CHAPTER 3

MATERIAL AND METHODS

“ ... the most important function of a Department of Anatomy is to teach
the subject as a service discipline to clinical studies and patient care ”
Monkhouse, (1993:185)

During the last few years various different attempts have been made by UEM staff to
improve the quality of the graduates. Reforms of the medical curriculum have been
introduced relatively regularly but, in contrast with the most common change in many
other countries, the time allocated to Anatomy increased from a total of 192 hours in the
curriculum in place between 1986 and 1994, to 256 hours in the current curriculum used
since 1995 (Rodrigues, 2000).

Anatomy at UEM is learnt as a foundation for the clinical courses as well as for the medical
profession (see Chapter1, Section 1.3.1.1), however too little is known about the effectiveness
of its teaching process. The present study intended to evaluate the role of the teaching-
learning of Anatomy in promoting an understanding of what is experienced in clinical practice.

3.1 RESEARCH DESIGN AND SUBJECTS

3.1.1 Study Design

The study was carried out at the Faculty of Medicine of UEM in Maputo. It applied both quantitative and qualitative methods. The combination of both types of data gathering methodology is seen as advantageous since, according to Malone (2001), they are necessary and complementary components of any system of research. In addition, Lawrenz & McCreath (1988) stated that the quantitative components provide the data necessary to document the degree of the effects and that the qualitative components provide richness to the data and are a valuable source for identifying potential relevant variables. A correlational, cross-sectional research approach was used since it provides valuable data, particularly when investigating a specific area (Thorndike, 1990), as is the case of the present research.

The decision to carry out a cross-sectional study was based on the fact that it allows the use of larger groups at a lower cost and all at the same time (Schumacher & McMillan, 1993). Thus, compared to a longitudinal study, the cross-sectional study does not need to wait for a number of years to complete the research (which was seen as essential in this case), and does not require keeping track of subjects and maintaining their cooperation for an extended period. According to Schumacher & McMillan (1993) a possible major disadvantage of cross-sectional research is that selection differences between the groups may bias the results and it
is thus important to use appropriate selection methods. Although there had been no major changes to the curriculum, teaching approaches and assessment procedures were adjusted across the time, it was seen as essential to evaluate if these aspects developed differences between cohorts.

### 3.1.2 Study Population

The study involved 175 students enrolled in the clinical cycle of the medical training programme (4\(^\text{th}\), 5\(^\text{th}\), 6\(^\text{th}\), and 7\(^\text{th}\) years) at UEM in the academic year of 2001/2002. This sample was based on the fact that the students of the clinical cycle are involved directly in the care of patients at the Central Hospital of Maputo City (HCM).

A further 10 junior doctors working in the Department of Casualty and Emergency at HCM, in 2001/2002, were also part of the study. It was not possible to involve more of the doctors working in this Department because of exclusion factors, i.e. the participants should have been trained at UEM and have completed the UEM medical course between two and five years previously. This limitation of participation was based on the fact that two years after graduation (at Mozambican licenciatura degree), the medical graduates can apply to start their post-graduate training to becoming specialists, and it takes about 5 years to complete this training.

In an attempt to explore the possible effect of the time, it was decided to include the forty-three students of the 4\(^\text{th}\) year of the following year (2002/2003), all of whom had been assessed in Anatomy without the oral examination. None of the students of the other clinical
years (5th, 6th and 7th) of 2002/2003 or the new junior doctors was added to this part of the research since the questionnaire was applied to those individuals only in the cross-sectional main design in 2001/2002.

### 3.1.3 Sampling

Although all the students in the clinical years and junior doctors working in the Department of Emergency and Casualty were involved in the study by being asked to answer a questionnaire, data collection of clinical reports required sampling. It was done considering that patients admitted to the Department of Casualty and Emergency who have been referred by other health providers (health centres and hospitals) or have been admitted directly (particularly in the case of an emergency which is evidently life-threatening) are handled according to age and the level of the risk to life (see Figure 1). For this purpose, there is a room ("Balcão III") where only non-urgent patients aged over 8 years are evaluated by senior students (7th year students) or junior doctors. This means that only those trauma patients who are unlikely to be in a life-threatening situation (moderate or severe trauma), and who are over the age of 8 years, are seen in Balcão III. Only senior doctors work in the other rooms (Balcão I and II).

The random sampling was done by drawing up a table consisting of the numbered codes of all the available clinical reports. Reports of each participant were chosen in each week with the possibility that every clinical report of the population had an equal chance of being chosen to be in the sample. These clinical reports were randomly selected from the total of the reports of patients seen by the participants of the study (senior students and junior doctors), with minor/superficial trauma (e.g. bruises, minor cuts) or moderate trauma requiring some skilled
basic treatment (e.g. fractures, sutures) and appropriate investigations such as radiographs (see Chapter 1, Section 1.3.1.2, page 12).

Figure 3.1: Handling of intake patients at the Emergency and Casualty Department at HCM

According to a schedule used in the Department of Casualty and Emergency for “Balcão III” rooms, each doctor (including the senior students) works at least 3 shifts per week (shifts are 8h.00-14h.00, 14h.00-20h.00 and 20h.00-8h.00). Two clinical reports created by the senior
students and one created by a junior doctor in one week, were randomly selected. The data collection from these clinical reports was taken over a 5 week period.

Sampling was also needed for the interviews. The numbers of interviews and who needed to be interviewed was defined by the overall quality of the clinical reports on 4 domains: (1) use of anatomical terms; (2) report of the physical examination; (3) use of the data of the physical examination to propose a diagnosis (4) use of the data of the physical examination to request diagnostic/therapeutic procedures. Those senior students/junior doctors whose reports were either worst or best of their group were selected based on these categories for the interview.

3.2 MEASURING INSTRUMENTS

To answer the study questions, data was gathered using three main instruments, which were drawn up originally in Portuguese and translated into English for presentation of the research (see Appendices A, B and C):

- **Questionnaire** (Appendix - A): to evaluate if the Anatomy course is perceived by the students as structured to address their needs regarding medical practice

- **Clinical reports** (Appendix - B) of patients admitted to the Department of Casualty and Emergency at the HCM, generated by the senior students/junior doctors participating in the study to evaluate the quality of the use of Anatomy in clinical practice
- **Semi-structured interviews** (Appendix - C) with those senior students and junior doctors who had produced the best/worst overall quality of clinical reports: to obtain a deeper insight into the students’ and doctors’ opinions on the quality of medical curriculum at UEM taking into account the recognised role of Anatomy in this process.

The combination of these instruments and techniques enabled the researcher to corroborate results of each part by triangulation (Miles & Huberman, 1984), since the semi-structured interviews give the possibility to explore qualitatively the results of the questionnaires and clinical reports.

### 3.2.1 Questionnaire

According to authors such as Oppenheim (1992), the questionnaire is the most widely used technique for obtaining information from subjects since it has standardised questions, can ensure anonymity, and questions can be written for specific purposes. In addition, questionnaires can use written statements to which the subject responds by making use of scales. The most widely used type of scale is the Likert-type scale which provides great flexibility since the descriptors of a property or attitude may be varied to fit the nature of the statement.

Authors such as Marel et al. (2000) have used these methods to assess the opinions of postgraduate trainees about the content and adequacy of their training, and in so doing examined differences in attitudes, knowledge and experience among different groups of
medical residents in particular areas as well as to evaluate aspects of an education programme for junior doctors.

According to Oskamp (1977), the simplest way of reporting a group’s opinion is to give statement percentages separately for each statement. However, several statements on the same general topic must be classified into categories or combined to form a scale with a single score for the group of statements computed for each respondent. Oskamp (1977) also argues that scales give a broader range of scores than a single statement and including more statements can increase the reliability of the overall score. Taking this argument into account, the researcher drew up the questionnaires, as well as the grouping of statements into sub-scales used in this study.

The first step of the questionnaire design was to identify the constructs for the study in exploring the perception of the effectiveness of the teaching process of Anatomy within the medical training programme. The constructs included students’ expectations of the teaching process of Anatomy; fulfilment of students’ expectations of the benefits of Anatomy taught in their medical training and self-evaluation of skills acquired during the training of Anatomy. These constructs were further developed into five sub-scales comprising:

- fulfilment of students’ expectations regarding quality of teaching Anatomy;
- efficacy of teaching strategies used in Anatomy under students’ perspective of their needs;
- perceived relationship between Anatomy and other medical courses;
- perceived benefits to the medical training/profession of learning Anatomy;
- perceived ability in applying anatomical knowledge in other medical courses and in medical practice.
The draft questionnaire was reviewed and revised by the Faculty staff and the researcher and used in a pilot study with 15 medical students who were not part of the sample (they were the 7th year students of 2000/2001). This process is supported by Schumacher & McMillan (1993), who stated that it is recommended that researchers conduct a pilot of the questionnaire before using it in studies and it is best to locate a sample of subjects with characteristics similar to those that will be used in the study.

The final questionnaire contained 50 statements, half of which were worded positively while the other half were worded negatively, covering the 5 proposed sub-scales. In order to better assess the reliability of the responses the statements were not organised according to the subscales, nor were the positively and negatively worded statements grouped together. A five point Likert-type scale ranging from strongly disagree to strongly agree, was applied.

After the pilot study minor changes were indicated, mostly in the sequencing of the statements. The respondents felt that the statements were clear and they covered what the participants perceived as relevant to the work. They felt that the results would be more reliable if the questionnaires were kept anonymous.

Efforts were made to make the language of the questionnaire as simple as possible and participants were encouraged to clarify doubts. Space was given to make suggestions or comments. The questionnaire was administered at a time when there were no major examinations immediately before or after its completion.

In the last week of the second semester of the academic year of 2001/2002, the necessary number of copies of the questionnaire was given, through the students’ council, to the
representative of each of the clinical years (4th, 5th, 6th and 7th years of study), to be distributed to all their colleagues preferentially at the end of a lecture which was usually well attended by students.

The aims of the study were explained to the student representatives, and the voluntary basis of participation was emphasised. In addition, an information sheet relating to the questionnaire was attached, including an invitation and instructions for participation, as well as a message reinforcing the aims of the study and the need to give individual and reliable opinions about the statements presented in the questionnaire.

This initial part was limited to one half of an A4 page, as this would hopefully minimize the chance of questionnaire rejection by the potential participants in the study. The study’s title page was also included to identify the researcher and the institutions involved. The same timing and procedure were followed for the 4th year students in 2002/2003. Participants provided informed consent to be involved in all phases of the study. All of the clinical students were interested in participating in the study and in receiving substantial feedback from the results of the study. Basic demographic characteristics of the individuals were also requested but the respondents could remain anonymous, meaning that confidentiality was effectively assured.

A similar result was obtained from the 10 selected junior doctors working in the Department of Casualty and Emergency at HCM. The questionnaire was administrated on the same day to all the participants in one of the Faculty lectures’ theatres. They filled in the questionnaire and returned it immediately. It should be noted that the representatives of students and junior
doctors did not allow the respondents to discuss the contents of the questionnaire with their colleagues.

All participants were asked to report their final marks in Anatomy, Biochemistry, Physiology, Histology, Pathology, Surgery and Internal Medicine. These courses were chosen in accordance with the traditional opinion that Anatomy is related to them, and according to the Mozambican medical curriculum, some of the content of the Anatomy course is revised in these courses.

As the participants in this research were involved anonymously, it was not possible to check their exact marks for previous courses passed from the student record base. Most participants could not remember their exact marks, but were confident of their marks within the 2 categories based on the pedagogical practice at UEM: students achieving a year mark of 14 or more out of 20 are allowed to pass without writing a final examination, while those who achieve between 10 and 13 have to write the final examination. So their recorded performance in Anatomy, Pathology, Biochemistry, Physiology, Histology, Surgery and Internal Medicine was classified according to the following two categories: Satisfactory (Mark between 10 and 13) and Good: (Mark of 14 and above).

3.2.2 Clinical Reports

For each patient a report (see Appendix B) is produced in which the history taking, the physical examination, suggested diagnosis, complementary investigations such as radiographs (to investigate the integrity of most bony anatomical structures), blood tests,
urine tests and medical/surgical procedures, are recorded by the examining senior student/junior doctor.

As described in Chapter 2, Section 2.1.2, page 31, it is evident that anatomical knowledge is one of the foundations of the ability to conduct a patient examination, since a physical examination is an evaluation of the body and its functions, using inspection, palpation, percussion, and auscultation which allows the doctor, (in conjunction with the personal clinical history) to propose a diagnosis and subsequent management.

A comprehensive physical examination provides an opportunity for the doctor to obtain baseline information about the patient that is important not only in making a diagnosis and deciding on treatment, but also for future use, including that by any specialist to whom the patient may be referred for further investigation or a second opinion (Bates, 1995 and Soto, Kleinman & Simon, 2002). The importance of the physical examination once again highlights the usefulness of Anatomy and the relationship between the teaching-learning process of Anatomy and the doctors’ competencies.

To evaluate the students’ and junior doctors’ performance in applying anatomical knowledge in medical practice, clinical reports of patients were collected. Thus, by collecting the clinical reports of the trauma patients observed in “Balcão III” it was possible to use comparable patients and to evaluate the performance of senior students and junior doctors since these cases were of a similar severity.

The clinical reports were evaluated in four different domains of quality: (1) use of anatomical terms; (2) report of the physical examination; (3) use of the data of the physical examination
to propose a diagnosis (4) use of the data of the physical examination to request diagnostic/therapeutic procedures. These domains were then divided into categories to which value scores were attached:

**Quality of the use of anatomical terms in reporting history taking**

- No use of anatomical terms (**never**) 1
- Use of anatomical terms at least in locating the affected part of the body (**inadequate**) 2
- Use of anatomical terms to describe the relationship of the affected parts of the body (relative position) (**adequate**) 3
- Use of correct anatomical terms (terms relative to the anatomical planes, relationship/comparison and movements) (**good**) 4

**Ability in reporting a physical examination**

- No report of physical examination (**not done**) 1
- A report of physical examination based exclusively on the positive signs related to the main complain of the patient (**inadequate**) 2
- A report of physical examination oriented to the complaints of the patient based on the description of positive and negative signs (**adequate**) 3
- A report of clear and complete physical examination (**good**) 4

**Ability in applying the data of the physical examination to decide on diagnosis**

- Diagnosis not suggested (**not suggested**) 1
- Less probable diagnosis (**inadequate**) 2
- A list of probable diagnoses (**adequate**) 3
- Most probable diagnosis (**good**) 4
Ability in applying the data of the physical examination to request therapeutic/diagnostic procedures:

- No description of procedures (not prescribed) 1
- Unnecessary procedures (inadequate) 2
- Correct but insufficient procedures (adequate) 3
- All the necessary procedures (good) 4

Overall quality of the clinical reports: The overall quality of the clinical report was based on the 4 domains described above. In deciding who should be interviewed, the median category of these domains was used as the measure of individual overall quality of the clinical reports as follows:

- **Category I**: The lowest category showed a junior doctor/senior student’s report that was unsatisfactory in most of the domains, and thus this report would be of virtually no use to a colleague or senior doctor.

- **Category II**: The second category showed that a junior doctor/senior student’s report was inadequate in most of the domains meaning that the report was of little or moderate use.

- **Category III**: The third category showed a junior doctor/senior student’s report of satisfactory use; a colleague or senior doctor could use this report with some confidence.

- **Category IV**: The fourth category showed a junior doctor/senior student’s report that was excellent. As such this report would be of very good use.

These categories identified in the clinical reports where then collapsed into two categories: the bottom two of the four categories was classified as “unsatisfactory” and the top two as “satisfactory”.
No personal details of patients were collected, since this part of the study aimed to evaluate only the senior students'/junior doctors’ abilities in applying their anatomical knowledge in these domains.

**3.2.3 Semi-structured Interviews**

Instruments like clinical reports, when used alone, have certain disadvantages. With such instruments there is no possibility of asking subjects clarifying questions immediately after a particular opinion has been given (Schumacher & McMillan, 1993). Also such instruments are static and give no information about the stability and dynamics of the subjects’ opinion. Thus, to compensate for these disadvantages, a semi-structured interview was devised in advance and incorporated into the design of the study.

The semi-structured interview was developed by the researcher in order to identify and further explore the reasons for deficiencies in the use of anatomical knowledge in medical practice. Thus, after collecting data from the clinical reports it was decided to interview the senior students and junior doctors who had showed the poorest ability to apply anatomical knowledge (as assessed by the clinical reports), as well as the senior students and junior doctors who had showed the best ability in applying anatomical knowledge.

In constructing these scheduled interviews basically the same major steps were used as for the questionnaires. However, there were differences, the most obvious being that interviews involve direct interaction between the interviewer and the subject and are thus more flexible and adaptable to the situation, and yield much deeper results than do questionnaires. It must be stressed that in the semi-structured interview there were no choices from which the
respondent selected an answer. The interview consisted of open-ended questions but was
directed in its intent. Evident disadvantages of the semi-structured interview are its potential
towards subjectivity and bias, and its higher cost and time consuming nature.

The semi-structured interview was designed to understand the quality of clinical reports and
the confidence on the perception of quality of the medical curriculum by exploring the
participants’ opinion on:

- the use of anatomy terminology in the clinical reports
- use of anatomical knowledge in assessing a patient
- description of a physical examination and anatomy
- ability in proposing diagnosis and/or diagnostics/therapeutics procedures based on the
  physical examination
- relationship between the teaching-learning of Anatomy and clinical practice

As in the case of the questionnaires, the best way to avoid misunderstandings in the semi-
structured interviews was to solicit feedback from other experts and pilot the interview with
procedures identical to those that were followed in the design of the questionnaire. The
interviews were conducted personally. Only one interviewer, the researcher, was used. The
selected students/doctors employed were included in this part of the study and the others in
their groups given an explanation about the reasons for their exclusion.

In conducting these interviews clinical cases where chosen according to the availability of the
doctor and patients at “Balcão III”. Each selected senior student/junior doctor was interviewed
individually. All interviews began with the interviewer explaining the aims of the study and
the aims of the interview again and asking for an informed consent to the interviewee to be involved in this part of the study.

A few minutes were spent with small talk in order to establish a proper rapport and the interviewees were asked whether they had any questions or concerns and only after that were the questions addressed to the interviewee using the exact words indicated on the interview schedule. In all the cases the interviewer just observed the patient examination.

The most explicit disadvantages of a semi-structured interview were mitigated since the interviewer became a neutral medium through which information was exchanged. To increase the accuracy of the interview a second approach was used to allow the respondent an opportunity to check the interviewer’s perceptions. The questions that guided the interviews are presented as Appendix C.

The method used to record responses was taking abbreviated notes based on the answers. Particular attention was paid to the time by allowing the interviewee to answer fully without anticipating or cuing a potential answer. It was decided not to use a tape-recorder since all the interviews were conducted just after the examination of a specific patient and the interview did not involve anything other than an explanation of the performance of the interviewee in the patient examination. Since the questions were judged as semi-structured there was no need for recorded responses. This procedure is supported by Schumacher & McMillan (1993) when stating that the most common method used to record responses is taking notes based on the answers.
According to Schumacher & McMillan (1993) the problem with taking verbatim notes is that it takes too much time during the interview. On the other hand, information is lost when interviewers rely solely on their memories to write answers after the interview. Thus, it was necessary to have a compromise between these extremes during the interview and abbreviated notes were taken that were expanded upon immediately after the interview was completed.

When a response was unclear, the interviewer probed to clarify the exact meaning of the response and allowed sufficient time for the interviewee to answer. The first probe was always a simple repetition of the response, in the interviewee’s own words. In most cases, this would cause the respondent to elaborate on the initial response. However, if the interviewee did not elaborate or if the elaboration was still too vague, the interviewer asked one of a set of pre-selected questions.

The most common probe involved the clarification of the consistency of the procedure in a medical examination, with a response such as “because I tried to guess the diagnosis”. In this case if the repetition probe was ineffective the interviewer asked: “Did you always try or just try sometimes?” This always led to a clarification, but overall, this kind of probe was needed in less than 5% of the interviews.

### 3.3 LIMITATIONS OF THE STUDY

Certain limitations of the present study need to be noted. Firstly, the study involved exclusively clinical students because it is assumed that only at this point of the course could the long-term impact of the teaching-learning Anatomy in the Faculty of Medicine at
UEM be evaluated. Secondly, this evaluation of students’ opinion on the role of the teaching-learning of Anatomy in promoting an understanding of what is experienced in clinical practice should take into account that the fact that the pilot study’s participants suggested that the results would be more reliable if the questionnaires were kept anonymous and thus reduced the possibility of obtaining accurate data regarding the students’ performance in different subjects of the medical course. In this context it was necessary to choose to use interval data instead of ordinal in an attempt to get better reliability in most important data (i.e. the statements of the questionnaire). In addition, the possibility that inaccuracy of memory influenced the answers was assumed to be the same for all courses and therefore did not affect the quality of the research.

The analysis of the categories of the quality of clinical report should take into account the fact that what students write down may not necessarily reflect what they are thinking or alternatively they may not have written all that they knew about the relevant Anatomy. In addition, a good student with a good knowledge of Anatomy and little time may well choose only to report on the positive findings. Thus, the need for interviews is supported by the possibility that the students’ style of note taking might have confounded the results if considered in isolation.

It is of importance to note that Schumacher and McMillan (1993) have pointed out that the knowledge acquired through research is limited by the nature of both educational practice and research. Educational research is constrained by ethical and legal considerations in conducting research on human subjects, the public nature of education, the complexity of educational practices, and methodological limitations. This study is no exception and some of the
constraints related to the validity of the instruments used should be seen as meaningless as these are the accepted institutional instruments.

3.4 DATA ANALYSIS

3.4.1 Anatomy and the Medical Course

The responses to the questionnaires which included the ratings on students’ expectations toward the teaching process of Anatomy, the perceived benefits of learning Anatomy and self-evaluation of skills acquired in the medical training programme, were coded and entered into a computer and processed using the Statistical Package for Social Science (SPSS 10.1). After reversing the scores of the negatively worded statements, the respondents’ ratings on the set of statements included in questionnaire (Appendix A) were analysed:

- for internal consistency using Cronbach’s Alpha Coefficient. In scale construction internal consistency is a desired quality, as all the items should contribute to the content domain being examined. Acceptable values for Coefficient Alpha are between 0.7 and 0.9 (Anastasi & Urbina, 1998)

- by frequency distributions used to describe the respondents’ perceptions. A Student’s t-test was used when comparing these perceptions by gender. Student’s t-test was used once it had been ensured that variance was not significantly different between the groups compared. The Analysis of Variance (ANOVA) was used when examining differences
between years of study. When significant differences were found by ANOVA the post hoc procedure used was that of Bonferroni’s ‘t’.

- **by mean of each of the sub-scales** (statements’ scores were summed to give a sub-scale score) and the mean of the total questionnaire considering that the developed constructs were considered as sub-scales:
  - “Quality of Teaching” (items: 8, 12, 15, 20, 31, 32, 35, 40, 45, 49);
  - “Teaching Strategies” (items: 18, 25, 26, 27, 28, 37, 41, 42, 44, 48);
  - “Other Medical Courses” (items: 11, 13, 14, 17, 19, 34, 43, 46, 47, 50);
  - “Benefits of Learning” (items: 1, 2, 3, 4, 5, 6, 7, 9, 10, 16)
  - “Applying Anatomy” (items: 21, 22, 23, 24, 29, 30, 33, 36, 38, 39).

- **frequency of the categories of the self-reported marks**

- **the inter-relationship of student performance in the various courses** (Anatomy, Physiology, Biochemistry, Histology, Pathology, Internal Medicine and Surgery) and examined by the Chi-squared test of association, and Phi coefficients.

- **a t-test comparing the mean scores on the sub-scales of the questionnaire and the total scale, and students’ self-reported performance in Anatomy.**

### 3.4.2 Use of anatomical knowledge in clinical practice

In this context it was necessary to compute:

- **Frequency distributions of categories of the previously established domains identified in the clinical reports.**
- Inter-relationship between the category 1 and the other categories of the clinical reports.

A thematic content analysis (Landis & Koch, 1977) was done on the selected participants’ explanations for their ability in using anatomical knowledge in medical practice. Tables of common comments and extracted themes related to these explanations were compiled and presented. According to Schumacker and McMillan (1993) qualitative data analysis is primarily an inductive process of organizing the data into categories and identifying patterns (relationships) among the categories. Unlike quantitative procedures, most categories and patterns emerge from the data, rather than being imposed on the data prior to data collection.

3.5 ETHICAL PROCEDURES

Following the rules on ethical procedures of the relevant institutions (UEM/HCM, and the University of the Witwatersrand) permission to conduct the study was requested from the ethical committees of UEM/HCM and the University of the Witwatersrand (M01-02-20) and granted by these institutions.

No experimental procedures were performed on humans or animals. All the participants were invited to be part of the study on a voluntary basis (Appendices) and informed consent was given by all of the participants at each stage of the study. The anonymity of the participants was assured by the structure of the questionnaire (see Appendix A). There was no inclusion of patient personal data, and in the case of the interviews, the identity of the senior student/junior
doctor and patient were also not recorded. Participants were assured that participation was voluntary and that there would be no benefit or disadvantage in either participating or choosing not to participate.

### 3.6 VALIDITY AND RELIABILITY

In order to establish the content validity (Ebel & Frisbie, 1991) of the questionnaire and interview schedule, the opinion of experienced medical educators at UEM was sought. The pilot study involved 15 former final year students of the academic year of 2000/2001 who were not part of the study’s sample. The medical educators and the sample from the pilot study had a similar opinion that the statements were relevant and worded in clear and understandable language, and reflected the content domain.

Although the questionnaire used in this study was devised by the researcher, it was created by referring to information available in the international literature (Winzenberg & Higginbotham, 2003; Soto, Kleinman & Simon, 2002; Oppenheim, 1992 and Hines, 1979), taking into account the researcher’s perspective of medical practice in Mozambique, the structure of the medical curriculum at UEM and the opinion of the senior medical educators of the students involved in the study. Furthermore, the researcher, in consultation with both colleagues and experts in the teaching of Anatomy, was responsible for the grouping of statements into sub-scales. Thus, face validity of this content domain had been established.
It was necessary to establish the reliability of the evaluation of the clinical reports. Data from a total of 122 clinical reports generated by the senior students and junior doctors (two reports from each participant in this part of the study) were collected and categorised independently by the researcher and an experienced colleague (a lecturer with more than 10 years experience in Internal Medicine and Emergency in Medicine at UEM, who had also specialised in intensive care with extensive experience in trauma). Inter-rater agreement was evaluated by using Cohen’s Kappa. A Kappa value of 0.836 was found, which is considered as excellent, according to Landis and Koch (1977).