

Stellenbosch University

# Students' perceptions of Anatomy as expressed through drawings

MPHIL (Health Sciences Education) Research Assignment



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## Declaration

I, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree.

Signature:     Desiré Schabort

Date: 6 August 2013

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## Abstract

Anatomy remains a foundational subject in the preclinical years of medical and other allied health sciences courses, with exceptionally large volumes of content, and a unique practical aspect: conducting cadaveric dissection and the use of pre-dissected cadaver specimens. The educational climate can be set by incorporating a suitable introduction to the subject, addressing academically and emotionally underprepared students before the formal commencement of the Anatomy curriculum. The literature does not mention what such an Introduction Module should entail.

Quantitative means such as questionnaires have been used to evaluate the perceptions and the emotional and psychological influence of Anatomy. It is often assumed that through words meaning is conveyed, providing researchers with data that can be objectively interpreted. But questionnaires are rather pre-emptive of what students might say about what they experience, and the number of possible answers is restricted. The use of drawings might be an opportunity for the students to express their unmediated feelings; strong emotions could appear in the form of images instead of words, allowing students to experience rather than verbalize feelings especially with a limited vocabulary. Qualitative data analysis enables the researcher to get at complex layers of meaning, interprets human behaviour and experiences beyond the surface appearance, provides rich evidence of this behaviour and/or experiences and consequently builds theory inductively from the data source.

The primary purpose of this study is to establish the feasibility of using drawings to explore how a diverse group of students from the University of Limpopo, Medunsa Campus, view Anatomy and what insights can be gained from these drawings to inform the Introduction Module. Students were asked to draw their perceptions of Anatomy after approximately 10 weeks of allocated contact time, which includes lectures as well as practical sessions. A total of 74% (134 out of 181) drawings were handed in. A matrix-type method of analysis based on existing literature was formulated to analyse the drawings. Three dimensions were identified for each of the drawings: “what” is illustrated, then “how” is the message conveyed or illustrated, and lastly, the “emotion” communicated through the drawing. The reliability was increased with two interpreters who analysed the drawings.

Learning approaches, orientation on human life and death, the general emotional state of individuals influenced by Anatomy, their course of study, the influence of family and friends are some of the aspects that were depicted in the drawings. The rich data encountered through the drawings provided curriculum organisers with insights enabling them to

implement necessary changes to the Introduction Module in order to improve student preparedness for what is to follow during the Anatomy curriculum. Further studies are recommended on how student drawings can be utilised to inform curricula and in other educational contexts.

## Opsomming

Anatomie bly 'n fundamentele vakgebied in die prekliniese jare van mediese en ander verwante gesondheidswetenskappe kursusse, met besonder groot volumes van die studie-inhoud en 'n unieke praktiese aspek: die uitvoer van kadawer disseksie en die gebruik van voorafgedissekteerde kadawer monsters. Die opvoedkundige klimaat kan ingestel word deur 'n geskikte Inleiding Module tot die kurrikulum te voeg wat akademies en emosioneel swak voorbereide studente kan voorberei vir die formele Anatomie kurrikulum. Literatuur noem nie wat so 'n Inleiding Module moet behels nie.

Kwantitatiewe praktyke soos vraelyste is voorheen gebruik om die persepsies en die emosionele en sielkundige invloed van Anatomie te evalueer. Dit word dikwels aanvaar dat deur woorde betekenis oorgedra word wat navorsers van data voorsien wat objektief vertolk kan word. Maar vraelyste is vooropgestel ten opsigte van dit wat studente mag ervaar, en die aantal moontlike antwoorde is beperk. Sterk emosies kan na vore kom in die vorm van beelde in plaas van woorde, wat studente in staat stel om te ervaar, eerder as om gevoelens te verwoord, veral met 'n beperkte woordeskaf. Die gebruik van tekeninge is 'n geleentheid vir die student om hul onverdeelde gevoelens uit te druk. Kwalitatiewe data-ontleding stel die navorsers in staat om komplekse lae van betekenis te interpreteer, menslike gedrag en ervarings buite die oppervlak te analiseer, bied voldoende bewyse van hierdie gedrag en ervarings en kan gevolglik teorie induktief uit die data bron bou.

Die primêre doel van hierdie studie is om die lewensvatbaarheid van die gebruik van tekeninge te verken in hoe 'n diverse groep studente aan die Universiteit van Limpopo, Medunsa-kampus, Anatomie sien en watter insigte kan verkry word uit hierdie tekeninge om die temas wat in die Inleiding Module aangespreek moet word, vas te stel. Studente is gevra om hul persepsies van Anatomie uit te beeld na ongeveer tien weke se formele kontaktyd, wat lesings, sowel as praktiese sessies insluit. 'n Totaal van 74% (134 uit 181) tekeninge is ingehandig. 'n Matriks-tipe metode van analise gebaseer op bestaande literatuur is geformuleer om die tekeninge te ontleed. Drie dimensies is geïdentifiseer vir elk van die tekeninge: "wat" is geteken, dan "hoe" is die boodskap wat oorgedra word geïllustreer, en laastens die "emosie" gekommunikeer deur die tekening. Die betroubaarheid is verhoog met twee individue wat die tekeninge ontleed.

Leerbenaderings, oriëntering op die menslike lewe en die dood, die algemene emosionele toestand van individue en hoe dit hul persepsies van Anatomie beïnvloed, die studiekursus waarvoor hul ingeskryf is, die invloed van familie en vriende, is 'n paar aspekte wat in die tekeninge uitgebeeld is. Die ryk data teëgekome in die tekeninge kan kurrikulum

organiseerders in staat te stel om die nodige veranderinge aan die Inleiding Module te implementeer ten einde die voorbereiding van studente te verbeter vir wat gaan volg tydens die Anatomy kurrikulum. Verdere studies word aanbeveel oor hoe student tekening gebruik kan word om leerplanne en in ander opvoedkundige kontekste in te lig.

## List of Tables

Table 1: Students' Half Year Mark corresponding with Figures 6 to 25 .....	38
Table 2: Comparison of deep and surface learning approaches (sourced and adapted from Ramsden, 2003 and Entwistle & Peterson, 2004) .....	67

## List of Figures

Figure 1: The cyclical process of data collection and analysis (Adapted from Maree, 2007)	21
Figure 2: An illustration of the dimensions of the matrix method of analysis with its sub-categories that guided the analysis of the drawings	25
Figure 3: Demographic data of the BCur/BSLPA group	29
Figure 4: A bar diagram illustrating the “how” within the “what” categories. (‘Studying Ana’ shortened for ‘Studying Anatomy’) (n=134)	30
Figure 5: A bar diagram illustrating the positive, negative and neutral sub-categorization of the “emotion” portrayed in the drawings	30
Figure 6: The ball game in the river but not everyone plays along	32
Figure 7: The Neuro-anatomy lecture	34
Figure 8: Anatomy is a heavy subject	35
Figure 9: With my hands in my hair	36
Figure 10: Good versus evil	40
Figure 11: Anatomy portrayed as a mosquito	41
Figure 12: Don’t end up like your father	43
Figure 13: The rising star	44
Figure 14: The influence of others	45
Figure 15: How to obtain the crown	47
Figure 16: Social and leisure sacrifices to be made	48
Figure 17: My ticket to 2 <sup>nd</sup> year	50
Figure 18: An easy walk across	51
Figure 19: The bigger picture	53
Figure 20: Could this be my grandfather?	55
Figure 21: A true work of art	57
Figure 22: We are all unique, in one body	58
Figure 23: The unreachable fruits	60
Figure 24: Anatomy is Life	61
Figure 25: The packet of sour sweets	63

## Table of Contents

1.	Introduction .....	11
2.	Literature review.....	13
3.	Research setting .....	17
4.	Aims of the study.....	18
5.	Ethical Approval .....	19
6.	Methodology.....	20
6.1	Participants .....	21
6.2	Data collection.....	22
6.3	Data analysis & reporting .....	22
7.	Results .....	28
7.1	Student Demographics .....	28
7.2	The “what”, the “how” and the “emotion”.....	29
6.2.1.	Studying Anatomy .....	31
6.2.1.1.	Drawings illustrating students experiencing exclusion .....	32
6.2.1.2.	Drawings illustrating personal conflicts.....	39
6.2.1.3.	Drawings illustrating the influence of family and others.....	42
6.2.1.4.	Drawings illustrating crucial factors to pass Anatomy .....	46
6.2.1.5.	Drawings illustrating deep, surface and strategic learning approaches.....	49
6.2.2.	Dissection/Practical aspect.....	54
6.2.3.	The body itself.....	56
6.2.4.	Anatomy as a discipline.....	59
7.	Discussion.....	64
8.	Limitations .....	72
9.	Conclusions.....	73
10.	References.....	77

## 1. Introduction

Anatomy remains a foundational subject area in the preclinical years of medical and other allied health sciences courses, with exceptionally large volumes of study content, the high rate in which terminology is acquired and a unique practical aspect (Leboulanger, 2011, Lucas, Lenstrup, Prinz, Williamson, Yip & Tipoe, 1997). Anatomy is classified as a basic biomedical science that needs to be incorporated in curricula to create an understanding of the scientific knowledge, concepts and methods fundamental in applying clinical science (World Federation for Medical Education, 2003). Furthermore, Anatomy aids in the understanding of other subjects in the course (Harden, 1986). Pawlina, Hromanik, Milanese, Dierkhising, Viggiano and Carmichael (2006) explain how Anatomy outcomes may include outcomes beyond acquiring knowledge of the human body, such as gaining communication skills, developing the ability to work in a team, acquiring competencies as well as other aspects of professionalism. The importance of Anatomy and other basic sciences in the nursing curricula has been affirmed in the literature (Davis, 2010; Johnston, 2010; Larcombe & Dick, 2003).

In most South African tertiary institutions, Anatomy comprises a theoretical as well as a practical component. The practical component involves the study of structures in cadavers or in pre-dissected cadaver specimens. Cadaveric dissection and pre-dissected cadaver specimens are, in spite of the reduced time allocated to this subject, still considered by researchers and anatomists to be crucial to integrating theory and practice (Arráez-Aybar, Castaño-Collado & Casado-Morales, 2008; Azer & Eizenberg, 2007; Dinsmore, Daugherty & Zeitz, 2001; Older, 2004; Swartz, 2006).

Some studies mention a lack of preparedness in the students before the start of Anatomy with regard to the content volume and, more specifically, the practical aspect of Anatomy – dissection and the use of dissected specimens (Abu-hijelh, Hamdi, Moqattash, Harris & Heseltine, 1997; Tschernig, Schlaud & Pabst, 2000). But, student behaviour and development are also affected by the educational climate (McLean, Henson and Hiles (2003). The educational climate can be adjusted to be conducive to student learning. It might be valuable for lecturers to investigate and consider the students with regards to their culture and backgrounds to adjust the educational climate accordingly. Most often lecturers are from different cultural, socio-economic and educational backgrounds than their students.

An educational climate conducive to various aspects that will be encountered throughout the year can be established by incorporating a suitable introduction to the subject, addressing

academically and emotionally underprepared students before the formal commencement of the Anatomy curriculum. This might also help to “desensitize” students to the aspects of dissection, as well as counteract negative reactions (Abu-hijelh *et al.*, 1997). The literature, however, does not mention what such an Introduction Module should entail. By investigating students’ perceptions of Anatomy, the needs of students can be identified in order to improve the effectiveness of programmes, maximize allocated time and increase pass rates since Anatomy is a high-risk subject.

Published literature of studies investigating students’ perceptions of Anatomy, especially in terms of the practical component will be discussed. Qualitative and quantitative methods used to investigate student perceptions will be explained and then the use of drawings in the educational context will be amplified. The literature review concludes with the importance of orienting educators towards the diversity of the learners so as to inform educational practices.

The rationale for this study initially arose from my interest in an unpublished quantitative study (by means of questionnaires) currently conducted in the Department of Anatomy, University of Limpopo, Medunsa Campus, to determine the perceptions of death and cadaveric dissection on the part of second-year MBChB students and how to better prepare them for their upcoming academic commitments and responsibilities.

## 2. Literature review

The central problem of medical education is to discover effective ways of transferring an unusually large volume of relevant background knowledge, vital for the actual practice of medicine, to students to be able to retain this in long-term memory for the successful application to problems of clinical practice (Custers & Bozhuizen, 2002). Anatomy is a pre-clinical subject that forms a vital part in the foundation for the majority of clinical subject areas and is often described by students as “difficult” and “a lot of work”. Additional to the large work load, there are a considerable number of medical terms introduced during an Anatomy course. In a study by Lucas et al. (1997) it was explained that students enjoying English as a first language do have an advantage with most medical textbooks in English. In this study it was stated that language is a crucial barrier to success in Anatomy especially for students who do not speak English as a first language. Furthermore, if English is the medium of instruction at the institution it also plays a substantial role for these students. Consequently, Anatomy is also referred to as a high-risk module. The Higher Education Quality Committee (HEQC) has recommended in the *Audit Report on the University of Limpopo* (2011) that academic support for students needs to be improved. The *Draft Strategic Plan: University of Limpopo 2020* (unpublished) addresses the goal of improving academic support services for all students but particularly for at-risk students, by specifically developing systems for their early identification and for their continual support and assistance throughout their studies, amongst other projects. Specifically pertaining to high-risk modules, such as Anatomy, that contributes to the majority of students not exempted to the next year of study.

Another factor to consider is the practical aspect of Anatomy – the use of cadavers and cadaveric specimen. The emotional and psychological influence on students using cadavers as part of the Anatomy curriculum has been widely researched (Houwink, Kurup, Kollars, Kral Kollars, Carmichael & Pawlina, 2004; Leboulanger, 2011). Arráez-Aybar *et al.* (2008) reaffirm that the practice of dissection affords the student the opportunity to learn how to confront and adapt his or her reactions and emotions, but Francis and Lewis (2001) argue that dissection could also cultivate inappropriateness in dealing with death and the human body. Various interventions have been introduced to reduce the fear and anxiety of the students on the first day of dissection, such as the assistance of older students (Houwink *et al.*, 2004) and regular discussion groups with their peers (Notzer, Zisenwine, Oz & Rak, 2006). In a study by Tschernig, Schlaud and Pabst (2000) in which students' emotional reactions to dissection were evaluated, students mentioned the difficulty of discussing their emotions with family members as well as close friends. Other institutions incorporate

'creative projects' during the Anatomy course to offer students a possible way of reflecting on various aspects of professionalism, which helps them manage stress (Shapiro, Nguyen, Mourra, Boker, Ross, Thai & Leonard, 2009).

A few ethnically specific studies have been conducted such as the study by Notzer *et al.* (2000) in which students and staff members from an Israeli Jewish background were interviewed on their conflicting views of dissection – dissection viewed as a means to study Anatomy and gaining knowledge, versus dissection being a threat to the sanctity of the human body and leading to defilement of the student. It was concluded that when students confront their own personal ethical, cultural, as well as religious views on death and dying, it may enhance personal growth as well as professional behaviour as future medical professionals. Abu-hijelh *et al.* (1997) investigated attitudes and reactions of Arab students to dissection and indicated that female students showed higher levels of fear, reported stronger physical and behavioural reactions, and used certain coping methods more frequently than their male counterparts. In contrast, a few studies of other populations did not find significant differences between genders (Leboulanger, 2011). Studies reporting perceptions of students specific to the diverse South African population could not be found.

Quantitative means such as questionnaires have been used in the past to evaluate the perceptions and the emotional and psychological influence of Anatomy (Arráez-Aybar *et al.*, 2008; Azer & Eizenberg, 2007; Abu-hijelh *et al.*, 1997; Leboulanger, 2011). Another quantitative method, a check-list of possible sensations the students expected to experience during dissection, was also utilized (Arráez-Aybar *et al.*, 2008). Often quantitative methods are favoured because of a belief in the need that this will lead to greater validity and reliability (McLean, Henson & Hiles, 2003).

Reavey and Johnson, as referred to by Rohleder and Thesen (2012) refer to the chapter *Visual approaches: Using and interpreting images* by how with questionnaires and check-lists it is often assumed that through words meaning is conveyed, providing researchers with data that can be readily recognized, with a clear and objective interpretation (Rohleder & Thesen, 2012). However, the use of visual material in qualitative studies has increased in popularity (McNiff, 2007; Rohleder & Thesen, 2012).

McLean and colleagues (2003) explain that qualitative research can give the educator insight into the full richness of the educational environment as well as taking into account that learning is a process of personal, subjective and variable experience. Qualitative methods exploring students' perceptions of Anatomy that have been published include interviews with students and Anatomy instructors (Houwink *et al.*, 2004; Lempp, 2005) and non-participatory observations of dissection sessions (Lempp, 2005; Notzer *et al.*, 2000).

In qualitative studies, the emphasis is on how an individual makes sense of his/her experience and surroundings (Rohleder & Thesen, 2012). Sfard (1998), as referred to by McLean, Henson and Hiles (2003), states that the act of putting a metaphor (graphic representation of a personal idea or perception) down on paper involves reflection, introspection as well as progress in self-understanding. Since questionnaires and checklists are rather pre-emptive of what staff members might think the students will experience, and the number of possible answers is restricted, drawings might be an opportunity for the students to express their attitudes and unmediated feelings (Weber & Mitchell, 1996). Strong emotions could appear in the form of images instead of words, allowing students to experience rather than verbalize feelings especially with a limited vocabulary (Foley & Mullis, 2009). Emotions seem to be woven into who we are, how we express ourselves, how we react to situations and interact with the world (Löfström & Nevgi, 2013). A small number of studies have evaluated perceptions of educational experiences in general by means of student drawings, with this being posited as a process where the student has the opportunity to express that which is not easily put into words (Bessette, 2008; McLean, Henson & Hiles, 2003).

Although the article from McLean and colleagues (2003) explored drawings of medical students as participants, it particularly interested me to qualitatively explore the perceptions of Anatomy in the BCur (Nursing) and BSLPA (Speech-Language Pathology and Audiology) first years. These perceptions, influenced by cultures and backgrounds, and how they can inform the curriculum, pertain especially to the Introduction Module with the aim of adequately preparing students for the academic year.

In that study, McLean and colleagues (2003) focused on the possible use of drawings as a means of contributing to the evaluation of a course in terms of student development and learning in a problem-based learning curriculum that was newly implemented at a medical school. Irrespective of socio-economic backgrounds, these diverse students were expected after a specific period to become independent learners as well as to develop appropriate behaviour, attitudes and personal reflective skills. Although much quantitative evaluation was done on almost all possible aspects of and participants in the new curriculum, these methods did not seem to fully address the outcome of personal growth that was specified. A holistic approach to course evaluation was needed that would supplement the other quantitative results. Students were asked to draw their perception of themselves when they first arrived at the medical school and then in a second drawing to illustrate how they perceived themselves 10 months later. Rich data were gathered and analysed that informed the researchers of aspects that had not been fully captured by the use of quantitative measures.

In a study by Rohleder and Thesen (2012) drawings were used to engage students in dialogue to discuss emerging professional identities. It was explained that language barriers were intensified if writing was used as students were from different disciplinary, racial and socio-economic backgrounds. Furthermore, the study investigated how drawings can be a medium of communication whereby these language barriers can be broken down as students create new possibilities for their perceptions to be interpreted. Rohleder and Thesen (2012) describe how images are “read” differently from text (such as in the case of Western alphabetic scripts, from top to bottom, left to right), whereas drawings are usually read starting with the eye on whatever is most striking or outstanding to the viewer, which can be anywhere on the page. Whereas language offers the logic of sequence in time, images present the logic of space, leading to a more open reading path (Rohleder & Thesen, 2012). The use of drawings created an opportunity for students to communicate and participate as equals. Wesley (2007) states this in her writing on multicultural diversity and art, that participation in the arts which can range from visual art to the writing of songs, give adults the means to learn about differences, broaden worldviews and form bridges between racial and ethnic lines.

The educator needs to consider the diversity of his or her students and the factors contributing to this diversity, as well as the array of learning theories, in order to create an optimal learning environment (Torre *et al.*, 2006, Terrell, 2006). In increasingly diverse populations, Dowdy and Campbell (2008) state that it is essential for educators to be oriented to ideas and practices that will enhance student learning in their classrooms and to be culturally responsive to these diverse students. Often educators are also from a different socio-economic background from that of the majority of students in their classrooms, which affirms that the lecturer should be even more inclined towards the needs of the students. The learning experience as well as assessment greatly influences whether the student will adopt a deep, surface or strategic learning approach (Dowdy & Campbell, 2008).

No qualitative study to evaluate student perceptions of Anatomy by means of drawings has been found in the literature.

This study aims to analyse the perception of Anatomy of allied health students in a unique diverse educational context by using a qualitative method – the use of drawings □ in order to inform the Introduction Module in preparation for the rest of the year’s Anatomy course. After the methodology, the overall results from the drawings as well as a few selected drawings will be discussed. The report ends with viewpoints regarding the feasibility of using drawings in an educational contexts and concluding the study aims.

### 3. Research setting

The University of Limpopo, Medunsa Campus is one of eight medical schools in South Africa, currently producing the largest output of Black doctors in the country ([http://www.hst.org.za/uploads/files/chap5\\_98.pdf](http://www.hst.org.za/uploads/files/chap5_98.pdf)), priding itself on its ethnic diversity as well as having students from other African countries. Students differ in their socio-economic, educational and geographical backgrounds. This institution also provides paramedical degree courses such as Nursing, Physiotherapy and Dentistry.

I, the researcher, am currently coordinating the Anatomy course for BCur (Nursing) and BSLPA (Speech-Language Pathology and Audiology) first years and facilitate the learning during most of the contact time with these students. This first-year group consists of members of almost every ethnic group in South Africa, differing in language, socio-economic and schooling background. Students are often underprepared academically. Aspects such as cultural diversity and academic backgrounds and preparedness are some of the factors that influence the educational climate and group dynamics. This should be investigated to inform curricula.

The BCur (Nursing) and BSLPA (Speech-Language Pathology and Audiology) programmes (between 90 and 100 students per year) include Anatomy (ANTM 109) during the first year of study. ANTM 109 consists of seven weekly periods of 45 minutes each. Two of the seven periods are used for practical sessions in which a large variety of cadaveric and osteology specimens are utilized while the remaining are formal lectures. The regional study approach is utilised in the ANTM 109 curriculum in which the focus is on the different regions of the body, i.e. the thorax, in contrast to the systemic approach which focuses teaching on the Anatomy pertaining to the different systems in the body, i.e. the cardiovascular system.

This study was conducted after the first two of six Anatomy modules (Thorax and Back; Neuro-anatomy), i.e. after approximately 12 weeks of contact time with the students. It was assumed that by then students were familiar with the various aspects involved in terms of a number of practical sessions with a broad spectrum of cadaveric specimen, considerable amount of formal teaching as well as theory and practical formative assessments.

#### 4. Aims of the study

The primary purpose of this qualitative study is to explore how students view Anatomy and its diverse aspects, and analyse how workload, emotions, personal lives, religion and culture might influence this view. As a lecturer I wanted to understand my students better and by gaining insights into their lives and perceptions, optimally adapt the learning environment and experience to the advantage of the student.

It is anticipated that the data obtained through the study could provide me (and other curriculum organisers) with insights into the perceptions of first year Anatomy students, enabling them to implement necessary changes to the Introduction Module in order to improve student preparedness for the rest of the Anatomy curriculum and decreasing the failure rate of this high-risk subject. The aim of this study is not to evaluate the Anatomy course. It is class room research, the discovery phase of action research, where student perceptions are explored to gain insights that could be incorporated into the Introduction Module of the following year.

This proposed study also aims to determine the feasibility of using drawings as a tool to investigate student perceptions of their experiences in general.

The following research questions are addressed:

1. Is the **use of drawings feasible** as a means to investigate student perceptions of Anatomy with the BCur and BSLPA students as the participants?
2. What **insight** can be gained from the drawings by first-year BCur and BSLPA students expressing their perceptions of Anatomy?
3. How can these **insights inform the development** of a more appropriate Introduction Module?

## 5. Ethical Approval

This study has been approved by the Health Research Ethics Committee (Stellenbosch University) (S12/02/044) and the Medunsa Research & Ethics Committee (University of Limpopo) (MREC/P/72/2012:PG).

## 6. Methodology

The proposed study followed an interpretivist paradigm with a qualitative approach. Qualitative data includes any form of information gathered in a nonnumeric form (Lewins, Tailor & Gibbs, 2005). With qualitative research, it is acknowledged that people have their own assumptions, attitudes, beliefs and values and that these aspects can be understood by exploring experiences of others (Maree, 2007).

Qualitative Data Analysis (QDA) aims to interpret meanings and generate rich depictions of research settings (Cousin, 2009). QDA refers to the processes of explaining, understanding and interpreting people, their situations and phenomena encountered from the data gathered (Lewins, Tailor & Gibbs, 2005; Maree, 2007). Content analysis is a systemic approach to QDA that identifies and summarises message content which may include the analysis of documents and visual media, as well as focus group interviews (Lewins, Tailor & Gibbs, 2005; Maree, 2007). Categorization of data into themes is part of the majority of QDA and involves coding, which is the labelling of data indicating some idea or theme (Lewins, Tailor & Gibbs, 2005). This enables the researcher to examine each theme, often comparing different cases within a theme (Lewins, Tailor & Gibbs, 2005; Maree, 2007).

There are, however, no set criteria or methods for the interpretation of drawings (Rohleder & Thesen, 2012). Interpretation of drawings is mostly subjective and influenced by the researcher's limitations in making sense of them (McLean, Henson & Hiles, 2003). Similar to the study by McLean, Henson and Hiles (2003), it is suggested that more than one individual should interpret the drawings to obtain a degree of reliability.

It is often the case that qualitative studies do not treat data collection and data analysis as two separate processes, but see them as a cyclical process (Figure 1). This cycle will continue until a point of saturation is reached after which no new insights are gained (Maree, 2007).

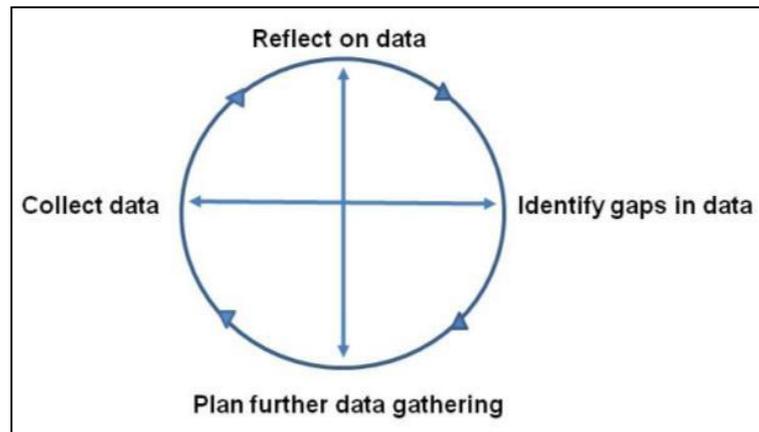


Figure 1: The cyclical process of data collection and analysis (Adapted from Maree, 2007)

Similarly, Lewins and colleagues (2005) also refer to the *Noticing, Collecting and Thinking* model of QDA as developed by Seidel (1998). These three parts are interlinked as well as cyclical. While certain things are thought of, other things are noticed and collected. Both the cyclical process (Figure 1) and the Seidel model are examples of how data gathering and data analysis are dynamically linked. Cousin (2009) explains how this entwining process enables the manageability of the data, allows the continuous focussing on the research problem or aim, and generates theoretical insights.

This section will firstly describe the participants in this study, followed by how the data was collected. The process of analysis of the data will then be described, and how the data was categorized in conjunction with the literature of the theoretical framework used – visual social semiotics.

## 6.1 Participants

The participants in this study were the first year and first year repeat students of the BCur (Nursing) and BSLPA (Speech-Language Pathology and Audiology) Anatomy class enrolled at the University of Limpopo, Medunsa Campus. The study was conducted with two cohorts: in 2011 with 88 students and in 2012 with 46 students (N=134). The same procedure for collecting the data was followed in both cohorts; therefore the word “iteration” (duplication/repetition) is used throughout this study.

## 6.2 Data collection

During a formal lecture, students were briefed on the study and informed that participation was voluntary. An informed consent form was given to the participants to sign (Appendix A). The informed consent form was in English since this is the medium of instruction at the University of Limpopo. Students were asked to complete a drawing on their perceptions of Anatomy (Appendix B). Aspects of the research method described in McLean, Henson and Hiles (2003) such as the instructions given to the students as well as giving them ample time (a week) to complete the drawings, were adapted to the design of the research method used in this study (see Appendix B), by the primary researcher who is the course coordinator for the Anatomy course for BCur and BSLPA first years.

Each drawing had to comply with five prerequisites to be included in this study: it had to consist of any type of drawing (illustration); any type of annotations to the drawings (words, phrases, sentences) had to be included; the information block had to be (partially) completed; three summarizing phrases or words on the drawing were to be filled out in the block provided; and the drawing was to be submitted on time. Drawings were not excluded from the study if the participants did not fill out all their personal details, i.e. omitted their home town or race, provided they complied with the other prerequisites.

Six days were granted to complete the drawing which meant that participants would be able to draw in any context suitable to them individually. Students were to hand in their drawings at the commencement of a formal lecture period after the six days. This study was conducted twice (in 2011 and 2012).

## 6.3 Data analysis & reporting

This proposed study aims to provide insights into the participants' perspective(s) of Anatomy by analysing drawings, identifying themes (coding) emerging from the drawings and consequently aiming to constructively incorporate aspects of these themes into the Introduction Module of the following year. By looking at similarities and differences, the drawings were categorized into themes that evolved from the cyclical process as explained in Figure 1. Student demographics were captured into a Microsoft Excel spread sheet such as age, ethnic group, language religion and the calculated Half Year Mark (HYM) were also taken into account during the analysis.

This cycle in Figure 1 is applicable here, as the drawings were collected (collect data), the suggested issues in the drawings were determined (reflect on data) and these were then

categorized. Analysis of the drawings went through these phases separately by both observers. Drawings were identified that were not classified in the same categories by the two observers (identify gaps in data) and then discussed until a consensus was reached. The participants could be informed of focus group interviews (plan further data collection) should this be required to get clarification of suggested issues and categorization (collect data).

Two iterations of the study were done. In the first iteration of coding and analysis of drawings, they were initially classified into different (linear) categories. By revisiting the codes and formulating new codes (Cousin, 2009), it was soon determined that multiple levels (dimensions) of categorisation were present in each of the drawings and that a linear categorization would be incomplete. Then, I came across the concept of social semiotics. Although social semiotics is not the only theoretical framework to analyse how drawings or any visual image convey meaning, it emphasizes that an image is itself a social process where the meaning of the image is not the result of a single and isolated creative activity but a negotiation between the producer and the viewer which can reflect social, cultural and political beliefs, values and attitudes (Harrison, 2003). This theoretical framework of social semiotics, which is presumed to be largely subjective, is conducive to the interpretivist paradigm that was adopted for this study.

Social semiotics is a form of enquiry that was derived from a linguist, Michael Halliday, who was more interested in language as a resource for meaning than in language as grammar (Rohleder & Thesen, 2012). Social semiotics draws on communication that goes further than the spoken or written, such as the visual, gestural and spatial and the motivation behind the sign (Rohleder & Thesen, 2012). Visual social semiotics is defined as the description of semiotic resources what can be said and done with images (and other visual means of communication) and how the things people say and do with images can be interpreted (Harrison, 2013). The Kress and Van Leeuwen framework for analysing images, suggested that all semiotic systems have meaning potential revolving around three metafunctions based on Hallidayan grammar (Harrison, 2013; Jewitt & Oyama, 2013; Rohleder & Thesen, 2012):

- The “what” of communication (representational/ideational metafunction): The representational metafunction is about the people, places and objects within an image; the awareness, understanding or conception of events or affairs of the world and the relationship of these aspects to one another. It answers the question “What is this picture about?” It can be either one of two kinds; the “narrative” or the “conceptual” representation. The “narrative” representation that relate participants in

terms of 'doings and/or 'happenings'. These are recognized by the presence of a vector which can be a line that connects the participants in the drawing. The "conceptual" representation which show participants in a more stable or timeless 'essence', not doing something and containing no vectors, but rather being something or meaning something (Harrison, 2013; Jewitt & Oyama, 2013; Rohleder & Thesen, 2012).

- The "how" (compositional/textual metafunction):

The compositional metafunction is about the format of the ensembles of signs that is cohesive with the producer and clear to the viewer – the composition of the images (if images are central, above, below, also called the information value of the image), how it is framed, connected or separated and how certain elements are emphasized by means of colour or position (also referred to as the salience of an image). It answers the question "How is the image composed?" (Harrison, 2013; Jewitt & Oyama, 2013; Rohleder & Thesen, 2012).

- The "who" (interactive/interpersonal metafunction):

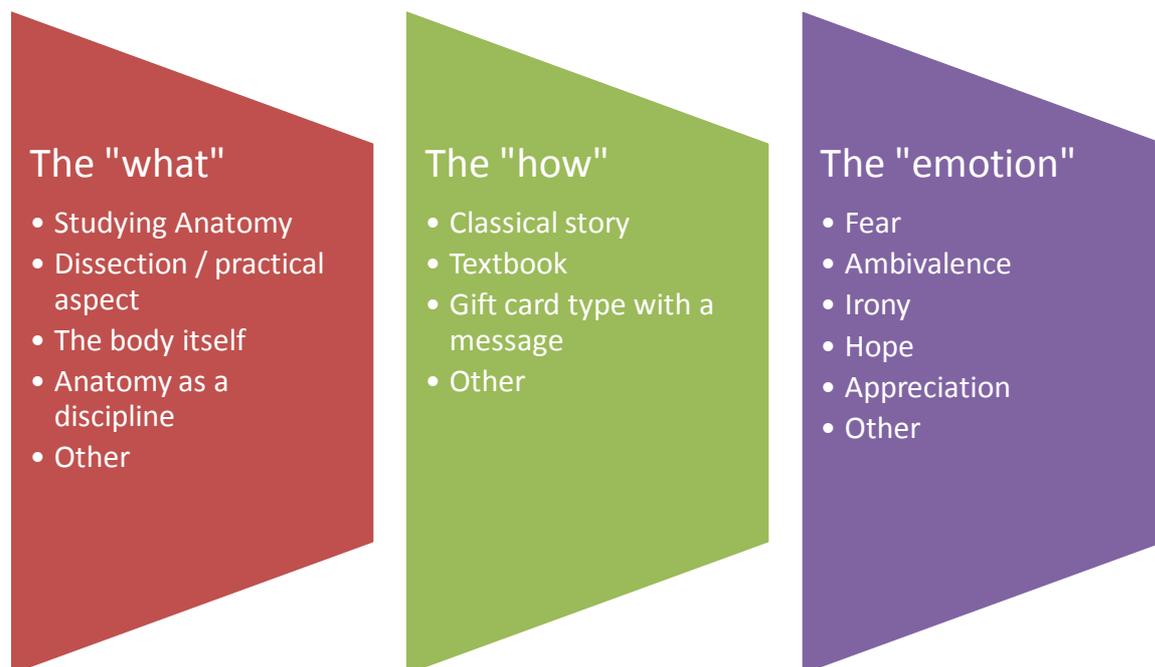
The interpersonal metafunction is about the social relations between participants in an interaction and how it is expressed. It answers the question "How does the picture engage the viewer?" Three factors play a role to make meaning of the image – distance, contact and point of view. Distance refers to how images can bring people, places and things close to the observer or to keep them a distance away i.e. a large portrait picture which would bring the observer intimately close to the producer or what the producer wanted to portray. Contact refers to how images "demand" something from the viewer; i.e. pity by pleadingly looking up to the viewer. Point of view suggests the angle to which the viewer sees the image (frontal angle to increase audience identification) or how certain aspects or participants are related to one another.

These three metafunctions are interconnected, present at the same time, and come together to communicate something to the reader (Jewitt & Oyama, 2013; Rohleder & Thesen, 2012). These levels as explained by Rohleder and Thesen (2012), influenced by the Kress and Van Leeuwen framework (1996), was adapted for the analysis and categorization of the drawings in this study.

In this study, three dimensions were identified for each of the drawings: first, "what" is illustrated, then "how" is the message conveyed or illustrated, and lastly, the emotional load (adapted from the interpersonal metafunction, the "who") communicated through the drawing. Cousin (2009) confirms that QDA enables the researcher to get at complex layers

of meaning, interprets human behaviour and experiences beyond the surface appearance, provides rich evidence of this behaviour and/or experiences and consequently builds theory inductively from the data source. As in the case of Kress and Van Leeuwen (1996) with the three functions of semiotic systems based on Hallidayan grammar, a matrix-type method of analysis was formulated to analyse these drawings.

All the drawings collected from both iterations (2011 and 2012) were analysed and coded in the matrix-type method of analysis, which was conducted in a systemic way, figuratively layered on top of one another, working from broad to more specific (Figure 2) with each drawing categorized on each dimension. Two independent interpreters categorized the drawings. Drawings were initially analysed and categorized by only looking at the drawings and key words and/or phrases itself, without reference to their biographical data, after which details such as demographic data and Half Year Marks were incorporated in the analysis process and discussion.



*Figure 2: An illustration of the dimensions of the matrix method of analysis with its sub-categories that guided the analysis of the drawings*

The “what” dimension; what is the content of the drawing, with four different sub-categories:

- Studying Anatomy: In these drawings, the main focus is on the students, their role, their constraints, motivation, achievement or lack thereof.

- The practice of dissection or handling of prosected specimens.
- The body itself: Drawings primarily illustrate the student's view about the body. Was the drawing informed by medical science or religious views?
- Anatomy as a discipline: Associations or a reproduction of what the students have learnt in class; typical textbook illustrations with annotations.
- Other: Any other subcategory that could emerge during the analysis of the drawings

The "how" dimension; how the narrative is conducted i.e. what type of drawing/illustration is used to convey the message. Sub-categories include:

- A classical story, with a beginning and an end such as in a cartoon.
- A reproduction of textbook illustrations.
- A gift card type drawing that has a "message", that can be clichéd or a well-worn message, a drawing that can be more attractive than the content.
- Other: Any other subcategory that could emerge during the analysis of the drawings

The category "emotion" refers to the overall emotional load that is revealed in the drawing such as ambivalence, fear, hope, irony, affirmation, appreciation or any other emotion that is overall communicated through the drawing. Depictions of emotions such as tears, sad faces and folded arms were considered as *depression* whereas smiling faces, flowers and sunshine were depicted as *excitement* and/or *affirmation*. When contradicting emotions were depicted or, for example, if the emotional load illustrated at the "start" of the narrative changed from positive to negative towards the "end" of the story, it was categorized as *ambivalent*.

To increase the reliability and validity of the categorization, two interpreters analysed the drawings. I am the primary researcher conducting this study, and analysed and categorized the drawings with the collaboration of a second interpreter who is a qualified educational psychologist, employed at the University of Limpopo and who uses drawings during diagnostic tests as well as for therapy. She also has a particular interest in the efficient assistance of tertiary students.

Demographic data were captured on Microsoft Excel™ and a biographic profile of the group was compiled that illustrated aspects such as mean age, year of matriculation, ethnicity and religion. The Half Year Mark (HYM) of each participant was also incorporated into the data sheet. First, drawings were analysed and categorized by myself and the second interpreter individually. The same template Microsoft Excel™ spread sheet was used by each interpreter during the analysis. All submitted drawings were electronically scanned although

no electronic (computer assisted) data analysis was used. The electronic copies of the data simplified the analysis for the two observers, enabling them to access and analyse the data at any time. A scanned copy of the data also served the purpose of preserving the original documents. The two interpreters then had a number of meetings comparing and correlating the categorization and results, discussing ambiguous drawings or particularly interesting drawings. The summarizing key words/phrases as indicated by the participants were used together with the drawings during the categorization and were especially useful to clarify aspects that were initially interpreted differently by the two observers.

Drawings from each of the “what” categories were selected that was most compelling to me, where learning was the most for me as the primary researcher and lecturer of the course. Drawings were not chosen randomly to be representative of the participants of the two iterations, i.e. the class of a specific year. The feasibility of the use of drawings in this specific educational setting is demonstrated where valuable insights are gained.

These selected drawings will now be discussed as the results of this study. Drawings (Figures 6 to 25) are either portrait or landscape oriented and are consequently formatted to different sizes to fit the text yet large enough not to compromise the visibility of the detail.

## 7. Results

The results of the two iterations in 2011 and 2012 are discussed with regard to study population and then according to results obtained for each dimension. The “how”, and the “who” dimensions are described in terms of the overall study population whereas the “what” is described according to a few selected drawings from its sub-categories.

### 7.1 Student Demographics

A total of 181 documents (Appendices A and B) were handed out during the two iterations of which 134 were returned (74%). From the demographic data gathered in Appendix B, the mean age of the participants is calculated to be 20 years ( $SD=±1$ ). Figure 3 summarizes the demographic data obtained from the two iterations pertaining to race, language, religion, course of study and the calculated Half Year Marks in scoring intervals of 10%.

The diversity of the study population as well as their academic performance in the first half of the year is illustrated in Figure 3. Most students in the study population were Black (87%), speaking Pedi (15%) and Christian (98%) whereas 20% of students performed in the 30 to 40% and 50 to 60% scoring interval respectively. No student indicated English as a first language.

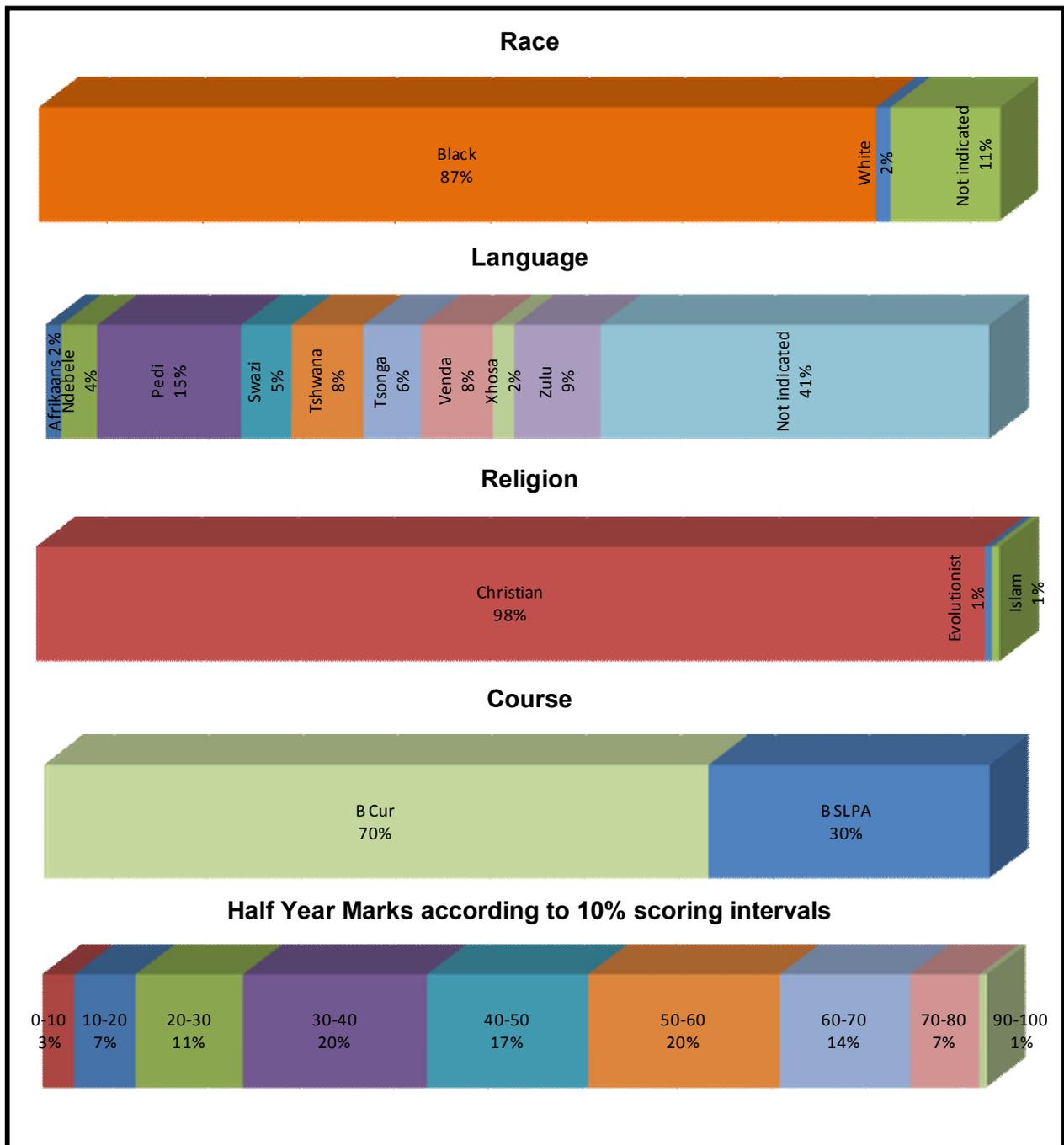


Figure 3: Demographic data of the BCur/BSLPA group

## 7.2 The “what”, the “how” and the “emotion”

The results of the “what” and the “how” are illustrated by the bar diagram in Figure 4. The four main sub-categories are illustrated on the one axis with the sub-category ‘Studying Anatomy’ represented the most and ‘dissection’ the least. Each of these bars indicates “how” the content was illustrated in the drawings either as a classical story (green), a

textbook illustration (red) or a gift card representation (blue). Although the observers were open to any other subcategories that could have emerged during the analysis process, all drawings were categorized under subcategories of the “what” and the “how” as represented in Figure 4.

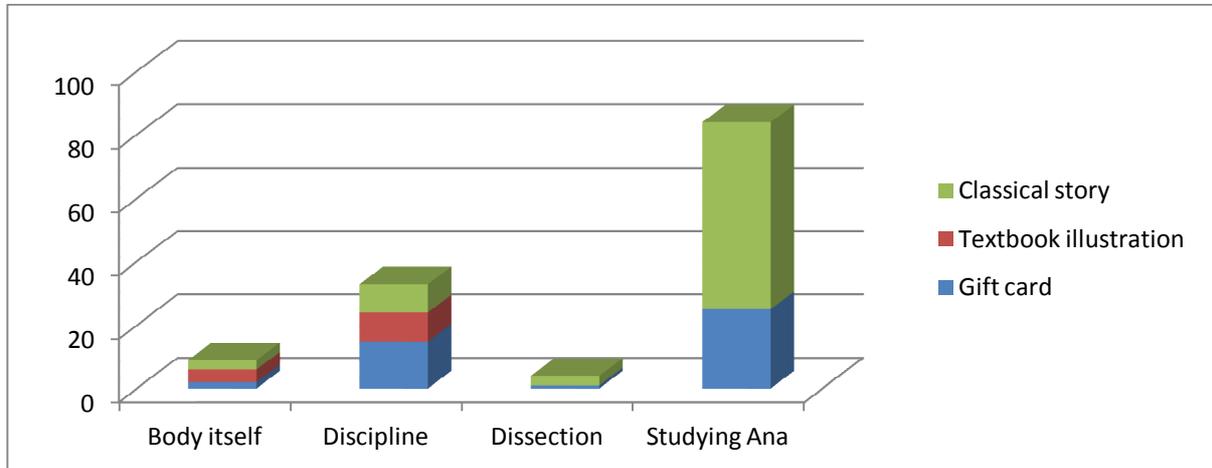


Figure 4: A bar diagram illustrating the “how” within the “what” categories. (‘Studying Ana’ shortened for ‘Studying Anatomy’) (n=134)

Different emotional loads were identified as drawings were analysed for the “what” and “the how” classifications. The emotional loads were classified as the overall emotional impression that the drawing backed up by the keywords and/or phrases are communicating. These emotions were then classified as positive, negative or neutral (either no emotion illustrated or ambivalent where positive and negative emotions were contained in the same drawing) (Figure 5). Although not the majority, the proportion of drawings that portray a negative emotional load is a substantial 35%.

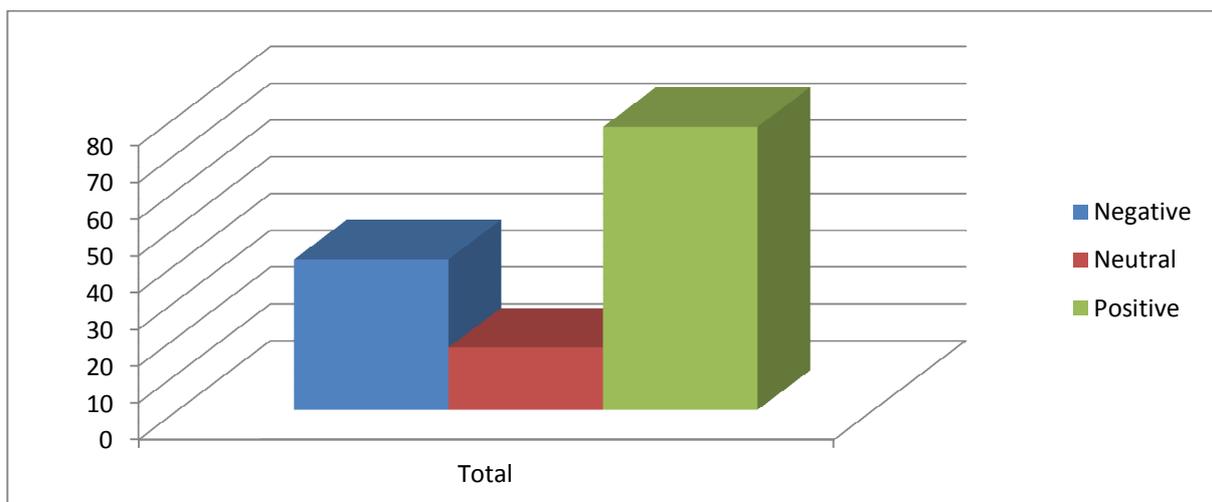


Figure 5: A bar diagram illustrating the positive, negative and neutral sub-categorization of the “emotion” portrayed in the drawings

All 134 drawings were analysed and categorized. Twenty drawings selected as particularly interesting and perceived to be data rich, and representing each of the “what” categories will be explained in this section (See Appendix C for a summary of the categorization of Figures 6-25). For discussion purposes only, the ‘Studying Anatomy’ category representing the majority of the drawings obtained, is sub-categorized according to drawings illustrating students experiencing exclusion, drawings illustrating personal conflicts, influences of family and others, crucial factors to pass Anatomy and deep, surface and strategic learning approaches, respectively. Inevitably, a few drawings overlap in these subcategories, but remain in the ‘Studying Anatomy’ category. These drawings will now be described, analysed and correlated with other drawings and literature. The differences between deep and surface learning approaches outlined in Table 2 served as a guide to discuss some of the drawings. Words or phrases emphasized in italics are quoted directly from the drawing itself or on the front page where students were instructed to write down key words or phrases that summarized their drawings (Appendix B).

### 6.2.1. Studying Anatomy

In terms of the “what” category, most drawings were categorized as ‘Studying Anatomy’ (Figure 4). In these drawings, the main focus is on the students, their thoughts, their strategy for and approach to studying Anatomy, their role, their constraints and their motivation. A few subcategories emerged which specifically gave insight into the perspectives and lives of the students. These subcategories are for descriptive purposes and might even overlap with other subcategories. In some drawings, the Half Year Mark of the student (Table 1), which was calculated approximately four weeks after the drawings were received, will be disclosed as required for the discussion, without identification of the student. In some drawings, the learning approach, i.e. deep, surface or strategic was noticeable and will be discussed where deemed necessary.

### 6.2.1.1. Drawings illustrating students experiencing exclusion

The illustration in Figure 6 is categorized as a classical story drawing with feelings of sadness and anger. In this drawing, a group of boys is playing ball in the river and inviting their friend who is on the other side to join them. He is standing in tall grass, between trees and rocks (suggesting obstacles) on the bank of the river. The student also explains that he cannot swim and finds the play to be *scary and dangerous*. His *friends*, as referred in the key words, however, seem to be enjoying this ball game in the river as illustrated by their participation in the game (hands held high to catch the ball) as well as the smiles on their faces. The boy standing on the bank has an angry facial expression, his arms are folded and his thoughts indicate that he is considering going home. In addition, the student has not drawn any feet, which emphasizes his immobility and his inability to get out of this seemingly frustrating environment with so many obstacles.

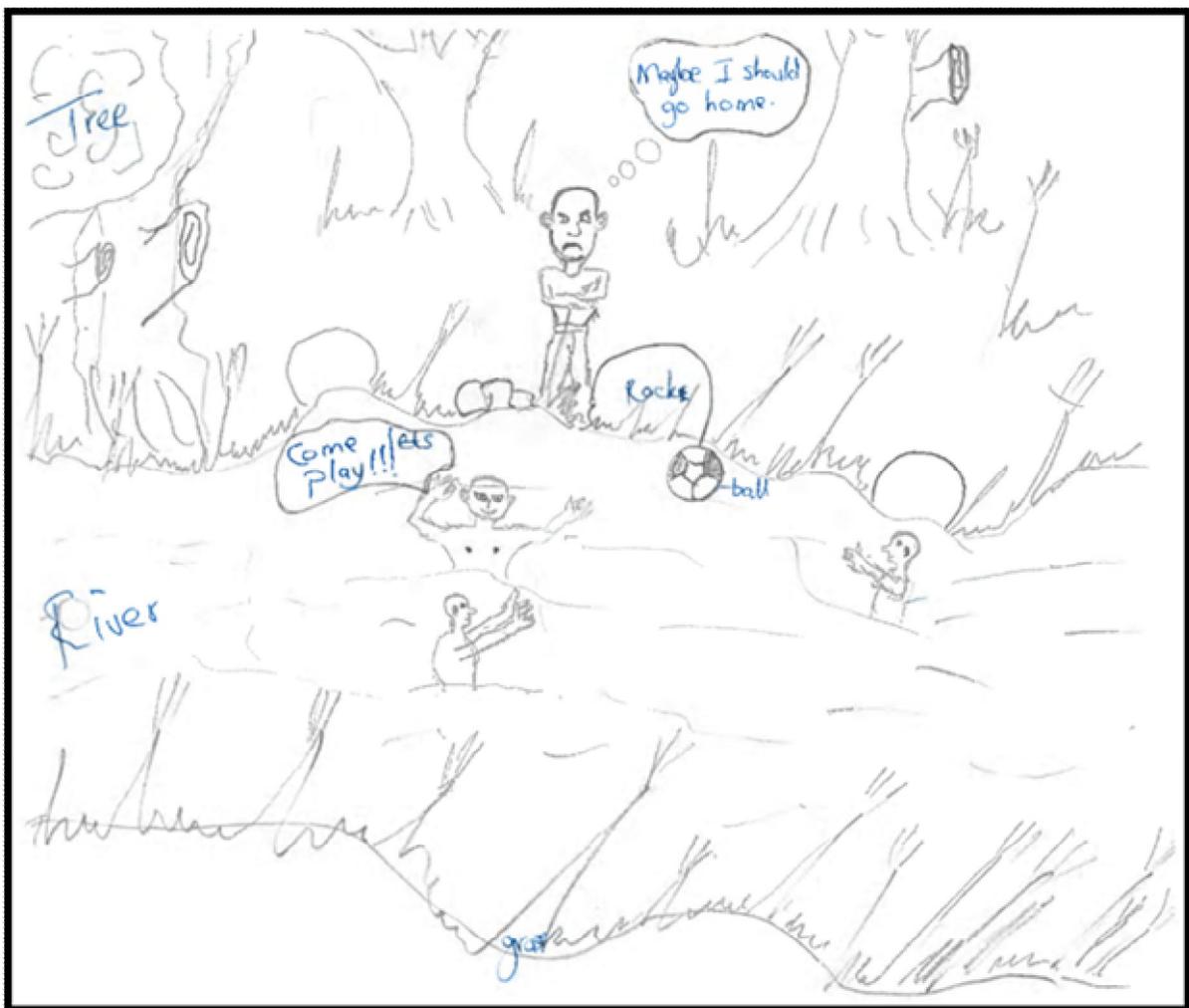


Figure 6: The ball game in the river but not everyone plays along.

The Neuro-anatomy lecture (Figure 7) is categorized as a classical story drawing with an emotional load of sadness, confusion and frustration. In Figure 7, a classroom is illustrated with the lecturer in the centre of the page lecturing Neuro-anatomy by means of a laptop and the projection screen next to the lecturer. Three students seem to be sitting (without chairs) at a table looking at the screen, viewed from the back. One smaller student, however, seems to be sitting lower than the table. The two students high enough in relation to the table have question marks just above their heads, possibly illustrating their confusion with the content of the lecture. The smaller student, however, has not only a question mark above the head but an exclamation mark as well. This might indicate that this relatively smaller student wanted to say something or ask for help but as a result of sitting below the table was unable to do so. This may indicate a feeling of insignificance or inferiority, or the student saying something that the lecturer was unable or unwilling to hear. The lecturer has sharp fingers that can be perceived as a sign of being aggressive or unapproachable, compared with these three students who were drawn without any hands. The lecturer seems to be continuing with the lecture and the student indicates her frustration with the lecturer and inability to understand by expressing the content as *blah blah blah*.

On the right side in Figure 7, a female student, illustrated outside of the classroom context by a dividing pink lightning bolt. The student seems to be very sad and crying many blue-coloured tears. The eyes are drawn without pupils. The student is standing with arms and hands away from the body, feet apart, which gives one the idea of anger experienced by the student. The lecturer, projection screen and students at the table are all drawn in pencil (grey), while the right side of the drawing, the lightning bolt, the crying student as well as the question and exclamation marks on the left are in colourful purple, pink and blue. The crying and angry student as well as the confusion of the three students on the left is highlighted by the colours in the drawing.



Figure 7: The Neuro-anatomy lecture

Another sad and crying student is illustrated in Figure 8. This drawing was categorized as a classical story drawing with the emotional load categorized as discouraged, depressed and hopeless. The student indicates that she has drawn herself carrying many heavy things, explaining that Anatomy is a *heavy subject*. She expresses her workload by carrying two big suitcases as well as a big container on her head. The student mentions that by trying to *hang on* to these things, she is *killing herself*. The intention of the student is to put in a lot of effort to *understand everything*; even studying throughout the night. The general impression is that the student appears to be feeling overwhelmed by this overpowering subject and describes that she is trying to persevere and cope even if her head *can't take it no more*. This indicates a student who might be at the end of her tether, experiencing feelings of hopelessness and depression.



Figure 8: Anatomy is a heavy subject

A similar drawing that primarily illustrates sadness, hopelessness and frustration is Figure 9. The student indicates that she has drawn herself as stressed, with many tears falling from her pupil-less eyes. There is another (bigger) female person sitting with either notes or a textbook lying next to her. With her hands in her hair, this has been interpreted as that she is indicating a combination of feelings such as confusion, frustration and hopelessness. She confirms this by saying that Anatomy is a *stressing subject because there is lot of work, challenging and needs a lot of time to study*. This drawing was also categorized as a classical story drawing with the emotional load categorized as discouraged, depressed and hopeless.



Figure 9: With my hands in my hair

In these drawings the student perceived himself or herself as being “stuck” with many obstacles to overcome (Figure 5 and Figure 7) or burdens to carry (Figure 8). The body

language as well as facial expressions illustrated in this category indicates extreme frustration and hopelessness with their situation. All three of the female students in this category in Figure 6, Figure 7 and Figure 8 exemplify themselves as extremely tearful, having not just a sad face or one or two tears but tears streaming down their faces. Although not illustrating tears, the male student in Figure 6 (the ball game in the river) expressed a very angry face with clear feelings of exclusion from his friends.

In Figure 6 and Figure 7 each drawing illustrated an educational context (Figure 6 metaphorically as a ball game in a river) with the student outside of the context indicating feelings of exclusion. In Figure 9, the student illustrated herself sitting on a chair at a table (educational context) being composed but still stressed whereas she is very overwhelmed and tearful outside of the educational environment. The student in Figure 8 reveals her personal thoughts. One could come to the conclusion with the first (upper left) exclamation that Anatomy might not be the only contributing factor to the heavy weight that needs to be carried by the student. She furthermore expresses her frustration and hopelessness with her situation by saying that “hanging on” for her, figuratively means killing herself.

These drawings that have been discussed all had aspects such as the following: being either very emotional or very sad (as illustrated by many tears); few or no positive aspects; no hope of passing the subject; and no appreciation of the content or any excitement.

When these drawings were being analysed for the first time, the need arose to look into the Half Year Marks (HYM) of these students. See Table 1 for HYM of all figures presented. Although 50% is required to pass, students we obtain less than 40% are regarded in general as at-risk students. All the above students (drawing figures 6 to 9) had an HYM of less than 40% except for the student drawing Figure 7 which was 67%. This student was repeating Anatomy but still seemed to have a negative perception of the subject regardless of her despite marks.

*Table 1: Students' Half Year Mark corresponding with Figures 6 to 25*

<b>Figure</b>	<b>Half Year Mark %</b>
<b>6</b>	32
<b>7</b>	67
<b>8</b>	35
<b>9</b>	29
<b>10</b>	50
<b>11</b>	44
<b>12</b>	54
<b>13</b>	73
<b>14</b>	42
<b>15</b>	74
<b>16</b>	57
<b>17</b>	53
<b>18</b>	67
<b>19</b>	45
<b>20</b>	61
<b>21</b>	58
<b>22</b>	39
<b>23</b>	30
<b>24</b>	76
<b>25</b>	73

### 6.2.1.2. *Drawings illustrating personal conflicts*

Conflicting thoughts are depicted in Figure 10 with this drawing categorized as a classical story drawing with ambivalence as the emotional load. Anatomy is portrayed as a psychological and a spiritual battle for the student, with the student's head, face and neck in the middle of the page with the good (angel-like figure) and the bad (devil-like figure) on each side, respectively. The word *Anatomy* is the heading of the drawing and is centred, colourful and with capital letters at the top of the page. The student illustrates a personal struggle to determine if she is good enough to be able to pass this subject. Most of the thoughts, either good or bad, are however, thoughts reflecting on herself and her abilities. These personal positive and negative thoughts contradict each other on opposite sides of the student's head.

The thoughts pertaining to Anatomy itself, i.e. *It is interesting* and *It is applicable* suggest that she is trying to persuade herself to like and appreciate Anatomy. There are 19 positive thoughts compared with 12 negative thoughts. The student however declares that she is able to do all things through Christ, suggesting she seeks spiritual assistance. The student obtained an HYM of 50%.

Weber and Mitchell (1996) state that the use of drawings is a valuable tool to evaluate how the teaching experience is perceived by the students. This inner conflict in a way illustrates the need for students to be affirmed in their strengths and encouraged in their performances. Students should be encouraged throughout the year to give their best and affirmed that they will be able to make it. With an academic workload that needs much time to be mastered, students cannot afford to spend so much time wondering if they will be able to do it or not.

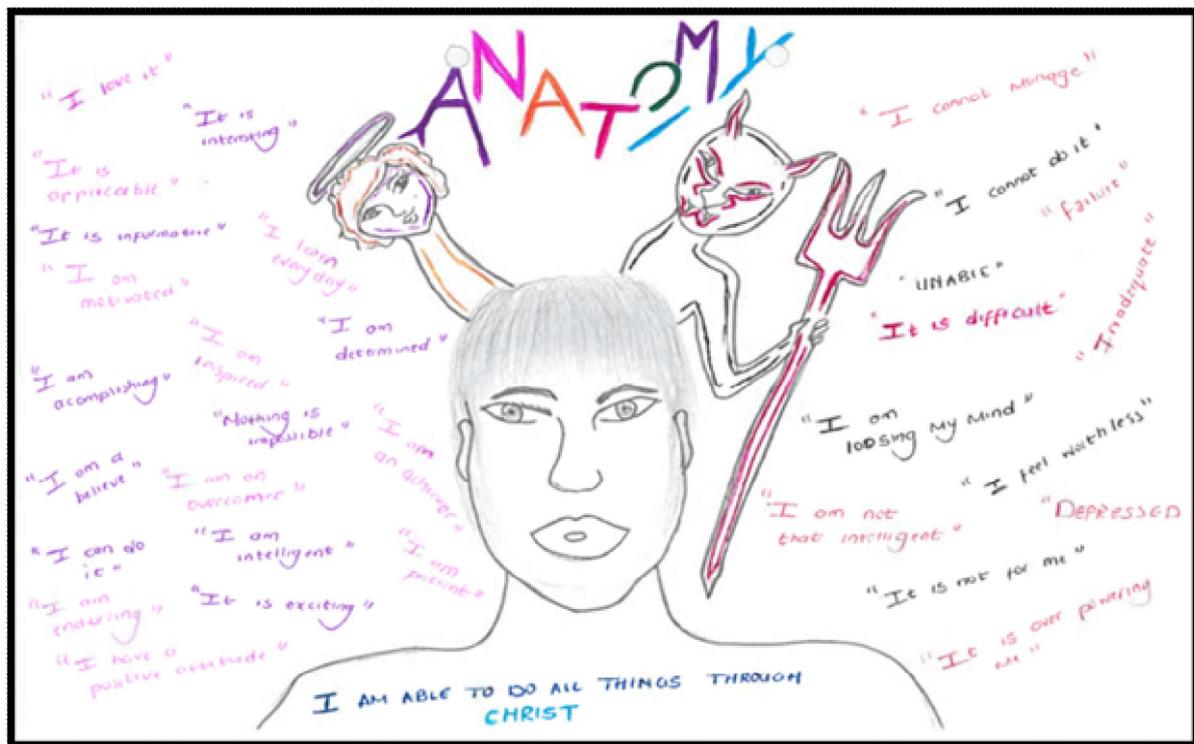


Figure 10: Good versus evil

Much like Figure 10, the inner conflict of a student is illustrated in Figure 11. Anatomy is represented as an irritating mosquito, *Mr Anatomy*, who is keeping the student, *Mr Learner*, busy in Figure 11. This classical story drawing depicts the student's frustration with the subject. It starts with the student, *Mr Learner*, thinking that he doesn't know how to kill this mosquito. The student describes how the mosquito, *Mr Anatomy*, persists by intending that *Mr Learner* will *never rest today*. *Mr Learner* gets to a point where he shouts to *Mr Anatomy* to leave him alone, but *Mr Anatomy* says that it will only happen when *Mr Learner studies hard*. No other strategy for passing Anatomy, apart from *Mr Anatomy's* suggestion to *study hard*, was mentioned or illustrated □ there is only a shout of frustration.

This student does not seem to understand the importance of Anatomy in his intended nursing profession, but only perceives it as frustrating. He seems to just want to wish it away. Furthermore, the student summarizes his drawing as *irritating, keeping busy, tiresome*. Only if he studies hard (passes Anatomy) will the mosquito leave him alone. This student might also have adopted a surface learning approach to studying Anatomy, with no other motivation than to just pass the subject and get it over and done with. This student obtained an HYM of 44% (Table 1). His unsatisfactory "study hard" approach with no motivation is clearly evident in his low marks.

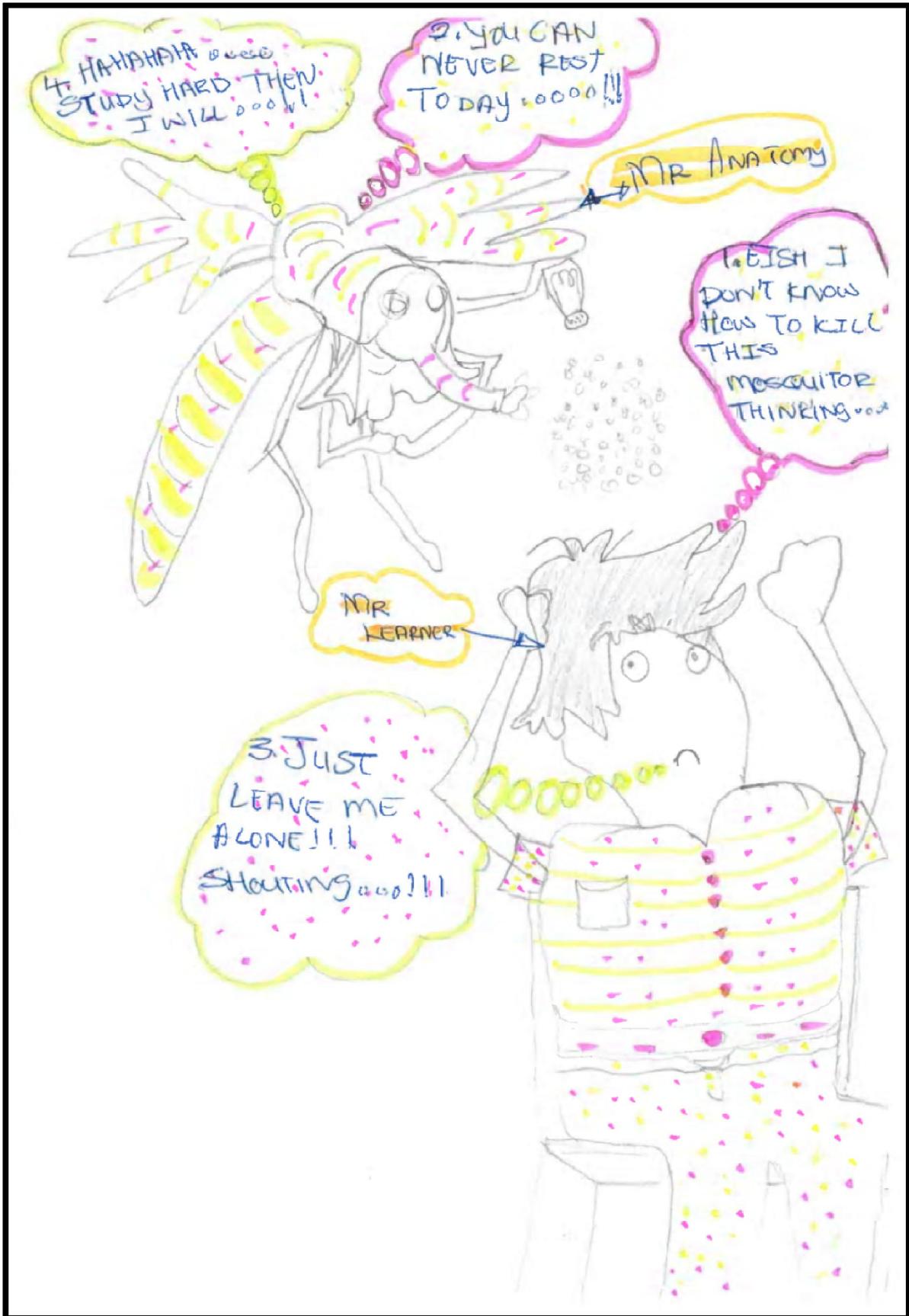


Figure 11: Anatomy portrayed as a mosquito

### 6.2.1.3. Drawings illustrating the influence of family and others

A family picture is portrayed in Figure 12 as indicated by the heading on the upper left hand side and classified as a classical story with frustration as the emotional load. The *drunken* father is illustrated on the left of the page, with a stethoscope around his neck indicating that he has some medical background. He has a bottle of beer in his left hand with the words *Chomi ya bana* written next to him which translates to him being a friend of young children. This illustrates the father's irresponsibility by trying to be a medical professional, yet drinking and befriending children or youngsters at the same time. The student summarizes the drawing on the back of the drawing by explaining that the father is *always drunk* because he didn't get to finish his degree. Interestingly, the student draws himself dressed professionally. A mother pleads with her son (Mpho) to put a lot of effort into his studies. Mpho, however, is *lazy to study Anatomy* (stated by the student as a key phrase) by stating that he perceives Anatomy to be a difficult subject. The student does not seem to understand all the implications if he does not pass Anatomy or finish his degree. That is why his mom is pleading with him to study hard, so as not to *end up like your father*.

The family of the student seems to be a source of conflict with one positive and one negative role model. The mother is deeply concerned for her son to study Anatomy very hard in order to eventually pass his degree. But, the primary motive is that Mpho should not end up like his father, which leaves the reader with the sense that the father's not completing his degree, as well as his alcohol abuse, was the source of much conflict in the family. Mpho on the other hand, is faced with the reality that Anatomy is a difficult subject in spite of these family influences. The student also states that Mpho is *lazy to study Anatomy*. For some students, the content is so overwhelming that they procrastinate, which might motivate the student to reveal and label this as *laziness*. This student achieved an HYM of 54% (Table 1).

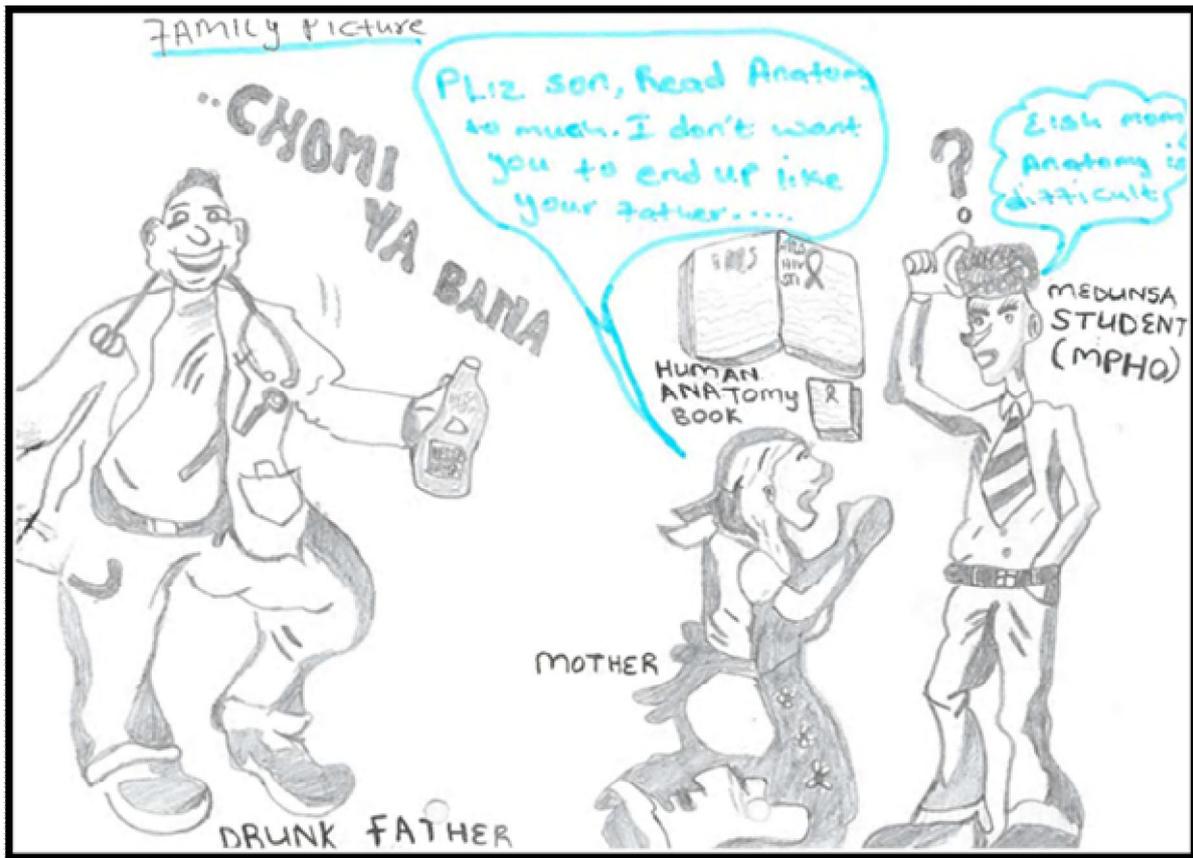


Figure 12: Don't end up like your father

The rising star in Figure 13 is a classical story with a motivated emotional load. This drawing depicts how hard work pays off and takes the form of a story starting on the left of the page. The student is studying sitting on a chair at a desk with Anatomy text books as resources. The studying seems to take place when the sun rises. The clock on the desk indicates that it is 3 o'clock and it is explained in the bottom left corner that more time should be spent on studying. What happens next is that the student checks her Test 2 results on the notice board and sees that she is the top student in the class. She continues by showing these results to her mom who expresses her happiness about her daughter being the top achiever in Anatomy. As the sun sets, she portrays herself as *the rising star*. The student adopted a strategic learning approach, with a clear aim to be the best in the class. Besides knowing that she needs to put in a lot of effort and time to achieve her goal, she also has the support and encouragement of her mother (family) that is vital for her.

Whereas the mother in the previous drawing (Figure 12) was portrayed to motivate her son to study Anatomy not to *end up like your father*, the mother in this drawing (Figure 13) is portrayed to encourage her daughter to study Anatomy to such an extent that that her mother was the first person she informed after noting her achievement on the notice board, before she could be *the rising star*. The mother states sincerely that she is happy that her





Figure 14: The influence of others

#### 6.2.1.4. *Drawings illustrating crucial factors to pass Anatomy*

In this gift-card type drawing, the student's confident emotions are illustrated when she exclaims in Figure 15: *This is how I perceive Human Anatomy!* Central to the drawing is a crown with the words *Success in Anatomy*, which suggests the theme of the mind map-like Figure 15. The crown is explained as representing success and superiority as an educated health professional. There are seven explosive call-outs that all point to the crown. Each explosive call-out is dark-coloured, which the student explains by saying that it *represents all the efforts one must take in order to get to the crown* and continues by advising that these efforts are *generally not easy*. The seven aspects are (directly quoted):

- Read, learn and understand the terminology
- Time management, ensuring that you make time to read it each day so it becomes a part of you
- Confronting your lecturers where you aren't clear because every detail is important
- Know where structures are located and able to link theory to practical work
- Know your pictures of the structures very well
- For theory, read along the lines, never over-read
- Functions of landmarks found on the human Anatomy

The student mentions the issue of time management where students should make time daily to keep up with the content being covered during lectures and practicals. Terminology must be not just learnt, but understood as well. Furthermore, the student advises that uncertainties must be clarified by approaching the lecturers. Integrating theory with practical skills, not just scanning or looking over the work, and knowing the functions of landmarks as well and not just where structures/landmarks are situated, are aspects highlighted by this student that reveal her desire to understand the subject and consequently also pass well (*obtain the crown*). These aspects suggest that the student has adopted a deep learning approach. This student achieved a 74% HYM (Table 1).

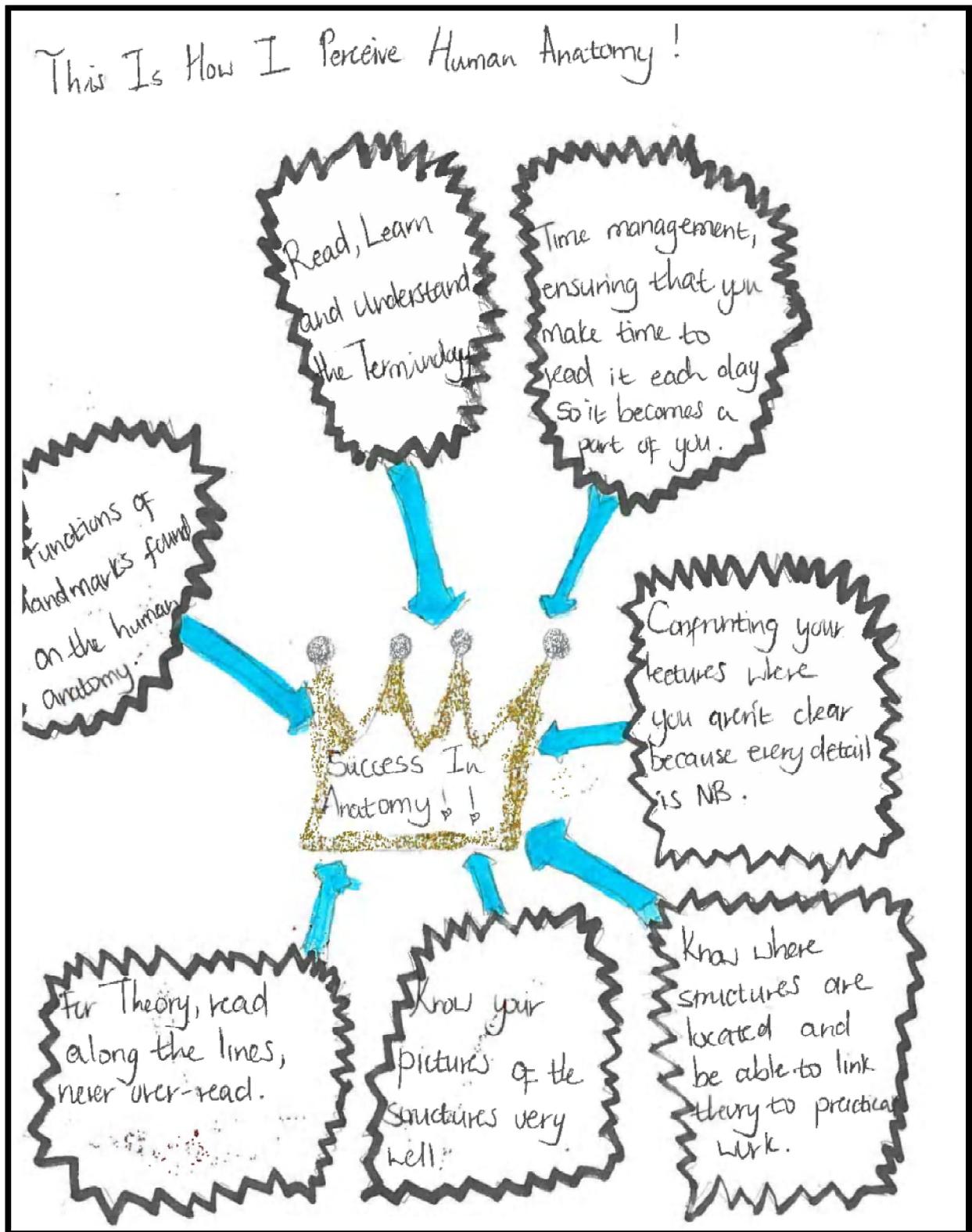


Figure 15: How to obtain the crown

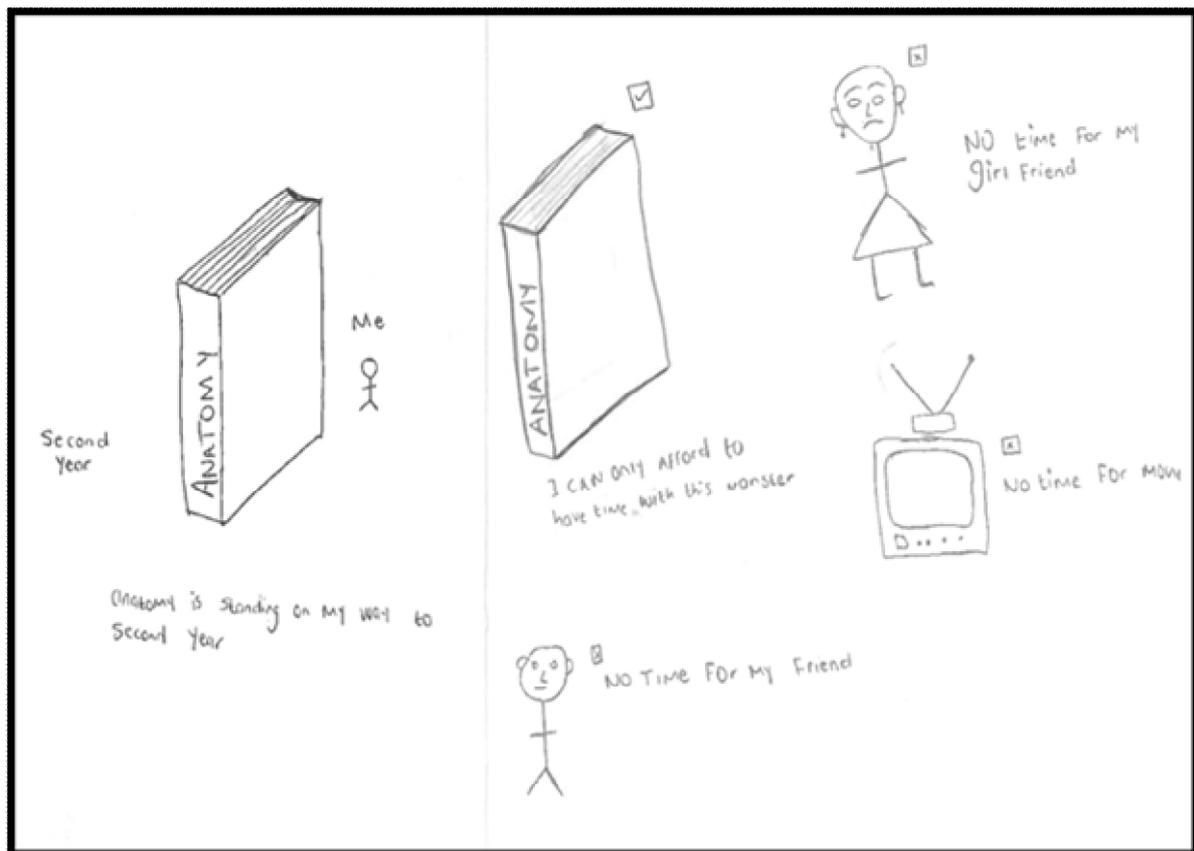


Figure 16: Social and leisure sacrifices to be made

In Figure 16, categorized as a classical story with a depressed emotional load, the drawing seems to be divided into two unequal parts. In the first part on the left, the student only sees how Anatomy is *standing on my way to second year*. The student clearly just wants to pass Anatomy to be able to be accepted into second year. Anatomy is depicted as a textbook much bigger than the stick man that portrays the student. On the right, time management is specified. Passing Anatomy seems to come with some sacrifices with regard to leisure and social life on the time management level i.e. *NO time for my girlfriend*; *No time for movies* and *No time for my friend*. He portrays Anatomy (again portrayed as a large textbook) in a negative light by saying he can only *afford to have time with this monster*.

As in Figure 15, time management is also addressed in Figure 16. Compared with Figure 15 where success in Anatomy (crown) is accomplished through what needs to be done in a positive way, Figure 16 is all about what should not be done in order to be able to spend time with the 'monster' Anatomy, which stands in his way to being promoted to second year. Anatomy seems to have put a constraint on his social life with his girlfriend and friend not too happy about this as indicated by their facial expressions. Because of this, the student might

find it difficult to be motivated to put in more time and effort in the subject to be able to pass. This drawing is an example of a student who will most likely adopt a surface approach to learning Anatomy. The student obtained 57% as an HYM (Table 1).

#### 6.2.1.5. *Drawings illustrating deep, surface and strategic learning approaches*

Similar to the previous drawing (Figure 16), Figure 17 also expresses the idea that passing Anatomy is required to proceed to second year. The classical story with a motivated emotional load, begins in the upper left corner where the student affirms that he is drawing himself and his Anatomy books, sitting on a chair at a table, his books open with a smile indicating that he enjoys studying the work. With an arrow, the next part of the story is explained as Anatomy being a race and the students needing to run to the finish line. The next part of the story is about obtaining the train ticket to the *destination: 2<sup>nd</sup> year*. Lastly, the student illustrates himself as a stick man with a smile, climbing over a wall which is annotated as Anatomy.

The student acknowledges that Anatomy is challenging, but then this challenge also prepares him for upcoming challenges. He compares Anatomy to a race which needs to be finished, after which a ticket is obtained with the last hurdle to be overcome (the wall), which will consequently get him on the train to go to the desired second year. Although this is not specifically mentioned by the student, one can come to the conclusion that the race is the hard work throughout the year with various formative assessments. If he succeeds, he can get the ticket, which may represent the student being allowed to sit for the examination, with the final examination (summative assessment) as the wall. If the student can climb the wall, in other words pass the examination, he will be on his way to second year. This student's drawing and HYM of 53% suggest that he has adopted a strategic learning approach with steps clearly outlined to get to the destination: study hard, run the race, get the ticket, climb the wall and get on the train.

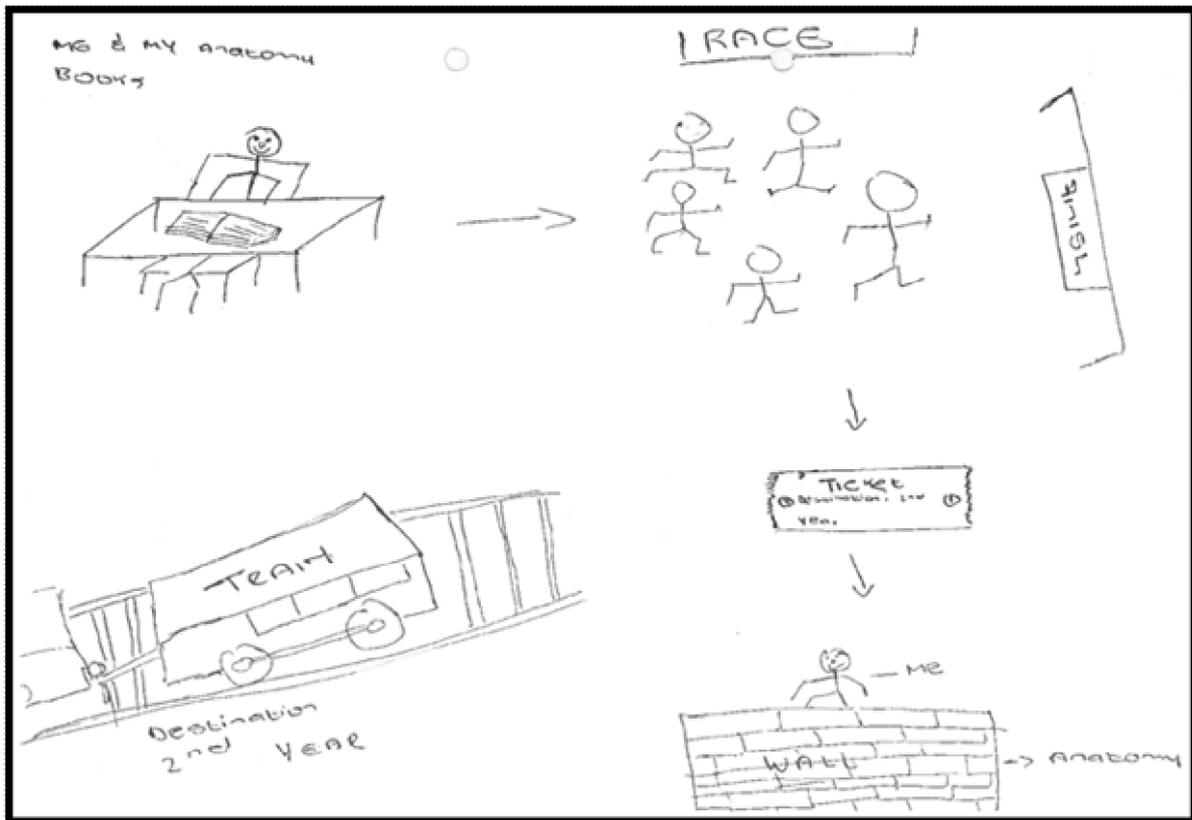


Figure 17: My ticket to 2<sup>nd</sup> year

In Figure 18, another classical story with a motivated emotional load illustrates a bridge from one side of the river to the other. The bridge is strong and stable, named Azania's bridge, identifying the student who has drawn the picture. The student illustrates someone who walks over the bridge, but doesn't indicate who it is or if it is the student himself crossing the bridge. There are a few rocks under the bridge, on the sides and in the river. This drawing was categorized as a classical story drawing with a motivated emotional load.

The student describes his perception of Anatomy as a bridge enabling one to cross a river. He explains how Anatomy is a lot of work, which to him is as heavy as rocks inside the river that are difficult to move out to the sides. In spite of the obstacles (heavy workload), he managed to build a bridge that is an *easy walk across* to the other side. The bridge can represent a valuable study method, a strategic learning approach, or useful resources that contributed to this student's experiencing Anatomy as *easy as walking across to the other side*. The HYM of this student is 67% (Table 1).

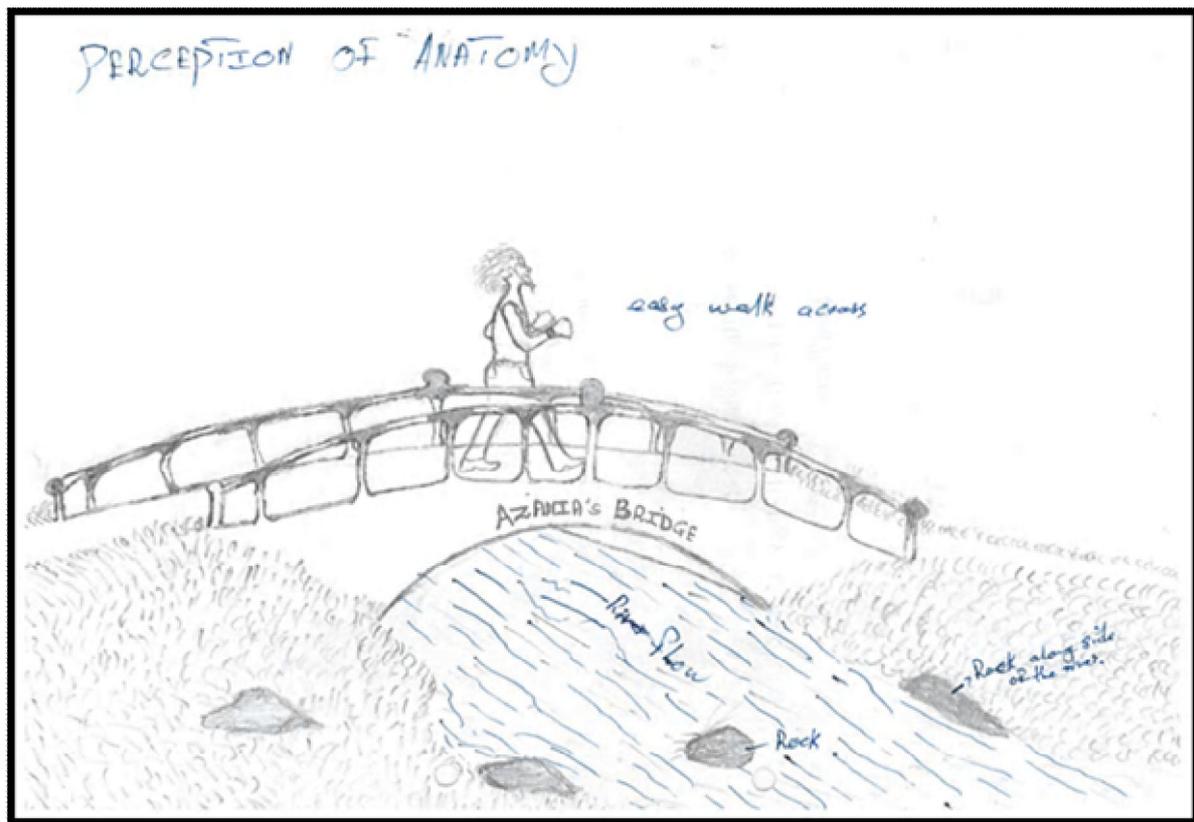


Figure 18: An easy walk across

In Figure 19, the student describes how his perception of Anatomy *begins with me, studying Anatomy holistically* with the aim of being efficient. He also draws a very determined facial expression. Secondly, he explains that books and lectures provide him with adequate information and illustrates two books; a popular Anatomy Atlas as well as his practical book. The next step is illustrated by a body (cadaver) lying on a moveable dissection table and a man (himself) drawn with a frown and heart beating. The man (student) is concerned that the cadaver, named Hitler, is going to wake up. The name Hitler might suggest a monster, someone scary. This third step suggests that knowledge of the human body and its functions is not enough, but that the student should also know the location of structures within the body. Lastly, the student explains that the knowledge of Anatomy and the practical sessions must be applied within his environment that will enable him to be efficient. His direct environment is the academic Dr George Mukhari Hospital in Ga-Rankuwa, as illustrated. He then extends his vision of being efficient in the world with a globe concluding the picture.

In Figure 19, the bigger picture of Anatomy is illustrated in four phases. The student seems to realize the importance of studying Anatomy, how it is applicable to the work environment and his occupation as a nurse. Although the student realizes the importance of not just

having theoretical knowledge, but also being able to integrate it with the practical sessions, i.e. works with cadavers and cadaveric specimens, he is still nervous, having his heart beat faster and wondering if the cadaver can *wake up* from the dead. Nevertheless, in spite of some personal uncertainties, the student seems to understand that studying Anatomy would increase his efficiency in his occupation. This student is most likely to adopt a deep learning approach as evident in his perception of Anatomy illustrated in this drawing. An HYM of 45% was obtained by this student. The reason for this low score could have been explored further. It might be possible that the student gained insight to the bigger picture of Anatomy just before participating in this study, after the HYM was calculated.

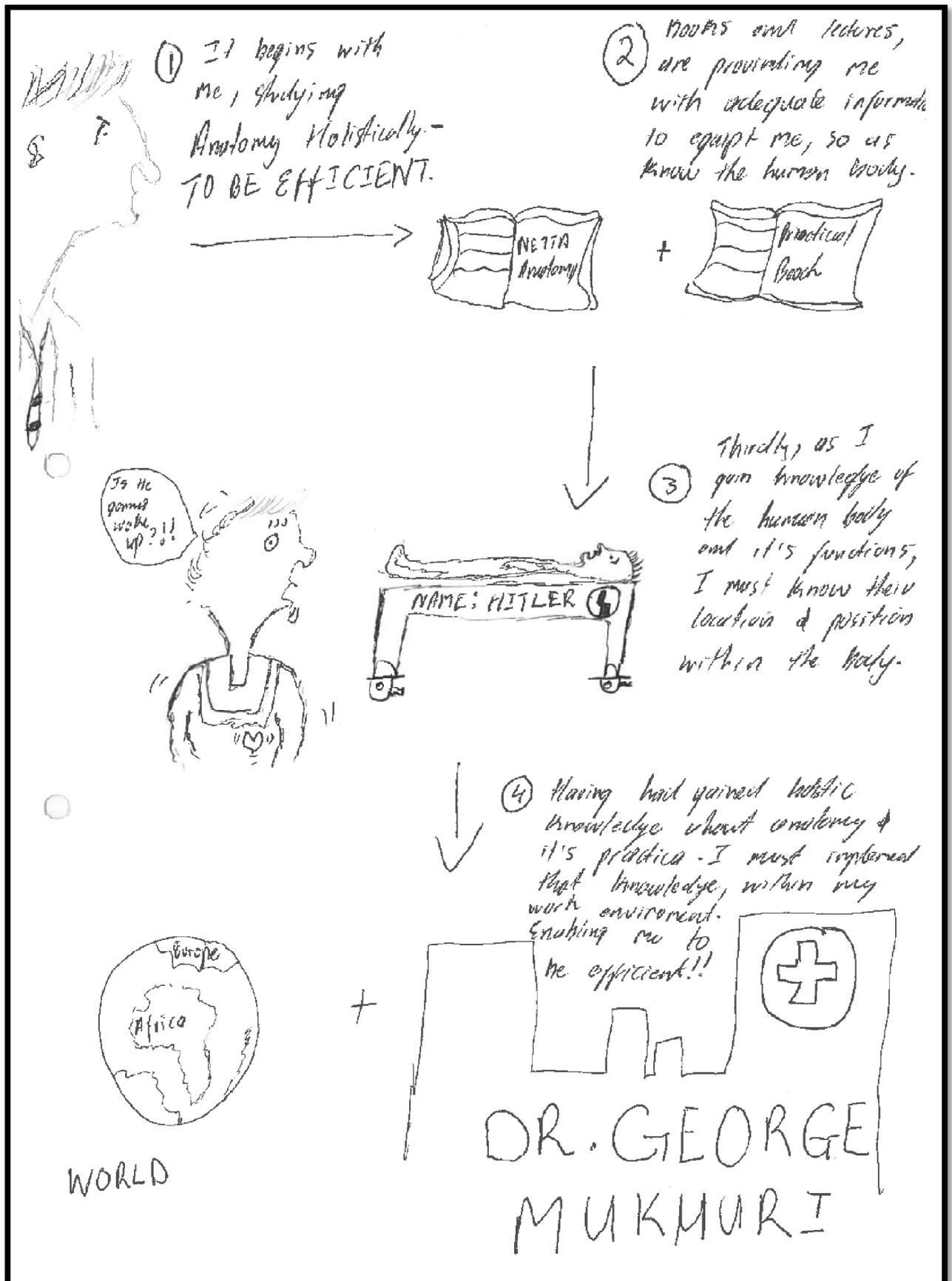


Figure 19: The bigger picture

### 6.2.2. Dissection/Practical aspect

The only four drawings classified under this section were either gift card or classical story drawings, all having a negative emotional load categorized, i.e. fear, uncertainty, discouragement, depression and anxiety. One of these drawings is described below.

In Figure 20, the student expresses two thoughts: a concern about encountering his *long lost grandfather* in the practical component of the subject and one of anger, explaining a common belief in some cultures in terms of which the ancestors are not respected if they are not properly buried. This illustrates some of the questions a student might have with regard to obtaining the bodies and the prosected specimens. Concerns such as disrespect for ancestors and the consequences thereof, and encountering someone familiar or even a family member, could discourage students from studying and fully participating in the learning opportunities presented in the subject. The bottom half of Figure 20 illustrates an anxious and depressed student who wants to sleep and feels lost in class. The student perceives Anatomy as a tiring subject and describes it as boring, together with the issues raised in the top half of the drawing. In spite of these deep emotional concerns, the student managed to achieve an HYM of 61% (Table 1).

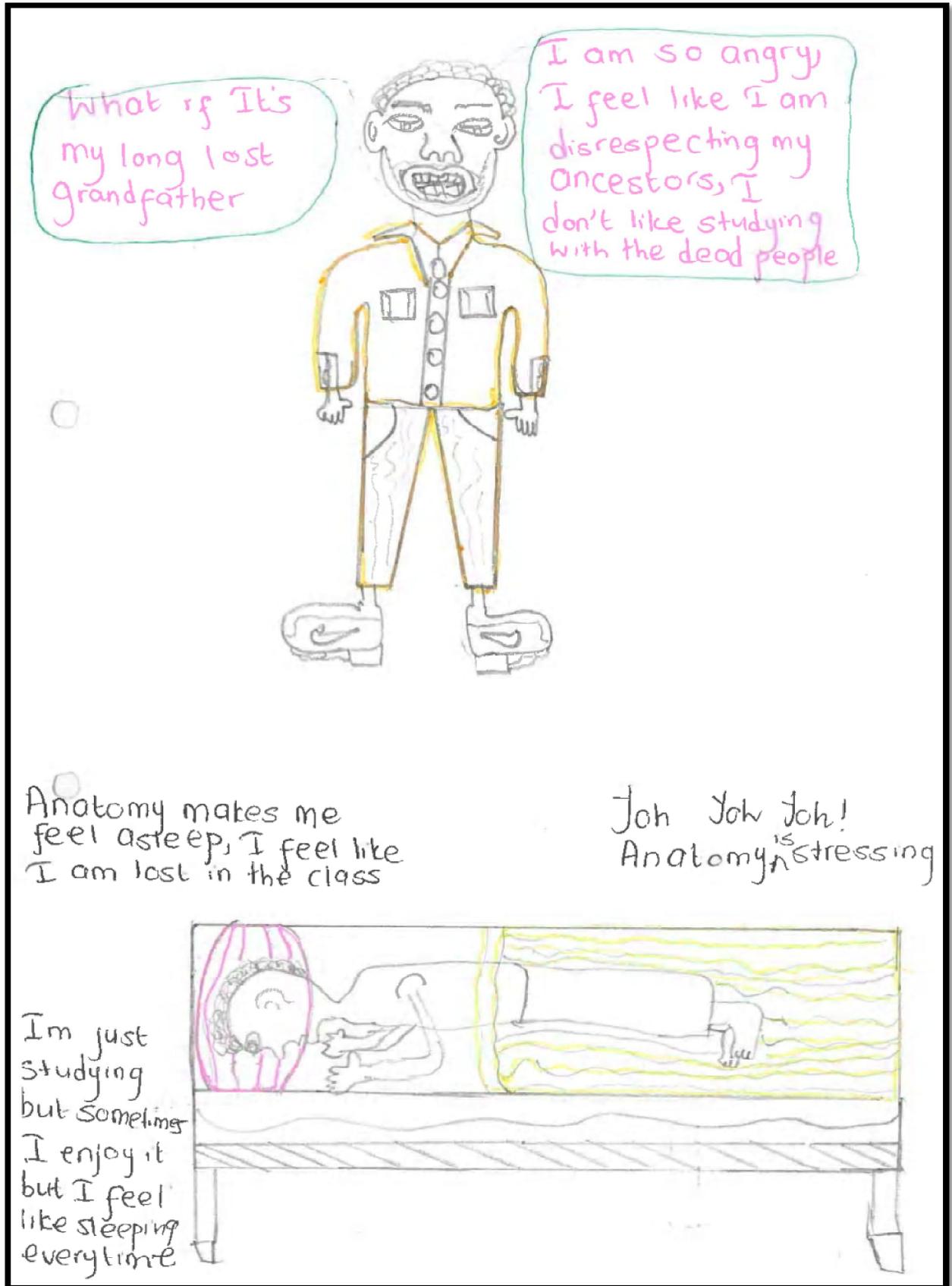


Figure 20: Could this be my grandfather?

### 6.2.3. The body itself

Most of the drawings in this category expressed an awe or appreciation of the human body, its different dimensions, functions and aspects as well as the fascination students experience when they actually come to know what they themselves look like underneath the skin.

A foetus, *in utero*, with a detailed umbilical cord attached to the placenta and, interestingly, the foetus' relation to the vertebral bodies of the vertebral column are illustrated in Figure 21. On the top left the intricate lactiferous ducts, sinuses and glands with fat lobules of the breast are illustrated corresponding to a pregnancy in the third trimester. The function of the placenta as well as the amniotic sac is also indicated. This drawing was categorized as a textbook illustration with an appreciative emotional load. The student described Anatomy in the key words/phrases summarizing the drawing as an *eye-opening bridge to how complex and interesting... the human body functions and works. A true work of art, a sensational creation by God*. The student confirms her belief that God is the creator of the human being.

In Figure 21 the student illustrated an aspect of the human body that had only partly been encountered in class (breast) since only the Thorax and Back and Neuro-anatomy modules had been completed at the time the study was conducted. The greater part of the picture which was a foetus in relation to the vertebral column, therefore including parts of the abdomen and reproductive system, had not been covered at the time when this study was conducted. We can therefore draw the conclusion that the student was interested in how the foetus was positioned within the uterus and made an effort to explore this in a textbook or another resource, therefore referring to Anatomy as an *eye-opener*.

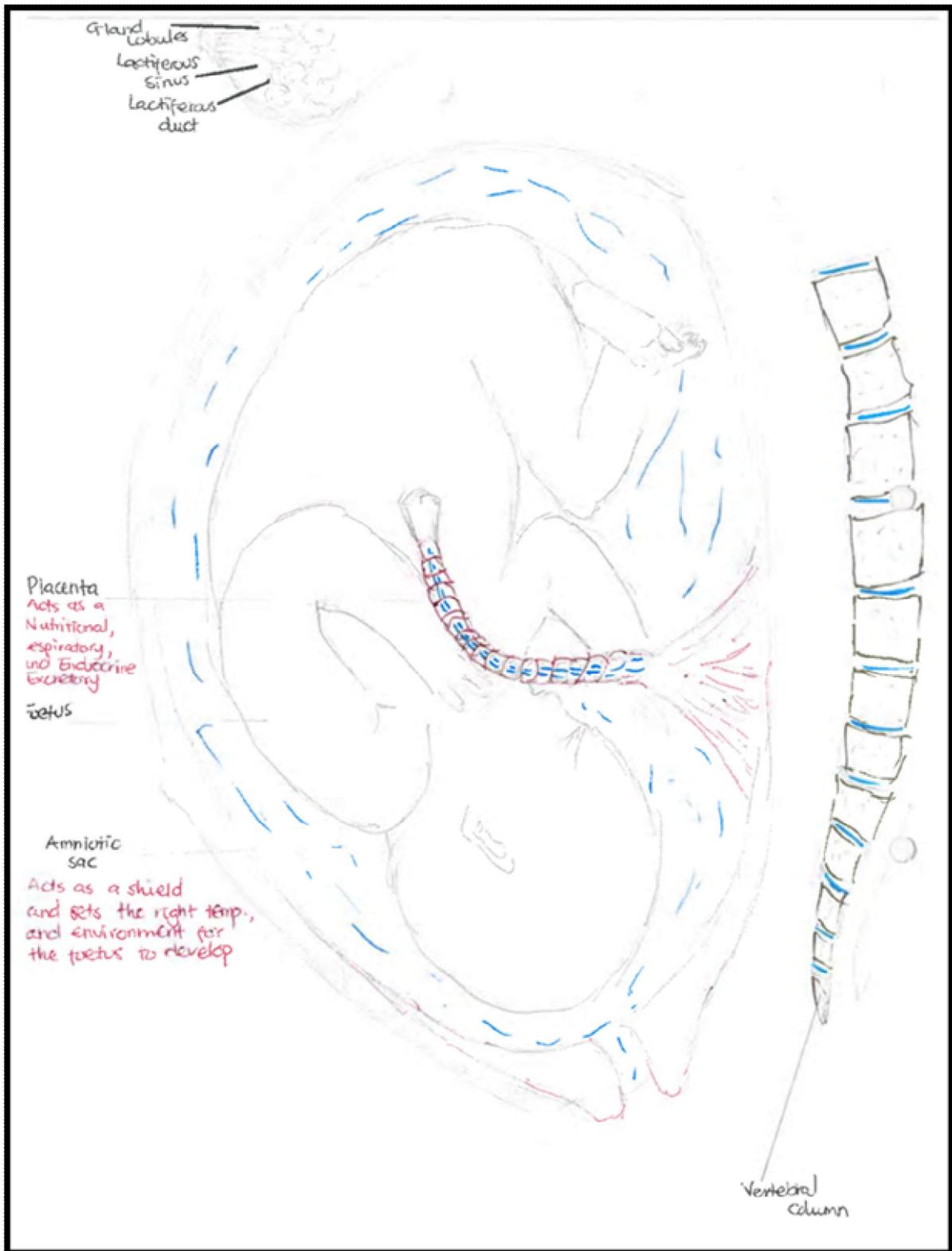


Figure 21: A true work of art

The message of the gift card type drawing in Figure 22 is that everyone is the same inside by virtue of having a central body from the shoulders to the feet but still being unique as

illustrated by ten different heads on this one body, all created by a *Heavenly Being God*. The different faces on the one single body are from different races (White, Black, Indian) as well as of different ages.

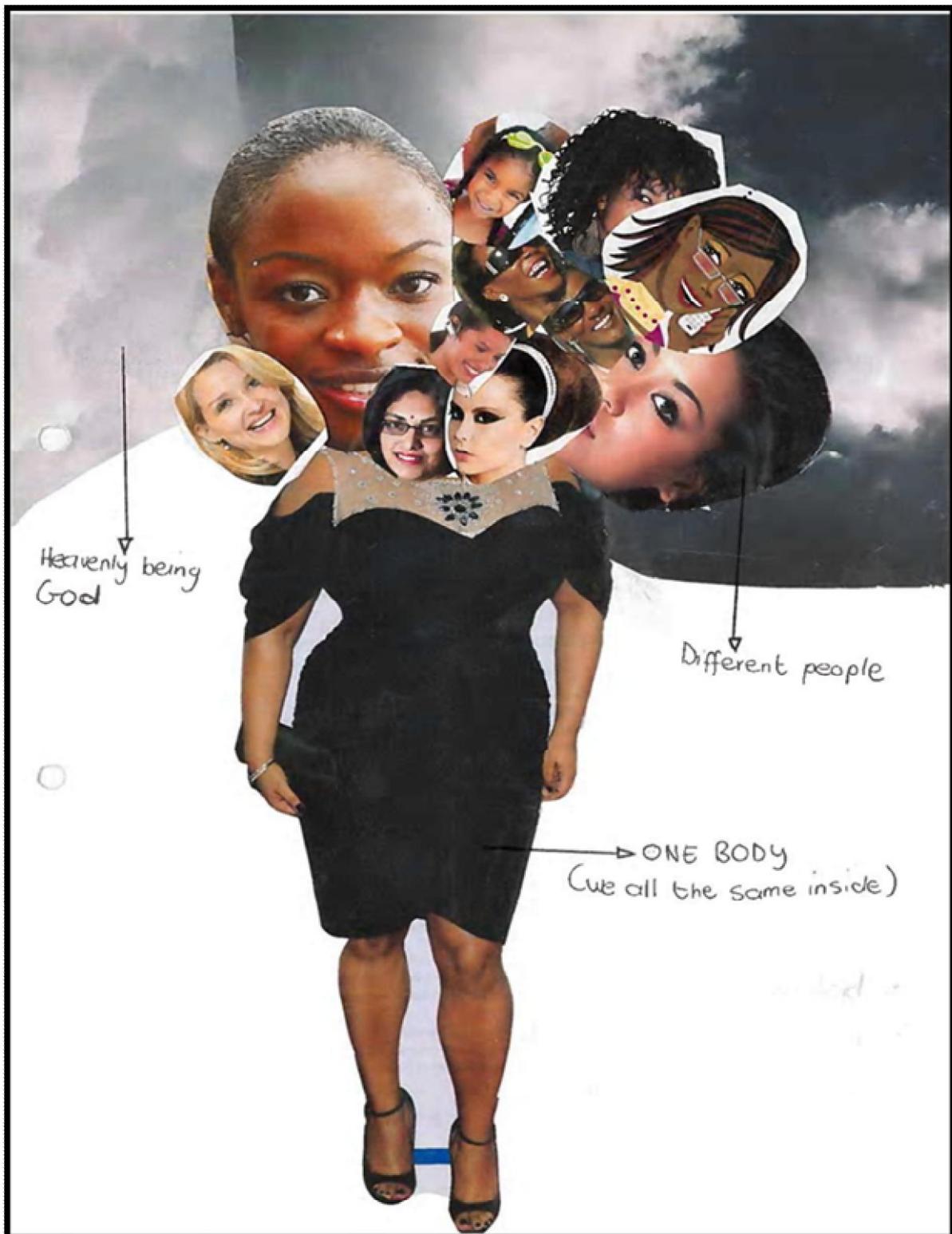
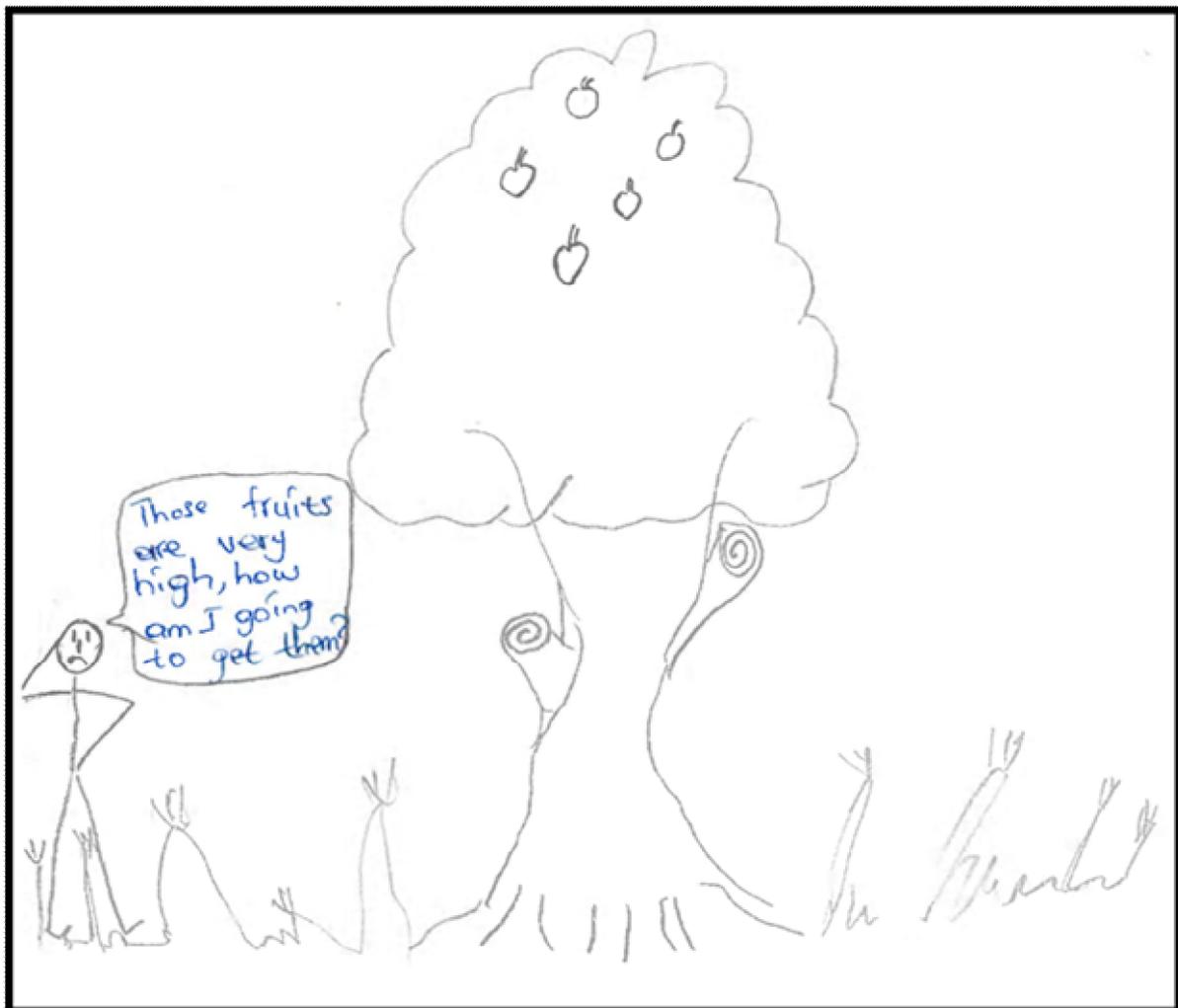


Figure 22: *We are all unique, in one body*

#### 6.2.4. Anatomy as a discipline

In this category, students express how they view Anatomy as a discipline by using an analogy or metaphor.

A classical story with a 'discouraged' and 'helpless' emotional load is depicted in Figure 23. A perplexed stick man is standing with one hand on his head, the other one on his hip, thinking *those fruits are very high, how am I going to get them*. The fruit in the tree is situated at the top of the tree and cannot be reached from where the stick man is situated. The stick man might represent the student himself trying to figure out a strategy for passing Anatomy (to reach the fruits). The stick man is drawn with tall grass around him and surrounding the tree, suggesting further obstacles to get to the tree. The cut-off branches might indicate that he hasn't found a strategy for learning Anatomy. It might also indicate that there were once lower branches where the fruit was more reachable from the ground, which might indicate opportunities missed to obtain the fruit.



*Figure 23: The unreachable fruits*

*Anatomy is Life* as illustrated by Figure 24 where Anatomy is compared with perceived as a tearful mother who gives birth to a baby with two nurses assisting at her bedside. The nurses are actively assisting the mother, as they are illustrated directly next to the bed with their hands visible. The mother's facial expression indicates a painful labour. The student summarizes the drawing in three statements (directly quoted):

- Anatomy is Life (A mother giving birth to a new baby, new life)
- Anatomy requires effort to pass (A mother has to feel pain to get a child)
- Anatomy requires other people's help (Nurses assisting the mother to give birth to a child)

This drawing was further categorized as a classical story and with an appreciative emotional load. The emotions captured in the drawing in Figure 24 could suggest that the student herself went through the process of labour or was involved in a situation where labour was witnessed. The explanation is given that a student needs to put in effort which is metaphorically compared with the process of labour, in order to be able to pass the subject in the end, and that it won't be easy, as indicated by the mother crying and experiencing pain, but that in the end it would be worthwhile i.e. having a new-born baby (passing Anatomy). The importance of the help of others is emphasized, which might suggest help from lecturers, peers or other resources. This student obtained an HYM of 76%.

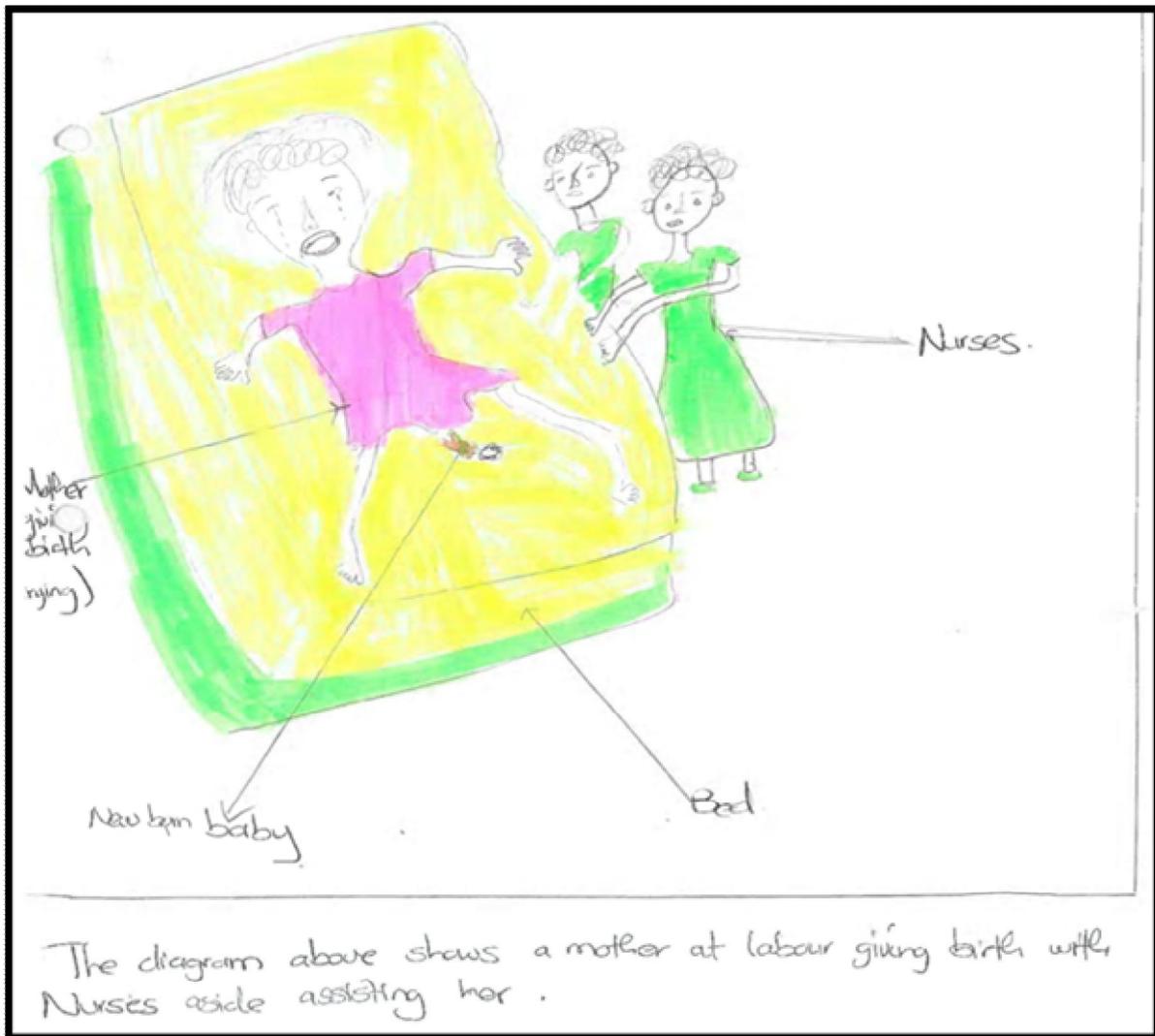


Figure 24: Anatomy is Life

Anatomy is compared with perceived as a packet of sour sweets in Figure 25. It is a gift card type of drawing categorized under a motivated emotional load. The student colourfully compares the sweets of different shapes and sizes with the many types of specimens encountered during practical sessions. The student expresses her appreciation of the subject by pointing out that although the packet is *small*, there are many things found on the inside. The *sour powder* surrounding the soft inside of the sweet is correlated with the student's encountering new work for the first time during a lecture but suggests that she is motivated to understand the content which then becomes *nice and easy*. Some sour lollipops are also found inside the packet of sweets, resembling work that the student experiences as very unpleasant, but the student indicates that time is needed to understand it better. This student understands that time needs to be spent to really understand Anatomy

for it to be a pleasant experience for her, and also that perseverance is required for the more difficult aspects of the subject – to get past the sourness to gain access to the sweeter part. The student also mentions that although the packet might seem to be for children, children won't be able to handle the sour taste inside. This indicates a certain emotional maturity that is needed to be able to cope with all the intricacies of Anatomy, especially the practical aspect thereof. This student obtained an HYM of 73%.

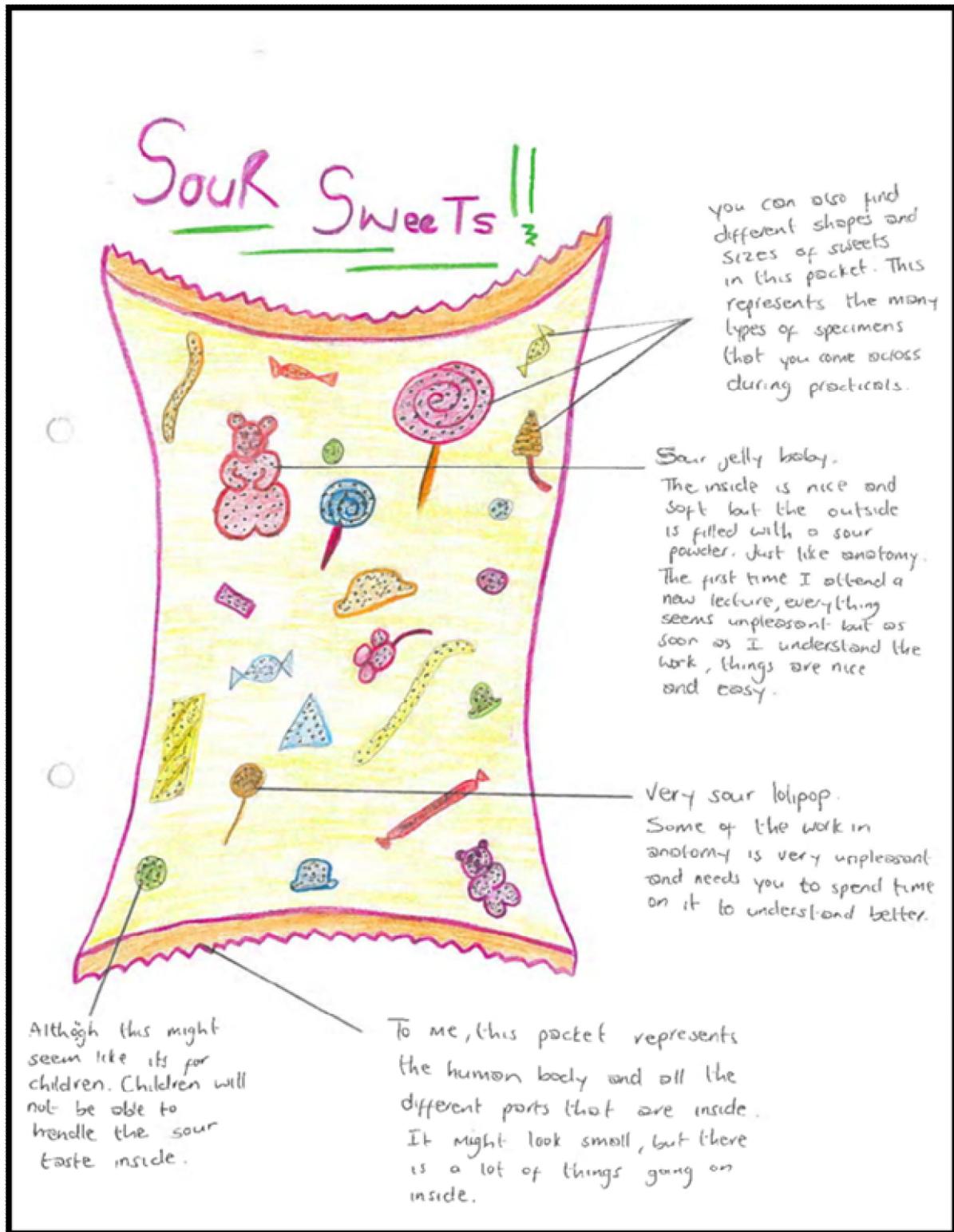


Figure 25: The packet of sour sweets

## 7. Discussion

Anatomy is a subject in which students encounter large volumes of content that is reported to be necessary to form a foundation for clinical subjects later in the course. Anatomy has been described as a semantic microcosm in the linguistic universe and that medical students are exposed to more than 2000 new terms during the course (Lucas *et al.*, 1997). When a practical component is part of the Anatomy course, where osteology, cadavers and cadaveric specimens are utilised, students may be confronted with aspects such as death and dying, ethics and various spiritual and cultural beliefs (Houwink *et al.*, 2004; Leboulanger, 2011). Students need to be thoroughly introduced to what the subject entails at the commencement of the course. Abu-hijelh *et al.* (1997) reiterate the importance of an orientation where the needs of students are addressed, especially to counter possible negative reactions towards the subject. Given the small but significant number of students in this study who have beliefs that may be in conflict with practical aspect of Anatomy, it is an important issue to address comprehensively during the Introduction Module.

In South Africa, the Human Tissues Act No 65 of 1983 indicates that if close relatives do not claim the body of a family member and the government has done everything in its power to locate these family members, these bodies will be donated to specific institutions provided that they died of natural causes. The different means of obtaining these bodies, i.e. donated or unclaimed, the process of embalming and dissection, and the disposing of the remains are a few important issues that need to be thoroughly addressed during the Introduction Module. Students might find it useful if a theologian, or any other religious expert who may have possible answers to questions about death and dying, can engage students in discussions, including the context of different cultural beliefs. Students should have the opportunity to have their concerns addressed before embarking on the practical aspect of the course. It is important that students are mentally prepared with what they will encounter in practical sessions to avoid unnecessary emotional stress and anxiety additional to the stress of an already full timetable.

The use of drawings might be an unthreatening method within a safe environment to identify vulnerable students. Aspects such as an overwhelming negative emotional load (tears, anger and frustration) where students portray themselves or the situation as hopeless and the subject as an impossible mountain to conquer, as portrayed by drawings such as in Figure 6, Figure 7 Figure 8 and Figure 9, ought to be noted. Since Anatomy is a high-risk module (subject), early identification of vulnerable students as well as making the necessary informed interventions as soon as possible, might contribute to the pass rate of the students.

When identifying vulnerable students by means of their drawings in conjunction with the results, the necessary student support should be in place to be able to refer students for the appropriate support and academic remediation.

Although Houwink *et al.* (2004) describe the value of the assistance of older students during the first day of dissection, Figure 14 illustrates how an initially positive student who liked the subject can also be negatively influenced by older students. Students then enter Anatomy class with preconceived ideas received from negative older students. This effect can be countered by asking a former Anatomy student to share experiences to the new first-years in a class during the Introduction Module. Aspects such as how he/she experienced Anatomy, his/her way of approaching the study of Anatomy, the time he/she had to spend and sacrifices made to understand and pass Anatomy, as well as the need for the moral support of others throughout the year, might contribute to managing the students' expectations of Anatomy.

The support as well as the lack of support from family members and others was illustrated in some of the drawings. Students entering directly after school, that is, most of the students in this study, might find challenging not only the workload of different subjects but also the adjustments on a personal level to adapt to their new environment. The influences of family members, of other and often older students, as well as the result of addictive substances (i.e. beer in Figure 12), were clearly illustrated. Students should be made aware of these influences so that they can take care of themselves and rely on those who are supporting them. Supportive family members and friends can assist students in dealing with fear and anxiety as encountered during the practical aspect of Anatomy but also during the course of studies in general.

A theme that emerged during the analysis of the drawings was the study approach used in Anatomy. A deep approach is defined by Ramsden (1999) as an approach with the intention to understand, whereas a surface approach is an approach with the intention only to complete task requirements. Arnold and Feighny (1995) have illustrated that students adopting a deep learning approach are not influenced by individual personality traits, and this should be regarded as the preferred way of approaching a learning task. Ramsden (2003) reiterates that because an approach is not a characteristic of a learner, students should be able to use different approaches on different occasions (Ramsden, 2003). Students need to select a learning approach and therefore choose to conceptualize  $\square$  seek to understand what they learn, giving meaning to details (Custers & Boshuizen, 2002). However, the choice of learning approach is influenced by the educational context (Custers & Boshuizen, 2002).

General tendencies in learning styles will be adapted to specific approaches as there are different demands made by different courses, as well as by previous educational experiences (Ramsden, 2003). Furthermore, Ramsden (2003) states that learning approaches cannot be deduced from observing a student's behaviour and that surface and deep learning are not complementary or a consequence of an approach. In contrast, Entwistle and Peterson (2004) argue that there is a place for memorising within the deep approach and that in certain subject areas, such as languages and zoology, surface learning plays a central part in developing understanding. Further differences between deep and surface approaches are outlined in Table 2.

*Table 2: Comparison of deep and surface learning approaches (sourced and adapted from Ramsden, 2003 and Entwistle & Peterson, 2004)*

Deep approach	Surface approach
"What am I studying?" – seeking meaning	<b>"How can I learn these?" – Structuring, reproducing; also called rote learning</b>
Effort to make sense of ideas; relating material to previous knowledge & experience; transforming it to personal meaning; transforming the student	<b>Perceived as the process of accumulating separate pieces of knowledge provided by teacher to student</b>
Holistic approach – what is the bigger picture; integrating the work as a whole	<b>Atomistic approach – looking at sections of the work</b>
Initial intention is to "get the point"/main point/conclusion to be drawn from reading a text; to understand ideas for yourself	<b>Initial intention is to finish the task or the reading; focusing on the text; to cope with course requirements</b>
More understanding; more development	<b>Poor learning; can never lead to understanding</b>
Sense of involvement; challenge; achievement; higher grades; personal fulfilment & pleasure	<b>Tedious &amp; unrewarding; linked to negative attitudes; lower grades</b>
Content more interesting; easier to understand; likely to spend time on task	<b>Leads to procrastination &amp; delay</b>
Best adapted to demands of higher education, most committed to studies	<b>Dissatisfaction; difficulty adapting</b>
Necessary for high quality outcomes	<b>Effective for recollecting unrelated facts &amp; details; used to cope with excessive amounts of curriculum content</b>
Perceived as "good teaching" and "freedom in learning"	<b>Perceived as "heavy workload" and "lack of freedom"</b>

Some of these characteristics can be seen in drawings and could therefore indicate the learning approach adopted by the student. The use of drawings can assist teachers to critically reflect on the teaching process by providing insight into how students perceive the teaching experience (Weber & Mitchell, 1996).

Can we also teach students to use deep approaches? Ramsden (2003) explains that there is an inevitable gap between the educator's intentions and students' perceptions of the context of learning, and that teaching or developing deep approaches is not possible. Interestingly, though, a study attempting to teach students more effective learning strategies increased their tendency to use surface approaches (Ramsden, 2003). However, if the surface approach is rewarded during assessment, the educator will not be able to motivate students to use a deep approach. Learning approaches are inseparable from content and context with assessment being one of the most critical influences (Ramsden, 2003). This means that the educator, who sets unsuitable assessments, and not the student, is the reason why students adopt surface learning approaches (Ramsden, 2003). To encourage deep learning, the focus needs to be on the student's development of critical thinking, self-directed learning and construction of meaningful knowledge. Although students' performance cannot be correlated with the use of either surface or deep learning approaches, or to personality traits, the educational context greatly influences the choice of learning approach (Custers & Boshuizen, 2002; Ramsden, 2003). With regard to learning approaches, the use of drawings was valuable for the educator to see how the educational context and possible other contexts influence the approach adapted by the student. The comparative outline of the surface and deep approaches in Table 2 was valuable in the analysis of drawings. When the study of Anatomy is facilitated as a subject that is highly relevant to other subjects and to the clinical setting as well as the theory that is applicable during Anatomy practical sessions, the adoption of a deep learning approach might be encouraged. The relevance of the subject, as well as focusing the learning on the student, is important to facilitate deep learning of the content. It is also important to integrate the theory with clinical practice and to adapt educational strategies to increase retention of knowledge (Bergman, *et al.*, 2008).

Teacher-centred learning focuses on the teacher transmitting knowledge from the expert to the novice, whereas student-centred learning is focused on the student's learning and the process of accomplishing the learning (Harden & Crosby, 2000). Barr and Tagg (1995) describe student-centred learning as a paradigm shift away from teaching to an emphasis on learning that moves power away from the teacher to the student. The teacher-centred learning approach has been increasingly questioned and criticized over the past few years

and student-centred learning, which had already been introduced by Hayward in 1905, is being increasingly implemented in tertiary institutions (O'Neill & McMahon, 2005). Creating more student-centred educational contexts assists students in finding the best learning methods according to their personality. This can contribute significantly to a student's academic performance.

It is important for the lecturer to be well acquainted with some of these styles and strategies since students will often ask the lecturer what the best way to study a subject is. Although different ideas, approaches and methods can be discussed, with some working better in different contexts, much of the learning style of an individual is determined by his or her personality. Personality of learners plays a substantial role in learning approaches and learning style (Marino, 2002). A short online version of the Myers Briggs Type Inventory (<http://www.humanmetrics.com/cgi-win/JTypes1.htm>) can be utilised during the Introduction Module to assess the personality of each student. This will increase learner-centeredness of the Introduction Module. The different styles and methods of learning for different personalities can be discussed according to *The smarter study skills companion* by McMillan and Weyers (2009). During the Introduction Module study method examples should be discussed especially as they pertain to the study of Anatomy.

Torre *et al.* (2006) confirm that medical educators need to become conversant with different learning theories and approaches in order to create appropriate learning environments and optimize learning. In this regard, Entwistle and Peterson (2004) state that students prefer courses and teaching approaches that are in line with their own approaches. Therefore, investigating the learning approaches of a group of students is valuable in informing teaching practices.

An interesting view of Anatomy was illustrated in Figure 21. Although there are some differences in the osteology between races, broadly speaking everything under the skin anatomically is the same. This student appreciates the unifying aspect of everyone looking 'the same inside' but appreciates each person being unique, all created by the *Heavenly being God*. It is important for students to gain respect for the human body and for life itself in the medical environment, but it is also desirable and appropriate behaviour as students will be utilizing dissected human specimens during their practical sessions (Houwink *et al.*, 2004).

Löfström and Nevgi (2013) explains how recognizing and reflecting on emotions may assist teachers to understand their reactions to diverse teaching situations and also initiate methods to cope with difficult or inappropriate feelings. The drawings especially in 'The body itself' category also served to inform the teaching approach. I was reminded of the

importance of encouraging students throughout the Anatomy Course. Some drawings initiated self-reflection on how approachable the lecturer and other staff members are to provide assistance to students. Reassuring students from the start that the lecturer/s is/are available to provide assistance at specific times during the week, and informing them where and how the lecturer can be contacted (phone, email, student management system) are possible ways of increasing approachability. Instead of only focussing on the basics of Anatomy, study methods and learning approaches during the Introduction Module, it is also important to express admiration of the human body. This will create an awareness and appreciation of and respect for the intricacies and different dimensions of the body.

The drawing in Figure 23 was categorized as 'Anatomy as a discipline' which expresses the student's perception of 'Anatomy being unreachable'. It was specifically not categorized under 'Studying Anatomy' because of no indication of an approach, effort, plan or strategy to reach those fruits (passing Anatomy). What is interesting about this, as the cyclical interconnected process of analysis works, is that the student drawing the ball game in the river in Figure 6 (2011 iteration) is the same student who illustrated the unreachable fruits in Figure 23 (2012 iteration). Ironically, the cut-off branches of the trees (which indicate opportunities missed to obtain the fruits) were interpreted by the two interpreters before knowing this demographic detail, which in this case was that of a repeating student. In 2011, the student experienced tremendous exclusion and in 2012, unfortunately after two modules, still seems to lack motivation and strategy to *get the very high fruits from the tree* i.e. passing Anatomy. The HYM of the student in 2012 is 30% (Table 1), confirming his lack of effort, approach or strategy.

In the last drawing, Figure 25, Anatomy is accurately compared to a packet of sour sweets. Different shapes of sweets are compared to different types of specimen encountered during practical sessions. Although the packet may look small, there are many different parts inside. The student seems to be challenged by the new work as well as having an appreciation for Anatomy. Aspects such as perseverance are addressed by explaining how the student will eventually taste the sweet inside after the sour that was tasted at first. Not only do the various types of cadaveric specimen that are encountered need a certain emotional maturity on the part of the student, but also the perseverance in the subject itself indicates an emotional maturity required to continue with studying throughout the hard times. As a lecturer of Anatomy, one needs to be sensitive to the different levels of emotional maturity in a group of students and coach, motivate and instruct accordingly. During the Introduction Module students should be made aware of the different components of the subject as well as what is emotionally required (i.e. maturity, perseverance) to enjoy and be able to pass Anatomy.

Figure 25 is also a good example of the value of writing or, rather, annotating these drawings. The annotations as well as the summarizing words or phrases on the front of the document, contribute towards understanding and giving meaning to the drawing. It also assists the student to get the message across. But written text serves as a supplement and do not replace the value or effectiveness of the drawings.

## 8. Limitations

Limitations of the use of drawings include the fact that it is unclear to what extent the students are informally illustrating a past event or showing naïve expressions, or wanted to please me, their lecturer, although the student didn't gain anything from participating in this study. The Kress and Van Leeuwen framework from which the analysis and categorization of the drawings in this study was adapted is essentially descriptive, and do not offer all that is needed for the sociological interpretation of images (Jewitt & Oyama, 2013).

Not all drawings in this study were equally expressive or did students have equal experience in drawing. Some of the drawings did not express much about the student's perception of Anatomy. The analysis of the drawings were occasionally difficult, and more difficult than analysing quantitative data, but much more exciting as new insights are gained almost each time the drawings are viewed to be interpreted and categorized. The interpretation of qualitative measures is subjective and culturally biased, but the reliability increases with more than one interpreter categorizing the drawings.

## 9. Conclusions

The first research question for this study related to the feasibility of drawings as a way to investigate student perceptions of Anatomy. By using drawings, students have the freedom to express whatever they wanted without any restrictions compared with set possible answers in questionnaires. Furthermore, if the language medium is not the language of the heart, students might find it difficult to write about their personal and educational experiences. From personal experience, students seem reluctant to write! I presume that the relatively high voluntary return rate of the drawings (74%) confirms a certain level of comfort for students in drawing their perceptions that would not necessarily have been obtained if students were instructed to write (in English) about their perceptions of Anatomy. Students participating in this study are from diverse backgrounds, mostly from a rural setting with English as a second or even third language. Drawings have perhaps created an opportunity for students to reflect, exploring their experiences as a student and identifying their emotions.

All the drawings from the two iterations of this study have contributed to provide rich insights into how Anatomy is perceived and how personal lives and emotions influence that perception although only 20 drawings was discussed. From these drawings emerged specific themes that needed to be addressed during the Introduction Module. The valuable data gathered in this study would not necessarily be acquired through questionnaires or another quantitative research method. Although focus group interviews are conducted in order to collect in-depth data about the group's perceptions, attitudes and experiences on a defined topic, as explained by Maree (2007), the data gathered from both iterations for the matrix method of analysis was so rich in data it was felt that further focus group interviews were not required.

Furthermore, the drawings in this study provided a means for the researcher to critically reflect on the teaching profession, one that coincides with the view of the importance of drawings as a means for students to reflect on how they perceive the teaching experience as explained by Weber and Mitchell (1996). An additional value of the use of drawings emerging from this study was that possible at-risk students could be identified fairly early in the year, resulting in a specific intervention to support students effectively. The use of drawings could serve as a system for the early identification of at-risk students as directed by the *Draft Strategic Plan: University of Limpopo 2020* (unpublished). Drawings such as those discussed in Figures 5 to 8, where the emotional load is overwhelmingly negative, despairing, depressed and discouraged, where students indicated they were "stuck" in a

hopeless situation without the ability to get out and with many tears running down faces, suggest that those individuals need early intervention to provide the necessary emotional and academic support. Emotions have been explained to greatly affect motivation, interest, cognitive strategies and performance of students throughout their studies (Löfström & Nevgi, 2013). The use of the HYM during analysis was not to determine one to one trends, but by putting these different sources of data side by side to the drawing, I, as their lecturer were able to see some broad influences or trends. The drawings of aspects thereof cannot be used as an accurate predictor of student performance.

Although the validity of the interpretation of drawings is questionable, since it will not necessarily match the participant's own verbal interpretation and explanation of the image (Rohleder & Thesen, 2012), the method of asking students to summarize their drawings in three words or phrases assisted the interpreters by amplifying the message the participants wanted to convey. The use of quantitative measures still has its rightful place in educational research. But, where student experiences are evaluated, the use of student drawings might be useful to surface important aspects which would not necessarily have been thought of during the development of quantitative means of enquiry. As a lecturer it may be feasible to use drawings as a means to gain knowledge of his/her students and their understanding of the subject.

Themes (needs) were identified from two iterations of this study where students had to draw their perceptions of Anatomy. The themes not only gave insight into the lives and perceptions of students but will inform or add to the content of such an Introduction Module, resulting in students being more prepared for what is to follow in the Anatomy course. This will hopefully reduce the number of negative perceptions (35%) of Anatomy as illustrated by Figure 5.

The second and third research questions concerning the insights that can be gained from the drawings as well as how these insights can be addressed in the Introduction Module were informed by drawings of the BCur and BSLPA first years. The following insights are suggested to be incorporated in the Introduction Module:

- What is to be expected? The practical component of the course as well as its purpose needs to be covered in all aspects – from where cadavers come from to what happens to the remains after dissection. This will decrease anxiety as questions are answered, and the student can focus on the greater good and how this will assist him or her in knowing Human Anatomy. The theory component can be

discussed with the specific mention of time management, understanding and study methods.

- Time management. Many drawings mentioned the lack of time to master the content, and the sacrifices (i.e. lack of sleep, not spending time with friends) that need to be made in order to pass Anatomy. Although not part of the Anatomy curriculum, a life skill such as time management should be addressed during the Introduction Module. Principles of time management need to be discussed, which may result in students spending enough time as required individually to understand and master this subject as well as other subjects and at the same time lead a healthy and balanced life. Time management is an essential skill to gain and apply from first year, to be able to prioritise studying Anatomy and other subjects in relation to other recreational aspects in life i.e. watching movies, spending time with friends.
- Understanding. The importance of *understanding* compared with just knowing human Anatomy. Broadly, by *understanding*, it is suggested that a deep learning approach is adopted which was indicated by some students as being essential to master the content, especially the practical aspect of the subject. The clinical relevance and importance of Anatomy need to be thoroughly discussed and consequently might influence the dynamics of the educational context to such an extent that students could adopt a deep learning approach. To pass Anatomy is not just a means to progress to the next year of study. Students might have increased motivation, enjoy Anatomy more and have improved results when the “bigger picture” is understood; with the aim of obtaining a thorough knowledge of Anatomy that will be invaluable to their profession.
- Study methods. Students should be exposed to a variety of study methods to give students an overview of how they can proactively approach the content. Each student should work out a study method that suits their personality type, i.e. work individually or in a group, how to make notes efficiently and if they are visual, auditory or kinaesthetic learners.
- Availability of resources: During the Introduction Module, students should become familiar with the different available resources from text books to interactive Anatomy websites. The lecturers should be accessible to the students by communicating available times for appointments to be made where strategy as well as learning approaches can be discussed. Necessary information such as email addresses and other contact details can facilitate easy communication with lecturers as well as the means to communicate through Blackboard™ which is the current learning management system used on the Medunsa campus.

- Appreciation and encouragement. It is vital for respect and appreciation to be cultivated in the student group, beginning with the Introduction Module. Students must be regularly encouraged in terms of their capabilities. Some of the drawings obtained in this study can be used to facilitate conversation between peers during the Introduction Module on the appreciative aspects of Anatomy. Issues such as respecting differences in cultural and religious views of dissection and other aspects of Anatomy, can be also be addressed by using the drawings from the study.

The use of drawings in this study was a feasible way to investigate student perceptions of Anatomy. Additionally, orientation on human life and death were exemplified in the drawings. Learning approaches are difficult to presume. They are dynamic and influenced by many aspects such as the educational environment. Nevertheless, some drawings clearly illustrated an approach adopted by a student at a specific time during the course. The general emotional state of individuals influenced by Anatomy, their course of study, family and friends and learning approaches were depicted in the drawings. The rich data encountered in these drawings can only be learned from and add value to the Introduction Module at the commencement of the year. It is also suggested that this study is repeated towards the end of the year, to investigate if the negative emotional load of the group as a whole, has increased or decreased.

Further studies are recommended to investigate the usefulness of drawings in exploring how aspects such as language, religion and culture can inform the curriculum. Additional studies by means of drawings that illustrate how family, culture and academic achievement affect student attitude are recommended as well as the correlation between deep and surface approaches indicated in student drawings and student performances.

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## Appendix B

### Perceptions of Anatomy

ANTM 109/114

Anatomy is not just about learning facts but includes aspects such as formal lecturing (theory), practicals (with dissected wet specimens and osteology) as well as assessment in both theory (written and computer tests) and practical (spotter test). Your emotions and personal lives as well as past experiences may influence how you perceive the subject, Anatomy.

#### Instructions:

1. On the back of this page, **draw a picture** on how you perceive or “see” Anatomy. You are free to do anything – colour, black and white, pencil sketches, paint, anything!! Be as expressive as you like. Please include **annotations** to describe/explain the picture. It does not matter if you cannot draw - it is what’s inside the picture that really matters.
2. Use the block at the bottom of the page to **write down three phrases/words** summarizing your drawing/perception of Anatomy.
3. Please fill out the following **personal information**.

#### Personal information:

Name and surname	
Course	
Age	
Year of Matriculation	
Ethnicity	
Religion	
Church (if applicable)	
Home town/village	

#### Key words/phrases summarizing your drawing:


## Appendix C

Drawing	The “What”				The “How”			The “Emotion”
	Studying anatomy	Dissection/ Practical aspect	The body itself	Anatomy as a discipline	Classical story	Text book	Gift card	
Figure 6	x				x			Sadness; anger
Figure 7	x				x			Sadness; confusion; frustration
Figure 8	X				X			Discouraged; depressed; hopelessness
Figure 9	x				x			Discouraged; depressed; hopelessness
Figure 10	x				x			Ambivalence
Figure 11	x				x			Frustration
Figure 12	x				x			Frustration
Figure 13	x				x			Motivated
Figure 14	x				x			Ambivalent
Figure 15	x						x	Confident
Figure 16	x				x			Depressed
Figure 17	x				x			Motivated
Figure 18	x				x			Motivated
Figure 19	x				x			Motivated
Figure 20		x			x			Fear; uncertainty; depression
Figure 21			x			x		Appreciative
Figure 22			x				x	Appreciative
Figure 23				x	x			Discouraged; helpless
Figure 24				x	x			Appreciative
Figure 25				x			x	Motivated