharmacy,* **8**(2), 50. https://doi.org/10.3390/pharmacy8020050

Boughen, M., Sutton, J., Fenn, T., & Wright, D. (2017). Defining the role of the pharmacy technician and identifying their future role in medicines optimisation. *Pharmacy,* **5**(3), 40. https://doi.org/10.3390/pharmacy5030040

Chew, L., Leng, L., Mok Shiang, N., & Brown, A. (2017). Technicians and other pharmacy support workforce cadres working with pharmacists: Singapore case study. *Research in Social and Administrative Pharmacy,* **13**(2), 291-293. https://doi.org/https://doi.org/10.1016/j.sapharm.2016.10.011

Creswell, J. W. (2015). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (5th ed.). Pearson

Dave, R. H. (1970). Psychomotor levels. In R. J. Armstrong (Ed.), Developing and writing behavioral objectives (pp. 33-34). Educational Innovators Press

Forman, J., & Damschroder, L. (2007). Qualitative content analysis. *Advances in Bioethics,* **11**, 39-62. https://doi.org/10.1016/S1479-3709(07)11003-7

Hansen, E., & Brown, A. (2017). Technicians and other pharmacy support workforce cadres working with pharmacists: Denmark case study. *Research in Social and Administrative Pharmacy,* **13**(2), 286-287. https://doi.org/https://doi.org/10.1016/j.sapharm.2016.10.008

Harrow, A. J. (1972). A taxonomy of the psychomotor domain: A guide for developing behavioral objectives McKay

Hsieh, H.-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research,* **15**(9), 1277-1288. https://doi.org/10.1177/1049732305276687

International Pharmaceutical Federation. (2017). Technicians and pharmacy-support-workforce-cadres working with pharmacists: A global descriptive study. International Pharmaceutical Federation

John, C., & Brown, A. (2017). Technicians and other pharmacy support workforce cadres working with pharmacists: United Kingdom Case Study. *Research in Social and Administrative Pharmacy,* **13**(2), 297-299. https://doi.org/10.1016/j.sapharm.2016.10.007

Kleinheksel, A., Tawfik, H., Wyatt, T., & Winston, N. (2019). Demystifying content analysis. *American journal of pharmaceutical education,* **84**(1). https://doi.org/10.5688/ajpe7113

Larsen-Cooper, E., Crawford, J., Ziba, M., Blauvelt, C., & Brown, A. (2017). Technicians and other pharmacy support workforce cadres working with pharmacists: Malawi case study. *Research in Social and Administrative Pharmacy,* **13**(2), 288-290. https://doi.org/https://doi.org/10.1016/j.sapharm.2016.10.010

Lassi, Z. S., Cometto, G., Huicho, L., & Bhutta, Z. A. (2013). Quality of care provided by mid-level health workers: Systematic review and meta-analysis. *Bulletin of the World Health Organisation,* **91**(11), 824-833. https://doi.org/10.2471/BLT.13.118786

Lehmann, U. (2008). Mid-level health workers. The state of the evidence on programmes, activities, costs and impact on health outcomes: A literature review. World Health Organisation

Maxwell, J. (2013). Qualitative research design: An interactive approach. SAGE

Moles, R. J., & Stehlik, P. (2015). Pharmacy practice in Australia. *The Canadian journal of hospital pharmacy,* **68**(5), 418-426. https://doi.org/10.4212/cjhp.v68i5.1492

NHS Careers. (2017). Entry requirements and training for pharmacy technicians. NHS. Retrieved 21 March 2017 from http://www.nhscareers.nhs.uk/details/Default.aspx?Id=894

Parrish, R. H. I., & Chew, L. (2018). Briefing note: Proceedings of the Singapore national clinical pharmacy colloquium - Health manpower development planning. *Pharmacy,* **6**(2), 54. https://doi.org/10.3390/pharmacy6020054

Patton, M. Q. (2015). Qualitative Research & Evaluation Methods: Integrating Theory and Practice. SAGE

Pharmacy Guild of Australia. (2004). Workforce and Career Options for Pharmacy Assistants. Healthcare Management Advisors

Pharmacy Technician Certification Board. (2021). PTCB Credentials. Pharmacy Technician Certification Board (PTCB). Retrieved 11 June 2021 from http://www.ptcb.org/

Quality Council for Trades and Occupations. (2019). Quality Council for Trades and Occupation. Retrieved 7 April 2020 from https://qcto.org.za/index.php

Rosado, H., John, C., Puaar, D., & Bates, I. (2015). An analysis of the initial education and training standards for pharmacy technicians and views on their fitness for purpose - A report to the General Pharmaceutical Council. University College London

Scott, D. (2017, July 4). Developing pharmacy in Malawi. The Pharmaceutical Journal. https://pharmaceutical-journal.com/article/opinion/developing-pharmacy-in-malawi

Simpson, E. J. (1966). The classifcation of educational objectives, psychomotor domain. University of Illinois

Skills Future Singapore. (2018). Skills framework for healthcare skills map - pharmacy technician executive Skills Future Singapore. Retrieved 21 May 2020 from https://www.skillsfuture.gov.sg

South African Pharmacy Council. (2017). Rules relating to Good Pharmacy Practice in South Africa. Juta and Company. https://www.pharmcouncil.co.za/Media/Default/Documents/Rules%20published%20in%20terms%20of%20section%2035A%20of%20the%20Pharmacy%20Act%2053%20of%201974.pdf

South African Pharmacy Council. (n.d.). Tasks and responsibilities relating to the scope of practice of pharmacy support personnel [Unpublished addendum to regulation]. South African Pharmacy Council

South African Qualifications Authority. (2019a). Occupational Certificate: Pharmacist's Assistant (Basic). South African Qualifications Authority

South African Qualifications Authority. (2019b). Occupational Certificate: Pharmacist's Assistant (Post-Basic). South African Qualifications Authority

Suarta, I. M., Suwintana, I. K., Pranadi, F., & Hariyanti, N. K. (2017). Employability Skills Required by the 21st Century Workplace: A Literature Review of Labor Market Demand. *Advances in Social Science, Education and Humanities Research,* **102**, 337-342. https://doi.org/10.2991/ictvt-17.2017.58

The Pharmacists' Defence Association. (2019). Pharmacy technicians: an assessment of the current UK landscape, and proposals to develop community pharmacist and pharmacy technician roles and skill mix to meet the needs of the public. . T. P. D. Association. https://www.the-pda.org/wp-content/uploads/FINAL-PT-Report-28-02-19.pdf

UNESCO - IBE. (2013). Glossary of curriculum terminology. UNESCO-IBE. http://www.ibe.unesco.org/en/glossary-curriculum-terminology/

UNESCO Bangkok Office. (2015). 2013 Asia-Pacific Education Research Institutes Network (ERI-Net) Regional Study on transversal competencies in education policy and practice. UNESCO. https://unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196&id=p::usmarcdef_0000231907&file=/in/rest/annotationSVC/DownloadWatermarkedAttachment/attach_import_e3ee90c2-f875-4690-b43e-2ba0ef10c180%3F_%3D231907eng.pdf&locale=en&multi=true&ark=/ark:/48223/pf0000231907/PDF/231907eng.pdf#Transversal_26_Mar.indd%3A.11440%3A1264