

**STUDENTS' PERCEPTIONS OF THE MEDICAL CURRICULUM AT THE
UNIVERSITY OF LIMPOPO**

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Declaration

I, Thakadu Arnold Mamashela, hereby declare that this research report is my own, unaided work. It is being submitted for the Degree of Master of Health Sciences Education at the University of the Witwatersrand, Johannesburg. It has not been submitted for any other degree or examination at any other university



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14 June 2023

Date

Abstract

Any educational program follows a process of development by various stakeholders. Program evaluation is an important step in curriculum development and implementation. This study evaluated the medical curriculum delivery from the perspective of the students at the new medical school of the University of Limpopo. The research employed a cross-sectional descriptive quantitative method using a survey. All students registered for the medical curriculum in their second to fifth years of study were invited to participate in the research.

The findings of this research showed there was a perception of factual overload in some modules, however, most of the modules were perceived to have been well taught with mixed methods of assessment strategies applied across the year levels of study. The infrastructure and the equipment required for teaching and learning activities were not considered satisfactory. Students embraced the use of technology in teaching and learning. The university provided adequate support in relation to Wi-Fi on campus. Recommendations for teaching/ practice and future research were made.

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Chapter 1

Introduction, Aims, Objectives and Conceptual Framework

1.1. Introduction

The Republic of South Africa (RSA) is amongst the countries on the continent that faces various challenges in the delivery of healthcare services to address the burden of disease. This is also a challenge faced by many developing countries in the world. Despite the substantial differences between developing and developed countries, the key themes in rural health are the same around the world. Many South Africans living in rural areas lack access to inexpensive, high-quality, and comprehensive health care, despite significant government investment in programmes to reform the health system (Gumede, 2021). The South African health care system is two-tiered with the least advantaged heavily dependent on the poorly resourced public sector, while the wealthy (many of whom have private medical insurance) use the adequately resourced private sector (Gordon, 2020). More than 40 million people who are uninsured are dependent on the public health care system that is served by only 30 % of the country's medical practitioners (Passchier, 2017).

The social determinants of health (which are external to the health system) should be addressed as a national priority, the health care system should be strengthened, and universal health coverage should be made easier (Mayosi, 2014). In 2016 a ninth medical school with an accredited program was opened in the Faculty of Health Sciences at the University of Limpopo. The opening of this ninth medical school was one of the initiatives aimed at alleviating the shortage of medical practitioners, in particularly to strengthen the human resources required to render quality health care services in the public sector and this was a national priority. The first cohort of students is currently in their second year of the medical internship program after the completion of the sixth year in 2021.

Any educational program follows a process of development by various stakeholders. It goes through the process of accreditation by various (education and professional) bodies before implementation. With the ultimate goal of delivering the best possible patient care, accreditation of undergraduate medical education programs is to guarantee the calibre of medical education and encourage quality improvement (Blouin, 2018). Program evaluation is an important step in curriculum development and implementation (Santen et al., 2019). The purpose of program evaluation is to

identify challenges that may have been encountered and bring about improvement in the quality of teaching and learning (Thomas et al., 2022).

To maintain and improve the quality of the medical education program, as well as to ensure that medical students complete all program objectives and participate in all necessary clinical experiences and settings, a medical school's faculty engages in curriculum revision and program evaluation activities (Santen et al., 2019). Through the internal quality assurance (IQA), the medical schools demonstrate being in control of their educational quality to accrediting bodies and continuously improve and enhance their educational programmes (Stalmeijer et al., 2023). It is about identifying program strengths and identifying areas that require curriculum reform because the ultimate goal of medical education is to train the students to be able to provide the best care to their patients as practitioners. To be successful in achieving this goal, we need to better understand the quality and impact of our medical schools and training programs (Triola, 2018).

The University of Limpopo's medical students were not consulted in any of the curriculum development cycles and their views could be valuable. Identifying areas for growth through the students' self-assessment and appraisal of their knowledge and its application is a useful method (Al-Drees et al., 2015). This medical curriculum has not undergone an evaluation. This study evaluated the medical curriculum delivery from the perspective of the students at the University of Limpopo.

1.2. Problem Statement

The founding medical students enrolled at the University of Limpopo were considered an important cohort. Due to the integrated nature of the program with some of its complexities in teaching and learning, it was important to determine the students' perceptions of the medical curriculum. The medical program at the University of Limpopo had not undergone an evaluation. Evaluation of the medical curriculum is one of the key aspects of quality assurance as it is aimed at improvement in various aspects of the program. The question is whether the educational process has achieved what was expected.

1.3. Aim of the study

The study aimed to determine the perceptions of the medical students enrolled in the medical program at the University of Limpopo about the program.

1.4. Research Question

The question which this study sought to answer was: What are the medical students' perceptions of the medical program at the University of Limpopo?

1.5. Research Objectives

- 1.5.1 To determine the students' perceptions of the educational environment/context of their teaching and learning.
- 1.5.2 To describe students' perceptions of the resources available for their teaching and learning.
- 1.5.3 To determine the students' perceptions regarding the structure and delivery of the modules in the various years of study.

1.6. Conceptual Framework

Stufflebeam's CIPP model (context, input, process and product) of curriculum evaluation was applied to this research. It focused on aspects related to the first three concepts, as the fourth concept – the product had not yet been produced. The CIPP model will be elaborated upon in Chapter 2.

1.7. The layout of the study

Chapter 2 of this study will provide the literature review and this contains a broad overview of the concept of 'curriculum' and the curriculum development cycle with the main focus on the evaluation phase. Various frameworks for curriculum development are described and the role of students during the curriculum evaluation phase is discussed.

Chapter three outlines the methodology used in the study, which includes the research design, research setting, study population and sampling. This study was a cross-sectional descriptive quantitative study and used a structured questionnaire for data collection.

Chapter four presents the results of the study.

Chapter five provides a discussion of the results.

Chapter six presents the study's limitations, recommendations and conclusion.

1.8. Conclusion

This chapter provides the background and introduction to the research. The aims and objectives were stated and the next chapter will outline the literature review that was conducted during this research.

Chapter 2

Literature Review

2.1. Introduction

This chapter provides a review of the literature on the role of students in the evaluation phase of curriculum development. The focus is on the perceptions of the medical students.

Fundamentally, educational initiatives are about change (Frye, 2012). The majority of people who take part in educational programs, including students, instructors, administrators, other health professionals, and a range of internal and external stakeholders, do so because they are motivated by a desire for change (Frye, 2012). The University of Limpopo's medical program is intended to bring the much-anticipated change in the education sector as this will contribute to the existing medical schools' production of medical practitioners. Most importantly, the products of this medical school will be of benefit to the provincial government by addressing health care service needs as this will increase the number of medical practitioners.

Students commonly assess undergraduate medical programs at various points throughout their training (Cantillon, 2017). While there are many potential sources of feedback and evaluation data on teaching used for quality assurance purposes, student feedback is the most common source of input for teaching evaluation (Debroy, 2019). The students' feedback provides evidence of how well learning objectives are being achieved and whether teaching standards are being maintained (Al-Drees et al., 2015). Questioning students has the potential to be valuable because their perceptions of their experiences as students will not have been tainted or diminished by their post-graduation experiences, even though data collected sometime after graduation provides information derived from experiences as practitioners (Green-Thompson et al., 2012). The information gained from these processes can be used to identify problem areas and implement changes to the curriculum, educational delivery and the physical environment. The strengths of a curriculum are also identified during these evaluation processes (Green-Thompson et al., 2012). Medical students play a pivotal role in faculty development initiatives and quality assurance in medical education through their learning experiences (Blitz, 2019).

2.2. Curriculum

Harden defines curriculum as “a sophisticated blend of educational strategies, course content, learning outcomes, educational experiences, assessment methods, the educational environment, and the individual student’s learning style, personal timetable, and program of work” (Harden, 2001 p.123).

A curriculum is an intellectual, social, and aspirational declaration that must take local conditions and needs into account. All of the learning experiences that students will have in clinical and basic sciences, as well as clinical skills at the undergraduate and graduate levels, make up a curriculum in medical education (Grant, 2018).

The most significant embodiment and conception of the curriculum is derived from the learning environment. The social interactions, organizational culture and structures, as well as the physical and virtual places that surround and mold the learners' experiences, perceptions, and learning, make up the learning environment (Gruppen, 2019). A curriculum is mainly as illustration of how educational principles are put into action (Prideaux, 2003).

A curriculum outlines the teaching and learning procedures as well as the goals for the course of study. It also provides a rationale for the topic or subject to be studied (Grant, 2018). At least four crucial components make up a curriculum: goals or objectives, materials or topics, methods or procedures, and assessment or evaluation (Mohammed, 2022).

So, a curriculum is much more than a "syllabus," which is essentially a summary of the course's or program's themes or substance (Grant, 2018). “A curriculum is a strong weapon, hence conflicts over power and control over its organization, content, and implementation frequently centre on it both within institutions and in the broader society” (Grant, 2018 p.72).

Higher degrees of organizational abilities are required for the planning and delivery of curriculum in medical education (Sanchez-Reilly, 2012). First, a medical curriculum must have clear learning objectives and criteria, the goals must be understood by important participants including students and faculty (Sanchez-Reilly, 2012).

2.3. Curriculum design

Curriculum design refers to the ways in which we position the curriculum components (Mohanandasundaram, 2018). “The curriculum must be in a form that can be

communicated to those associated with the learning institution, should be open to critique, and should be able to be readily transformed into practice. The curriculum exists at three levels: what is planned for the students, what is delivered to the students, and what the students' experience" (Prideaux, 2003 p.268). It is an academic plan which should include: the purpose of the curriculum (i.e. goals for student learning), content sequence (the order of the learning experience), instructional methods, instructional resources, evaluation approaches and how adjustments to the plan will be made based on experience or assessment data (Alfauzan, 2017).

The curriculum should be designed in such a way that It will direct students, teachers, and educational administrators (Grant, 2018). In addition, it should allow for the teacher's creativity and individual professionalism as well as the learner's personal preferences in its implementation, provided that all parties are aware of the objectives (Grant, 2018).

For instance, United Nations Educational, Scientific and Cultural Organization (UNESCO) uses the terms "planned curriculum", "written curriculum", "official curriculum", "implemented curriculum", "achieved curriculum", "learned curriculum", "hidden curriculum", "curriculum system", and "curriculum processes" (Grant, 2018 p.72).

The intended curriculum is the part of the curriculum that supports educational objectives and is planned by a curriculum committee (Brauer et al., 2023). "The curriculum in action consists of the teaching of the students, and the learned curriculum is what students learn. If there are considerable discrepancies between any of these three 'curricula' the education is neither effective nor efficient" (Moercke, 2002).

"The hidden curriculum, also known as the unintended curriculum, encompasses those aspects of education that are not explicitly defined and discussed but that foster changes in students' attitudes, behaviours, and knowledge. The hidden curriculum describes those aspects of the educational environment and student learning (such as values and expectations that students acquire as a result of going through an educational process) which are not formally or explicitly stated but which relate to the culture and ethos of an organisation" (McKimm, 2007).

2.4. Curriculum models or frameworks

There is no evidence to support the idea that there is "one optimal way," despite the abundance of research on various curriculum models and teaching and learning techniques that have been published (Grant, 2018). This is due in part to the fact that a curriculum is made up of a large number of components, and there is little evidence that there is a preferred option for even one of these components in all situations (Grant, 2018).

Some of the most popular organizational models and frameworks are based on the spiralling of subjects, systems or life stages modules, core and options, vertical or horizontal integration of information or experiences, and themes. (Grant, 2018).

2.4.1 Vertical or horizontal integration

Most traditional discipline-based curricula present knowledge and skills based on the subject matter, such as anatomy, physiology and pathology in their own right. "The method of teaching medicine, since Flexner's days, implies that students should first learn basic and biomedical sciences and then move to clinical sciences; however, this is not how patients present" (Quintero et al., 2016). This strategy is frequently criticized because students won't understand how basic and biological sciences are related to clinical practice and it is desirable to encourage students to think like doctors as soon as they enroll in medical school. (Quintero et al., 2016).

An integrated curriculum arranges the subject matter to be learned around something more relevant to practice or at least makes an effort to connect knowledge from several fields. In the discipline-based curriculum, integration has to occur entirely in the student's head by putting it to use in practice (Grant, 2018). Undergraduate medical education can handle curriculum integration as either vertical integration between the clinical and basic sciences or horizontal integration between several topic areas (Grant, 2018).

"The definition of horizontal integration is the merger of several disciplines over a limited time. Anatomy, physiology, biochemistry, and neurobiology are only a few examples of the basic sciences that are routinely combined into a single, year-long introductory course as examples of horizontal integration in the literature" (Brauer, 2015 p.314). The blending of several themes within a course of study is another example, as in the case of including instruction in ethics and clinical skills in first-year courses (Brauer, 2015).

Vertical integration aims to eliminate the traditional gap between basic and clinical sciences to enhance education (Brauer, 2015). Traditionally, there was a barrier as the basic sciences would run for a year or two depending on the institution separate from the clinical skills that were introduced later in the years from the third year or fourth year.

2.4.2 Spiral integration

In its ultimate form, spiral integration combines horizontal and vertical integration, bringing together integration across time and disciplines (Brauer, 2015). This has lately been described as a curriculum that involves studying both sciences (basic and clinical) throughout a wide range of subject matter and time (Brauer, 2015).

As they advance through the course, students should revisit the content using spiral integration because this is practically inescapable in practice. (Grant, 2018). In describing an example of a spiral curriculum, Grant states that the main stages of the course, which dealt with normal structure, function, and behaviour, abnormal structure, function, and behaviour, clinical practice, and finally on-the-job learning, may be designed in the curriculum to be revisited during the themes of clinical methods, ethics, and health promotion, and their accompanying attitudes, knowledge, and skills, in more complex ways (Grant, 2018).

2.5. Curriculum evaluation cycle

Evaluation and assessment are words that are frequently used interchangeably in the education environment (Vaughan et al., 2014). While evaluation is commonly believed to refer to the process of gathering data about a course or program of teaching for further judgment and decision-making, the main goal of assessment is to gauge student performance (Vaughan et al., 2014). Rather than concentrating on the evaluation of a single or group of individuals, evaluation focuses on the design, execution, improvement, or outcomes of a program (Lovato C. and Peterson L., 2018). "Medical education is continually evolving, necessitating ongoing programmatic evaluations to determine the worth of the programmatic components and whether overall goals and objectives are being attained" (Karpa, 2012 p.783).

One of the most crucial methods for assessing any educational program's quality is through evaluation and this might result in program reformation, alteration, or discontinuation. (Toosi et al., 2021). Assessment and evaluation of objectives and

strategies, executive policies, operational procedures, products, and outcomes are necessary for quality in higher education (Toosi et al., 2021).

While enabling educators to learn essential information about their program and maintain ongoing program development, a strong program assessment process promotes accountability (Vaughan et al., 2014). The main purpose of evaluation is to establish whether the programme is working as intended and if there are any unintended consequences (Lovato C. and Peterson L., 2018).

“According to Cook (2010), evaluations are generally used to inform policy and guide decisions, such as:

- a. determining effectiveness,
- b. identifying areas for improvement,
- c. optimizing resource allocation, and
- d. empowering individuals (teachers, students, administrators, policymakers, etc.) in their respective roles”.

The evaluation shows whether or not teaching standards are being upheld and how well students' learning objectives are being met. It is significant because it allows the curriculum to change. Furthermore, the outcomes of the evaluation process are used to determine if an educational programme is of an acceptable standard and may be approved for training and accreditation purposes (Lovato C. and Peterson L., 2018). A medical curriculum ought to be updated regularly to meet the demands of students, organizations, and society (Morrison, 2003).

Evaluation is typically done for local use and does not typically need approval from an ethics committee. Yet, curriculum committees must carefully analyse evaluation to make sure it is carried out in an ethical manner (Morrison, 2003).

2.6. Curriculum evaluation models

“Curriculum evaluation can be broadly defined as the continuous systematic process of gathering information about all elements of a curriculum, analysis and interpretation to help arrive at an understanding of the extent to which goals, objectives and outcomes have been achieved and subsequently take informed decisions for further improvement” (Goldie, 2006., p. 210).

The use of numerous models, such as the logic model, as well as objective-oriented, expertise-oriented, management-oriented, naturalistic, and participant-oriented

evaluation methodologies have all been discussed (Musal et al., 2008). There are different reports on the available models of curriculum evaluation in education, with some literature reporting more than 50 models (Nouraey et al., 2020). Lovato and Peterson (2018) reported as many as 13 different models and approaches to evaluation. Some of these models have constantly been investigated by other researchers and are more reputable in the field, while some have been less studied (Nouraey et al., 2020). There are some widely used models that are well suited to medical education such as Kirkpatrick's hierarchy; the context-inputs-process-products (CIPP) model (Lovato C. and Peterson L., 2018). Educational institutions have been advised to weigh the benefits and drawbacks of various evaluation models and approach to create an evaluation model that is unique to their institution and meets their specific needs (Musal et al., 2008).

2.6.1. The experimental/quasi-experimental models

Arising from the reductionist theoretical foundation, the validity of findings from studies using these designs depends on the evaluator's careful validation of the assumption of linear causal relationships between program elements and desired program outcomes (Frye, 2012). This model is less useful in the complex environments of educational programs: true experimental, tightly controlled designs are typically very difficult to implement in educational programs as complex as those in medical education" (Frye, 2012).

2.6.2. Kirkpatrick's four-level evaluation model

"Kirkpatrick described four levels of program outcomes to be assessed. The first level is learners' and instructors' reactions and contentment with the program that is at the base of the pyramid indicating some satisfaction in the teaching and learning. The second level evaluates the growth in learners' knowledge and competence, and the third level evaluates whether learners apply their new knowledge and skills through appropriate behavioural changes in their subsequent work/roles. The fourth level is to evaluate the impact of the program on the institution and society in which the program was implemented" (Musal et al., 2008).

The limits of Kirkpatrick's hierarchy have drawn criticism, despite its widespread adaptation and application in medical education. Unfortunately, most educational evaluations have focused on the base of the pyramid that is related to the satisfaction

and learning, with few evaluating long-term impact questions such as the impact of the intervention on the society or the community (Lovato C. and Peterson L., 2018).

2.6.3. The logic model

“This is often used during program planning instead of solely as an evaluation approach. The Logic Model structure strongly supports a rational evaluation plan. The Logic Model’s structure shares characteristics with Stufflebeam’s CIPP evaluation model but focuses on the change process and the system within which the educational innovation is embedded” (Frye, 2012).

The model comprises four basic components, mainly inputs, activities, outputs and outcomes. It is based on the presumption that the connections between the instructional strategies used in the program and the desired outcomes are well understood (Baylis et al, 2021). With the use of this model, educators can create a theory of change by outlining certain logical presumptions regarding how resource inputs into a program lead to deliverable outcomes (Baylis et al, 2021).

There are three primary areas of criticism of logic models. The first is that it can take so much time and so many resources that not enough energy and resources are left to complete whatever task the logic model was to facilitate (McLaughlin, 2015). The idea that logic models are overly linear is a second area, however almost little in modern society is linear, and people frequently presume a temporal sequence that may not actually exist (McLaughlin, 2015). Thirdly, the models' applications are rigid rather than dynamic, failing to account for the inherent change in the program and its environment (McLaughlin, 2015).

2.6.4. The CIPP model for curriculum review

This study was conducted following a framework used to evaluate educational programs, Stufflebeam’s CIPP model to establish the perceptions of the curriculum by the medical students. The CIPP model evaluates the context, input, process and product (Stufflebeam, 2000).

The model proposes a context evaluation, which assesses needs. “The “I” in CIPP refers to an input evaluation, which assesses plans or strategies used and the responsiveness of the programme to client needs, while process evaluation looks at the extent to which outcomes were met” (Madaus, 1983; Stufflebeam, 2000).

Because the study's participants were still registered students, the CIPP's product

aspect was not assessed. Evaluation of the product can only be performed once the students graduate from the program.

a. Context

According to Stufflebeam, context evaluation involves analysing the general needs of stakeholders, the resources at hand, and any issues with the program within a specified environmental context (Harris et al., 2010).

This model evaluates the context in which the curriculum was delivered or prepared for delivery. The teaching and learning environment from the lecture rooms, tutorial rooms, laboratories, libraries, clinical teaching sites and student accommodation are among the critical aspects of the environmental needs of the curriculum.

The social interactions, corporate culture, and physical and virtual places that surround and mold learners' experiences, perceptions, and learning are referred to as the learning environment (Gruppen, 2019). The learning environment is the area that overlaps the "work environment" (the clinical setting in which trainees receive training and assist with patient care) and the educational context that comprises of curricula, and objectives that specify teaching strategies, desired learning results, and assessment procedures (Nordquist et al., 2019).

The learning environment is influenced by teaching and learning opportunities such as a consultant sending students to a ward without engaging them in scheduled bedside instruction. (Isba, 2013). As such, while teaching activities are often considered part of the formal and informal aspects of the curriculum, they are also a powerful force within the hidden curriculum and may have an impact on the learning environment, either favourably or unfavourably via several means (Isba, 2013).

While no learning environment is likely to be perfect in terms of resources available to learners, those with responsibility for this aspect of the learning environment must be sensitive to the actual needs of those learners (Isba, 2013). There are currently significant challenges in the learning environment such as overcrowded clinical environments, understaffing and service pressures and clinical workload as barriers to learning particularly in the clinical learning environment (Kilty et al, 2017).

b. Input

This relates to the teaching and learning strategies used. Aspects that also need to be evaluated are teaching and learning resources that are required to apply the

strategies. Here, facilities like the library, book availability, technology used in education, and pertinent aspects of the institutional culture like the Dean's or departmental support will be taken into account. (Vaughan et al., 2014).

Also of importance is the teaching staff as they are key in delivering the program and it relates to how prepared and developed they are to teach the curriculum. The word "faculty development" is frequently used in the literature on medical education to describe a specific collection of educational activities, usually geared at developing skills in niche fields like grant and manuscript writing, curriculum creation, and teaching (Hafler et al., 2011). Faculty development includes both general processes linked to the more general concept of socialization as well as specialized, formal experiences for skill-building (Hafler et al., 2011). Being a faculty member requires a process of occupational enculturation that incorporates a variety of social behaviours that are infused with both formal/explicit and informal/implicit learning elements (Hafler et al., 2011).

c. Process

The process emphasizes how the program is applied and assesses how the educational program affects students (Toosi et al., 2021).

Process evaluation includes an assessment of the teaching and learning activities as well as the attitudes, skills and experiences of the instructors, and the management and supervision practices (Toosi et al., 2021). In other words, the term "process" refers to all of the actions that are carried out when the program is being implemented.

This concept considers students' views about early clinical exposure sessions considering the integrated nature of the curriculum whereby various departments are involved during the delivery of a module. Placing students in clinical learning environments from the beginning of the medical curriculum assist them to become accustomed to their new roles as learners as well as their future professions (Liljedahl et al., 2015).

2.7. Students as key stakeholders during the curriculum evaluation

It is a typical practice at many higher education institutions for students to give lecturers feedback through anonymous written surveys. Although teachers generally use the feedback to enhance student learning, its effectiveness in enhancing

teachers' instructional practices has not been proven (Könings et al, 2021). The literature provides some, if scant, evidence that medical students' contributions to enhancing their educational programs have not yet been fully tapped (Milles et al., 2019). Medical education is one area where medical students may contribute significantly, and including them as important stakeholders in their education can have a substantial impact on both the students and the institutions that support them (Geraghty et al., 2020).

Involving learners in the design of teaching and learning contributes to improvement in the quality of education, by addressing perspectives of different stakeholders and stimulating teachers' growth (Könings et al, 2021).

Medical students are frequently regarded as a trustworthy and legitimate source of information in curriculum review as they observe teaching daily (Ranasinghe et al., 2011; Cantillon, 2017; Dinkevich, 2006). They are a useful resource that is also reasonably priced. Curriculum development uses students' descriptive evaluations of a curriculum as a key tool (Ranasinghe et al., 2011; Cantillon, 2017; Dinkevich, 2006).

"They are in a great position to create resources, carry out analysis, and evaluate the program" (Furmedge, 2014). Their involvement at all levels makes them feel engaged in the design of the course and the education of their peers, which ultimately raises student happiness (Furmedge, 2014).

A key strategy for increasing medical students' satisfaction and engagement is to involve them in all facets of their program, including its design, execution, and evaluation (Furmedge, 2014). Pressure is mounting on medical schools to provide top-notch, reasonably priced resources both within and beyond the classroom as a result of the introduction of new technologies and the expansion of the online learning environment (Furmedge, 2014). Students are in a unique position to contribute to the evaluation of the curriculum with the desired results since they are technologically savvy, digital natives, and have these other skills (Furmedge, 2014).

Student engagement describes a wide range of initiatives to improve students' learning and growth, in addition to the norm of the academic environment and institutional culture (Milles et al., 2019). It represents a mutually beneficial collaborative approach between students and their institutions (Milles et al., 2019).

Giving students ownership by involving them in teaching, planning, development and decision-making inspires them to engage with and improve their educational community (Furmedge, 2014). In addition to involvement in school administration, academic communities, and the local community, curriculum development activities, including curriculum design, reform, and improvement, represent an important domain for student engagement in medical education (Milles et al., 2019).

The students are stakeholders in the academic community who have seen the "curriculum in action," represent its output, and have a voice. (Milles et al., 2019). Furthermore, the level of student participation has been utilized as a barometer for medical education institutions' excellence and as a quality indicator for medical programs (Kassab et al, 2023).

2.8. Conclusion

The nature of the curriculum and the function of curriculum evaluation in educational development were covered in this chapter. The importance of the stakeholders, particularly the students, in the entire curriculum development cycle was also emphasized.

Utilizing comprehensive and methodical curriculum review models as a reference, considering that learning is a continuous process and that the educational system is built around these processes, it is expected that all components of the system will be consistently interrelated (Toosi et al., 2021).

The University of Limpopo has not yet embarked on a curriculum evaluation process and the findings from this study will be of value considering that these data were collected and analysed from one of the key stakeholders.

Chapter 3

Methods

3.1. Introduction

This chapter discusses the methodology utilised in the study, which includes the research design, research setting, study population and sampling. The chapter further describes the piloting of the collection tool, and how the data were collected and analysed. The validity and reliability of the data collection tool and ethical considerations are also detailed in this chapter.

The researcher encountered two major delays in conducting this study. Firstly, ethical approval was required from the study site and although requested in September 2019, it was only granted in February 2020. Secondly, this came just as COVID-19 was identified in South Africa and lockdown measures were imposed. This resulted in the change from face-to-face learning to a completely online approach. Students were off campus for most of the year after hard lock-down measures were instituted and this prevented the administration of the questionnaire.

Ethical approval had been sought and obtained for the face-to-face administration of the questionnaire and not an online administration. Generally, response rates for online surveys are poor compared to face-to-face data collection (Nayak & Narayan, 2019). It was decided to wait until students were back on campus to proceed with data collection.

This study's main emphasis was the perceptions of the students of the medical curriculum at the University of Limpopo.

3.2. Research Design

3.2.1. Study Setting

The setting was the School of Medicine at the Faculty of Health Sciences, University of Limpopo. In 2016 a ninth medical school with an accredited curriculum was opened in the Faculty of Health Sciences at the University of Limpopo. This enabled the university to enroll and register the first intake of students into a six-year program in 2016. Limpopo is a rural province and the university is located in Mankweng township with the clinical teaching and learning activities taking place in the two accredited tertiary hospitals (Mankweng and Pietersburg Hospital in Polokwane).

There was a need to have this medical school to address the health-care needs of the province which has an overall doctor-to-population ratio of 16.4/100 000 for the five districts (Gerein, Green & Pearson, 2006).

3.2.2. Study Design

A cross-sectional descriptive quantitative study using a survey design was conducted to determine the perceptions of the students registered for the medical curriculum. Cross-sectional studies are characterized by the collection of relevant information (data) at a given point in time (Kesmodel, 2018).

3.3. Population

The target population was years 2 to 5. There were a total of 226 students in the four years of study in 2022.

3.4. Sample

Given the size of the target population, the entire population of students in years 2-5 of the programme were invited to participate in the study. Table 3.1 below reflects the number of students in each year of study.

Table 3.1 Number of registered medical students at UL in 2022

<i>Year of study</i>	<i>Number of students</i>
2	57
3	57
4	60
5	52
Total	226

3.4.1. Inclusion Criteria

All students who were registered for the 2nd to the 5th year of the MBChB program were included.

3.4.2. Exclusion Criteria

Year 1 medical students and all students who were in the sixth year of study (including those from the Nelson Mandela Fidel Castro program) were excluded from the study. The first-year students were only three months into

the program at the time of data collection. Students enrolled in the Nelson Mandela Fidel Castro program are only registered in their sixth year of study.

3.5. Pilot Study

A pilot study of the tool was conducted by administering the questionnaire to the class representatives of the included year levels. The questionnaire was distributed by the program coordinator for completion and the students returned the completed questionnaires with no comments. These questionnaires were included in the total sample as there were no changes made.

3.6. Validity and reliability

The ability of the instrument to measure what it is designed to measure is referred to as validity (Tavakol & Dennick, 2011; Barry et al., 2014). The data collection tool was designed by the researcher and discussed with the supervisor for accuracy. This was further subjected to a panel of assessors who were experts in the field of health science education before ethics submission to the Human Research Ethics Committee (HREC) of the University. The panel members were all or had been actively involved in curriculum development and evaluation. Two members had postgraduate diplomas in health science education or education at tertiary level.

Reliability refers to the consistency of a measure by ensuring that results can be reproduced when the study is repeated under similar conditions (Barry et al., 2014; Mohamed, Moey, & Lim, 2019). This was achieved through the use of a structured questionnaire. All students responded to the same questions in the same order. The same questionnaire, adapted to the year of study, was administered with instructions on how to complete the questionnaire.

3.7. Data collection procedure

Data collection commenced in April 2022 and was completed in June 2022. At the beginning of 2022, students returned to campus for face-to-face teaching and learning. However, given that most of 2020-2021's teaching and learning had been in the online format, minor changes were made to the questionnaire. This required that the questionnaire be re-submitted to the Human Research Ethics Committee (HREC) of the Faculty of Health Sciences, University of the Witwatersrand for approval and this was granted by the HREC (Appendix F).

The questionnaires were distributed by the module co-ordinator or a lecturer at the end of a teaching session. Students completed the questionnaires and handed them back to the distributor before leaving the venue.

A total of 226 questionnaires were distributed to the participants. Of these, 147 were completed and returned, yielding a response rate of 65%. All the questionnaires were collected and returned to the researcher, whether completed or not.

3.7.1. Data collection instrument

A questionnaire with both open and closed-ended questions was used for the study (See Appendix C). This comprised five sections dealing with the following:

Section 1: Biographical information

Section 2: Teaching, learning and assessment in the medical curriculum

Section 3: Learning environment

Section 4: Student accommodation

Section 5: Institutional processes

Sections 2 to 5 of the questionnaire were informed by Stufflebeam's CIPP (context, input, process & product) model of program evaluation (Toosi et al., 2021).

"Evaluation is one of the most important tools for determining the quality of any educational program, which can lead to the reformation, revision, or termination of programs" (Toosi et al., 2021 p.1). "The CIPP Evaluation Model is a comprehensive framework for guiding evaluations of programs, projects, personnel, products, institutions, and systems" (Stufflebeam, 2015). Only the first three elements of the model were utilized as the product would have required that graduates who had completed the medical program be sampled. The three elements of the CIPP model were adapted as follows:

a. Context

"Stufflebeam describes context evaluation as assessing the broad requirements of stakeholders, the available resources, opportunities and potential problems for the program within a defined environmental context" (Harris et al., 2010; Frye & Hemmer, 2012; Toosi et al., 2021). The educational environment was evaluated by asking four questions relating to the teaching and learning infrastructure such as lecture halls, tutorial or small discussion rooms, laboratories and students' residences.

b. Input

“Input evaluation helps to determine an appropriate programme model to satisfy the identified needs” (Mirzazadeh et al., 2016). It also focuses on human and financial resources, policies, educational strategies, barriers, and limitations of the education system (Toosi et al., 2021). Students’ perceptions of teaching and learning strategies used in this medical curriculum were assessed. The aspects such as teaching and learning resources, library, availability of books, technology in education and important aspects about the culture of the institution, e.g. Dean’s or departmental support were evaluated. A total of 14 questions were asked in this section

c. Process

In process evaluation, performance issues during educational activities are identified or predicted, and the viability of the implementation process is assessed (Toosi et al., 2021). The implementation of the program and how it affects students are discussed throughout this phase of the process (Toosi et al., 2021). The integrated nature of the medical curriculum involves various departments during the delivery of the different modules at different year levels and the students were asked about the volume of work in the modules, and how well or poorly they were taught and assessed. There were seven questions posed about the process.

3.8. Data Management

The researcher was the only one with access to the hard copies of the questionnaires, which were kept in a locked cabinet. The Epicollect programme (version 5 of 2020) and the Excel spread sheet developed (version 14 of 2016) were password-protected, and copies were kept in a password-protected Dropbox (version 288.2.2).

3.9. Data Analysis

Data were captured using Epicollect (version 5 of 2020) and Microsoft® Excel (Microsoft Corporation version 14).

Descriptive analysis was applied to both quantitative and open-ended questions. Descriptive statistics were used to describe and summarize data in a tabulated format, using graphs, pie charts and statistical comments. The responses to the open-ended questions were analysed for similarity, and themes were then developed.

3.10. Ethical Considerations

3.10.1. Ethical clearance

Ethical clearance to conduct the study was granted by the Human Research Ethics Committee (HREC) of the Faculty of Health Sciences, University of the Witwatersrand (Appendix D).

The University of Limpopo's Turfloop Research Ethics Committee (TREC) approved the study's execution. (Appendix E).

3.10.2. Confidentiality

The students were informed during the administration of the questionnaire about the study and that it was not compulsory to complete the questionnaire but voluntary (Appendix A). Furthermore, they will give consent to participation in the study by signing a consent form (Appendix B). The signed consent form was separated from the completed questionnaire before data capture.

3.11. Conclusion

This chapter has outlined the study design used to obtain students' perceptions of the medical curriculum at the University of Limpopo. The population, sample and data collection methods, utilising a self-administered questionnaire have been described. The following chapter will include a description of the study's findings.

Chapter 4

Results of the study

4.1. Introduction

In this chapter, the results from the data that were collected in response to the structured questionnaire are described.

4.2. Response rate

Of the 226 questionnaires that were distributed, 145 were completed and returned (65%). The third and fifth years showed the highest number of responses with 61 and 44 respectively (See Fig 4.1).

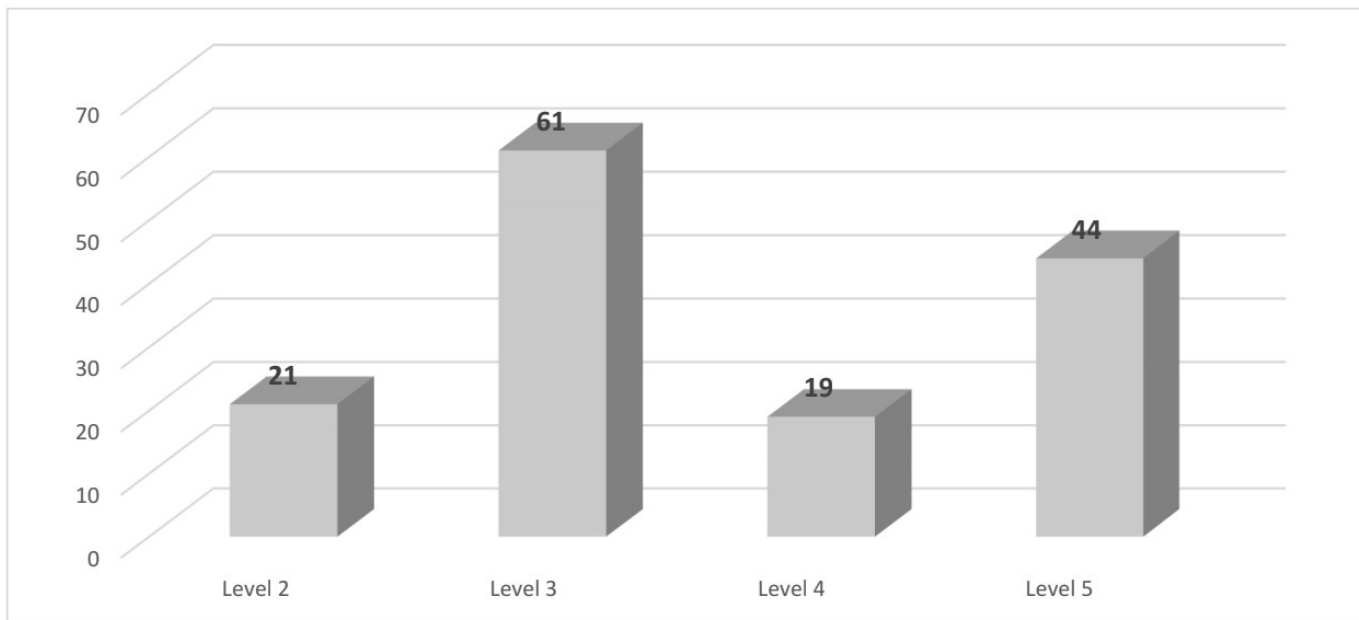


Figure 4.1 Overall response rate per level of study (n=145)

4.2.1 Gender

There were more female respondents (60.0%) than males (38%) as shown in Fig 4.2 below. Three respondents (2.1%) did not indicate their gender.

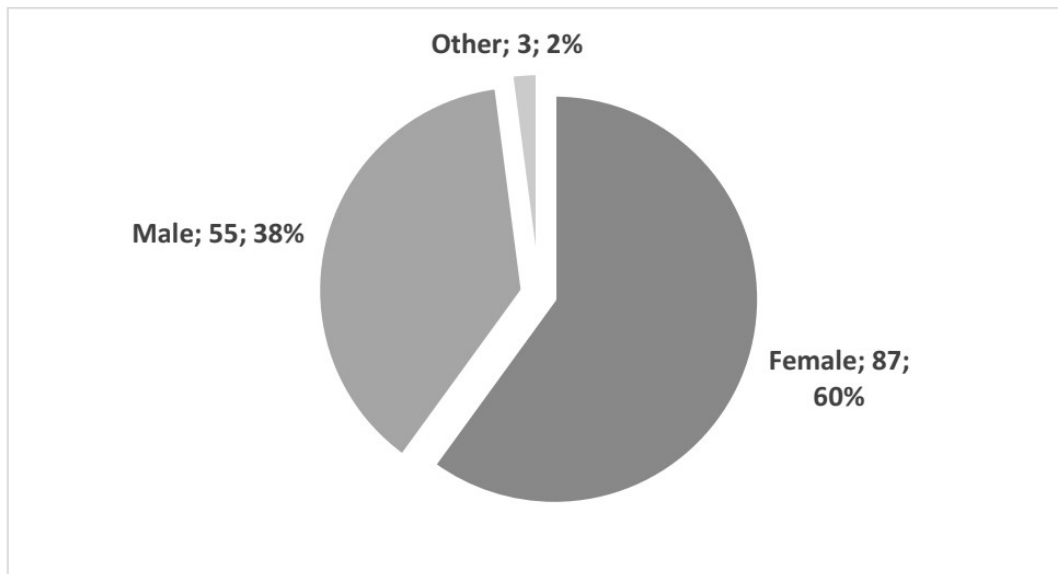


Figure 4.2 Gender representation of level 2 to 5 students (n=145)

4.2.2 Age

Most of the students were 21-23 years of age (n=61: 42.1%) and 18-20 years old (n=45; 31%). Twenty-one (14.5%) were 24-26 years of age and 18 (12.4%) were 26 years old and above. (See Figure 4.3).

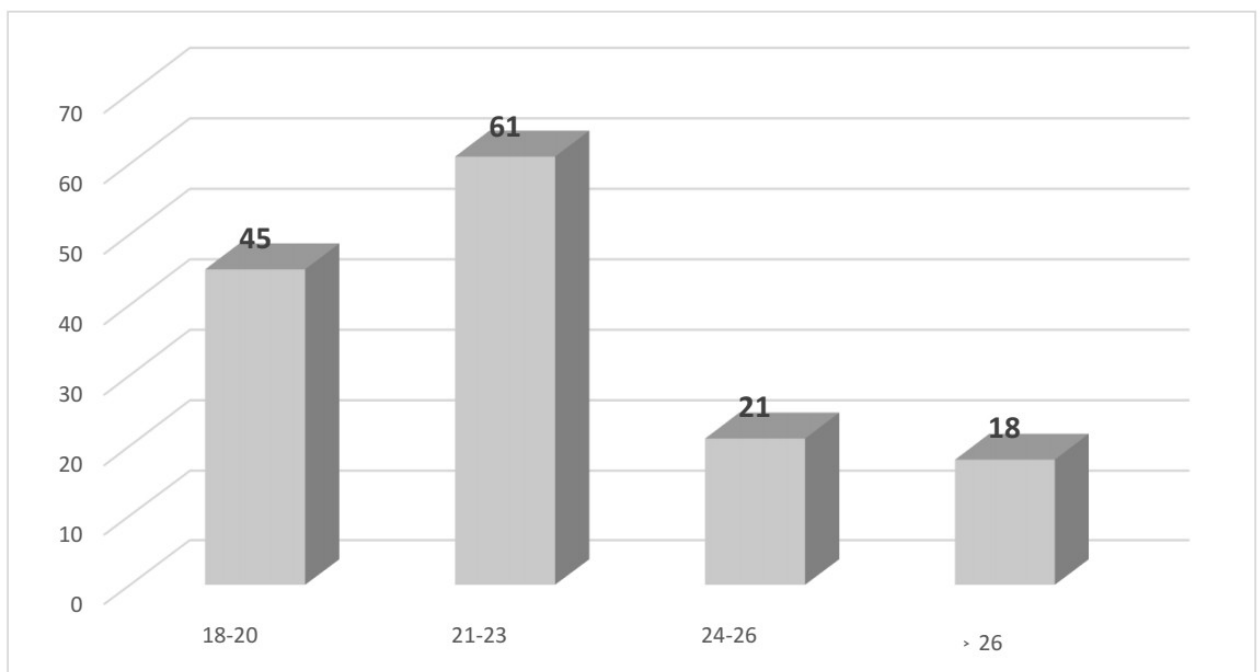


Figure 4.3 Age distribution of students in levels 2 to 5 (n=145)

4.2.3 Previous Education

The vast majority of those who took part in this study were enrolled into the medical curriculum directly from school following completion of Grade 12 (n=105; 72.4%) This was followed by students with previous university experience (n=26;17.9%) and those who had previous work experience (n=7; 4.8 %). (See Table 4.1 below)

Table 4.1 Distribution of respondents by gender, admission background and age categories across the levels of study.

	Level 2	Level 3	Level 4	Level 5	Total
	n=21	n=61	n=19	n=44	N=145
Female	11 (52,4%)	41 (67,2%)	11 (57,9%)	24 (54,5%)	87 (60,0%)
Male	10 (47,6%)	18 (29,5%)	8 (42,1%)	19 (43,2%)	55 (37,9%)
Other	(0,0%)	2 (3,3%)	(0,0%)	1 (2,3%)	3 (2,1%)
18-20	15 (71,4%)	27 (44,3%)	3 (15,8%)	(0,0%)	45 (31,0%)
21-23	4 (19,0%)	21 (34,4%)	8 (42,1%)	28 (63,6%)	61 (42,1%)
24-26	1 (4,8%)	9 (14,8%)	3 (15,8%)	8 (18,2%)	21 (14,5%)
> 26	1 (4,8%)	4 (6,6%)	5 (26,3%)	8 (18,2%)	18 (12,4%)
After working for a period	1 (4,8%)	1 (1,6%)	2 (10,5%)	3 (6,8%)	7 (4,8%)
Directly from school	17 (81,0%)	48 (78,7%)	13 (68,4%)	27 (61,4%)	105 (72,4%)
Following some college/university technology experience	1 (4,8%)	(0,0%)	(0,0%)	2 (4,5%)	3 (2,1%)
Following some university experience	1 (4,8%)	11 (18,0%)	4 (21,1%)	10 (22,7%)	26 (17,9%)
Other: After taking a gap year	1 (4,8%)	(0,0%)	(0,0%)	2 (4,5%)	3 (2,1%)
No response	(0,0%)	1 (1,6%)	(0,0%)	(0,0%)	1 (0,7%)

4.3 Perceptions of teaching in the medical curriculum

4.3.1 Volume of work

4.3.1.1 First-year modules

The respondents viewed the volume of work in most of the modules during their first year of study as reasonable. The two modules that were reported to be excessive were the essentials of the disease process (n=115;79.3%), and biology and chemistry of life (n=84;57.9%) modules (See Table 4.2).

Table 4.2 Volume work for modules in the first year of study (n=145)

Year 1 Modules	Too little	Reasonable	Excessive	Missing
Physics for Medicine	2 (1,4%)	124 (85,5%)	8 (5,5%)	11 (7,6%)
Chemistry for Medicine	2 (1,4%)	102 (70,3%)	27 (18,6%)	14 (9,7%)
Biology & Chemistry of Life	(0,0%)	50 (34,5%)	84 (57,9%)	11 (7,6%)
Health in context/Professionalism	16 (11,0%)	118 (81,4%)	8 (5,5%)	3 (2,1%)
Introduction to structure & function	4 (2,8%)	105 (72,4%)	34 (23,4%)	2 (1,4%)
Essentials of disease processes	1 (0,7%)	25 (17,2%)	115 (79,3%)	4 (2,8%)
Introduction to Clinical Skills & Communication	11 (7,6%)	122 (84,1%)	7 (4,8%)	5 (3,4%)

4.3.1.2 Second-year modules

The respiratory system module was reported as excessive by half of the respondents (n=74; 59,7%) while just over a third viewed it as reasonable (n=47; 37,9%) (see Table 4.3)

The volume of work in the gastrointestinal tract was reported as reasonable by over half of the respondents (n=77; 62%) and excessive by over a third (n=43;34,7%), see Table 4.3.

Table 4.3 Perceptions of Volume of work in second-year modules (n=124)

Year 2 Modules	Too little	Reasonable	Excessive	Missing
Cardiovascular System	(0,0%)	102 (70,3%)	19 (13,1%)	24 (16,6%)
Respiratory System	(0,0%)	47 (37,9%)	74 (59,7%)	3 (2,4%)
Endocrine System	3 (2,4%)	106 (85,5%)	12 (9,7%)	3 (2,4%)
Gastrointestinal tract	1 (0,8%)	77 (62,1%)	43 (34,7%)	3 (2,4%)
Urogenital tract	1 (0,8%)	110 (88,7%)	10 (8,1%)	3 (2,4%)
Clinical medicine I	9 (7,3%)	80 (64,5%)	7 (5,6%)	28 (22,6%)

4.3.1.3 Third-year modules

Three modules were perceived to have an excessive amount of work. These were the reticuloendothelial system & haematology (n=50;79.4 %), nervous system (n=25;39,7 %) and musculoskeletal system (n=21; 33.3 %). (See Figure 4.4).

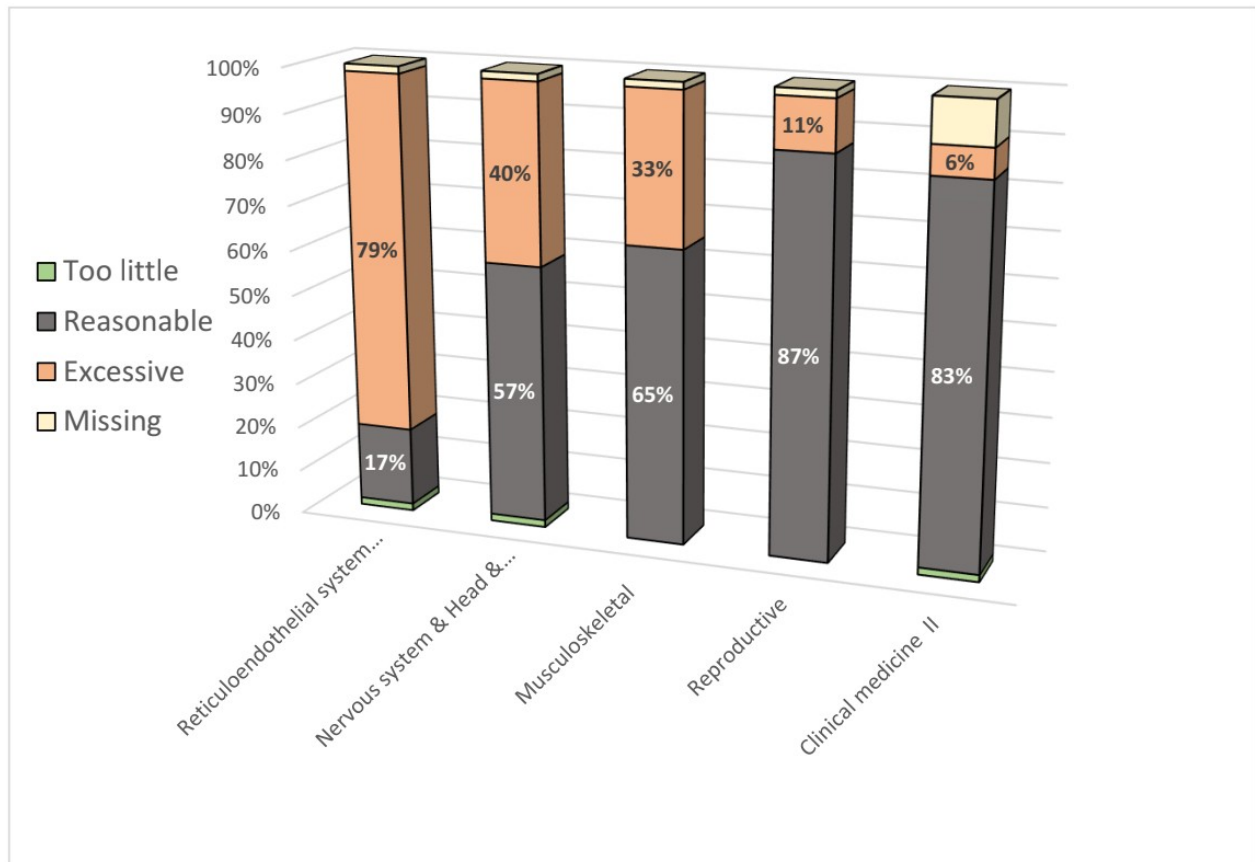


Figure 4.4 Perceptions of Volume of work of third-year modules (n=63)

4.3.1.4 Fourth-year modules (see Table 4.4)

Most of the modules were perceived to have a reasonable volume of information by more than 60% of the respondents except for the introduction to clinical anaesthesiology which was reported as reasonable by just over half the respondents (n=23; 52,3 %) and excessive by (n=20; 45,5 %).

Regarding the dermatology module, a total of 26 (59.1%) and 14 (31.8%) students reported the module as excessive and reasonable respectively

The internal medicine module work was reasonable for more than half (n=30; 68.2%) compared to those who said it was excessive (n=14; 31.8%).

Table 4.4 Perceptions of the volume of work of fourth-year modules (n=44)

Year 4 Modules	Too little	Reasonable	Excessive	Missing
Clinical Pharmacology	4 (9,1%)	29 (65,9%)	11 (25,0%)	(0,0%)
Dermatology	3 (6,8%)	26 (59,1%)	14 (31,8%)	1 (2,3%)
Introduction to Clinical Anaesthesiology	1 (2,3%)	23 (52,3%)	20 (45,5%)	(0,0%)
Forensic Medicine	2 (4,5%)	39 (88,6%)	3 (6,8%)	(0,0%)
Health & disease in communities	(0,0%)	33 (75,0%)	11 (25,0%)	(0,0%)
Internal Medicine	(0,0%)	30 (68,2%)	14 (31,8%)	(0,0%)
Obstetrics & Gynaecology	1 (2,3%)	39 (88,6%)	4 (9,1%)	(0,0%)
Psychiatry	(0,0%)	33 (75,0%)	11 (25,0%)	(0,0%)
General Surgery	(0,0%)	38 (86,4%)	6 (13,6%)	(0,0%)

4.3.2 Methods of teaching

The perceptions of the respondents of the quality of the teaching in the various modules on a scale of well, average or poor in the various year levels was obtained.

4.3.2.1 First-year modules

Respondents in the first year of study considered themselves to have been well-taught. The chemistry for medicine module was perceived to be well taught by a third of the respondents (n=52; 35.9 %) and to have average teaching by another third (n=53;36.3 %). A smaller number (n=23;15.9%) felt that it was poorly taught. Essentials of disease processes (n=19; 13.1%) and health in context modules (n=17;11.7%) were perceived to have been poorly taught. (See Table 4.5).

Table 4.5 Students' perceptions of the teaching of the first-year modules (n=145)

Year 1 Modules	Well taught	Average Teaching	Poorly taught	Missing
Physics for Medicine	102 (70,3%)	26 (17,9%)	2 (1,4%)	15 (10,3%)
Chemistry for Medicine	52 (35,9%)	53 (36,6%)	23 (15,9%)	17 (11,7%)
Biology & Chemistry of Life	82 (56,6%)	45 (31,0%)	4 (2,8%)	14 (9,7%)
Health in context/Professionalism	86 (59,3%)	35 (24,1%)	17 (11,7%)	7 (4,8%)
Introduction to structure & function	92 (63,4%)	44 (30,3%)	3 (2,1%)	6 (4,1%)
Essentials of disease processes	72 (49,7%)	48 (33,1%)	19 (13,1%)	6 (4,1%)
Introduction to Clinical Skills & Communication	102 (70,3%)	34 (23,4%)	5 (3,4%)	4 (2,8%)

4.3.2.2 *Second-year modules*

More than half of the respondents felt that the second-year modules were well taught (See Table 4.6).

Table 4.6 Perceptions of teaching in the second year modules (n=145)

Year 2 Modules	Well taught	Average Teaching	Poorly taught	Missing
Cardiovascular System	72 (58,1%)	40 (32,3%)	4 (3,2%)	8 (6,5%)
Respiratory System	70 (56,5%)	46 (37,1%)	2 (1,6%)	6 (4,8%)
Endocrine System	85 (68,5%)	32 (25,8%)	1 (0,8%)	6 (4,8%)
Gastrointestinal tract	85 (68,5%)	32 (25,8%)	0 (0,0%)	7 (5,6%)
Urogenital tract	84 (67,7%)	30 (24,2%)	2 (1,6%)	8 (6,5%)
Clinical medicine I	88 (71,0%)	25 (20,2%)	2 (1,6%)	9 (7,3%)

4.3.2.3 *Third-year modules*

More than half of the respondents in the third year felt that the year modules had been well taught and at least 25% felt that there had been average teaching in all the modules (See Figure 4.5).

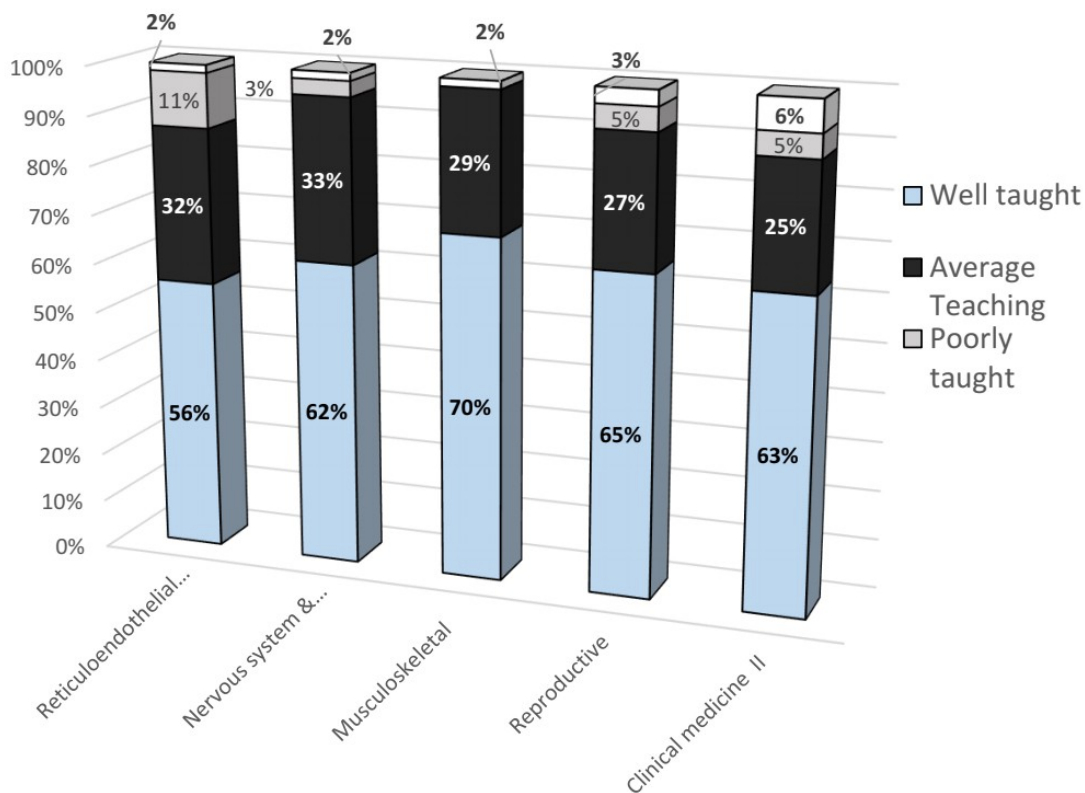


Figure 4.5 Perceptions of teaching in the third-year modules (n=63)

4.3.2.4 Fourth-year modules

More than half of the respondents felt that the fourth-year modules had been well taught. Three modules were perceived by less than 20% of the respondents to have had average teaching. (See Table 4.7).

Table 4.7 Perceptions of teaching in the fourth-year modules (n=44)

Year 4 Modules	Well taught	Average Teaching	Poorly taught	Missing
Clinical Pharmacology	35 (79,5%)	6 (13,6%)	2 (4,5%)	1 (2,3%)
Dermatology	31 (70,5%)	10 (22,7%)	3 (6,8%)	0 (0,0%)
Introduction to Clinical Anaesthesiology	24 (54,5%)	14 (31,8%)	5 (11,4%)	1 (2,3%)
Forensic Medicine	35 (79,5%)	8 (18,2%)	1 (2,3%)	0 (0,0%)
Health & disease in communities	23 (52,3%)	18 (40,9%)	3 (6,8%)	0 (0,0%)
Internal Medicine	23 (52,3%)	12 (27,3%)	9 (20,5%)	0 (0,0%)
Obstetrics & Gynaecology	34 (77,3%)	10 (22,7%)	0 (0,0%)	0 (0,0%)
Psychiatry	34 (77,3%)	9 (20,5%)	1 (2,3%)	0 (0,0%)
General Surgery	34 (77,3%)	8 (18,2%)	2 (4,5%)	0 (0,0%)

The methods used by the lecturers during the teaching and learning sessions were as per Table 4.8 below.

Table 4.8 Teaching methods used by the lecturers

	Level 2		Level 3		Level 4		Level 5		Total	
	n	%	n	%	n	%	n	%	n	%
Lecture room power point presentations	10	22%	36	24%	12	28%	25	21%	83	23%
Small group guided discussions	12	26%	31	20%	6	14%	15	13%	64	18%
Tutorial sessions	15	33%	59	39%	18	42%	44	37%	136	38%
Laboratory demonstrations	1	2%	16	10%	4	9%	15	13%	36	10%
Clinical skills demonstrations	8	17%	11	7%	3	7%	20	17%	42	12%
Total	46	100%	153	100%	43	100%	119	100%	361	100%

4.3.3 Perceptions of factors that affected students' studies

Students were asked about four factors that may have affected their studies such as the overall theoretical and practical components of the modules, a transition from basic education to the higher education institution, social interactions with friends and balancing academic work with recreation.

Just over half of the respondents found it difficult (n=84; 57.9 %) and 14 (9.7%) found it very difficult to cope with the theoretical components of their studies. In comparison, 73 (50.3%) found it easy to cope with the practical component. However, 51 (35.2%) found it difficult and 14 found it very difficult (9.7%).

The transition from school to first-year MBChB was difficult for 62 (42.8%) of the respondents and very difficult for 33 (22.8%), with 32 (22.1%) finding it easy.

The respondents found it difficult (n=44; 30.3%), very difficult (n=30; 20.7%), easy (n=43; 29.7%), and very easy (n=28; 19.3%) to make friends and balance work with recreational activities (See Figure 4.6).

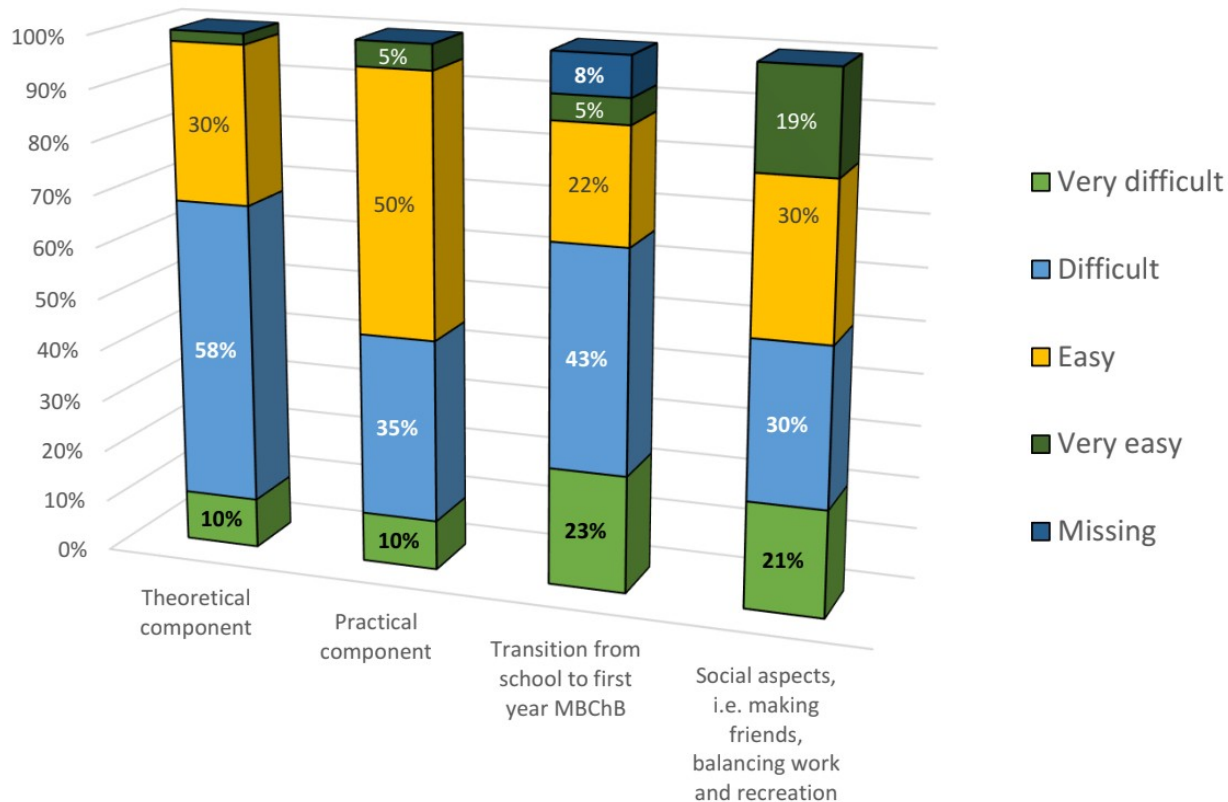


Figure 4.6 Overall perceptions of coping with studies and transition to university (n=145)

4.3.4 Methods of assessment

4.3.4.1 Multiple choice questions

Multiple choice questions were the predominant method of assessment used across all the year levels, with some respondents indicating that they were used almost all the time (n=48; 33.1%) or most of the time (n=74; 51.0%). There were fewer who reported that they were only used sometimes (n=22; 15.2 %). (See Figure 4.7).

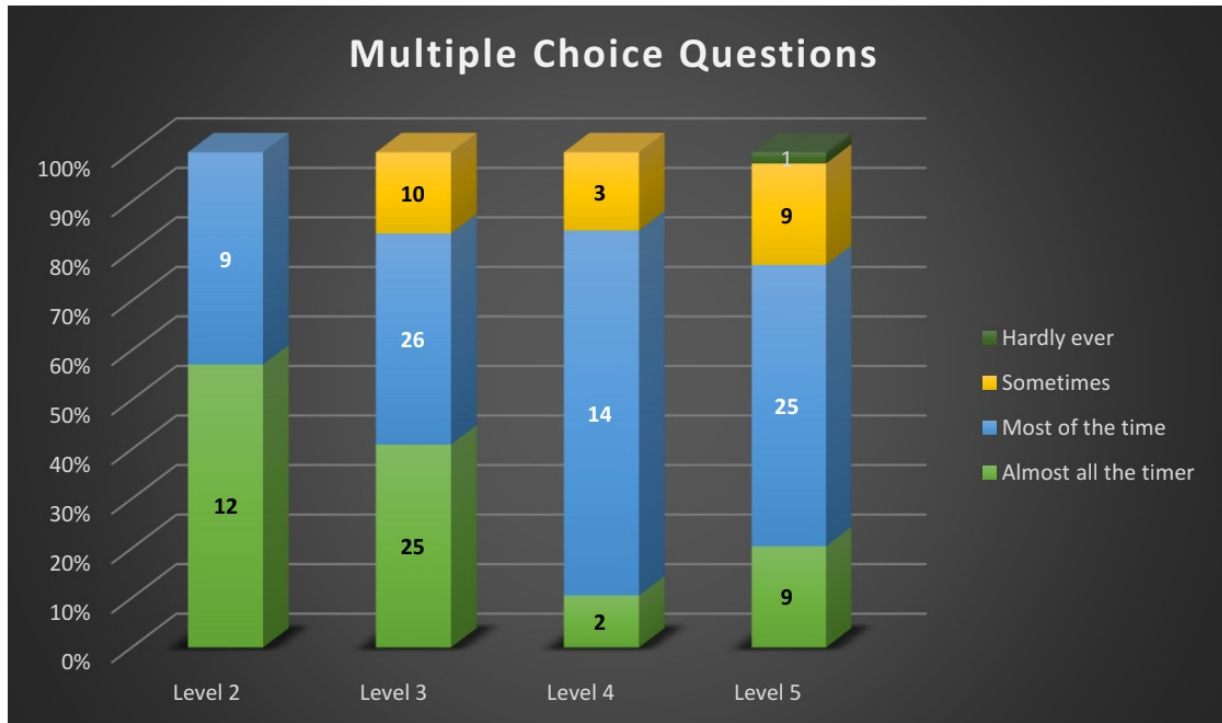


Figure 4.7 Multiple choice questions as a method of assessment (n=145)

4.3.4.2 Essays

Essays were reported to be used sometimes (n=46; 32%) and hardly ever (n=95; 66%) in assessment. Year levels three (n=22; 36%) and five (n=21; 48%) were the only levels in which respondents reported occasional use of this method. (See Table 4.9).

Table 4.9 Frequency of use of essays as the method of assessment (n=145)

Essays	Almost all the time	Most of the time	Sometimes	Hardly ever	Missing	Total
Level 2	-	-	-	20 (95%)	1 (5%)	21 (100%)
Level 3	-	-	22 (36%)	39 (64%)	-	61 (100%)
Level 4	-	1 (5%)	3 (16%)	15 (79%)	-	19 (100%)
Level 5	1 (2%)	-	21 (48%)	21 (48%)	1 (2%)	44 (100%)
Total	1 (1%)	1 (1%)	46 (32%)	95 (66%)	2 (1%)	145 (100%)

4.3.4.3 Short answer questions

More than half (n=88; 61%) of the respondents indicated that short answer questions were used most of the time, while 38 (26%) indicated that they were used sometimes. A smaller number (n=19; 13%) viewed this method as being used almost all the time, (see Figure 4.8).

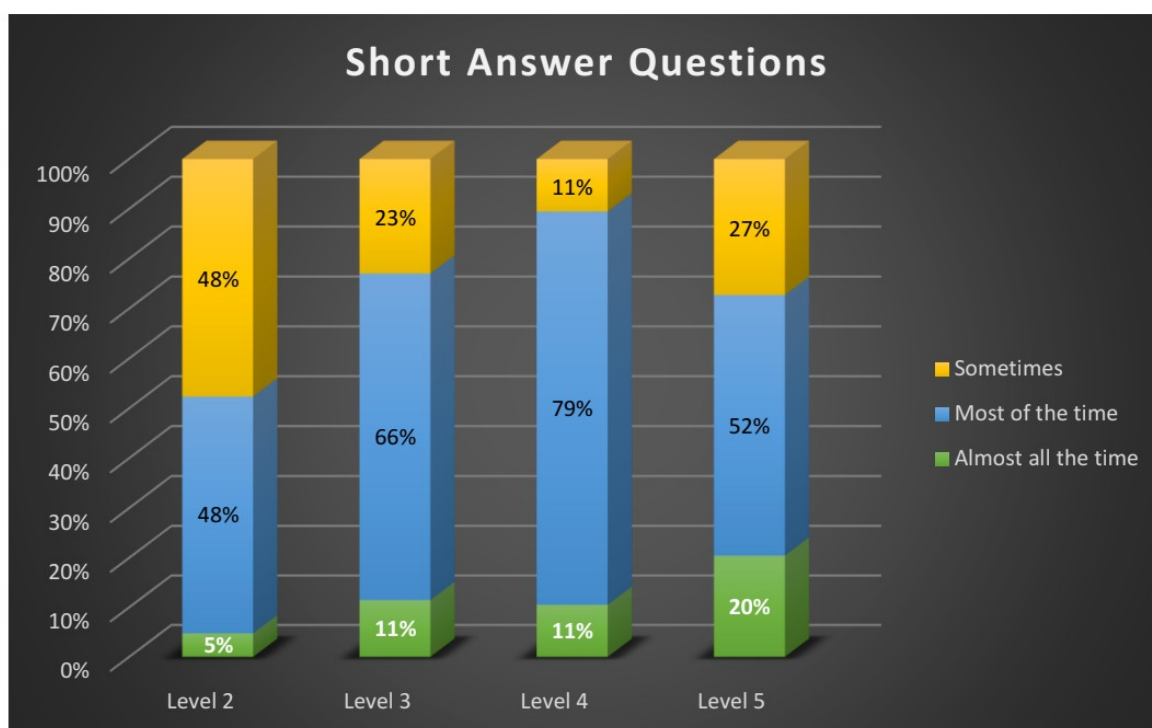


Figure 4.8 Proportion of the use of short answer questions (n=145)

4.3.4.4 Projects

Projects as a method of assessment included case studies and research. This method was sometimes used (n=86; 59%) or hardly ever used (n=32; 22%). Only a small number viewed this as being used most of the time (n=22; 15%) and almost all the time (n=4;3%). (See Table 4.10).

Table 4.10 Frequency of the use of projects as a method of assessment (n=145)

Projects, e.g. case studies, research	Almost all the timer	Most of the time	Sometimes	Hardly ever	Missing	Total
Level 2	-	1 (5%)	12 (57%)	8 (38%)	-	21 (100%)
Level 3	-	7 (11%)	36 (59%)	18 (30%)	-	61 (100%)
Level 4	1 (5%)	3 (16%)	9 (47%)	5 (26%)	1 (5%)	19 (100%)
Level 5	3 (7%)	11 (25%)	29 (66%)	1 (2%)	-	44 (100%)
Total	4 (3%)	22 (15%)	86 (59%)	32 (22%)	1 (1%)	145 (100%)

4.3.4.5 OSCE (observed structured clinical examination)

The use of the OSCE as a method of assessment was proportionately used sometimes (n=48; 33%), most of the time (n=47;32%) and almost all the time (n=47;32%), (see Figure 4.9).

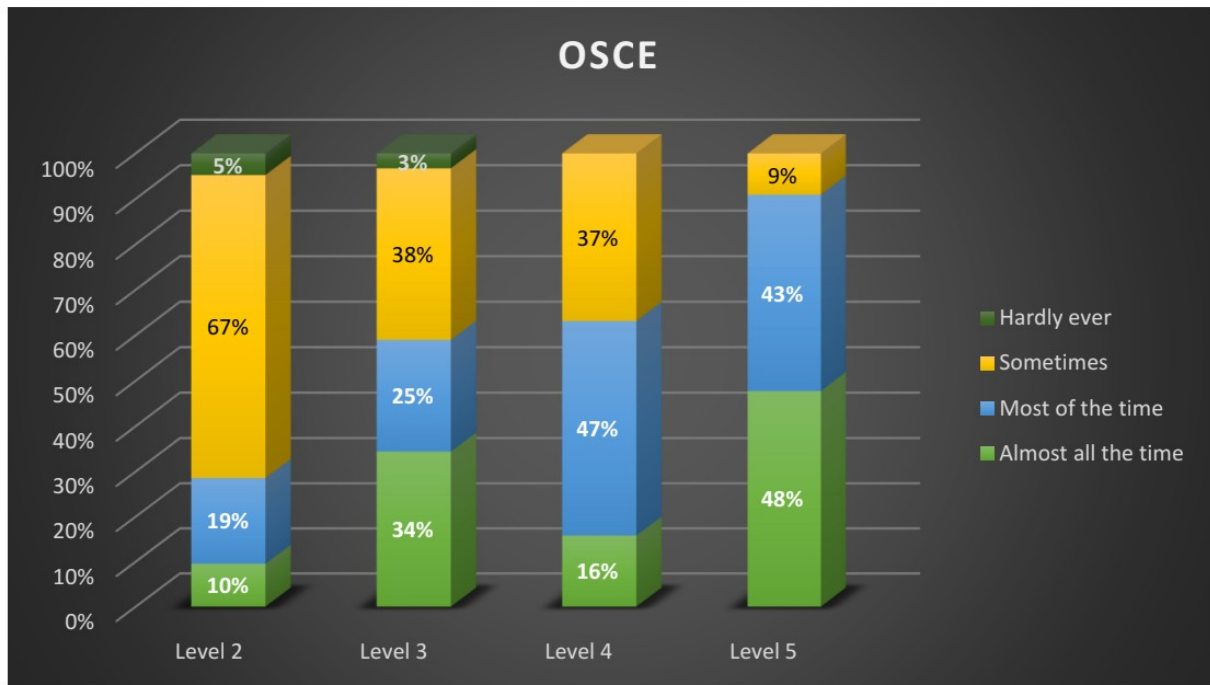


Figure 4.9 Frequency of the use of OSCE during assessments (n=145)

4.3.4.6 Vivas

Vivas were hardly ever used (n=94; 65%); a small number reported them being used sometimes (n=17; 12%) and most of the time (n=13; 9%). There was no response provided by 18 respondents (12%) and these were classified as missing. (see Table 4.11)

Table 4.11 The use of vivas during assessments (n=145)

Vivas	Almost all the timer	Most of the time	Sometimes	Hardly ever	Missing	Total
Level 2	1 (5%)	1 (5%)	1 (5%)	14 (67%)	4 (19%)	21 (100%)
Level 3	(0%)	3 (5%)	4 (7%)	48 (79%)	6 (10%)	61 (100%)
Level 4	(0%)	1 (5%)	1 (5%)	13 (68%)	4 (21%)	19 (100%)
Level 5	2 (5%)	8 (18%)	11 (25%)	19 (43%)	4 (9%)	44 (100%)
Total	3 (2%)	13 (9%)	17 (12%)	94 (65%)	18 (12%)	145 (100%)

4.3.5 Perceptions of assessment methods

4.3.5.1 Best methods of assessment

In an open-ended question, respondents were asked which method of assessment was the best and to provide reasons for their responses. There were 74 responses to this question. Of these, all but one respondent stated that multiple-choice questions were best. The reasons are given for this fall into four main categories as shown in Table 4.12 below.

Table 4.12 Multiple choice questions as the best method of assessment (n=74)

Category identified	N value	Illustration
MCQs are easier to answer	37	<i>"because it's easy to answer as you just choose which answer you think it's correct"</i> <i>"They are easy to answer and they help one to remember things they have studied".</i>
MCQs allowed them to recognize answers and hence made it easier to pass	15	<i>"It helps you explore the possible answers and assists you think hard about your answer."</i> <i>If you studied enough you will notice the answer"</i>
MCQs cover a lot of content and allow assessment of a variety of concepts	13	<i>"They can cover a lot of topics especially when the module content is a lot".</i> <i>"Because it is easier to include all the topics taught".</i>
MCQs challenged their knowledge and tested critical thinking	9	<i>"Because it teaches how to approach and think critically"</i> <i>"only one answer is collect so it requires you to think hard and apply the knowledge".</i>

Forty-eight respondents felt that short answer questions were best. Three categories were evident in their responses (See Table 4.13)

Table 4.13 Short answer questions as the best method of assessment (n=48)

Category identified	N value	Illustration
Demonstrate their understanding of the content	28	<i>"help test our theoretical understanding. it allows us to think out of the box, to express our knowledge"</i>
Ability to apply their knowledge	11	<i>"These questions assess if you understand the content and if you can apply it in real life".</i> <i>"allows us to think out of the box, to express our knowledge"</i>
Easy to answer	9	<i>"With short questions, it's much easier to answer the question because they are specific with what they are asking"</i> <i>"they were easier to complete in light of the workload"</i>

The third method of assessment that was selected as the best was the OSCE (n=15). Most indicated that the OSCE allowed them to apply the skills that they learned in practice (n=11), *"they give an opportunity to know what's right and how one can take and handle in a real patient scenario"*, one felt that it promoted independence and three did not provide a justification to their response.

Only five respondents mentioned essays as the best method and the reason given was that essays allow one to explain one's answer, which MCQs do not allow. There were only three respondents who selected projects as the best method, without any justification for their response.

4.3.5.2 Worst methods of assessment

Several respondents selected essays (n=59), MCQs (n=24), projects (n=24), OSCEs (n=17), Vivas (n=5) and short answer questions (n=5) as the worst methods of assessment. The reasons provided by the respondents for essays as the worst methods are as per Table 4.14 below.

Table 4.14 Essays as the worst method of assessment (n=59)

Category identified	N value	Illustration
Difficult, stressful and time-consuming	22	<i>"They are stressful and difficult and they take longer to answer, you can waste time trying to answer".</i> <i>"because they take a lot of time to be written and students may end up not finishing their test/exams, and if a certain student has a panic attack they may end up not remembering the majority of what they have studied".</i>
Chances of failure are high	18	<i>"Because if unclear understanding of the question asked then a lot of marks will be lost to that question, thus a higher chance of failing that particular assessment".</i> <i>"If you don't know the answer / forgot the chapter for the question you lose all marks.</i>
Bias by the assessors	7	<i>"leave a great room for bias as it is marked according to lecturer's discretion. May disadvantage students, who are not well versed in the language of instruction if they have to write essays".</i> <i>"because sometimes you write the essay according to your understanding relative to the content you were taught but still get low marks because the lecturer was too narrow when marking different individuals".</i>
Promotes cram work	2	<i>"they enforce regurgitation and cram work"</i> <i>"Because they require a lot of cramming than understanding"</i>

The selection of the MCQs as the worst method of assessment was based on the opinion that it is all about guesswork (n= 10) with the justifications such as *"It's a guessing game"* and *"because when you didn't understand the question it's easy to guess the answers"*. The other reason was that respondents felt they were not assessed on what they understood (n=5), *"It is very easy and is liked by all students because it is so easy but it does not help to show if we know our work very well or*

not” and *“multiple choice doesn't test understanding fully”*. Nine respondents selected MCQs as the worst without any specific justification-

Fifteen respondents indicated that projects were the worst as they are time-consuming and students were not taught how to do them:

“It requires skills that we are not well taught and it makes the work difficult especially when unguided” and

“Projects, because we are hardly taught how to go about doing those projects so we end up doing what we think is right even when it is not the correct way of doing it/them.”

Lecturer bias was a concern highlighted by three respondents:

“Some of our lecturers will tell you that they do not have time to read through our reports so submitting is just for evidence”

“It has so much bias and unfair mark allocation”.

Two respondents mentioned that this method contributes less to their final mark and one indicated the lack of resources to execute their tasks as a limiting factor.

Seven respondents felt that the OSCE was the worst method of assessment because anxiety made it difficult to answer even when the answer was known:

“Assessor looks angry at you”.

“I get so anxious during OSCE and that leads to forgetfulness and poor performance”

“the nerves and anxiety make it difficult to give answers even when you feel like you might know the answer”.

Three respondents indicated that there is limited time allocated during the OSCE:

“Too many skills we are expected to know, to be able to demonstrate and there is not enough time allocated to perform the skill”.

Four respondents highlighted the lack of resources which did not allow them to practice on their own.

“Because we don't get enough exposure to practice the skills on our own. The only lab we have is in Polokwane Hospital”.

Three respondents felt that Vivas were the worst form of assessment as they created anxiety.

"They cause panic and confusion".

"Because anxiety can kick in fast leading to one failing to get the correct answers due to the presence of the examiners".

"I do not feel confident enough speaking in front of other students, getting the answer wrong always feels wrong and embarrassing".

However, it was not clear why vivas were conducted in front of other students

Four respondents felt that *"Short answer questions because they are tricky"* were the worst and that *"if you fail to answer one question you lose most of the marks"*.

4.3.6 Teaching facilities and technologies used

Most respondents (n=61) thought the teaching facilities used were satisfactory. However, there was a comment that the School of Medicine does not have its facilities (n= 4) and that the facilities at the hospital were not adequate due to the lack of equipment. It was noted that laboratories are used for lectures (n=14) and that these are not adequate *'because we had to sit in between the sinks and the board was obscured'*. It was noted that some teaching spaces are small and that this inhibits the use of technology (n=14) and for four respondents the small spaces were of concern in the light of poor ventilation and COVID-19. Dissection halls were considered to be too small by 11 respondents and it was noted that they had not originally been built for this purpose. This meant that the halls cannot accommodate the entire class at the same time and cadavers have to be shared. (see Table 4.15)

However, 16 respondents noted the value of the dissection halls:

"I think it's great because you got to see the gross structure and not just the animated ones from notes. You also get to learn how to dissect cadavers, this way it's easy to remember.

"Dissecting hall help(s) in the ability to be able to appreciate all the organs and tissues we see in books".

Table 4.15 Facilities used for teaching and learning (n=145)

	Level 2	Level 3	Level 4	Level 5
Lecture room PowerPoint presentations	10	36	12	25
Small group guided discussions	12	31	6	15
Tutorial sessions	15	59	18	44
Laboratory demonstrations	1	16	4	15
Clinical skills demonstrations	8	11	3	20

4.3.6.1 Perceptions of the value of technologies used

Respondents indicated that technologies were used in teaching and they selected more than one option. The most frequently mentioned were Blackboard (n=144), images (n=143) and videos (n=136). Website links (n=130) and pre-recorded lectures (n=129) were also used. E-books were less frequently used by respondents (n=63). (See Table 4.16).

Table 4.16 Technologies used during teaching of the modules (n=145)

	Yes	No	(%)
The use of images	143	2	98,6%
The use of videos	136	9	93,8%
Website links	130	15	89,7%
Pre-recorded lectures	129	16	89,0%
e-book access	63	82	43,4%
Blackboard	144	1	99,3%

In response to the value of these modalities, Blackboard was found to be useful because of the images, videos and pre-recorded lectures that were posted and the fact that the material could be revisited:

“The images were very useful since I learn best with pictures”.

“Blackboard especially helped because the lectures are recorded and one can go back anytime and listen if they don't understand something”.

4.3.7 Value of library, internet and cadavers in learning

In response to the question to assess the value of library services, access to the internet and cadavers in the learning process, the total sample (n=145) provided their views.

4.3.7.1 The value of a library

The value of the use of the library was assessed and there were variable responses (n=94) categorized in Table 4.17 below.

Table 4.17 The value of the library in learning (n= 94)

Category identified	n value	Illustration
Accessibility to the required material (books) for study	42	<i>"Very good as I have access to them whenever I need them and also the availability of books is adequate to accommodate everyone or at least most of us"</i> <i>"Efficient: I have never gone to the library to borrow a book and did not find it".</i>
Limited operating hours	18	<i>"Library is not very friendly to medical students. It opens until late when other schools start their exams, while we write exams the whole year in the school of medicine".</i> <i>"They are good although it would've been better if the library could open until at least 12 am/00h00 for students who enjoy a quiet, controlled environment".</i>
Insufficient books	14	<i>"Library services are average, we need more books e.g. we only have 2 Kuman and Clark books in the library a clinical book which is very essential".</i> <i>"The university library has a limited number of medical books because the program is still new".</i>
No experience in the use of the library	13	<i>"Rarely used as in today's world all textbooks can be found online"</i> <i>"I don't use the library services. Not because I witnessed something wrong with it but because I prefer (to study) in a less quiet space".</i>
Lack of functional equipment (printers, etc.)	7	<i>"The services are complicated and the printing machines never seem to work".</i> <i>"Not enough computer(s); photocopy machines barely work"</i>

4.3.7.2 The value of the internet in learning

Half of the respondents (n=72) were satisfied with internet access. It was regarded as a valuable modality without limitations as it is provided by the university.

"Eduroam is easily accessible and works quite well. It is easy to connect as well. The advantage is it works also during load shedding with a back-up".

"The university provides us with 30 GB data in our sim cards every month and we have access to Wi-Fi when in the university".

A few respondents (n=28) did note internet access with limitations. During load-shedding when there are power outages, there was no connectivity in certain areas.

"When the electricity is off the Wi-Fi also becomes unavailable and also it limits the apps we have to open".

"The internet/ Wi-Fi is average. But we need it in the library setting, in our hospital, even if it is in a lecture room. It would still be okay".

However, a few respondents (n=35) felt that internet access was poor.

4.3.7.3 The value of cadavers in learning

Just over half of the respondents (n=76) felt that there were sufficient cadavers for the teaching of anatomy.

"We are lucky to have a small class so only 4 - 6 people work on a cadaver and eliminate the problem of overpopulation on a cadaver".

"I would say we had sufficient cadavers, very productive and progressive learning".

However, a few respondents (n= 35) were not satisfied with the number of cadavers that were provided for teaching and learning purposes:

"Cadavers were not enough as 15 students had to share 1 cadaver, so we didn't learn well as we were many on one cadaver".

"Cadavers are available but I don't think they are enough since you will find a group of more people working on one cadaver and there are many student(s) using them e.g. Medical students, Nursing students, etc.".

Eight respondents appreciated the value of anatomy dissection as it put their theory into practice to understand the human body:

"Makes learning even more efficient as we learn about things that we can see and touch".

"Cadavers were always there and it is effective using them to integrate the theory when it comes to knowing the body structure and knowing the basics of dissection".

Five respondents noted the late delivery of the cadavers:

“The problem begins when they arrive late; end up messing up the timetable as it will affect dissection dates”.

“Main issue - They take time to be available at the beginning of the year”.

4.3.8 Perceptions of online teaching during the COVID-19 pandemic

Over half of the respondents found it difficult to change from classroom teaching to the online modality (n=81). They indicated that at first it was difficult but got better with time. The reasons given ranged from the network connection to adapting to the use of technology. Other reasons included load shedding, lecturers who lacked skill in the technology and the lack of interaction. (See Table 4.18)

“Initially it took a while for the University to implement online teaching systems but following that the online systems were very user-friendly and are a much better system”.

“It initially was hard to adapt due to lack of technical knowledge but then when I was informed about how everything works I then started enjoying it”.

“Network issues and lecturer unfamiliarity with the online learning was also problematic”.

However, for some respondents (n=56) the transition was less problematic. One student stated: *“Online teaching is very suitable for students as they get to manage their time properly. Our marks have improved significantly which is evidence of the reflectivity of online teaching. Students can also revisit what they missed”.*

Another felt that:

“The online learning is better because it is less tiring as you don't have to run around with as we have a lot of classes and you get to go back to lecture recordings”.

An open-ended question on whether online teaching should remain in place beyond the era of the Covid-19 pandemic was responded to as follows (see Table 4.18):

There were a total of 137 responses to this open-ended question with 106 respondents who agreed that online teaching should remain beyond Covid-19, 29 who did not agree and eight who did not respond.

Table 4.18 Online teaching beyond the Covid-19 pandemic (n= 137)

Response	n value	Illustration
Yes	106	<i>Yes, because one can study at their own time and lectures are recorded so you can always go back and review if you don't understand".</i> <i>"Yes, it gives a much better learning experience, especially because lectures can be recorded and replayed over and over again until one grasps or fully understand".</i>
No	29	<i>"It lacks interactive learning and I prefer to ask questions when classes are face-to-face"</i> <i>"No issues with reception always disrupt lessons as well as the issue of data to access the internet".</i>

4.3.9 Student residence and recreation

The majority of the respondents lived on campus (n=134;92%), while only three lived at home and eight rented off-campus residences. See Table 4.19 below.

Table 4.19 Type of students' accommodation (n=145)

Type of Residence	Frequency	(%)
On campus residences	134	92%
Own parents/family residence	3	2%
Privately rented residences off campus	8	6%
Total	145	100%

The respondents were asked about the suitability of the type of accommodation they selected. This was an open-ended question and responses were as follows:

Table 4.20 Respondents' perceptions of suitability of campus residence for learning(n=80)

Category identified	n value	Illustration
Internet access	21	<i>"The residences have Wi-Fi so we can attend online classes in our rooms" Wi-Fi helps when you need to research something school-related and work on other social media platforms".</i>
Non-specific responses	17	<i>"They are very suitable for learning."</i> <i>"Good"</i> <i>"They are very nice, we like it".</i>
Interaction with other students for study purposes	15	<i>"The residence is suitable as almost all students stay there allowing us to interact and have the opportunity to ask questions where need be and have study sessions together".</i> <i>"It is alright, most medical students stay in one residence, we can motivate each other and work together".</i>
Safe to access other learning sites at any time	11	<i>"The residences are close to the student centres and even the library. The University environment is also safe to go study during late hours".</i> <i>"On-campus residences are safest residences because every residence has security and students can go to the academic side to study at any time on campus".</i>
Well-maintained and equipped	11	<i>"Well-managed residence with running water and electricity".</i> <i>"They are good as they have a chair, table and notice board and also the lights are suitable for learning".</i>
Privacy of own space/room	5	<i>"It's good we have single rooms which make it easy to study and focus on your work".</i> <i>"Single rooms are more suitable because of one's privacy. The space is good and a study table is also available".</i>

A similar number of respondents (n=71) felt that on-campus accommodation was not suitable for learning. Reasons are given related to the lack of maintenance of the facility, lack of water and noise:

“The quality is that we go 3 weeks without hot water. The showers we only have 2 working on my floor which makes us late for class. The condition is just BAD”.

“It is bad at this point, we are doing 5th year staying with 4th, 3rd and 2nd years who play loud music because they don't know we are writing”.

The respondents were asked if they participated in sporting or other recreational activities. Table 4.21 below reflects the responses.

Table 4.21 Students’ participation in sports or other recreational activities (n=145)

The proportion of students who participate in any sporting activity or other related recreational activity	Frequency	%
Yes	42	29%
No	102	70%
Missing	1	1%
Total	145	100%

Of the respondents who did not participate in sporting or recreational activities, 51 indicated that the overwhelming academic responsibilities of the medical curriculum did not allow them time.

“The way the programme makes it difficult to be part of sporting events as we are consistently in hospitals and studying”.

“The congested timetable and amount of workload of the degree does not allow me to engage in any sports activities because of their time slots of practising where by that time I will be in class or attending the anatomy dissection hall”

The sporting activities that were commonly taken by the respondents were soccer (n=19), netball (n=5), gym (n=7), rugby (n=2), volleyball (n=1), and aerobics (n=1).

Only one respondent was actively involved in the student fellowship program:

“We have a lot of activities, such as meeting on Saturdays as a choir and singing new and old songs in our church”.

Several respondents (n=42) did not give any comment on this question.

In response to the question asked whether respondents had failed any modules only 18% responded that they had failed a module. (see Table 4.21 below). Most respondents (n=119) did not fail any of the modules.

The modules that students failed were: essentials of the disease process (n=9), introduction to structure and function (n=6), respiratory system (n=6), chemistry for medicine (n=2), reticuloendothelial system (n=1), cardiovascular system(n=1) introduction to anaesthesiology (n=1). The reasons given for failing a module were mostly related to the excessive work-load:

“Essentials of disease processes-The pressure that came with the module was a lot. We did the module for a few weeks. I could not cope with the pressure. I ended up wanting to complete the content without understanding, thinking that I do. It does not even have any supported assessments, it only has tests 1 and 2 and an exam”.

“Respiratory system and Chemistry for medicine. Too much information/workload in a very short period given”.

Three respondents indicated that they failed because of medical and psychological reasons. One respondent was not attending the classes, and as a result, there was a failure in that module. See Table 4.22 below.

Table 4.22 Students that failed a module (n=145)

The proportion of students that reported having failed a module	Frequency	%
Yes	26	18%
No	119	82%
Total	145	100%

4.3.10 Suggestions for improving the learning environment

Respondents highlighted several suggestions for improving their learning environments and these are categorized in Table 4.23 below.

Table 4.23 Suggestions for improving the learning environment

Category identified	n value	Illustration
Infrastructure related	51	<i>"Build lecture rooms, laboratories and residences for medical students because it's really difficult having to be always looking to other schools to help us in that regard".</i> <i>"Proper lecture hall should be built and a skills lab with the appropriate equipment".</i>
Equipment related	27	<i>"Improve the dissection hall with more equipment to fit the number of students. And improve the clinical labs and its equipment including providing chairs".</i> <i>"The skills lab doesn't have enough mannequins for the various skills we are required to learn before entering the clinical field such as suturing, IV line insertion, urethral catheterization, etc."</i>
Network connectivity (internet)	8	<i>"Improve on the quality of internet connection and IT equipment".</i> <i>"Better residential areas with a good internet connection".</i>
Access to the library (operating hours)	7	<i>"We need access to the medical library without having to travel off-campus".</i> <i>"They should make the library accessible 24/7 since students study better in the library or rather provide a conducive study environment that is opened the whole day".</i>
Human resources	5	<i>"increase the number of lecturers, because they are not enough".</i> <i>"We need extra Anatomy lecturers, the ones we have already are lecturing at other schools and sometimes miss classes with us due to clashing classes of ours with another course".</i>

4.3.11 Perceptions of institutional support

4.3.11.1 Support received by the students

More than half indicated that they had received some form of support (n=87; 60%) with just over a third stating that they (n=57;39%) did not get any assistance (See Table 4.24)

Table 4.24 Perceptions of the students' support-related matters(n=145)

The proportion of students who received assistance on student support-related matters	Frequency	%
Yes	87	60%
No	57	39%
Missing	1	1%
Total	145	100%

The respondents were asked if they were satisfied with their experience of the support they received from the institution and most of them(n=87) indicated a good experience:

"I am using NSFAS. I could always go to the health centre for medical and psychological (help) if I needed it. I have a mentor who is a year ahead of me."

"I have been struggling with my mental health recently and the psychology office has been helpful. I get monthly contraceptive pills from the University health centre, they are efficient. I am funded by NSFAS. It had not released funds for the past term and we received meal allowance advances from the university."

A total of 57 respondents felt that they had not had a good experience regarding student support assistance. The reasons fell into two main categories:

- a. The lack of financial aid support (n=22):

"The school has not provided the student with any support at all. There are students who couldn't register for the academic year due to financial exclusion and the school did not assist at all".

"Because the financial department of the University is always slacking when they have to allocate us money/allowance for books and meals. It has been a year since I joined the University and still to this day I have never been allocated any allowance for meals and books although I am sponsored a bursary (Compensation fund bursary)".

- b. Access to medical and psychological support services (n=14):

"In the first year, the psychology unit was approached by a lecturer to let us know about D-Block availability. Upon booking, it took very long to get a date and the time slots don't accommodate the medical programme."

“The waiting time at the health centre is too long and we often leave without getting help because apparently, we came too late (of which we go after class).”

4.3.12 Concerns related to the learning processes

Table 4.25 Students’ concerns about the processes of their learning (n=145)

Students having concerns relating to the processes of learning	Frequency	%
Yes	48	33%
No	94	65%
Missing	3	2%
Total	145	100%

Of the 48 who stated they had a concern about the learning process, 19 provided comments:

“Many concerns have been raised according to (to) things like (the) elective module where they let us leave for six weeks without means for transport, accommodation and food. We as students wrote petitions and even boycotted for our issues to be concerned but (they) were not resolved”.

“The issues were raised with the school management and also the dean but they were not resolved. The issues were raised multiple times”.

An open-ended question was asked if their concerns were attended to their satisfaction or not and the respondents (n=35) indicated that they were not satisfied indicating some of the reasons as follows:

“No, there is still insufficient equipment for OSCE. The mannequins that are supposed to be used for ECG and CPR are not calibrated nor enough. The BP gauges are also not enough”.

“No, because we raised one issue multiple times (different groups) but no solution from the school. Groups have been complaining about residences in hospitals and here on campus but no renovations were done”.

Eight respondents indicated that their concerns were attended to, however, they did not express if this was to their satisfaction or not:

“Yes, because we have a much bigger venue for both classes and exams”

“Some of them: The main problem was the short duration in which each module is allocated, and we were required to write a test and an exam within a short space of time. Requested for postponement of test or extension of the module, some of them were granted, some of them were not”.

4.3.13 Suggestions for improving the teaching and learning activities of the medical programme

In response to the open-ended questions that related to suggestions for changes to the curriculum and the learning environment, there were considerable overlaps in the responses and therefore these two questions have been analysed together. There were four broad categories identified, namely communication, perception of teachers, assessment methods and infrastructure.

4.3.13.1 Communication

Communication was a broad issue in terms of the management of issues raised and the timetable. Respondents felt that when they raised issues that the problem was not attended to and that no one was listening to them.

“I suggest that the school management take students’ issues into account and make it easy for students to lodge complaints without fear or repercussions when issues are raised. They should be addressed and changes must be seen as evidence. We can't complain about something every year and it's not addressed.”

“The management must not be emotional when students raise points that shine a light on their incompetence. We don't raise complaints because we hate them and are ungrateful, we do so because we want to see improvements that will make us proud to say UL is our Alma Mata”.

Regarding timetabling issues, the respondents reported a lack of adherence to the timetable as the lecturers would cancel or postpone classes without giving adequate notification in terms of time and respondents felt that this affected their learning plans.

“Some Lecturers must learn to be punctual and stick to the proposed schedule/timetable because it has become a norm for many Lecturers to cancel and/or re-schedule lectures any time they deem fit without taking into consideration the students' schedule for the day”.

“Most lectures are not done on time and there is always rescheduling of lectures which leads to us having a lot of workload at the end of the day. So if the timetable can be followed exactly as it is that would be great and reduce the workload for us as students”.

4.3.13.2 Perception of teachers

Respondents were of the view that there were too few lecturers/teaching staff. They felt that the university should consider employing more teaching staff.

“the recruitment of more competent staff should be at the priority (of the university) in trying to improve the program”.

“Anatomy department needs more lecturers to be able to teach us. At some point, we were left by ourselves, to ourselves in (the) dissection hall since we only had two lecturers and they had to also teach other classes”.

4.3.13.3 Assessment

Respondents expressed the need for more opportunities for formal assessment and felt that assessments should include a variety of methods rather than just MCQs. It was also felt that students should be exposed to informal assessments before the formal assessment of the module.

“They must normalize giving us practice questions, quizzes and tutorials to help us and make the work much easier”.

“They must give us a tutorial, quizzes and questions to help us easily grab the content”.

4.3.13.4 Infrastructure

Respondents felt that the infrastructure required refurbishment and suggested a dedicated medical campus with adequate lecture halls and an equipped clinical skills laboratory.

“The school of medicine needs to have its campus where it can be just medical students only. There are a lot of activities that happen in the school in general that disrupt the activities of the school of medicine”.

“There is currently no functional skills lab on the university premises. A functional skills lab would help in teaching and learning”.

“A laboratory with dummies at the university that students could use on their own would improve our understanding of anatomy, heart sounds, breath sounds and any other learning outcomes that require one to participate practically”.

4.4 Conclusion

Of the 145 respondents most were female and the greatest number of responses were from the third and fifth years. On the whole, students felt the workload was reasonable except for a few modules in the first year (essentials of diseases process; biology and chemistry of life), second year (respiratory system module) and third year (reticuloendothelial system). Students felt that they were well taught throughout most of the modules. The most common methods of assessment were multiple choice and short answer questions. Only 18% of the students indicated that they failed a single module mostly during their first and second years.

The most common method of technology that was used during teaching and learning was Blackboard. Students embraced technology in teaching and learning that was implemented during the Covid-19 pandemic albeit there were a series of challenges during the implementation stages. Despite this, they mostly recommended that it remain beyond the pandemic. Infrastructure and human resource-related challenges that affected students' learning processes were highlighted. The difference in the students' opinions to some of experiences was expected as their experiences will differ. In the next chapter, the results will be discussed.

Chapter 5

Discussion of results

5.1. Introduction

In the previous chapter, the results of the study were reported. In this chapter, I will discuss the results and present the conclusions drawn from the results.

The purpose of this research study was to determine the perceptions of medical students about the medical curriculum. Perceptions relating to module workload, the teaching and learning processes together with the required resources, the environment where teaching and learning take place, methods of assessment, and the institutional processes experienced by the students were explored. The research results also revealed some suggestions to improve the medical curriculum and the environment based on student experiences. Stufflebeam's CIPP model of curriculum review is used to guide the discussion of the results from the study relating to the context, input, and process.

5.1.1 Demographic details

The distribution of the gender of the respondents in this study is reflective of the University of Limpopo student population and that of most of the institutions of higher education. "For 2021, Statistics South Africa (Stats SA) estimated the mid-year population to be 60,14 million people. Approximately 51,1% (about 30,75 million) of the population was female and approximately 48,9% (about 29,39 million) was male" (Statistics South Africa, 2022). "Nationally women have outnumbered men in MBChB enrolments since 2000, with figures ranging between 52% and 63% at seven of the eight medical schools in 2005" (Breier, 2008). In this study, 60% were females and 37.9% males which is comparable to the national enrolment of students registering for the first time, which was 58% females to 41% males (Higher Education Management Information Services, 2022).

A small number of students who registered for this medical program had obtained a qualification from another institution of higher learning before admission (n=29; 20%). This may be considered an advantage for this category of students as they may have adjusted and coped more easily with some of the learning processes based on their previous experience. The University of Limpopo students' selection criteria for medical students make provision (20% of spaces) for students who obtained a

degree previously to be admitted to the medical program (University of Limpopo, 2018). The University of the Witwatersrand reserves up to 25% of its medical places for those students who have obtained a prior (preferably science) degree (Seggie, 2010).

5.2 The volume of work

In the first year of study, the 'essentials of disease processes' and biology modules were found to be excessive in volume. The respiratory system module in the second year and the reticuloendothelial system and haematology module in the third year were also described as excessive. Since more than a century ago, there have been issues with too dense curriculum and excessive information in medical education. Abraham Flexner observed in 1910 that the demanding curriculum of medical school would "tax the memory, not the intellect" (Slavin, 2021). When content in the curriculum is maintained even when it may no longer be necessary to educate students for professional practice, curriculum overload frequently results. The addition of fresh knowledge from the constantly evolving requirements for professional practice and revisions to accrediting standards serves to exacerbate the overload (Chen et al, 2023).

This perception of the students of the excessive volume of work in these modules is consistent with the findings of the professional body (Health Professions Council of South Africa) and the education body (Council for Higher Education) that are responsible for the accreditation of programs. In 2014 and 2018, the accreditation visits to the University of Limpopo by the Health Professions Council of South Africa (HPCSA) recommended that a core curriculum be defined and implemented to reduce the factual overload identified in the early years and to prevent factual overload in the later years (Health Professions Council of South Africa, 2014).

"When students experience information overload, they revert to performance goals and adopt the wrong motivation for learning. Their focus turns primarily to being successful in tests and examinations, and they consequently adopt a surface learning approach. Surface learning and memorization of facts without understanding their content usually results in moderate retention of knowledge, which can handicap the development of clinical reasoning" (Struwig, 2016). The majority of medical programs are fact-heavy, and the students inevitably spend a lot of time each day trying to meet the required academic standards, this may have unintended negative

consequences for students' personal mental and physical health (Naidoo, 2014). Anxiety may be brought on by the perceived amount of subject matter, and many students struggle to demonstrate an acceptable depth of understanding (Struwig, 2016).

Factual overload and the necessity to impart fundamental skills to students were two factors that led to changes in undergraduate medical education in the UK (Lumsden, 2010). The creation of an integrated curriculum with a significantly decreased knowledge base about fundamental medical sciences was prompted by the General Medical Council's directive to "minimize factual overload" (Andrew et al., 2015). The difficulty for educators is to incorporate successful teaching strategies into a comprehensive curriculum that puts students first (Andrew et al., 2015).

The University of Limpopo's medical curriculum is integrated at both horizontal and vertical levels, thus there are several departments involved in the delivery of a single module during the teaching and learning activities (e.g. anatomy, physiology, pathology, & clinical departments). There is no separation between the basic sciences and clinical teaching. This is further demonstrated by the building up of the content or the relationship between the modules, such as the basics provided in the 'Essentials of diseases process' and the subsequent system's modules taught in the second year such as the cardiovascular system. According to Harden, integration is the arrangement of instructional material to relate or bring together concepts that are typically presented in different academic departments or courses; this structure can occur both inside and between subjects, and throughout what seems to be an unlimited range of periods or depths." (Harden, 1984, p. 288).

Students' perceptions of the lack of participation in sports and recreational activities in this study were attributed to the lack of time due to the demands of the medical program as a result of the excessive volume of work that did not allow them to have an opportunity to participate. A study conducted by Naidoo (2014) revealed that medical students complained that there wasn't enough time in the course to do other things. A healthy lifestyle requires regular physical activity and this has health advantages such as increased strength, fitness, and general well-being. (Al-Asousi, 2016).

Despite the indications of the excessive volume of several modules in this study, only 18% of the respondents had failed a module.

5.3 Methods of teaching the modules

Students perceived the teaching of their modules to be 'well taught' despite the volume of work that they were subjected to, especially in their early years of study. It has been suggested that the methods of teaching may contribute towards the perceptions of content overload in various modules, however, this was not the case in this study (Greville, 2016). The curriculum alone won't solve the problem of medical education; the instructional methods also have to be improved. The quality of medical education, particularly in developing nations, may be improved by cutting back on the excessive amount of theoretical information that is taught in a course that may not be relevant to future practice and replacing it with more practical instruction like fundamental laboratory tests and bedside clinical teaching (Al-Shamsi, 2017).

Pedagogical instructions applied in this study were a combination of different modalities with tutorial sessions being most commonly (38%) used followed by PowerPoint presentations (23%) as reported by all year levels of study. This may be explained by the fact that both the pre-clinical years and the clinical years use both modalities during the delivery of the modules.

5.4 Factors that affected students' studies

Most students encountered difficulties with the theoretical component of their studies (58%) compared to the practical components (35%) which were mostly considered easy to cope with. The volume of the modules and the teaching and learning methods used could play a role as a factor in the difficulties encountered by the students. As reported, the students indicated that they were 'well taught' in most of their modules and as a result, the teaching methods may not be a factor that resulted in difficulties with the theoretical component.

Transitioning from school to the first year of medical school was not easy and many students (43%) reported that this made it difficult for them to cope with their studies. Students who enrol in the medical program come from various backgrounds of basic education and this may pose a series of challenges to the students attributed to factors such as: moving from the methods of teaching at basic education that is mostly dependent on the teachers as compared to university teaching that requires more independent learning. Lack of learning resources at public schools and the

socioeconomic backgrounds of students may also contribute to adaptation at the university level.

“Baker (2003) noted that undergraduates are faced with many new interpersonal, social, and academic demands during the transition from secondary school life to university, which is stressful for many of them” (Nakalema, 2013 p.2). The time spent by medical students is divided among a variety of activities, including placement and lecture attendance, tests, extracurricular activities, employment, families, and social life (Lumley, 2015). Finding a balance between these responsibilities is bound to affect the students’ quality of life and academic progress, which are interdependent. Student support and mentoring programs play a critical role in mitigating coping difficulties, especially for first-year students. Students who do not feel an academic, emotional, and social connection to the institution at a cultural level are more likely to drop out of school without effective student support services (Ciobanu, 2013).

The University of Limpopo medical students in this study indicated that they were satisfied with the institutional support received from the university (60%) while 39 % indicated that they were not satisfied with the financial aid, and medical and psychological support. Lack of financial support creates uncertainty for students who in most cases face difficulties of not knowing if they will have the next meal or not and this is likely to affect their studies. Researchers have long proposed that students who worry about money may be less committed to their goals and less engaged in their studies and less persistent (Baker, 2019). Longer time to degree has also been connected to financial issues, which can increase university expenses (Baker, 2019).

5.5 Assessment methods

Various methods of formative and summative assessment are used in the program. The perception was that the multiple choice questions, short answer questions, and OSCE were mostly used compared to other methods such as essays, projects, and vivas. This is reflective of the fact that any good assessment program consists of a variety of methods as no single instrument is perfect (Schuwirth, 2019). Because each evaluation method has its limitations, it takes a combination of procedures to make up for any weaknesses in a single technique (Lockyer et al., 2017). Furthermore, it is clear that clinical assessment is multidimensional and that no assessment is perfect (Joubert et al., 2020)

Multiple-choice question (MCQ) exams are more frequently employed at both undergraduate and graduate levels due to their excellent reliability and validity (Fortun, 2010). MCQ tests that are aligned with learning objectives can be used to efficiently evaluate various aspects of student performance, facilitate timely feedback, and contribute to the self-learning process (Brady, 2005).

With this action, the chance that examiner bias would be perceived and a subsequent legal challenge by the defeated candidate would be greatly reduced (Hift, 2014). The findings of this research revealed that the majority of the students (51%) reported MCQs as the best method of assessment compared to other methods as it allows assessment on a variety of concepts that they learned, and challenges their knowledge and critical thinking. One reason the multiple-choice format exhibits high validity is the observation that well-designed, context-rich multiple-choice questions are fully capable of assessing higher orders of cognition and that they call forth cognitive problem-solving processes that precisely mirror those required in practice. (Hift, 2014).

The OSCE as a method of assessment was used mostly during the clinical years as indicated by the responses provided by the third, fourth, and fifth-year students. The students are exposed to clinical skills learning late in their first year during the 'introduction to the clinical skills and communication' module, and then late in their second year when they do the 'clinical medicine I' module. In the third year, they are taught the clinical skills modules and from the fourth to sixth years, the clinical modules are delivered at various clinical training platforms (clinics and hospitals). The level of anxiety experienced and intimidation encountered by the examiners resulted in the OSCE being perceived as the worst method of assessment. There was a perception of a lack of resources for clinical skills learning, such as a need for a dedicated skills laboratory and the required mannequins

The short answer questions were another commonly used method of assessment. Students preferred this method (33%) as it provided them with an opportunity to demonstrate their ability to apply the knowledge gained to practical situations and the understanding of concepts.

Students at various year levels reported that essays were hardly ever used (95%) as a method of assessment. It was also viewed as the worst method of assessment by the students (44%) as it is time-consuming, there is the possibility of bias on the part

of the examiners, promotes superficial learning of work, and consequently high chances of failure. Open-ended questions (such as essays) often have lower dependability rates per hour since they take more time to complete than multiple-choice questions (Schuwirth, 2019). For essay questions to have a reliable score, there must be a lot of questions and several scorers (Hift, 2014). Studies have shown that evidence does not support the proposition that the open-ended assessment format (essays) is superior to the multiple-choice format, at least in exit-level summative assessment, in terms of either its ability to test higher-order cognitive functioning or its validity (Hift, 2014). Given the multiple-choice format's better dependability and cost-effectiveness, the focus should be placed on gradually removing open-ended questions (Hift, 2014).

Projects such as case studies were not a common method of assessment as they are used sometimes (59%) or hardly used (22 %). Students expressed their limitations in their ability to carry out projects as they felt that they are not properly equipped with skills during the teaching sessions on how to execute the tasks associated with the projects. This may be reflective of the teaching strategies that are not aligned with assessment practices and the lack of constructive alignment. Constructive alignment (CA) is a pedagogical strategy that emphasizes the alignment of the intended learning outcomes (ILOs), teaching and learning activities (TLAs), and assessment tasks (ATs) within the constructivist theory of learning (Wang et al., 2013). "Biggs (2011) suggests that intended learning outcomes come first, the learning activities second, and the assessment practices third. These intended learning outcomes help to make the overall learning experience more transparent and meaningful for students and ensure that the assessment practices are designed to assess the learning outcomes" (Abu-Hamdan, 2014). It is anticipated that courses with CA characteristics will improve student learning encounters and make it easier for students to attain the ILOs. (Wang et al., 2013)

Viva was reported to be hardly used (65%) and when used, the students indicated their concerns regarding how they were conducted as there was anxiety about being assessed in front of other students. The viva voce examination (colloquially known as the "viva" or "oral") is normally performed as an interview between the candidate and examiner/s (Selzer et al., 2015).

5.6 Learning environment

5.6.1 Teaching facilities/ Teaching and learning infrastructure, and students' residence

The educational environment influences how, why, and what students learn which is crucial to the success of the curriculum. The curriculum and students' perceptions of it may affect the quality of learning (Pai et al., 2014). An unsupportive learning environment can result in burnout, tiredness, and cynicism, while a supportive learning environment improves student empathy, professionalism, and academic performance (Dunham et al., 2017). A favourable learning environment is key to students' success in various aspects. The school should also provide a "fit-for-purpose" curriculum in a setting that will increase students' chances of success (Pai et al., 2014)

The efficiency of a program can be judged by how well students perceive their learning surroundings, which affects their learning strategies and outcomes (Ezeala, 2017). Although the students were satisfied with the facilities that were used for teaching and learning, there was an indication of several difficulties encountered during the learning processes ranging from unsuitable lecture halls (e.g., a laboratory) that were used. The fact that many health professions education programs are still being held in what could be described as monologue-centred learning spaces that are only intended for the transmission of information and for lecturers and students to be able to see, hear, and take notes properly is nevertheless crucial to be aware of (Nordquist, 2016). The University of Limpopo medical school depends on other schools and faculties for venues as it does not have a dedicated infrastructure as yet. This perception may be influenced by the arrangement of the other eight medical schools in the country that are well developed as they either have separate campuses for the medical school or there is a dedicated/allocated infrastructure that is used for teaching and learning for the school or faculty.

The majority of the respondents in this study (92%) stayed at the residence on campus. Students were divided in their perceptions of the living conditions and the suitability of the residence in that there was a balanced response between those who said they were satisfied (55 %) versus those who said they were not (48 %). There were general concerns about factors such as noise levels, lack of water, and poor

hygiene that affected their study processes. The Department of Higher Education report (2011) identified significant backlogs in providing student housing, as well as widespread abuse of students living in deplorable conditions (Gregory, 2020). The student's accommodation has to meet certain minimum standards set out by the Department of Higher Education. A policy on the minimal requirements and standards for student accommodation at public universities was implemented in 2015 as a result of an amendment to the Higher Education Act (South African Government, 2015). The few students (8 %) who stayed off campus experienced limitations in accessing facilities such as the internet, and the library and the lack of interactive study sessions with other fellow students.

There are infrastructure and maintenance-related challenges in several institutions of higher learning in the country, especially those that were previously historically disadvantaged. Shortage of students' residences nationally poses a challenge that results in students being accommodated in various private accommodations provided by landlords. "Universities have struggled to manage student accommodation as access to tertiary education has increased globally over the past 40 years. The social character of suburbs near the universities has been changed by the influx – a process that has been dubbed 'studentification'. To provide student housing, some colleges have created public-private partnerships; others have left it exclusively to the private sector." (Gbadegesin et al., 2021).

Participation in sports or other recreational activities by the students in this study was minimal (29%). This was due to the demands imposed by the high workload associated with this medical curriculum.

5.6.2 Value of library and cadavers in learning

Library services were perceived as accessible by most of the students (45%) but there were equally concerns about the limited operating hours (19 %) and limited books to borrow (15 %). The limited operating hours have implications for these students' learning processes as they have limited access, and they return to campus after long hours spent at the clinical training sites compared to other students who are attending full-time on campus. This may also be compounded by limitations in access to the e-books indicated by some of the students.

Most students (52%) were satisfied with the number of cadavers for teaching anatomy as they were allowed to dissect and appreciate the structure of the body

more than those who were not. Studies have shown that despite the advent of modern technology and evolved teaching methods, dissection continues to remain a cornerstone of the anatomy curriculum (Ghosh, 2017). Dissection, in the opinion of medical practitioners at all levels, facilitates learning anatomy with pertinent clinical connections (Ghosh, 2017). Moreover, dissection helps to build discipline and independent skills which are essential requirements of a modern healthcare setup (Ghosh, 2017).

Due to various factors, including religion, folk beliefs, culture, and local history that have an impact on what people believe should happen to the body after death and on the ritual and spiritual importance of a "intact" body (at least for a certain time after death), the availability of cadavers for teaching anatomy is a challenge that medical schools face globally (Habicht, 2018). Even though cadaveric dissection has long been used as a teaching technique, opinions on whether or not complete cadaver dissection is still appropriate for undergraduate education vary. (Gangata et al., 2010). A study by Washmuth et al. (2020), found that even with the variety of teaching methods, 69% of anatomists and 90% of students favour cadaveric dissections over other teaching tools. Many medical schools have abandoned expensive and time-consuming dissection-based instruction in favour of alternative methods of instruction such as prosection, medical imaging, living anatomy, and multimedia resources due to the limitations on curricular time, trained anatomy faculty, and resources for gross anatomy courses in integrated or/and system-based curricula (Estai, 2016). The ideal student-to-cadaver ratio is 10:1, since this allows for greater hands-on exposure and self-discovery while still maximizing the benefits of cadaveric active learning (Mutalik, 2016).

“The best way to teach modern anatomy is by combining multiple pedagogical resources to complement one another. Students appear to learn more effectively when multimodal and system-based approaches are integrated” (Estai, 2016 p.156). Many programs have switched from full-body dissection to prosections due to the reduction in the amount of time dedicated to gross anatomy in an integrated curriculum and the decline in the number of donated bodies; this decreases the number of contact hours while giving students access to structures that they might otherwise spend hours trying to find (Estai, 2016).

5.7 Technologies used in teaching and learning.

The use of technology in teaching and learning was widely embraced (84%). A variety of technologies were used rather than a single modality to deliver the medical curriculum. There is no single best method of technology for use in teaching and learning activities, it is the combination of all available methods that benefit the students. According to the theories of learning, students learn in different ways through different methods, e.g., some learn better with the use of images, videos, or a combination (Taylor, 2013). The online learning platform, Blackboard, was the most popular and preferred method by the students (99.3%) as it provides the teachers with an opportunity to post images, videos, website links, and other related material that the students can always refer to or revisit for further learning to ensure that there is an understanding after a lecture session as the material remains accessible.

Half of the students in this study demonstrated a satisfactory response (50%) to were satisfied about the support that they received from the university by having internet access through various means such as the university server that is also available regardless of a power outage, access to Wi-Fi connection on campus and also the monthly data provided, making it easy for them to study off campus. Internet access in most teaching and learning environments is critical, however, in most economically disadvantaged environments, this will directly impact the learning processes.

Students at the University of Limpopo are mostly from disadvantaged communities in the rural province residing in villages that have a series of restrictions on internet access and they indicated that this makes it difficult for them to continue with their studies when they are visiting home for holidays.

There was a notable limitation in access to e-books (57%), however, this was not explained better to determine the factors behind the restricted access, whether it is the availability of the e-books at the university or whether it has to do with other factors such as internet access. The response was also somewhat balanced as there was an almost equal number of students who indicated that they have access to e-books (43 %). The impact of load shedding or power outages experienced across the country is directly linked to the limitation in the use of technology for teaching and learning.

5.7.1 The use of online teaching during the COVID-19 pandemic

The impact of the Covid-19 pandemic was felt throughout institutions of higher learning globally. South Africa was one of the sub-Saharan countries that were equally affected negatively by the pandemic as there were imposed lock-down measures that were put in place to deal with the spread of the virus. The lockdown measures resulted in a complete closure of institutions of learning and the students and the teachers had to go to their homes due to the restrictions associated with the lockdown. "According to UNESCO, on 1 April 2020, schools and higher education institutions (HEIs) were closed in 185 countries, affecting 1 542 412 000 learners, which constituted 89.4% of the total enrolled learners" (Marinoni, 2020 p.8). As a result, there was a need to switch to the remote off-campus teaching and learning activities that were administered via the online modality. "Globally, most institutions were confronted with a sudden and unprepared shift to online teaching to respond to the need to continue teaching and learning activities and to engage and motivate students when social distancing measures were in place" (Marinoni, 2020).

There were a series of challenges that confronted most of the institutions as they were not ready or had never worked on a plan to migrate to full online teaching as this is not in the curriculum of most of the institutions. The teaching is still predominantly on campus and this was the case with the University of Limpopo which was not offering remote teaching, particularly for medical students. This required a process of training the teachers on the use of online platforms and resources for both the teachers and students to enable them to deliver and attend lectures respectively. Transitioning from traditional face-to-face learning to online learning can be an entirely different experience for the learners and the educators, which they had to adapt to with little or no other alternatives available (Pokhrel, 2021).

The students acknowledged that the transition from the conventional approaches of teaching (lecture room-based physical teaching) to the online platform was mostly due to the prolonged period that the university took to put systems in place, and internet connectivity as they were mostly in the remote areas with generally poor coverage and the teachers who were unfamiliar with the online teaching platforms. A survey conducted by the International Association of Universities identified that higher education institutions were unable to move to online teaching because their

students simply did not have access to the Internet from home, particularly in Africa, but also in other low- and middle-income countries (Marinoni, 2020).

There were also positive remarks by University of Limpopo medical students about the transition from the traditional teaching and learning methods to the online modalities as something that was effective and provided the students with different learning opportunities that were convenient and within their control. The forced transition to distance teaching and learning provided a significant opportunity to research blended or hybrid learning, propose more flexible learning options, and combine synchronous and asynchronous learning (Marinoni, 2020).

The majority of the students (77%) recommended that the online teaching and learning modality should remain beyond the Covid-19 pandemic era and be used as a routine method of delivering the medical curriculum. A small proportion (21%) of students did not prefer that online teaching remains beyond the Covid-19 pandemic as it lacked the interaction provided by physical teaching and the internet connection-related factors.

5.8 Institutional support

Students require various interventions from the institution to support their studies. This support is in the range of health needs, psycho-social needs, and financial support. Financial, medical, and psychological support were the prominent forms of support that the students required.

The transition from secondary schooling to higher education institutions can be an overwhelming experience for most students and psychological support to assist the students to cope is critical. Students who failed the modules attributed their physical and mental health as the main reasons (11%) for their poor performance. McLuckie et al., (2018) found that among medical students, psychological distress is common and is linked to poor academic performance, a decline in empathy, burnout, and suicidal thoughts. The structures such as mentoring and counselling for the identified students who are at risk have been proven to be effective (McLuckie et al., 2018). The majority of the students in this study received various means of support (60%) from the university.

5.9 Conclusion

The demographic profile of the students in this study is similar to other established medical schools in South Africa. Factual overload in this medical curriculum for some of the modules was one of the challenges that were highlighted by the students and this was supported by the accrediting professional body. The perception of overloaded modules affected students' participation in sporting and recreational activities. Modules were generally well taught using different pedagogical instructional methods. Mixed methods of assessment were applied in this medical curriculum with the students preferring the multiple-choice questions in the written assessments.

There were difficulties encountered by the students in the transition from schooling to university, however, there was general satisfaction with the institutional support system that is in place to assist them in coping with their studies. The infrastructure and the equipment required for teaching and learning activities were not considered satisfactory as the School of Medicine does not have a dedicated infrastructure for the activities. Students valued the use of cadavers for the teaching of anatomy even though they were limited in numbers.

The use of technology in teaching and learning for this medical curriculum was embraced by the students. Students confirmed the support offered by the university on access to the internet especially when they are on campus. There were a series of challenges during the transition from traditional on-campus teaching to remote online teaching imposed by the Covid-19 pandemic-related lockdown and this was mostly related to the access to the internet or Wi-Fi connectivity away from campus.

Chapter 6

Summary, limitations, and recommendations

6.1. Introduction

In this chapter, the summary, limitations, recommendations, and conclusions drawn from the research are presented.

6.2. Summary of the study

This was a quantitative descriptive cross-sectional study. A questionnaire was administered to the target population of 226 medical students who were in their second to the fifth year of study and 145 students responded yielding a response rate of 65%. There were more female (60%) respondents than males (38%) and 2% did not indicate their gender. Most students (72.4%) were enrolled on the medical program directly from matric; a few respondents had prior experience at an institution of higher learning (17.9%) and work experience (4.8%).

Some modules were perceived to be high in the volume of work resulting in factual overload which had been highlighted by the Health Professions Council of South Africa, e.g., essentials of disease processes, biology and chemistry of life, respiratory system, reticuloendothelial system and haematology. The modules were perceived to be well-taught, however, a small number of students (13.9%) felt that the essentials of disease processes and health in context (11.7 %) modules were poorly taught.

Students found it difficult to cope with the transition from school to university (42.8%) and the theoretical components of their studies (57.9%). Multiple choice (84.1%) and short answer questions (87%) were perceived to be the most commonly used and best methods of assessment. Essays were perceived as the worst method of assessment.

The teaching and learning environment was perceived to be generally satisfactory. There were concerns regarding the infrastructure, particularly that the School of Medicine did not have a dedicated medical school with lecture halls and laboratories. Lack of teaching and learning equipment (e.g., the skills laboratory equipment) was highlighted by the students as a factor that affected them negatively. Students were also satisfied with the support offered by the university on the network connection to enable them to access online teaching and learning material, however, they highlighted the need to expand points of access beyond the campus to residences

and other teaching and learning spaces. Students' financial and psychological support measures were in place, however, there were concerns raised about the effectiveness of the support structure.

6.3 Limitations of the study

The size of the sample was adequate; however, the population did not include the sixth-year/final-year students as the program was in the fifth year when ethical clearance was granted for the study. Overall there was a good response rate, however, there was a low response rate from the students in their second and fourth-year levels.

This study has only focused on the students and did not include the views of the other critical stakeholders such as the teachers, and administrators who ideally should be included in an evaluation of the curriculum. The views of the products of the curriculum, i.e. the graduates employed in the service delivery platform are also important during a curriculum evaluation and they were not included in the study.

In the case of the learning modules which were identified as having a large amount of work, it was not established if the perception related to the teaching methods used by the lecturers or the actual content of the modules. As a result, the cause/reason for the perceived high volume of work by the students cannot be stated.

6.4 Recommendations

6.4.1 Recommendations for practice/teaching

- 6.4.1.1 The University of Limpopo should take into consideration the students' perceptions about the modules reported to be voluminous such as the essentials of disease processes, and respiratory and reticuloendothelial systems. This provides an opportunity to review the content and the pedagogical instruction in these modules when the university embarks on the curriculum review process especially considering that the professional bodies also reported some evidence of factual overload of this medical curriculum.

- 6.4.1.2 Students' perceptions of the lack of adequate human resources required to deliver this medical curriculum to ensure quality teaching and learning experiences should be addressed by the university during their planning processes. The planning processes will be an opportunity to review the required human resources in line with the curriculum needs and the university students' enrolment plan. This study revealed limited staff for teaching and learning as a factor that affects students' performance
- 6.4.1.3 Faculty development to ensure that lecturers are prepared for the delivery of the medical curriculum. This should include preparation for current teaching methods and assessments.
- 6.4.1.4 Consideration needs to be given to learning spaces including lecture halls and a clinical skills laboratory. There must be more opportunities for formative assessment. Students indicated the need to have frequent formative assessments to be prepared for the summative assessment, e.g., more clinical skills assessments and OSCEs during the period of the module delivery.
- 6.4.1.5 Consideration needs to be given to the network connectivity in the residential areas to enable continuous learning away from the formal teaching and learning environment. The improvement in remote access to the library services using the online platform will be of value in this case.

6.4.2 Recommendations for further research

It is recommended that a follow-up study be conducted using a qualitative approach so that some of the issues identified in this study be probed more fully.

The expansion of the study population to include the products of the University of Limpopo medical curriculum. This will enable an evaluation of the curriculum in its entirety and provide information about its value once used in the workplace. Data from the other stakeholders in the medical curriculum development cycle such as lecturers and administrators in this type of study will add value as it will provide more information that will benefit the school and the university.

6.5 Conclusion

The aim of this study was to determine the perceptions of the medical students enrolled in the medical program at the University of Limpopo about the program. This program commenced in 2016. At the time of the study the first cohort of students had not yet graduated. This evaluation was the first attempt to obtain the views of the students regarding the curriculum. Students are important stakeholders in a curriculum evaluation. Consistent with the literature and reports from the regulating authority, students felt that some modules demanded a high volume of work. There were also suggestions that the medical program should have its own dedicated building and learning venues that would more appropriately meet the needs of the program in terms of the content being taught. Overall, the respondents were satisfied with the methods of teaching and assessment.

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APPENDIX A: STUDY INFORMATION DOCUMENT



STUDY INFORMATION DOCUMENT

Study title: "Students' Perceptions of the medical curriculum at the University of Limpopo"

Dear Prospective Participant

I, Dr Thakadu Arnold Mamashela am studying for a Master of Health Science Education degree at the University of the Witwatersrand, Faculty of Health Sciences. I invite you to participate in this research study by completing a questionnaire, which will take approximately 15 -20 minutes to complete.

The purpose of this study is to describe the second to fifth-year medical students' (levels 2 to 5) perceptions of the medical curriculum at the University of Limpopo.

I am required to conduct a cross-sectional study of second to fifth-year medical students in the school of medicine. The questionnaire will take you about 15-20 minutes to complete. Your identity will not be divulged in any way during the study and the questionnaire to be completed will be treated as anonymous. Information associated with the study will only be made available to the researcher, research supervisor and his co-workers in this study. The date, time and venue for completion of the questionnaire will be agreed upon between the participants and the researcher. All data about the study will be stored in a securely locked cupboard or password-secured folders. The questionnaires will be retained for two (2) years if a scientific publication arises from the study and six (6) years if there is no publication. Thereafter they will be destroyed accordingly.

Your participation in this study is voluntary. You may discontinue participation at any time without penalty and there will be no requirement to provide a reason for withdrawal; any data collected will in default be destroyed unless you specifically consent to its retention. There are no risks involved in participating in this study. The information gained in this study may benefit the medical curriculum and may ensure that there is improvement in teaching and learning.

Should you wish to seek further clarity about the research feel free to communicate using the following contact details:

Principal Investigator: Dr. Thakadu A. Mamashela

Telephone no: 015 287 5545, or by e-mail at: Thakadu.Mamashela@Ul.ac.za,

Supervisor: Prof Trish McInerney

Telephone no: 011 717 2073, or by e-mail at Patricia.McInerney@wits.ac.za

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg (“Committee”). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concerns over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted by telephone number 011 717 2301, or by e-mail at Clement.Penny@wits.ac.za.

The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.

Date: 30 September 2019

**APPENDIX B: PARTICIPANT
CONSENT**

WITS
UNIVERSITY



PARTICIPANT CONSENT SHEET

Project Title: “Students’ Perceptions of the new medical curriculum at the University of Limpopo”

1. I have been given a Participant Information Sheet which explains the nature and processes involved in this study, which is attached hereto;
2. I was given time to read it, or had it read to me, in the language I best understand;
3. I was given time to ask any questions I wanted to and found any answers given to me to be reasonable and satisfactory;
4. I believe I fully understand why the study is being conducted and what the intended outcomes will be;
5. I understand that there will be no immediate benefit to me, should I agree to participate, nor will I receive any payment; conversely, participation will not cost me anything but my time;
6. I understand that, even if I initially consent to take part in the study, I may subsequently withdraw at any time and would not be required to give any reasons; if that happened, any data collected about me for the study would immediately be destroyed, unless I give consent for it to be retained
7. I have been given a range of contact details, listed below. If I require further information or become concerned about any aspect of this study, I am free to speak to any of these contacts.

Contact details:

Principal Investigator: Dr Thakadu A. Mamashela

Telephone no: 015 287 5545, or by e-mail at: Thakadu.Mamashela@Ul.ac.za,

Supervisor: Prof Trish McInerney

Telephone no: 011 717 2073, or by e-mail at Patricia.McInerney@wits.ac.za

Professor CB Penny, Chairperson of the Human Research Ethics Committee (Medical) at the University of Witwatersrand, on telephone no. 011 717 2301, or by e-mail at Clement.Penny@wits.ac.za.

Ms Z Ndlovu or Mr Rhulani Mkansi, Committee Secretariat, telephone nos.: 011 717 2700 or 1234, or by e-mail at: Zanele.Ndlovu@wits.ac.za or Rhulani.Mkansi@wits.ac.za

Name of Participant: _____

Date: _____

Place: _____

Signature or mark _____

Witnessed by:

Name of Witness: _____

Signature: _____

Date: _____

APPENDIX C: QUESTIONNAIRE

QUESTIONNAIRE

Title of the Study: Medical students' perceptions of the medical curriculum at the University of Limpopo

SECTION 1: BIOGRAPHICAL INFORMATION

1. I am

Male		Female		Other	
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2. I am:

18-20

21-23

24-26

>26 years

3. I was admitted to first-year MBChB (please tick)

Directly from school	
Following some university experience	
Following some college/university of technology experience	
After working for a period	
After going overseas	
Other: Please specify _____	

4. Please indicate your year level of study (Tick the relevant)

2	3	4	5
----------	----------	----------	----------

SECTION 2: TEACHING AND ASSESSMENT IN THE MEDICAL CURRICULUM.

5. How would you describe the volume of work in the following modules?

Please note: Year 2 students must only respond to year 1 modules in the table below; year 3 students must only respond to year 1 and year 2 modules; year 4 students must only respond to year 1,2 and 3 modules and year 5 students must respond to all the modules listed

Year 1 Modules	Too little 1	Reasonable 2	Excessive 3
Physics for Medicine			
Chemistry for Medicine			
Biology & Chemistry of Life			

Health in context/Professionalism			
Introduction to structure & function			
Essentials of disease processes			
Introduction to Clinical Skills & Communication			
Year 2 Modules	Too little 1	Reasonable 2	Excessive 3
Cardiovascular System			
Respiratory System			
Endocrine System			
Gastrointestinal tract			
Urogenital tract			
Clinical medicine I			
Year 3 Modules	Too little 1	Reasonable 2	Excessive 3
Reticuloendothelial system & Haematology			
Nervous system & Head & Neck			
Musculoskeletal			
Reproductive			
Clinical medicine II			
Year 4 Modules	Too little 1	Reasonable 2	Excessive 3
Clinical Pharmacology			
Dermatology			
Introduction to Clinical Anaesthesiology			
Forensic Medicine			
Health & disease in communities			
Internal Medicine			
Obstetrics & Gynaecology			
Psychiatry			
General Surgery			

6. How would you describe the delivery of the content during your relevant years of study? Please respond to the modules that you have completed in your previous year/s of study.

	Well taught	Average teaching	Poorly taught
Physics for Medicine			
Chemistry for Medicine			
Biology & Chemistry of Life			
Health in context/Professionalism			
Intro to structure & function			
Essentials of disease processes			
Intro to Clinical skills & Communication			
Cardiovascular System			
Respiratory System			
Endocrine System			
Gastrointestinal tract			
Urogenital tract			
Clinical medicine I			
Reticuloendothelial system & Haematology			
Nervous system & Head & Neck			
Musculoskeletal			
Reproductive			
Clinical medicine II			
Clinical Pharmacology			
Dermatology			
Introduction to Clinical Anaesthesiology			
Forensic Medicine			
Health & disease in communities			
Internal Medicine			
Obstetrics & Gynaecology			
Psychiatry			
General Surgery			

7. What were the most common teaching methods used by the lecturers? Please tick.

Lecture room power point presentations	
Small group guided discussions	
Tutorial sessions	
Laboratory demonstrations	
Clinical skills demonstrations	

Please comment on the value of the teaching methods that you have selected:

8. Please indicate how easy or difficult you found it to cope with the following:

	Very difficult	Difficult	Easy	Very easy
Theoretical component				
Practical component				
The transition from school to first-year MBChB				
Social aspects, i.e. making friends, balancing work and recreation				

9. To what extent are the following methods of assessment used?

	Almost all the time 1	Most of the time 2	Sometimes 3	Hardly ever 4
8.1 Multiple-Choice Questions				
8.2 Essays				
8.3 Short answer questions				
8.4 Projects, e.g. case study, research				
8.5 OSCE				
8.6 Vivas				

10. Concerning the above question, which assessment methods do you feel are the best? Please elaborate on why.

11. About question 9, which assessment methods do you feel are the worst? Please elaborate on why.

SECTION 3: LEARNING ENVIRONMENT

12. Which of the following teaching facilities were used (please tick)?

Lecture halls	
Laboratories	
Dissection hall	
Tutorial rooms	
ICT room	

Please comment on the suitability of the facilities you selected

13. Was there any use of the following teaching and learning technology during the modules taught?

The use of images	Yes	No
The use of videos	Yes	No
Website links	Yes	No
Pre-recorded lectures	Yes	No
e-book access	Yes	No
Blackboard	Yes	No

Of the technologies that were used, please comment on their value.

13.1 With regards to the online teaching methods that were implemented during the imposed lockdown due to Covid-19:

a. Please describe your experience in changing to online teaching

- _____
- _____
- b. Do you think online teaching should remain in place even beyond the Covid-19 pandemic? Provide your reasons.

- _____
- _____
- _____
- c. What do you view as advantages or disadvantages of online teaching?

14. Please comment on the following about your learning:

14.1 Library services

14.2 Access to the INTERNET/ Wi-Fi

14.3 Availability of cadavers/ sufficient cadavers

SECTION 4: ACCOMMODATION/RESIDENCE

15. What type of residence do you stay in? Please tick the relevant box

On campus residences	
Privately rented residences off campus	
Own parents/family residence	
Other (please explain)	

Please comment on the suitability of the residences/accommodation for learning

16. Have you failed any module/s? Yes, or No
Please state which module/s:

17. If you have failed a module, why do you think you failed?

SECTION 5: INSTITUTIONAL PROCESSES

18. Do you think you received assistance on student support-related matters (such as Medical /psychological/social/financial/other) in the school or university?

Yes

No

19. Please explain your experiences with the answer above.

20. Did you have any concerns relating to the processes of your learning in the school?

Yes

No

21. If your answer above is yes, how did you raise those concerns and were they resolved?

22. Do you think your concerns were attended to your satisfaction? Please explain your answer.

23. Do you participate in any sporting activity or other related recreational activities?

Yes

No

24. If your answer is yes, please describe the activity or if the answer is No, please explain your reasons for not participating.

25. Do you have any suggestions to improve the teaching and learning activities about this medical program? Please explain briefly.

26. Do you have any suggestions to improve the learning environment? Please explain briefly.

APPENDIX D: ETHICS CLEARANCE CERTIFICATE



R14/49 Dr TA Mamashela

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL) CLEARANCE CERTIFICATE NO. M191065

NAME:
(Principal Investigator)
DEPARTMENT:

Dr TA Mamashela
Faculty of Health Sciences
Centre for Health Science Education
Medical School
University

PROJECT TITLE:

Students' perceptions of the medical curriculum at the
University of Limpopo

DATE CONSIDERED:

2019/10/25

DECISION:

Approved unconditionally

CONDITIONS:

SUPERVISOR:

Professor P McInerney

APPROVED BY:


Dr CB Penny, Chairperson, HREC (Medical)

DATE OF APPROVAL:

2020/02/04

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the 3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.
I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report.** When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **October** and will therefore reports and re-certification will be due early in the month of **October** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date

PLEASE QUOTE THE CLEARANCE CERTIFICATE NUMBER IN ALL ENQUIRIES

APPENDIX E: GATEKEEPER PERMISSION



**University of Limpopo
Office of the Registrar**

Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 2407, Fax: (015) 268 3048, Email: Kwena.Masha@ul.ac.za/Retha.Balie@ul.ac.za

21 May 2020

Dr TA Mamashela

Email: thakadu.mamashela@ul.ac.za

Dear Dr. Mamashela,

GATEKEEPER PERMISSION TO CONDUCT RESEARCH

TITLE: STUDENTS' PERCEPTIONS OF THE MEDICAL CURRICULUM AT THE UNIVERSITY OF LIMPOPO

PRINCIPAL INVESTIGATOR: Dr. TA Mamashela
SUPERVISOR: Prof. PA McInerney
INSTITUTION: University of the Witwatersrand
DEGREE: Master of Health Sciences Education

Kindly be informed that Gatekeeper permission is granted to you to conduct research at the University of Limpopo entitled: "**Students' perceptions of the Medical Curriculum at the University of Limpopo**".

Kind regards,

**PROF. JK MASHA
UNIVERSITY REGISTRAR**

Cc. Prof. RN Madadzhe, Acting Deputy Vice-Chancellor: Teaching and Learning
Dr. T Mabila, Director: Research Development and Administration
Prof. P Masoko – Chairperson: Research and Ethics Committee
Ms A Ngobe – TREC Secretariat

APPENDIX F: QUESTIONNAIRE AMENDMENT APPROVAL

 UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
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2021/02/08

Dr TA Mamashela
Faculty of Health Sciences
Centre for Health Science Education
Medical School
University

Sent by e-mail to: arnoupa@yahoo.com

Dear Dr Mamashela

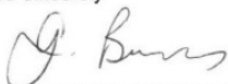
Re: Protocol Ref No: M191065
Protocol Title: *Students' perceptions of the medical curriculum at the University of Limpopo*
Principal Investigators: Dr TA Mamashela

I refer to your letter of 2021/01/31.

I confirm that we have noted and approve of your proposal to add three Covid-19-related questions to your questionnaire.

Thank you for keeping us informed.

Yours Sincerely



Mr I Burns
For the Human Research Ethics Committee (Medical)



Dr CB Penny, Chairperson, Human Research Ethics Committee (Medical)

STUDENTS' PERCEPTIONS OF THE MEDICAL CURRICULUM AT THE UNIVERSITY OF LIMPOPO

by Thakadu Mamashela

Submission date: 13-Jun-2023 04:54PM (UTC+0200)

Submission ID: 2115296796

File name: Final_For_Turn_it_in.docx (3.51M)

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TURN IT IN REPORT

STUDENTS' PERCEPTIONS OF THE MEDICAL CURRICULUM AT THE UNIVERSITY OF LIMPOPO

ORIGINALITY REPORT

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7	Lennart Steffen Milles, Tanja Hitzblech, Simon Drees, Wiebke Wurl, Peter Arends, Harm Peters. "Student engagement in medical education: A mixed-method study on medical students as module co-directors in curriculum development", Medical Teacher, 2019 Publication	<1 %