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Fourth year medical students' perception of their scheduled clinical training activities

Cassim, Amina

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Chapter 1

INTRODUCTION

1.1 Problem statement

Skills are important. One of the prerequisites for graduates' provision of healthcare for their patients is demonstrated competency in the basic clinical skills (General Medical Council, 1993). These competencies have been identified by medical accreditation bodies and professional organizations (General Medical Council, 1993; Health Professions Council of South Africa, 1999; World Health Organisation, 2003; General Medical Council, 2009): the clinical skills domains of history taking, physical examination, clinical decision making, communication skills and basic clinical procedural skills are essential skills required of doctors in their service to patients. In traditional medical curricula the acquisition of these basic clinical skills has been assumed to be achieved in the clinical training provided in the clerkships in the latter half of the medical curriculum. However, in recent decades, the efficacy of clinical clerkships in reliably providing the clinical training opportunities necessary for meeting this need has been questioned (van der Hem-Stokroos, *et al*., 2001, Peeraer, *et al.,* 2007). This perceived deficiency in clinical competence has further been confirmed in the findings of assessments of medical graduates from several traditional curricula (Wiener & Nathanson, 1976; Friedland, 1983; Remmen, *et al.*, 1998; Remmen, *et al.*, 1999; van der Hem-Stokroos, *et al.*, 2001; Peeraer, *et al*., 2007).

In response to these latter findings recommendations for the inclusion of specific clinical skills training in undergraduate medical training was proclaimed by accreditation bodies, e.g. in the United Kingdom (UK) and in South Africa amongst others (Health Professions Council of South Africa, 1999; General Medical Council, 2009). This directive translated globally into the

introduction of numerous clinical training reforms at many institutions. These changes to clinical curricula included, amongst others, the introduction of specific clinical skills units (CSUs) some featuring early clinical exposure to patients in longitudinal programmes, clinical practice in custom designed CSUs and the incorporation of ambulant settings in hospitals and the community (Littlewood, *et al.,* 2005). Specific clinical training programmes have thus become a regular feature in the undergraduate medical curricula of many tertiary institutions (Littlewood, *et al.,* 2005).

Medical accreditation bodies have followed their position statements for clinical training programmes to include recommendations for the evaluation of such programmes as a necessary component of investigating the efficacy of learning provided in the programmes, to meet the objectives of training. The published literature describes a systematic review of evaluations, some of which employ the methodology of investigating student perception of their clinical experience as providing valuable information informing faculty initiatives (Littlewood, *et al.,* 2005).

Therefore when the University of the Witwatersrand (Wits) introduced the Graduate Entry Medical Programme (GEMP) systematic clinical skills training was introduced. The Clinical Skills Programme (CSP) was introduced in 2003 at Wits as part of its newly implemented undergraduate medical programme, the GEMP. This programme represented the first attempt at providing systematic clinical skills training for its undergraduate medical students in this institution. The clinical exposure in this programme begins in GEMP I (the third year of the medical programme) in a two year longitudinal programme in which the basic sciences and clinical skills are delivered simultaneously. Curricular reform followed evaluation findings of graduates' deficient pathological and clinical proficiency, after training, provided in the traditional curriculum. It was also informed by global findings of evaluation initiatives

investigating medical graduates' professional ability (Health Professional Council of South Africa, 1999; Littlewood, *et al.*, 2005; General Medical Council, 2009).

At Wits the CSP has been described as a vertical thread running through the horizontally integrated curriculum beginning in the GEMP I (third year) of undergraduate study. In this programme, early clinical exposure to patients is provided in three clinical activities of the Health Practice Day (HPD). Between 2003 and 2008 the clinical skills training in the CSP included the following:

- Patient clerking and presentation to a tutor in a Formal Session (FS).
- Hands-on practice in the Clinical Skills Session (CSS).

During the rest of the HPD students were expected to use their own initiative to see patients in the hospital to which they are allocated.

Programme evaluation at Wits is also conducted by student perceptions of their clinical skills training experience in the end-of-block evaluations, which forms part of regular curricular evaluation. In 2006 anecdotal reports of problems to programme delivery by both faculty academics and students prompted a comprehensive evaluation of the FS of the HPD. This investigation conducted using multiple instruments and demonstrated findings supporting some of these assertions. The Following on this evaluation and its findings the following changes were instituted to the CSP in 2008 and 2009:

- An official attachment to a doctor in a hospital ward, or a Shadowing Session (SS), taking the place of the previous informal opportunity for clinical exposure
- Clinical tutors in the FS were thoroughly briefed in the objectives of the programme.
- Resources in the CSU were increased to improve the CSS.

This led to the introduction of the new CSP in the GEMP viz., three clinical activities in the HPD.

The questions are:

- What are student perceptions of their experiences of learning in the new CSP in the HPD?
- Have these changes had an effect?
- Have student perceptions and performance changed in the study period?

This study therefore aims to investigate Wits GEMP II students' (fourth year medical students') experiences of the three educational activities in the CSP in the HPD and to compare the learning experiences of students in the FS for this 2009 cohort with a similar peer cohort registered in the 2006 academic year. The study also compares the GEMP II student performance in an Objective Structured Clinical Examination (OSCE) for the study period (2006 and 2009).

1.2 Background

Medical accreditation bodies and academics alike agree that one of the aims of medical education is to "produce medical graduates with the appropriate professional skills, knowledge and attitudes for meeting the healthcare needs of their patients and communities" (HPCSA, 1999; WHO, 2006; General Medical Council, 2009). For meeting this need graduates are expected to demonstrate clinical proficiency in the basic clinical and procedural competencies in the domains of history taking, physical examination, clinical decision making, communication skills, professionalism and ethics relevant to the basic diagnostic and therapeutic procedural skills. Patient expectations of their doctors are that they should be caring, competent and knowledgeable healthcare professionals (General Medical Council, 1993; World Health Organisation, 2006). Therefore, guidelines for medical educators require demonstration of student mastery of these clinical competencies in their courses, at intervals in these programmes

and prior to certification (General Medical Council, 1993; Health Professions Council of South Africa, 1999; World Health Organisation, 2006; Alweshahi, *et al*., 2007).

Student perceptions of their experiences in early clinical contact programmes have been widely used for evaluating programme delivery. A number of studies have demonstrated student perception of their engagement with their learning in the opportunities provided in these exposures as reliable indicators of the success of programme delivery (Lam, *et al.,* 2002; Jaschinski, 2008; Matheson, *et al*., 2010). The results of student evaluations from certain programmes have identified many challenges in the adequate provision of opportunities for the achieving their objectives (Olsen, *et al*., 2005; Huggett, *et al.,* 2007; Hudson & Tonkin, 2008).

Whilst the deficiencies in structure inherent in traditional medical curricula has been cited as one of the main reasons for changing the focus of clinical training, contributory factors include the changing socioeconomic, political and health care needs of society (Flexner, 1910; Council of Deans of Medical Schools within Ireland, 2006).

1.2.1 Recent international trends in clinical training

In 1989 the General Medical Council (GMC) in the UK published 'Tomorrow's Doctors', its official guidelines on undergraduate medical training (revised in 2003, 2009 and 2010). In this document the GMC directs its accredited tertiary institutions to implement change to curricula. These interventions are given below:

- Promotion of patient and learner-centred outcomes based clinical training programmes.
- Integration of basic sciences and clinical learning by promoting early clinical exposure in vertical programmes.

- Specific clinical skills programmes with training in different clinical settings, viz. hospital inpatient and ambulant training in hospitals and the community.
- (General Medical Council, 2009).

Recommendations for programme evaluation include:

- Systematic and relevant monitoring of programmes.
- Student and patient evaluation of teaching process with feedback.
- Appraisal followed by feedback to students.
- Monitoring and implementation of relevant interventions indentified by evaluation. (General Medical Council, 1993).

Following on the curricular changes proposed by the GMC in 'Tomorrow's Doctors' (GMC, 1999) other international medical councils came forward, e.g. the Australian Medical Council (AMC). Medical institutions in many countries responded to this directive by making notable changes to the clinical training of their students. In fact changes to clinical training medical schools in the United States of America (USA) and Canadian medical schools in some cases had predated those on the European continent. An appraisal of North American medical school curricula in 2003 led to recommendations for much needed curricular and evaluation reforms in their institutions (Corbett, *et al.,* 2004). In the late 1990s the Health Professions Council of South Africa issued recommendations for change to medical curricula in South African medical schools (Health Professions Council of South Africa, 1999).

Together, these measures aimed at producing "medical doctors with desirable clinical attributes" (World Health Organisation, 2006) have globally lead to a spectrum of clinical training reforms. These reforms differ considerably in their choices of design and in timing of their implementation in programmes, taking into account socio-economic conditions and healthcare needs.

1.2.2 Clinical training in South Africa

In 1999, the Health Professions Council of South Africa (HPCSA) published its official position on the clinical training of undergraduate medical students. This document was based on some of the principles contained in 'Tomorrow's Doctors', modified in response to its own appraisal of medical graduates' competency from South African medical schools (Health Professions Council of South Africa, 1999).

This is the background against which the Wits clinical training reforms took place.

1.3 Clinical training at Wits

1.3.1 The Wits Graduate Entry Medical Programme (GEMP)

In this section the main clinical innovations in the Wits undergraduate clinical curriculum are briefly mentioned. A diagram illustrating the overall programme is given below and in Appendix F.

The undergraduate clinical training strategy of the old curriculum, based on the British model of traditional clinical training, was changed in response to its perceived deficiencies. Graduates of the traditional undergraduate medical curriculum were perceived as not receiving standardised clinical training in their clinical clerkships. The main proponents for change in clinical training at this institution included the deanery of the Faculty of Health Sciences as well as some faculty academics and clinical trainers. In the late 1990s therefore curriculum change at Wits was negotiated by consensus opinion of a task team comprising members of academic faculty, the Health Professions Council of South Africa (HPCSA) and professional medical organizations. In 2003, the GEMP, a completely new curriculum for undergraduate medical training, was implemented at Wits in its Faculty of Health Sciences.

The GEMP is modelled on the University of Sydney's undergraduate medical curriculum and adapted to local training needs. The first two years of this four year curriculum, viz. GEMP I to II (corresponding to MBBCh 3 to 4) consists of a horizontally integrated, organ systems based blocks, with correspondingly aligned learning objectives, teaching methods and evaluation strategies. This is followed by two years of clerkships by rotation in different academic disciplines (GEMP III to IV, MBBCh 5 to 6).

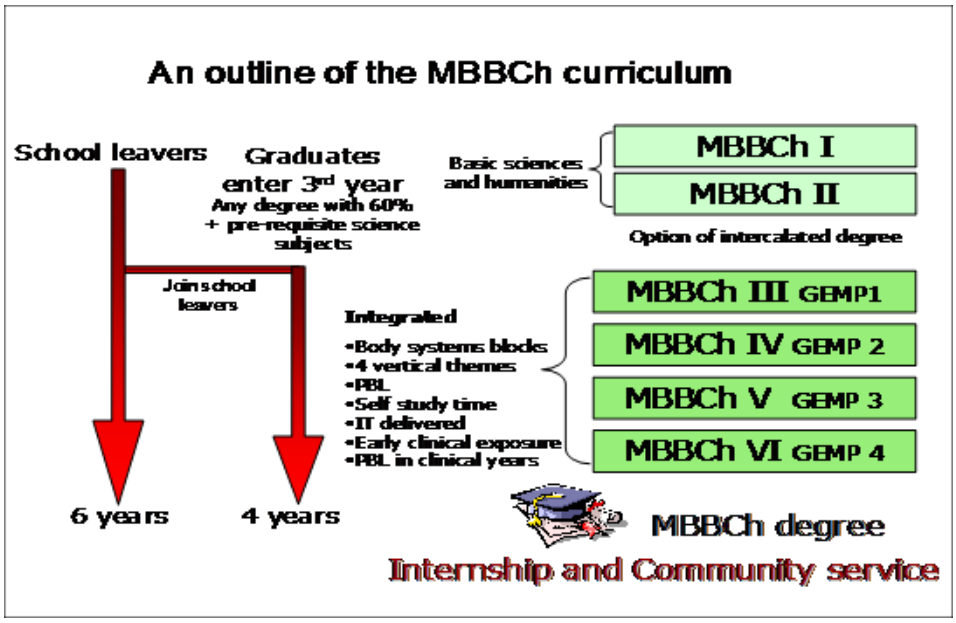


Figure 1.1 Overall structure of the new Wits undergraduate medical programme

Entrants to this programme comprise two groups:

- Graduates from a three year basic degree with specific science credits (one third of entrants).
- Secondary school entry students having completed the first two largely traditional years of medical training (two thirds).

These groups join together into a single stream in the third year of study, the GEMP I student cohort, combining the perceived academic strengths of the latter and maturity of the former.

In this curriculum learning is structured into four main themes as detailed below:

- Basic and Clinical Sciences (BCS)

- Patient Doctor (PD)
- Community Doctor (CD)
- Personal and Professional Development (PPD).

The PD theme focuses on students' understanding of the biopsychosocial factors affecting health care and specifically in relation to the consultation process. The CD theme focuses on a public health care approach to health, knowledge of disease causation and the principles of health care systems policies and programmes. The PPD theme directs students' development of a professional identity and respect for patients: it equips students to apply ethical rules, legal considerations and an evidence-base for clinical decision making and team work in clinical contexts.

The integration of clinical learning with the basic sciences is GEMP I and II is achieved by parallel delivery of subject material in anatomy, physiology, pharmacology, microbiology and, clinical sciences using various teaching modalities: basic clinical skills learning, problem-based learning (PBL) and a small number of lectures, self study from 'learning topics' and 'classroom interactive theme sessions'. Attendance is only compulsory in clinical skills and in PBL sessions.

1.3.2 The Clinical Skills Programme (CSP)

The CSP at Wits is a new initiative in the undergraduate curriculum in which basic clinical skills are systematically taught and assessed.

1.3.2.1 The original structure of the CSP (2003)

The structure of the CSP described here (pre-2009) was the model prior to the interventions.

The CSP began in the GEMP I year by offering weekly clinical exposures over a two year period in a so-called Health Practice Day (HPD). Early clinical exposure in this programme was offered

in two sessions of the HPD at four university academic hospitals, i.e. the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), the Chris Hani Baragwanath Hospital (CHBH), the Helen Joseph Hospital (HJH) and the Raheema Moosa Mother and Child Hospital (RMMCH). These two activities of the HPD are outlined below.

- The Formal Session (FS) scheduled over two hours with student groups of three each practising patient clerking (structured history taking, physical examination and clinical decision making) of a selected hospital patient (aligned with an organ- system block). This was followed by presentation to a tutor.
- The Clinical Skills Session (CSS) scheduled over half a day in the CSU of the learning centre in the Centre for Health Sciences (CHSE) in the Faculty of Health Sciences in the form of guided hands-on practice in selected clinical and online activities.

On the HPD students were assigned to attend these sessions in groups according to a rostered schedule beginning with either the FS or the CSS in the morning with transportation provided to and from these venues.

In each year (GEMP I and GEMP II) five of the scheduled in HPD was substituted by community and rural site visits in the morning. These formed part of a service learning programme.

In the original CSP the theory related to the clinical skills learning was offered as a web- based resource, in common with the practice of all other academic delivery in the GEMP curriculum. The relevant clinical skills teaching were demonstrated in a 'briefing session' prior to the clinical practice as either a clinical demonstration on a simulated patient (SP) or by role playing a paper based history case (with a colleague). This 'briefing session' lasted approximately 45 minutes and was conducted by a designated clinical skills tutor from the CHSE. In certain blocks viz. the

Musculoskeletal, Neurosciences and Reproductive blocks these briefing sessions were conceded by faculty academic specialists, who in consultation with the designated CHSE clinical tutor also reviewed the clinical and web-based content for standardisation purposes. This structure of the 'briefing session' has not changed in the new programme.

1.3.2.2 The Formal Session (FS)

In the pre-2009 CSP, the FS of bedside learning was structured for providing small groups of students the opportunity of clerking patients and making oral case presentations to a hospital tutor. The tutors' intended role focused on checking the accuracy of the clinical data collection including observing student practice and facilitating the discussion to enhance student understanding of the related skills.

The time allocated to this session (approximately two hours) was intended to cater for completing the two tasks of this session, viz. patient clerking and the session with the tutor. As mentioned before students were expected to use any free time before or after in this scheduled session to work independently in the wards.

Patient clerking occurred with small student groups each comprising three students clerking a patient selected for this practice. These students were expected to negotiate patient willingness for participation in this activity prior to beginning the clerking process. Students in each group were expected to take responsibility for the different tasks in the clerking process and rotate these responsibilities, amongst themselves in subsequent scheduled sessions, to allow each student opportunity for practice in all clinical skills domains.

The tasks of patient clerking were expected to proceed in a structured way according to a pre-determined schedule:

- A comprehensive history taking using the eight component generic history method taught in this programme.
- Using these data to focus the clinical examination on the organ systems relating to the patient's problems.
- Screening other systems for possible clinical abnormalities.
- Identifying the positive and relevant negative findings, assimilating these data in the formulation of appropriate differential diagnoses and prioritising them.
- Broadly applying the principles for formulating a plan of management.

Student groups were responsible for briefing their patients on the examination findings. Each student group was responsible for appointing a scribe, who was expected to record clearly all relevant clinical data, in preparation for the case presentation to the tutor.

The session with the tutor was intended to occur with three groups of three students combining into a larger group with each in turn making their oral presentations around their patient's bedside.

In this role, the tutor was vested with the following tasks:

- Verify the accuracy of the data collected on clerking.
- Check students' examination technique.
- Demonstrate relevant physical signs.
- Facilitate the application of the clinical reasoning process in working with the data.
- Refine the clinical position in relation to the differential diagnoses based on the 'surgical sieve' (Appendix E).
- Assist in formulating a plan of management.

Any time left over was intended to allow for identification and discussion of learning issues raised by these cases.

Patient selection was intended to occur by voluntary participation of hospital inpatients chosen for this purpose. Clinical registrars or consultants assigned by the clinical disciplines in participating hospital departments were charged with selecting suitable patients appropriate to the organ system block concurrent with student study. The following tutor tasks were intended for selection of patients:

- Select patients preferably with diagnoses related to the current block.
- Fully brief patients willing to participate in this activity.
- Liaise with the hospital coordinator (an administrator appointed in each hospital) to confirm the arrangements for meeting student groups.
- Be available for facilitating the case presentations.
- Delegate these tasks to peer colleagues when necessary.

Patients willing to participate in this activity were expected to be present for student practice at the appointed times, unless precluded by their need to attend other scheduled procedures e.g. clinical investigations or therapy with allied health professionals.

As the CSP is a compulsory activity in the GEMP attendance at this practice was registered for both the FS and the CSS.

1.3.2.3 The Clinical Skills Session (CSS)

This session was structured into four hands-on educational activities with guided instruction for student groups. The activities comprised a mix of mainly clinical stations (history taking and physical examination) and fewer applied clinical stations (of the related basic sciences selected for their perceived educational content). The latter varied in their use of clinical anatomy and pathology materials selected for practice e.g. macro- and micro-photographs, specimens, human

skeletons, illustrations and audiovisual techniques viz. selected PowerPoint presentations and online and video clinical case presentations. Station instructions specified the objectives for mastery of each activity.

The total time allocated to the session was approximately 90 minutes with each station of approximately twenty minutes' duration, an electronic bell, facilitating the timely movement of student groups through a preselected rotation. Students assigned to groups of approximately eight to ten rotated through these stations practising under the guidance of a clinical tutor.

Initially, history taking skills were taught in a generic approach which was amended in its structure. Pairs of students role-played paper-based cases constructed for this purpose. The tutor task in this station focused on facilitating the process of students critiquing their colleagues using a preselected technique.

Physical examination skills were performed on simulated patients (SPs) whilst selected models and mannekins were used for practising sensitive physical examination skills viz. the female breast, the pregnant abdomen and male and female pelvic examinations. Models and manikins were also used for some procedural skills learning e.g. providing basic life support, venepuncture and intravenous cannulation. Physical examination skills also were guided by a tutor assigned to these stations who performed an initial demonstration for the student group. This was followed by each student obtaining hands-on practice, in the specific skill, with feedback.

The principles of clinical decision making were taught in either selected online clinical case presentations, or as part of clinical problem solving for interpreting the clinical significance of data elicited by the physical examination. Abnormal clinical findings were related to basic pathophysiological processes and students were encouraged to think about the broad groups of causes using the 'surgical sieve' (see Appendix E). Feedback on student performance in this

practice was provided by the tutor. This practice was reinforced in the CSS at the end of each block incorporating a station with specific case scenarios linked to a questionnaire linked to this activity. Oral presentation of the findings was made to the tutor stimulating, followed by relevant discussion of the principles of management e.g. the selection and interpretation of basic diagnostic tests.

In the CSS, tutors were essentially CHSE clinical staff, complemented by paid enthusiastic generalists and sometimes senior students in the GEMP, volunteering a regular weekly commitment to this activity. These non-faculty and student tutors were expected to attend the briefing sessions, read the relevant content material and resources and revise the clinical technique necessary for tutoring these students. Novice tutors to these programmes were oriented in their tutoring role with initial support by shadowing of a designated CHSE tutor colleague. This process was repeated periodically for different clinical skills tasks delegated to the novice tutor.

SPs who participated in this programme were either paid students in other university courses, interested in augmenting their income by their participation, or paid volunteers recruited from the community. These SPs were not formally trained in their roles but learnt by apprenticeship with experienced peers.

1.3.2.4 Other clinical skills learning opportunities

Outside of the scheduled sessions in this programme the facilities of the CSU were available to students and faculty staff in two main activities:

- Encouraging the attainment of clinical proficiency by repeated practice outside of scheduled activities.
- Hosting twice yearly both GEMP I and II OSCEs.

1.3.3 Assessment and evaluation in the pre-2009 CSP

1.3.3.1 The situation in 2009

Objective assessment of clinical performance in the basic clinical skills competencies taught in the CSP occurred twice yearly in the form of a 15 station OSCE.

OSCE examiners comprised a substantial proportion of faculty clinical and other academic staff as well as paid general practitioner (GP) tutors in the CSP. These examiners assumed responsibility for assessing student performance in physical examination and history taking skills stations.

The OSCE tested all the clinical skills domains taught in the CSP as well as skills in Information Retrieval (IR). The latter were taught by the Health Sciences librarian in scheduled sessions during each block.

The distribution of skills testing in the different skills domains was as follows:

- Physical examination skills (approximately 35% of stations).
- Applied clinical application skills, viz. testing of the relevant basic sciences (35%).
- IR skill station (5%).
- History taking and corresponding questionnaire skills stations (20%).

All the physical examination and history taking stations were observed and rated by examiners during student attendance at these stations, whilst the questionnaire and applied clinical and basic sciences stations were marked after the completion of the OSCE.

Standardisation in the OSCE was achieved by examiner and SP attendances with CHSE staff in formal pre-OSCE training sessions. Examiners rated student performance using station specific checklists (which in 2009 were complemented by global rating scales). The minimum score for success in the OSCE was 60%.

The application of clinical skills was also examined three times a year during theory exams using modified essay type questions (MEQ) and computer based PowerPoint 'loops'.

1.3.3.2 Developments in the OSCE

The structure and scoring of the GEMP OSCEs evolved since their inception in 2003, when, they were introduced as the main arm of the clinical skills assessment in the CSP for these two academic years. The main changes are detailed below.

- 2003: A thrice yearly OSCE was conducted in the same week as other examinations in the GEMP I programme in alignment with the other theory examinations testing related basic and pathological sciences. This OSCE was integrated and tested clinical skills application of the basic sciences.
- 2005: The OSCE was conducted twice yearly and changed to become a 'stand-alone' examination testing the hands-on skills. Stations testing the relevant clinical skills application were incorporated as part of a PowerPoint 'loop' the examination thrice yearly.
- 2006: The proportion of stations testing history taking and clinical skills changed.
- 2006: The introduction of simulation of selected abnormal physical signs for testing student skills for eliciting signs in certain hand-on skills station SPs were trained beforehand to portray these signs.
- 2006: The introduction of a station for testing IR.
- 2006: Reintroduction of stations for testing the skills of clinical application following on testing of a skill ('follow-on' stations).
- 2007: The proportion of follow-on stations increased to equal the number of hand-on stations.

- 2008: The introduction of a high-stakes clinical examination of a hospital patient (integrated clinical examination), prior to students entering their clinical clerkships at the end of the GEMP II year, to complement the testing of individual clinical skills in the OSCE.
- 2009: The introduction of a global rating scale for scoring for the hands-on-skills in the OSCE complement scoring with standardised checklists.
- 2011: The introduction of a station checking the skills of Medical Zulu.

1.3.4 Routine CSP evaluation

CSP evaluation occurred with a student survey, as part of curriculum evaluation at the end of each of the ten organ systems in these two years. The evaluation incorporated student perception of their experience and self-ratings of their performance in the basic clinical skills domains taught in this programme. All students attending a scheduled session were asked to complete the questionnaires. Whilst these questionnaires were administered to all students enrolled in the GEMP I and II at periodic intervals in the programme, participation was voluntary and anonymous. The results were collated and discussed at the end-of block review meetings.

Quality assurance in this programme was also informally conducted as reviews of clinical teaching content in partnership with relevant faculty and the CHSE clinical staff. These reviews evaluated the suitability and accuracy of clinical content, teaching methods and chosen resources.

1.3.5 Formal programme evaluation (2006)

In 2006 a formal evaluation of the CSP was undertaken in response to anecdotal reports of problems in the HPD programme delivery; complaints were made by both hospital academics and students. Academics' perception of students' clinical standard on entering clerkship was that

this was below that of their peers from the traditional curriculum at the corresponding period in their training. On their part, their clinical training was being affected by reduced FS attendances due to scheduled community and rural site visits; insufficient numbers of patients available for clerking; and cancellation of CSP activities due to public holidays, vacation periods and summative examinations.

In contrast to academics' claims of students' perceived substandard clinical proficiency on entering their clinical rotations in the GEMP III year, students' performances in the twice yearly summative OSCEs in the CSP since its inception in 2003 indicated otherwise.

The 2006 study was therefore designed to evaluate the effectiveness of the FS in delivering the intended objectives of the CSP. This evaluation of the CSP, conducted in May / June 2006 by Prozesky and Cassim examined the organization and implementation of the FS of the HPD over a six week period covering clinical teaching in two blocks of the GEMP I and II years each..

Details of this investigation relevant to the current study are given below. It should be noted that some of the findings from 2006 serve as a baseline for the current study; these are given in Chapter 4.

1.3.5.1 Broad study objectives

To investigate the quality of the organization and the learning taking place, in the FS in GEMP I and II, over a six week period.

1.3.5.2 Study design

A cross-sectional descriptive study.

1.3.5.3 Study population

The FS events in both GEMP I and II over six weeks constituted the study population, together with students, tutors, patients and nurses and in hospitals and hospital coordinators participating in the FS activities.

1.3.5.4 Sampling

As a consequence of the resources available for this evaluation 25 learning events were polled. These learning events were then stratified by hospital and clinical department for the GEMP I and II classes according to the student rotations for the clinical blocks of the study period. Students, tutors, nurses and patients involved in these learning events constituted the student, tutor, patient, and nurse samples, respectively.

1.3.5.5 Data collection instruments

Instruments in the 2006 evaluation collected mainly qualitative but also some quantitative data. The instruments comprised an observation sheet for data collection for the on-site observations of the FS learning activity. Students as well as tutors, patients and nurses participating with students received questionnaires, as did the three hospital coordinators in this programme.

1.3.5.6 Pilot study

The purpose of this pilot study was to test the feasibility of using the instruments for this evaluation and also to provide information for training CHSE staff for conducting the on-site observations. The pilot study was conducted by three volunteer tutors in the CSP each conducting one on-site observation on separate HPD at one of the three academic hospitals, viz. the CMJAH, CHBH and HJH. The participants included five students, three patients, three nurses, and three clinical tutors who were presented with questionnaires at the conclusion of the scheduled FS. These completed questionnaires and on-site observation sheets were returned to the researcher. Use of the instruments and data were discussed with those who used them as well

as staff in the CHSE, viz. those in the CSP, CHSE researchers and block administrators. The procedure facilitated the comparison of responses to the individual items in the observation sheet collected by the individual tutors. The interpretation of responses from the findings of the nurse, patient and tutor questionnaires was improved after receiving valuable feedback. discussion with academics and researchers in the CHSE who provided valuable feedback

1.3.5.7 Data collection

The procedure for data collection for other participants of the 2006 HPD

On-site observations:

On-site observers attended and recorded data during the student clerking and presentation sessions from the time students arrived in the wards.

Questionnaires:

At the end of the FS observers presented clinical tutors, patients and nurses with questionnaires. Hospital coordinators received questionnaires by internal mail.

a. Clinician questionnaires:

Altogether 18 tutors from the three academic hospitals returned completed questionnaires; Respondents represented three clinical departments and three rankings.

b. Nurse questionnaire:

A total of 21 nurses from the three academic hospital returned questionnaires. Again these nurses worked in these clinical departments.

c. Patient questionnaire:

A total of 20 completed patient questionnaires were received: males and females from all three clinical departments in all three academic hospitals.

Completed questionnaires from patient, tutor and nurse participants were either internally mailed to the CHSE or left with the relevant ward clerks from whom these were collected by CHSE staff not connected directly with the research.

d. Hospital coordinator questionnaire:

All three hospital coordinators returned completed questionnaires to the CSU director who forwarded them to the researcher.

e. Student questionnaire:

This information is given in section 3.4.2.

1.3.5.8 Process of notification of participants

The on-site observers and tutor, nurse and patient participants, the departmental coordinators and the matrons of each academic department were notified as soon as the initial permission for conducting these observations had been approved by the superintendents of the participating hospitals. Clinical coordinators were responsible for briefing tutors rostered for teaching on the HPD in the FS during the period of evaluation. Patient and nurse participants were informed of the intended observations prior to this activity at the time patients are usually selected for student practice. Students were recruited later at the scheduled problem-based learning (PBL) session.

1.3.5.9 Biases and limitations

The on-site observations carry a risk as the observer joining the student group. All participants in the FS practice are aware of being observed and this may be a factor which can influence student behaviour in their interaction with patients and tutors, and tutors' participation in this activity.

The data collected by this method may vary in its value for representing true student dynamics, student behaviour and practice when being observed; this process affects the interpretation and the generalisability of the results. There could be differences in data quality obtained from participants (tutors, nurses, patients) and during the on-site observations as a result of the different professional and cultural backgrounds of participants. To counter this, the collection of data from on-site observations and distribution of questionnaires to tutors, nurses and patients were trained for the purposes of standardization.

1.3.5.10 Data analysis

Quantitative data were manually entered into the Epi Info programme. Descriptive analysis of quantitative data was completed with data analysis programme, mostly calculating frequencies (as described in the present study) whilst qualitative data analysis followed the procedures described in the present study.

1.3.5.11 Principal findings

The findings of this 2006 evaluation confirmed problems in the delivery of the FS. The main findings follow.

a. Patient availability

Patient availability with student practice in this session yielded a range of responses from the different participants in the 2006 evaluation.

The on-site observers indicated in 20 (80.0%) of instances of GEMP I and II student encounters patients for clerking were available for the scheduled activity. These results are shown in the table below.

Table 1.1 Patient availability for clerking in the FS

Patient availability	2006 (N=25)
Patient ready and waiting	13 (52.0%)
Patient not in bed but located by student	7 (28.0%)
Patient could not be found	5 (20.0%)

Eighteen (85.7%) of the 21 nurses surveyed were aware of the student visits to the hospital, with seven (33.3%) i.e. a third perceiving the sister in charge of the ward as having the responsibility for informing patients of the activity. However, two of the three hospital coordinators in this programme indicated that they personally briefed patients of the students' intended visit and the third said she did it' sometimes'.

In contrast with these findings 18 (90.0%) patients surveyed said they were not informed of the student visit.

Nearly all clinicians surveyed in the 2006 evaluation for their perceptions on the availability of appropriate patients for clerking cited "good clinical signs" as the criterion used to select patients for student teaching. Close to 50% indicated that the patients' condition should be related to the 'system being covered'. Three tutors also included patient factors as criteria, e.g. "patient who is comfortable" and "cooperative patient". Finally the students reported that the patients available were mostly enough (65.5%) and suitable (75.0%).

b. Tutor perceptions of tasks in the FS

The data from different participants again yielded a range of responses. The results of on-site observers' perceptions of the tutors' tasks in the FS are presented in the table below.

Table 1.2 On-site observers' perceptions of the tutor's performance of their tasks

Tutor task	2006
Tutor checks findings	**n (%) (N=25)**
Well done	16 (64.0%)
Partially	7 (28.0%)
Not done	2 (8.0%)
Tutor checks technique	**n (%) (N=25)**
Well done	12 (48.0%)
Partially	7 (28.0%)
Not done	6 (24.0%)
Tutor explains findings	**n (%) (N=25)**
Well done	18 (72.0%)
Partially	4 (16.0%)
Not done	3 (12.0%)
Tutor gives more information	**n (%) (N=25)**
Well done	17 (67.0%)
Partially	6 (24.0%)
Not done	2 (8.0%)

The results of tutors' perception of their role in the FS are presented in the table below.

Table 1.3 Tutors' perceptions of their tasks in the FS

Tutor task	2006 n (%) (N=17)
Students present cases	17 (100.0%)
Tutor checks findings	14 (82.4%)
Tutor checks technique	12 (70.6.0%)
Tutor explains findings	8 (47.1.0%)
Tutor gives more information	8 (47.1%)

Students on the other hand report that tutors carry out their tasks satisfactorily to a lesser degree than on-site observers report: checking findings (76%), checking technique (40%) and giving more information (59%).

c. Student participation with tutor in the FS

The results of on-site observations for students' participation in the session with the tutor in the FS are shown in the table below.

Table 1.4 On-site observer's perceptions of students' participation with the tutor

No. of groups presenting cases to the tutor	**n (%) (N=25)**
Three	13 (52.0%)
Two	9 (36.0%)
One	3 (12.0%)
Mean size of student groups	**n (%) (N=25)**
7 – 9	16 (64.0%)
4 – 6	6 (24.0%)
>4	3 (12.0%)

Students on the other hand report an average group size of 4.7

d. Problems in the FS

Different participants reported problems from their particular perspectives.

- Seven of the 18 tutors reported problems: with organization of the sessions, with finding cases.
- Hospital coordinators report having occasionally experiencing problems; these all have to do with finding suitable patients in time.
- On-site observers on the other hand report problems arising due to inadequate student performance and the selection of unsuitable patients.

The nurses involved did not report any problems.

Finally the students report more problems than the other participants, especially in the areas of tutor attitude, tutor availability and tutor expectations.

It was considered to evaluate the data obtained from all these participants for making improvements to perceived problems. Differences and even contradictions were found, not

surprisingly since participants had different roles and expectations; in general the student participant data.

Note that data obtained from students has been given in summary form – more detailed data are given in Chapter 4.

1.3.6 Interventions in the CSP

In 2008 interventions in the CSP were negotiated in a meeting convened with academic faculty, the CHSE staff and student representatives.

The introduction of the Shadowing Session (SS) was the brainchild of a visiting academic from the University of Sydney Professor Anne Sefton, whose programme at Sydney University featured this learning approach.

This and other interventions aimed at increasing students' clinical exposure are described below:

- Decentralise the CSS practice on the HPD to the learning centres of three of the academic hospitals. This was envisaged to allow students to recoup time normally spent on commuting to and from their assigned hospitals to the CSU at the Medical School. This would increase clinical time spent with patients in the wards.
- Introduce a shadowing session (SS) in the HPD in the form of an official attachment of a student to a doctor in a hospital ward. This was sufficient evidence that students were not using their free time effectively for clinical learning.
- Conduct the 'briefing session' to the whole class to occur on the day prior to the HPD. This would save time for hand-on learning in the CSS.
- Maintain the status quo in respect of the structure of the FS, but improve communication with teachers about its nature and structure.

- Reschedule the planned community and rural site visits to occur later both in the GEMP II and GEMP II years. (For practical reasons this was never done).

Thus, in 2009, the structure of the HPD changed to accommodate three sessions:

- In the morning of HPD in the hospitals the SS and the FS, viz. the SS from 08h00 until 11h00 and the FS from 11h00 to 13h00.
- The CSS was scheduled for the afternoon at the learning centres, from 13h00 to 16h00.

The SS was intended as an unstructured activity with students shadowing their assigned doctors in the course of the units' scheduled service activities, complemented by students seeking out ward patients with good clinical signs, in any time left over in the session. The student allocation for a ten to twelve week period to a dedicated unit was structured to allow students to get familiar with ward staff and senior colleagues in the 'firm'.

These interventions implemented at the beginning of 2009 were evaluated in this study.

1.7 Objectives and definitions of this study

The objectives of this study and definitions of terms are presented in this section for the three clinical activities comprising the HPD, viz.:

1.7.1 The Shadowing Session (SS)

1.7.2 The Formal Session (FS)

1.7.3 The Clinical Skills Session (CSS).

In addition it was decided to include comparison of OSCE performance in the study, as an overall measure of changes in students' clinical competence.

In Chapter 3 (Methodology), the principal data collection instrument, a questionnaire is described. In the text below questionnaire items are linked to their relevant objectives.

1.7.1 The Shadowing Session: attachment to a doctor in a hospital ward (SS)

Objectives (for the 2009 cohort): To determine student perceptions of:

1.7.1.1 Level of student participation in the assigned unit's activities (Q1.1, Q1.2, students' attendance at rostered activities and procedural skills)

1.7.1.2 Level of student interaction with other members of the hospital team (Q1.5, Q1.6, students' interactions with allied health professionals involved with patient care)

1.7.1.3 The range of patients seen by students' (Q1.3, Q1.4, patients' medical diagnoses and the organ systems blocks to which these related)

1.7.1.4 Role of the doctor (Q1.7, the role played by the doctor in relation to interaction with the student)

1.7.1.5 Role of the student (Q1.8, students' role in the SS)

1.7.1.6 The educational value of the SS (Q 1.10; see page 155)

1.7.1.7 Problems experienced by students in the SS (Q1.9, the nature and frequency of problems that students reported)

Definitions:

'Level of student participation' is defined as student participation in the assigned units and the number of procedures performed.

'Range of patients seen' is defined as the range of diagnoses of the medical conditions of patients seen by a student in the study period and their related organ systems.

'Role of the student' is defined as students' perception of their intended role.

'Role of the doctor' is defined as the students' perception of the role of the doctor in this assignment.

'Range of problems' is defined as the spectrum and frequency of problems that students encountered in this attachment

'Educational value' is defined as the quality of opportunities to learn clinical skills and related facts and teamwork.

1.7.2 The Formal Session (FS)

Objectives: (for the 2009 cohort): To determine student perceptions of:

1.7.2.1 The availability of patients for clerking in the FS (Q2.6, and Q2.7, the provision of adequate numbers of suitable patients available for clerking)

1.7.2.2 The role of the tutor in the FS (Q2.4, the nature of the role played by the doctor in relation to the latter's interaction with the student)

1.7.2.3 Level of student participation in the FS (Q2.3, the number of students attending the session with the doctor)

1.7.2.4 The educational value of the FS (Q2.9, students' ratings of their skills of history taking, physical examination, interacting with patients and learning more about certain disease conditions)

1.7.2.5 Use of available time by students in the FS (Q2.1, Q2.2, Q2.5, the time taken by the student for the tasks of taking a history, performing a physical examination and time spent with the tutor)

1.7.2.6 Problems in the FS (Q2.8, the nature and frequency of problems experienced by students in this session)

Objectives: (for the 2006 and 2009 cohorts): To compare student perceptions of their experience of the FS in these two cohorts (Question numbers in the 2006 instrument *given in italics*):

1.7.2.7 The availability of patients for clerking in the FS (Q2.6, Q5.1, *Q2.7, Q5.2*)

1.7.2.8 The role of the tutor in the FS (Q2.4, *Q7.4*)

1.7.2.9 Level of student participation in the FS (Q2.3, *Q7.3*)

1.7.2.10 The educational value of the FS (Q2.9, *Q10*

Definitions:

'The Formal Session' (FS) is defined as a three part educational or learning activity at a hospital patient's bedside, involving groups of three students clerking a patient and joining with two similar peer groups who each in turn make oral presentations of the relevant clinical findings to the tutor. The tutor is tasked with checking the accuracy of the data collection, demonstrating appropriate physical signs on the patient, checking students' examination technique and facilitating discussion of the clinical data for application of the clinical reasoning process and the formulation of a differential diagnosis.

'Patient clerking' is defined as the process of conducting a medical consultation with a patient in order to gather medical and related psychosocial information relevant to the patient's problems by performing systematic history taking followed by focused and thorough physical examination of the patient in the context of building good rapport.

'The role of the tutor' is defined as the format that the clinical tutor applies in conducting the teaching in the FS. This task takes the form of a discussion in which all students are encouraged to participate. It comprises the tasks of checking the accuracy and thoroughness of data collection, assessment of students' examination technique, demonstration of clinical signs and applicable remediation, checking students' ability to assimilate the presented data in

formulating appropriate differential diagnoses, proposing a plan of management and providing further information on the related medical conditions.

'**The use of available time'** in the FS is defined as the time taken by students for the patient clerking and the presentation and discussion of the patient case with the tutor in relation to the time allocated for this practice.

'**The range of problems**' in the FS is defined as the spectrum of problems reported by the students and the frequency of their occurrence in this session.

'**Adequate numbers of suitable patients'** refers to the availability of sufficient numbers of suitable patients with problems related to the organ system block that students are currently learning allowing students in groups of three (no more) the opportunity to clerk patients.

'Level of student participation' is defined as students' attendance and participation in the preselected clinical activities of patient clerking, oral presentation and discussion of the patients with the tutor and their peers in their assigned groups.

'The quality of learning' is defined as students' perception of the opportunities for practice in the delivery of the FS in this programme for the skills acquisition in the domains of history taking, physical examination and clinical decision making, and learning more about certain diseases

1.7.3 The Clinical Skills Session (CSS)

Objectives: (for the 2009 cohort): To determine student perceptions of:

1.7.3.1 Facilities available to students in the CSS at the learning centres of the three academic hospitals (Q3.1, the provision of sufficient volumes of functioning

educational materials i.e. electronic and medical equipment and models and manikins for practice)

1.7.3.2 Medical supervision in the CSS (Q3.2 relates to the availability of clinical tutors at all stations and the ratio of tutors to students)

1.7.3.3 The educational value of the CSS (Q3.1, Q3.3 relates to tutors' ability to guide practice activities, and students' ratings of their resulting skills in history taking, physical examination, learning more about special investigations and clinical decision making and the integration of basic sciences with the clinical)

1.7.3.4 Problems in the CSS (Q3.2 relates to the nature and frequency of problems reported)

Definitions:

The **'adequacy of the facilities'** is defined as the availability of sufficient functioning medical and electronic equipment and models or mannekins necessary for students' practice and acquisition of the clinical skills in the tasks selected for this practice.

The **'medical supervision'** refers to the ratio of tutors to students in the skills stations in the CSS such that each student is provided with an opportunity to practise the skills within their groups, and each clinical skills station is supervised by a medical tutor necessary to guide the student practice.

The **'educational value'** is defined as students' perception of their skills level in the domains of history taking, physical examination, clinical decision making and learning about certain diseases in the practice opportunities provided in the CSS.

The **'problems in the CSS'** is defined as the spectrum and frequency of problems encountered by students in the CSS that interfered with optimal clinical practice in the three months of this study period.

1.7.4 The objective structured clinical examination (OCSE)

Objective (2006 and 2009 cohorts): To compare student performance in:

1.4.4.1 OSCE (GEMP II, OSCE 1) for the study period.

Definitions:

The '**GEMP II OSCE I'** is defined as the first scheduled OSCE for GEMP II students registered for that year in the GEMP curriculum.

The '**student performance'** is defined as student final scores in the OSCE.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

Programme evaluation has complemented new clinical training initiatives in many undergraduate medical education programmes as a necessary part of ensuring successful programme delivery. Approaches to these initiatives have taken on different forms with the selection of these modalities occurring in relation to institutions' specific needs and resources (Littlewood, *et al*., 2005).

This literature review intends to approach these training initiatives by examining the changes to clinical training from their historical perspective.

2.2 Literature search

This review quotes literature accessed between September, 2005 and July, 2012. The data sources consulted for this purpose included electronic searches of two online databases Pubmed and ERIC, online journals, internet journal articles, editorials, official policy documents of several medical regulatory bodies, and hand searches of articles in medical journals and health science education journals viz. Academic Medicine, British Medical Journal (BMJ), Lancet, Medical Education and Medical Teacher.

2.3 The clinical training of medical students

The basic clinical skills domains of history taking, physical examination and clinical decision making have come to be synonymously regarded with making a diagnosis and planning treatment of medical conditions. In their present form, they have recognition as being valid if structured and systematically applied (Dornan, *et al.*, 2005).

However, many changes have been identified to the course of clinical training since its first inception.

Historically, the use of clinical skills in healing is evident in the literature describing this practice in the case of the ancient Chakran and Egyptian practitioners, as early as 2000 BC. (Fulton, 1953) The evolution of clinical skills can be demonstrated by numerous examples in European and Middle Eastern history. Improvements in physical examination techniques in 450 BC were in evidence during the time of Hippocrates, followed in 150 AC with Galen's introduction of the skill of listening to patients' stories in order to focus the physical examination (Fulton, 1953.) In the following six hundred years Islamic scholars from the Middle East were to further develop these clinical skills to the familiar 19th century apprenticeship model of clinical training (Fulton, 1953).

In thirteenth century Europe, there existed no regulation for clinical practice and the clergy were the only group skilled who practised healing, taking responsibility for advising, performing surgery and using plants for their patients. In the 1400s early medical training was in evidence in Italy and Greece with the appearance of the first universities, albeit without a formal role (Fulton, 1953.)

This period was followed by changes in the direction of the medical training method which is thought to have occurred in relation to three main factors (Fulton, 1953):

- The regulation of the medical profession
- The development of medical technology

- The contributions of scientists and educators

In the UK, a century later, regulation and certification of medical practitioners enabled approval of medical practice for specific individuals. In the 1500s, the Royal College of Physician and Surgeons in the UK introduced a medical charter supporting this initiative. Apprenticeship training became the primary model of clinical training in the 1600s, approved by the successful completion of a seven year period of training with theory and some clinical skills examinations. Later, this term of training for surgeons was commuted to four years. The medical school came into existence and infirmaries were then seen to have revised their role to accommodate the need for teaching the skills of examination and treatment of patients. In the early 1800s larger numbers of medical schools appeared but teaching content and structure remained unregulated (Fulton, 1953)

The development of medical technology was the second factor identified for enhancing the clinical skills of medical professionals. Contributions in medical technology coming from pioneers such as Louis Pasteur, Joseph Lister and John Macintyre included the identification and development of aseptic techniques for the prevention of infection and the invention of the first X- ray machine (Fulton, 1953).

Following on this period, official organizations entrusted with regulating medical certification and registration emerged in response to parliamentary acts. Clinical training in this period was conducted in single lecture halls to large student classes and intended to be learnt by observation. The development of certain sub-specialties viz. Obstetrics and Otorhinolaryngology in this era indicates the direction taken by clinical training (Fulton, 1953).

North American clinical training in this time lagged behind that of its European counterparts. The first medical school in the late 18th century in Philadelphia existed alongside the apprenticeship model of clinical training. Initially connected to a large hospital, the medical

school supplemented this apprenticeship system. By the mid 19th century 26 medical schools had opened but formal regulation of the profession was still not in evidence (Fulton, 1953).

This pre-Flexnerian and pre-Oslerian paradigm was characterized by variable structure and content of clinical training and practice and went largely unregulated (Fulton, 1953).

In the late 19th century challenges to this model of clinical training occurred in relation to the academic contributions of two well known scholars, Sir William Osler, a medical scientist, and Abraham Flexner, a non-medical scholar.

2.3.1 Contribution of academics and educators

William Osler

In the latter half of the 19th century, bedside teaching was a common feature in clinical training in most European and all North American medical schools. This practice was largely influenced by the teachings of Sir. William Osler (Snell, 2006-7), who in 1889, introduced the 'Clinical Clerkship', which resulted in medical students spending dedicated time in hospitals, assisting with ward duties, clerking patients and being mentored by tutors. Osler is described as both a supporter of scientific innovation and as a humanitarian who encouraged excellence in the basic clinical skills of history taking, physical examination, clinical decision making and professional role modelling as domains of learning ideally suited to bedside teaching (Dornan, *et al*., 2005). His ideology extended to "the need for having respect and caring for the patient" (Ende, 1997). Osler's recommendation for clinical teaching include "theoretical and bedside learning, a core curriculum, the acquisition of the basic clinical skills, experiential learning, self directed learning and professional role modelling of the doctor patient relationship" (Snell, 2006-7).

These principles of teaching as described above align with those formed in the late 20th century, leading to reforms to clinical education which were supported by evidence from a number of studies (to be detailed later in this review).

Abraham Flexner

Abraham Flexner, a teacher with progressive views on 'learner-centred education' is responsible for radical change in the way American medical schools operated in the early 20th century (Beck, 2004). Commissioned in 1910 by the Carnegie Foundation, he evaluated the state of education in North American medical schools in respect of their courses and finances.

In his report, he highlighted amongst others, two main findings in respect on North American medical schools (Beck, 2004):

- Most medical schools in North America used scientific methods of teaching but had inadequate laboratory services and hospital teaching facilities.
- Many medical schools were in desperate need of funding.

Flexner's (Beck, 2004) recommendations for improvements in the standards of physicians' training in North America describe "the ideal ratio of physicians to patients and the number of medical schools" at a time of economic and social decline. These recommendations were the basis of the American Medical Association's (AMA's) position on changes to medical education (Corbett, *et al*., 2004.):

- Reducing the numbers of medical schools and amending student admission policies.
- Amending the curriculum to include an initial foundation in the biomedical sciences.
- Introducing apprenticeship training with bedside teaching in hospital attachments.
- The employment of full time physicians and staff in hospitals.
- Introducing research related study for students.

These summarise Flexner's recommendations for medical training in North America.

However, negative effects following on the Flexner Report were also seen in health systems delivery in North America. This resulted in reducing access of primary health care to rural populations and also medical training opportunities for minority communities (Corbett, *et al*., 2004).

However, in 2009, Flexner's evaluation of UK medical training had important consequences for medical training in European medical schools and in Canada, where it led to the accreditation of Canadian medical and specialist training and the formation of the Association of Medical Colleges in Canada (Gilbert, 2008).

This Oslerian and Flexnerian era marked a period of positive influence on clinical training in increasing bedside teaching and securing dedicated practical exposure in early structured apprenticeship training time in the hospital attachments. The potential for improvements in clinical training was evident: recommendations for more fulltime hospital physicians for clinical training of medical students and for using the basic diagnostic method in patient consultation. At this stage, clinical training was an established part of medical education (Gilbert, 2008).

2.3.2 Technology and specialisation

The third factor to influence clinical training in this period was the pressure placed on scientists to develop technology which would improve diagnostic skill (Gilbert, 2008). The 1930s is noted as a period of 'analytical and statistical' study, focusing on the science-centred approach which produced technological innovations in diagnostic imaging and laboratory science, heralded the beginning of medical specialization (Corbett, *et al*., 2004). A further threat to opportunities for basic clinical skills training arose by some educators questioning the need for its use in medical diagnosis (Zoneraich & Spodick, 1995). This trend in clinical training was noted to be most prominent in the USA and Europe initially, and became globally responsible for the reduction in the numbers of generalists for essential primary health care (World Health Organisation, 2006).

2.4 Clinical training in traditional medical curricula

For most of the 20th century undergraduate medical training in European schools had generally been discipline based and separated into two distinct entities: an initial three year period of didactic basic sciences education followed by three years of clinical training in hospital rotations in the different disciplines. This traditional British medical school model served as the basis for medical training in several countries around the world, and was the model adopted in the eight South African medical schools (General Medical Council, 2009). Medical training in North American medical schools during the same period however, required its applicants to these courses to have successfully completed a three year bachelor's degree in science, as an admission criterion to a four year graduate entry medical programme (Ross & Fineberg, 1994). This latter model of training subsequently gained popularity and in the late 20th century informed the newer reforms to undergraduate medical curricula (Metz, 1994).

Whilst the main thrust of medical education reforms occurred in the latter half of the 20th century, throughout the ages the essence of the diagnostic method has traditionally maintained its focus in the importance of the basic clinical skills methods, viz. the domains of history taking, physical examination, clinical decision making and professional role modeling (Corbett *et al*., 2004; Fred, 2005). The clinical training reforms which were highlighted in Chapter 1 followed academics' concerns regarding graduates' lack of clinical competence. Academics, many of whom differed in their views of their students' ability also differed in their expectations of their students' mastery of these basic skills – noting that medical graduates were unable to take reliable medical histories, perform physical examinations or analyse their patients' clinical findings. These academics viewed their students' clinical deficiency having resulted from the lack of opportunities for standardized clinical training provided in undergraduate curricula. A further reason assumed was doctors' indiscriminate use of medical technology). Furthermore,

undergraduate clinical training did not specify the objectives of this clinical training and there were no ways of measuring medical graduates' clinical skills deficiencies (Corbett, et al., 2004).

The cost of this clinical training was also perceived to be unaffordable (Zoneraich & Spodick, 1995; Corbett, *et al.*, 2004).

In the review of clinical training which is described further in this chapter, reference to the concept of the basic clinical skills will be taken to indicate the domains of history taking, physical examination, patient interaction and clinical decision making.

2.4.1 Deficiencies in traditional medical training curricula

Weaknesses of medical training in traditional curricula have been demonstrated in the findings of studies evaluating these, in the published literature (Wray & Friedland, 1983; Remmen, Anselen, Scherbier, Denekens, Hermann, Van der Vleuten, Van Royen & Bossaert, 2000; van der Hem-Stokroos, *et al*., 2001; Halaas, Zink, Brooks & Miller, 2007). These add to the findings of evaluations of clinical training curricula conducted by professional organizations and local regulatory bodies (General Medical Council, 1993; Health Professions Council of South Africa, 1999) in several countries. The accounts described below illustrate the extent of the problem:

1. Corbett, *et al* (2004) AAMC project on clinical skills training evaluated curricula in North American medical schools using multiple methods, viz. e-mail questionnaires to curricular deans of all selected medical schools, questionnaires to students and graduates to these programmes, ten onsite clinical observations (six USA, sites, three UK sites and one site in the Netherlands) and extensive literature reviews of existing medical education databases and historical reports. Their study findings demonstrated the following deficiencies in medical curricula: "variety of curricula designs, unstructured with mainly implicit clinical

curricula objectives and inconsistencies in teaching methods and evaluation practices" (Corbett, *et al*., 2004).

2. A report by Irish medical deans of the state of Irish medical education and training identified the following problems: "reduced funding, reduced size of the medical workforce and reliance on private practitioners not affiliated with the universities, providing coverage of parts of the teaching curriculum" (Council of Deans of Medical Schools within Ireland, 2006).

The findings of these two evaluations have been used to illustrate the need for "structured curricula" (Corbett, *et al*., 2004) and inclusion of skills not previously covered, viz. communication skills and moral and ethical reasoning skills, training in primary care and centralisation of resources for funding the restructuring (Corbett, *et al*., 2004; Council of Deans of Medical Schools within Ireland, 2006).

2.4.1.1 Evidence of graduates' clinical skills deficiencies in traditional curricula

"A plethora of studies in the published literature demonstrate deficiencies in graduates' clinical competency in traditional medical curricula using clerkships for clinical skills training" (Littlewood, *et al*., 2005). Some of these studies are described below.

Patel's (1999) evaluation of the American medical education system surveyed 125 deans of medical schools in the USA administering traditional curricula and those using newer programme designs. His findings demonstrated two areas of weakness in traditional clinical curricula: "poor coverage of communication skills learning and primary care and ethical and moral reasoning skills" (Patel, 1999).

A number of studies demonstrate clinical skills deficiency in 'graduates from traditional curricula' with clerkships to train students in basic clinical and procedural skills in comparison to specific clinical skills training. A selection of these is described below:

1. Remmen, *et al* (1998) investigated clerkship opportunities for providing final year medical students practise in a designated list of clinical skills, using different approaches to skills training. Students from two traditional curricula in universities in Belgium (Antwerp and Ghent) were compared with those from one in the Netherlands (Maastricht) with a problem based curriculum and systematic skills training, completed questionnaires containing 265 skills items covering eight organ systems. The findings demonstrated students from a systematic skills programme as performing more skills (Remmen, *et al*., 1998).

2. Remmen, *et al* (1999) also investigated final year medical students' (Antwerp and Ghent) perceptions of the process used in faculty clerkship training in the basic clinical and procedural skills with two parallel focus groups in three meetings. The findings reported skills training as not sufficiently coordinated with clerkships: "logbooks were not well used by students, faculty interns were the most important teachers in the clerkships and feedback was not usually given" (Remmen, *et al.*, 1999). The methodology in this study focused on a small study sample of eighteen students who were remunerated for their participation.

3. Remmen, *et al* (2000) compared the basic clinical skills performance of pre-specialty trainee and GP trainee students from two similar traditional curricula which used clerkships to train in these competencies, viz. Antwerp University and Ghent University. They used twelve station thirteen minute OSCEs based on existing skills lists. Both medical schools participated in skills training in compulsory specialist clerkships. The two groups (compulsory and non-compulsory clerkships) were compared and it was demonstrated that

non-compulsory attendees performed better in acquiring basic clinical skills – an unexpected finding (Remmen, *et al*., 2000).

4. Van der Hem-Stokroos, *et al* (2001) investigated opportunities for clinical skills learning and time utilization in a surgical clerkship in a traditional medical curriculum at a university in Netherlands, using a 116 item student questionnaire. The findings of this study demonstrated the following deficiencies: students saw inadequate numbers of patients, performed variable clinical procedures amongst themselves, were never observed taking a history or doing a physical examination nor supervised doing an oral presentation and received feedback from junior doctors (registrars as opposed to consultants) (van der Hem-Stokroos, *et al*., 2001). The findings of this study have also been replicated in other studies (Hall, 1975; Olsen, 2009).

5. In the 1970's, Wiener & Nathanson (1976) investigated direct faculty observation of interns' and residents' clinical skills with clinical training in traditional curricula. They demonstrated frequent physician errors in history taking and physical examination, interpretation of clinical findings and clinical recording in graduates from traditional curricula.

6. Wray & Friedland (1983), at their general medical service in Houston, investigated interns' and residents' clinical skills level whilst being observed by consultants. These students attended training in opportunities provided in traditional curricula. They reported total physical examination errors of interns (15.6%) and residents (13.1%). These comprised omission errors (10.7% and 9.5%), whilst errors related to inaccuracies (4.9% and 3.3%) for residents vs. interns respectively. At least one of these types of errors occurred in each patient. The finding of relatively higher error rates in residents' vs. interns' clinical skills level in this study was also replicated in a study conducted by Johnson & Carpenter (1986) which is described below.

7. Findings of examination errors for house officers in medical rotations provided in a traditional curriculum was noted and presented at two teaching conferences in the USA. The house officers were evaluated by attending physicians who reexamined these patients for accuracy in the performance of the physical examination. The findings of this study indicated a mean error rate per patient of 5.8% and 6.4% for residents and interns respectively, with highest mean error rates for cardiac examination compared to respiratory, abdominal or thyroid examinations (Johnson & Carpenter, 1986).

8. Wu, *et al* (2007) at Brown University in the USA, compared the perceptions of third and fourth year students, internal medicine residents and faculty consultants of the importance of the physical examination and their self-confidence using this skill as part of the patient consultation. A questionnaire with a 5 point Likert scale collected data of students' self-confidence and ability to perform fourteen individual skills in patient consultation. The findings reporting declining clinical skills levels with little progression in improvement as graduates move to more senior academic levels but also demonstrated higher overall self-confidence at more advanced levels of training, with more senior academics perceiving the physical examination as a diagnostic tool positively. These cohorts of health professional were from traditional medical curricula. The finding of this study has obvious consequences for junior staff in hospitals for their future ability for tutoring new students in these skills.

The studies described above investigating traditional medical curricula, all relying on clerkships for clinical skills training have demonstrated many of these studies for deficiencies in graduates' proficiency in the basic clinical skills mastery.

In the following paragraphs of this review, newer clinical training reforms are described and some of the evidence presented for their perceived improvements for students' mastery of the basic clinical skills competencies.

2.5 Clinical training in modern curricula

2.5.1 Early clinical exposure programmes

Early clinical exposure programmes with specified objective outcomes in clinical competencies have succeeded in securing a place in many new undergraduate clinical programmes.

These programmes differ in three main areas: timing of implementation in the curriculum, educational objectives and outcomes, and the nature of clinical exposure. Implementation occurs as early as year one in the curriculum with vertical integration increasing incrementally throughout the programme; or single courses of specified duration and frequency in the preclinical training period of traditional curricula. They differ in the domains of learning covered, and they may offer clinical exposure as formal structured bedside teaching or in ambulant settings in hospital, the community or simulations. Comparison of these programmes is however complicated by differences in study methodology, the fact that they are conducted in different countries and that participants are drawn from different fields in healthcare. The foregoing summarises the reforms in clinical training (Littlewood, *et al*., 2005).

In South Africa clinical training reforms are in evidence at all eight universities (Lehman, Andrew & Sanders, 2000) although their curricula differ. Programmes at individual institutions incorporate a range of approaches, either alone or in combination, in which systematic basic clinical and procedural skills learning is embedded – for example integrated curricula, graduate entry and problem based learning (PBL). The University of Pretoria's new undergraduate curriculum implemented in 1997 is an example of a hybrid structure with horizontal and vertical integration of subject matter, specific clinical skills training and the use of ambulant settings. At the University of the Transkei (now Walter Sisulu University) the medical curriculum too is vertically and horizontally integrated and incorporates small group learning and early clinical exposure with procedural and communication skills learning (Lehman, *et al.*, 2000).

Whilst it is evident that many models of clinical training are in existence, this review concentrates on three of the most commonly used for providing early clinical exposure, viz. bedside teaching, shadowing and clinical practice in clinical skills units.

2.5.2 Models of clinical training

2.5.2.1 Bedside teaching

Bedside teaching has been used in traditional curricula to teach medical students the doctor patient relationship in effective tutor role modelling. This model has been demonstrated as "effective in promoting respect for the patient and facilitating patients' trust in their doctors" (LaCombe, 1997). The role of bedside teaching in providing authentic experiences in the teaching of professionalism and ethics has been added to the traditional teaching of the basic clinical skills and communication skills domains (Doshi & Brown, 2005.) It has been further noted for occurring in a "context of real patients and therefore enabling recall" (Harden, Stevenson, Downie & Wilson, 1975) in contrast with learning on simulated patients (SPs) which do not match real life practice (Ende, 1997).

In the clinical context, bedside teaching was also identified for enabling students' exposure to working as team members (Health Professions Council of South Africa, 1999) and learning the roles of individual members of the health professions (General Medical Council, 1993). To meet these objectives however, there is a need for making the roles and responsibilities assigned to each member functioning in a multidisciplinary team explicit (Dornan, *et al*., 2006). Interaction in these teams was noted to promote mutual respect, sharing and negotiation of responsibility of the tasks associated with patient care. This describes the exposure of students to the clinical environment of that period (Spencer, 2003).

Traditionally this form of learning was intended to occur passively by observation of senior peers and teachers in the course of their service commitments in providing care to patient on the wards in the hospitals. Although many educators still maintain its use as a valuable part of the overall clinical teaching strategy, bedside teaching as the sole tool of clinical instruction declined in the mid 20th century. Its decline in this period is mainly due to the high turnover of patients in tertiary hospitals and attendance for same day clinical procedures for diagnosis and treatment (LaCombe, 1997).

Much emphasis has been placed on ensuring the success of programme delivery for meeting with identified learning objectives. However, all participants in the learning interaction are identified as essential in contributing to the attainment of these objectives. Modern curricula emphasise "active participation of students, patients and tutors in partnerships in the achievement of a common goal, suggesting that 'mere opportunity is not enough'" (Corbett, *et al*., 2004).

The studies described below demonstrate student and tutor perceptions of their experiences in interacting within this mode of clinical teaching.

Nair, Coughlan & Henley (2007) investigated student and tutor perspectives of the perceived benefits of bedside teaching in the basic clinical skills domains in a New South Wales (NSW) clinical curriculum. The findings of this study reported positive experiences for both students and patients for comfort and effectiveness of this mode of learning with nearly half reporting that they had enough bedside teaching.

In another survey in NSW 152 clinical tutors were investigated regarding their perceptions of clinical teaching. Of these 95% were reported as perceiving bedside teaching as an effective clinical teaching modality for learning professional skills, but less effective in the domains of basic sciences learning and evidence based medicine (EBM) (Nair, *et al*., 1989).

The concept of students' engagement with their learning in clinical contexts has been proposed for learning to meet with desired objectives (Issenberg, 2002). Proficiency in basic clinical skills requires the provision of adequate training opportunities and students' deliberate repeated practice (Issenberg, 2002). For students to apply their skills of clinical reasoning, they need to be engaged in the process of that learning experience, not least of all their personal motivation, initiative and interest in actively seeking out opportunities (Ende, 1997). This context is also noted for allowing students' presentation of their cases and participation in discussion, and the opportunity it offers students to play an active role in learning about clinical decision making (Doshi & Brown, 2005).

It is evident from these observations that effective student participation in the clinical encounter is essential for achieving desired educational outcomes.

The role of the tutor in formal bedside teaching includes the skills of identifying learning opportunities. Other skills in this role include a level of proficiency in accordance with meeting the objectives of the teaching session and a firm foundation in basic sciences and pathophysiological mechanisms of disease (Ramani, 2003). Expectation of tutors in this role (Ende, 1997) have been identified: prior preparation in structuring the learning session to suit the clinical objectives of the intended learning, and having insight into students' level of skills and knowledge (Ramani, 2003). Tutors are expected to encourage students in the presentation of their clinical finding and participation in case discussion and should provide timeous formative feedback to students (Doshi & Brown, 2005). The role of direct student observation, in bedside practice, is important for identification of students' learning needs.

On the other hand tutors are cited negatively regarding their perception of students' clinical learning needs and their integration of basic sciences knowledge with clinical skills (Nair, *et al*., 2007). It is perceived that they are "unfamiliar with and not understanding the aim of the

bedside sessions, do not check students' clinical findings and examination technique, nor demonstrate examination technique and use didactic styles of teaching" Corbett, *et al.*, 2004). The published literature has shown clinical tutors to be inadequately prepared for their tasks as they are usually not briefed on the objectives of the clinical curriculum to be taught and clinical teaching methods, and are unfamiliar with students' clinical skills level (Ramani, 2003).

Challenges of bedside teaching

Despite the demonstrated benefits of bedside teaching as an effective medium for teaching and learning the basic clinical and professional skills there are many challenges to its success.

Logistical challenges in bedside teaching includes "tutor time constraints, patients not in bed, noisy wards, patient anxiety, lack of privacy in wards, interruptions from telephones" (Nair, *et al.*, 1989) and large student patient ratios with resultant student inattentiveness and distraction (Nielsen, Moercke, Wickmann-Hansen & Eika, 2003).

Shortages of skilled and interested clinical tutors are a major problem in teaching contexts (Ramani, 2003) owing to the obligatory teaching responsibility placed on faculty registrars and consultants already overextended in their multiple and competing professional duties (Ramani, 2003). The perceptions of tutors interacting in this learning can also be problematical: tutors in clinical teaching environments have varying expectations of students' clinical standards and techniques for examination and presentations (Corbett, *et al*., 2004).

As a result of these barriers to clinical teaching, educators have proposed useful hints (Ramani, 2003) and ways for making bedside teaching optimal (Nair, *et al*., 1989). Some have emphasized the importance for faculty support and reward for tutors (Corbett, *et al*., 2004), motivating students and patients (Ende, 1997) and using voluntary tutors to clinical teaching environments, viz. clinical teaching faculty who show interest and aptitude in teaching students complementing

the clinical teaching around the bedside (Corbett, *et al*., 2004). Other suggested strategies are patient education and eliminating interruptions, disabled telephones (Mackie, 2005), measures to increase staff cooperation (Nair, *et al*., 2007), protected teaching time (Mackie, 2005; Spencer, 2003; Nair, *et al*., 2007), tutor training (Ende, 1997; Corbett, *et al*., 2004), measures to increase tutor motivation (Ramani, 2003; Doshi & Brown, 2005) leading to positive attitudes of tutors to teaching students (Ende, 1997; Ramani, 2003; Spencer, 2003; Doshi & Brown, 2005), motivated students, informed and willing patients, feedback to students, time for students to practise their clinical skills (Corbett, *et al*., 2004), tutor incentives (Corbett, *et al*., 2004), and "written anonymous feedback of poor peer teaching for motivating underperforming tutors to improve" (Johnson, & Carpenter, 1986).

In the Wits CSP the bedside teaching for GEMP I and GEMP II students is offered in the Formal Session (FS) with student clerking of patients in the wards of the specified academic hospitals, followed by presentation of the patients' findings to the clinical tutors assigned this duty. This learning is followed by the assigned tutor checking on the patient findings presented and appropriate discussion relevant to the case. The learning in the FS is intended to provide students with exposure to the real life environment of patients presenting with clinical problems either in the wards or in ambulant settings specified for this purpose.

2.5.2.2 Shadowing

Shadowing as a form of early exposure is recommended in many different disciplines, for the purpose of offering prospective students an opportunity to experience the practice environment in the presence of an experienced mentor. This form of early exposure in many healthcare settings and in many North American medical schools is used for example as a method for introducing prospective medical students to rural practice, by encouraging student electives in

Family Medicine as part of voluntary participation in these programmes, e.g. as at the McMaster University (Blau, Aird, Dolovich, Burns & del Pilar-Chacon, 2009).

The role of shadowing in the attachment of a student with a senior peer in under-resourced healthcare environments in Family Medicine and primary care is used as a method for attracting future health professionals to this field. At several Canadian universities medical students are involved in "pre-departure training programs" to prepare students for overseas electives which include a short exposure lasting a day to a week (Anderson, Slatnik, Pereira, Cheung, Xu & Brewer, 2012). In some countries in the Middle East, the exposure occurs as a voluntary attachment of a prospective student planning a career in a specific field of practice partnered with an interested professional who volunteers professional time for this (Alweshahi, *et al*, 2007).

In the UK, shadowing is widely used at the end of medical students' undergraduate training to prepare them for their Foundation Year. It involves the attachment of a student to a doctor in a month-long shadowing experience to familiarize the student with the duties expected at the end of that period, easing the transition into the future role (Mackie, 2005).

Shadowing doctors in a multidisciplinary environment has been demonstrated to have obvious benefits for students in clinical curricula. The demonstrated benefits of shadowing as a mode of learning is evident in the findings of the studies described below.

Doshi & Brown (2005) developed a model of patient-based teaching emphasising the student's passive role in shadowing senior doctors by observation in different clinical settings around patients. This is judged to have potential in offering extensive opportunities for students based on their active involvement by taking responsibility for their own learning.

This model has also been suggested to have potential for students for learning professional attitudes to patients, skills for dealing with medical conditions arising in the clinical context and learning how to negotiate patients' management plans (Snell, 2006-7).

In the Wits CSP the shadowing by a student in the official attachment to a doctor in a hospital offers clinical opportunity for GEMP I and II undergraduate medical students in an activity that is a scheduled part of the HPD experience. This activity is neither structured nor specified to students in its intended outcome as the learning is expected to occur in the opportunistic nature of departmental service activities and scheduled educational routines. In this format the expectation is that students' experiences and participation in opportunities would vary in accordance with the disciplines of their assigned attachments and the specific interns, registrars and consultants in these units.

2.5.2.3 Clinical skills units (CSUs)

CSUs have been prescribed as desirable settings for the practice and acquisition of clinical skills proficiency (Health Professions Council of South Africa, 1999; General Medical Council, 2009). CSUs were envisaged to provide repeated clinical practice under supervision (Issenberg, 2002) on simulated patients (SPs) and manikins in a safe environment – in other words in structured educational opportunities in the domains of basic clinical and communication skills though selected activities.

The efficacy of CSU training in replicating clinical experiences in meeting curriculum objectives has been the focus of several studies. The following two studies have been selected to illustrate its role.

Peeraer, *et al* (2007) in a university in Germany compared two groups of graduates for their clinical skills competency scores. The first group was trained in CSU (years one to five in a

vertically integrated curriculum), and the second mainly in clerkships (year seven). An OSCE with multiple stations was used for assessing competence. Their study findings demonstrated significantly better results for students' clinical competence in OSCE in those students who received CSU training compared to the group trained in clerkships in the traditional seven year curriculum.

"A study at the Universities of Antwerp and Maastricht, respectively, (Junger, Schafer, Roth, Schellberg, Friedman, Ben-David & Nikendei, 2005) compares the two basic clinical skills training competencies (history taking, physical examination) and ECG analysis for two groups of students from the competency assessed with OSCE and MCQ examinations. One group received basic clinical skills training in a CSU, bedside teaching and communication skills training, whilst the other received only bedside clinical teaching and practice for an equivalent number of hours of training. The findings of this study support the CSU exposure group as having performed better in these skills areas. This study was however flawed with poor validity as the measures in the OSCE included only five stations.

The role of CSUs as alternative settings for providing clinical teaching has now come to be regarded as a useful adjunct for clinical training opportunities in the basic clinical and communications skills domains as well as some procedural skills. Students work with healthy volunteers or mannekins, prior to practice on real patients. Ahmed (2008) describes CSUs for teaching clinical interviewing skills using SPs for role playing and for other skills as less stressful settings for students and tutors, in comparison with hospital environments. A study at the University of Miami, reviewing the literature of high fidelity medical simulations in clinical skills training, demonstrated the importance of CSUs in providing clinical skills mastery by repeated practice. In this study students perceived CSU learning as happening in a safe environment in which they can train repeatedly, build self-confidence, see patients, and enhance their clerkship outcomes (Issenberg, 2002).

CSUs allow students practice in situations precluding examination of real patients e.g. where patients are too ill to participate in student learning, and in those skills that are not considered suitable for repeat practice by students, viz. the examination of the pregnant abdomen and rectal, pelvic and the female breast examinations (Ahmed, 2008). The latter examinations are viewed as compromising patients' dignity and if carried out on live patients would not allow students adequate practice for acquiring confidence (Silverman & Wood, 2004).

Others have also suggested the use of CSUs for educational activities outside the domain for which they were initially designed (Dent, 2002), viz. as useful venues for interdisciplinary staff training and for formal assessments of clinical skills proficiency, the practice of procedural skills and emergency medicine training courses and in postgraduate training.

The quality of clinical training is a phenomenon described widely in the published literature. Its scope has extended to include the quality of partnerships in the clinical context as an influence on the quality of outcomes. This is described in the two studies below.

The relationships in the settings of CSU between SPs, medical students and senior peers have been explored in a study using student questionnaires, senior peer focus groups and a seven station OSCE with SPs. The aim of the study was to identify the factors that operate in the clinical learning environment and the experiences of partnership in teaching. Students reported increased satisfaction and comfort, interactive learning and received feedback from peer tutors as opposed to their experience with 'paid' medical practitioner tutors. There was however no difference in OSCE outcomes for these two groups (Issenberg, 2002).

Third year medical students' perceptions of their skills training in CSUs were compared with those developed with 'real patients' in an eight week clerkship at a university in Denmark. Students in a traditional medical curriculum attended a nine week clinical programme and completed three questionnaires, one pre-CSU, one post-CSU and one post-clerkship. Descriptive

analyses were conducted. The findings demonstrated both groups of students' positive attitudes and experiences for both settings; however ratings for CSU were higher than clerkship although students preferred clerkship over CSU (Nielsen, *et al*., 2003) – the clinical partnership being more prominent in clerkships.

2.5.3 Simulated patients (SPs)

The use of SPs as models in simulating physical signs, role playing paper based history scenarios, assessment and giving feedback to students has been well described (McGraw & O'Connor, 1999; Cleland, Abe & Rethans 2009; Eagles, Calder, Wilson, Murdoch & Sclare, 2007). SPs have been used successfully since the 1970s at McMaster University in Ontario, Canada, to portray the clinical symptoms and signs of a wide range of medical presentations, and to role play 'patients' in practising and in assessing student competence in the basic and clinical communication skills domains (Eagles, *et al*., 2007). For these programmes, SPs are recruited from a variety of sources, including professional actors, retired community volunteers, university students and faculty staff members. They represent an important teaching and assessment resource for clinical training programmes. For portraying their intended clinical role, they do however need to be carefully selected, trained and assessed (Dent, 2002; Eagles, *et al*., 2007).

The literature describes ongoing debates contesting the use of real patients vs. SPs in providing similar opportunities in bedside learning. Some centres chiefly using SPs to provide clinical training practice for students, argue the benefit of this system's reliability in replicating the experience where traditional clinical environments for this teaching are not available. Many suggest the use of SPs for providing an initial opportunity for students to familiarize themselves with procedures, whilst providing parallel opportunities for practising with real patients (Silverman & Wood, 2004).

At New York University Medical School the use of virtual and live SPs for teaching clinical skills was piloted (Triola, Feldman, Kalet, Zabar, Kachur, Gillespie, Anderson, Griessner & Lipkin, 2006). They compared the perceptions of a sample of registered health workers before and after a continuing medical education (CME) workshop. Participants were randomized to two groups to receive either live cases or two live and two virtual cases. Findings demonstrated equivalent ratings for students' positive experiences of comfort levels and preparedness in rendering health care in the skills taught in both experiences.

At Wits the Clinical Skills Session (CSS) learning is provided in a simulated environment in the clinical skills unit (CSU) with SPs used where necessary. For practising the learning activities SPs constitute a valuable resource, maintained by the recruitment and retention of enrolled tertiary education students and community volunteers. These are usually unemployed individuals interested in engaging with students in their learning. Their training takes the form of orientation to their role in apprenticeship to senior SPs who have been in the programme for an extended period. In each session however, SPs are specifically briefed on the educational objectives for teaching and guided in this role by clinical tutors in the CSP.

2.5.4 The clinical skills tutor

In the clinical skills programme (CSP) the role of the tutor in clinical skills sessions (CSS) includes the following:

- Demonstration of the clinical skills..
- Supervision and facilitation of students' learning in the practice of the clinical skills domains of history taking by role playing paper based cases with colleagues.
- Physical examination of SPs or peer volunteers and manikins.

- The application of basic sciences learning by understanding the pathophysiological mechanisms for physical signs.

Expectations of tutors to this role require them to be interested in teaching and interacting with students and a prescribed standard of proficiency in the basic sciences and clinical skills, sufficient for meeting the educational objectives in this learning. All CSU tutors are expected to attend the student briefing session which is conducted prior to each CSS, expounding the subject matter and demonstrating practice of the clinical skills. The tutor needs to be familiar with the objectives of the learning practice ensuring students' adequate practice in the selected clinical activities and providing students with relevant formative. The role of formative feedback is important for students' remediation with repetitive practice (Issenberg, 2002).

2.5.4.1 Peer tutors

In response to staff shortages volunteers have often been used for clinical teaching in CSU programmes, and in assessing students' assessment of basic clinical skills proficiency. They function as an additional resource to regular CSU tutors, i.e. the faculty clinical skills tutors and general practitioner tutors not affiliated with faculty who usually provide this role. Peer tutors as volunteers have been successfully used in clinical skills tutoring, but need to have the prerequisites applied to their practice, as do other clinical tutors in this environment (Issenberg, 2002).

Students report that senior peer tutors provide an interactive environment and relate more easily to their junior peers (Hudson & Tonkin, 2008).

2.5.5 Clinical training in ambulant settings

A feature of many clinical training programmes is the use of ambulant settings in hospitals, communities and rural areas in the early years of undergraduate medical training, to complement

training in CSUs and academic hospitals. The diversity of models of clinical training varies as much as do the different ambulant settings themselves.

Some of these studies in the published literature reflect this diversity; a few are listed below:

- An investigation into clinical training of interns in a district hospital in the Western Cape Province (Jaschinski, 2008).
- Community placement of preclinical students with a chronic patient in the community in a longitudinal programme, designed to teach students the skills of history taking and clinical interviewing, viz. the Dundee approach to early patient contact (Lockwood, 2008).
- A study of an early clinical exposure at the University of Natal for Year One and Two students, in healthcare visits in community and GP settings (McLean, 2004).
- A study investigating the introduction of a clinical skills component of a third year course at a tertiary institution at Adelaide University (Hall, 1975).
- A study describing observed student encounters in early clinical preceptor ships in GP and community settings in New Hampshire, USA (Ogrinc, Eliassen, Schiffman, Pipas, Cochran, Nierenberg & Carney, 2006).

Despite the widespread use of ambulant settings for these programmes educators have expressed concerns regarding the difficulties in conducting evaluations in these settings. They cite that the cost of performing these evaluations is prohibitive and highlight the paucity of published studies to date investigating the success of such programmes (Ogrinc, *et al*., 2006).

2.6 Evaluations of clinical skills programmes

In the 19th century evaluation of clinical training was not a routine part of administering medical curricula, only gaining acceptance subsequently. However, Littlewood, *et al* (2005), note that

implementation of undergraduate medical curriculum reforms in the last four decades often preceded evaluations demonstrating their benefits.

As described in 2.5.1, evaluators of modern clinical curricula emphasise the importance of including input of all role players to these programmes, i.e. students, tutors, patients and faculty. Although many institutions attempting to enhance the quality of the learning experience for their students have tended to concentrate their efforts mainly on studying the experiences of students, increasingly more have now initiated tutor evaluations of their programmes. Clearly, not all these evaluations allow viable comparisons (Austin & Gregory, 2007; Nair, *et al*., 2007).

Some of the methods used in the evaluation of clinical programmes are listed below.

- Surveys, questionnaires, interviews, focus groups and on-site observation of students, tutors and patients/
- Student reflective portfolios and diaries (paper based and hand-held with online data entry) and logbooks. These are applied prospectively or retrospectively at intervals either prior to, during or at the end of undergraduate or postgraduate studies.

The student groups include medical, dental, nursing or allied health professionals' programmes.

This summarises the literature, in relation to methodology and instruments for evaluation of clinical teaching interventions (Lam, *et al*., 2002; Littlewood, *et al*., 2005).

Reports of benefits demonstrated in evaluations from some clinical skills programmes are listed below:

- "Increased student motivation for their vocation to be doctors" (Lam, *et al*., 2002).
- "Learning empathy for and being more confident in interviewing patients.
- Appreciating the impact of the clinical context in patients' illness.
- Learning professional role modelling" (Littlewood, *et al*., 2005).

Whilst demonstrating benefits for enhancing students' clinical competency outcomes, these programmes have also demonstrated benefits for tutors and patients. (Nair, *et al*., 2007: Hudson & Tonkin, 2008; von Below, *et al*., 2008).

At Wits, the evaluation of the CSP is conducted at the end of each organ system block as part of curriculum evaluation. The students' evaluation of the learning in these blocks is therefore completed ten times in the two year cycle. The results of these evaluations are used for identifying problem and the needs for student remediation or interventions in the programme.

2.6.1 Student evaluation

The review has detailed the numerous evaluation strategies described in the published literature for the area of clinical training. Amongst those described in this review are evaluations which have identified the following variables to be important, viz. the learning activities (Hall, 1975; Lam, *et al*., 2002; Torre, *et al*., 2003; Diemers, *et al*., 2007; Howe, Dagley, Hopayian & Lillicrap, 2007), resources, tutor characteristics (Johnson & Carpenter, 1986; Kua, Voon, Tan & Goh, 2006; Alweshahi, *et al*., 2007; Huggett, Warrier & Maio, 2007; Kelly, 2007) and student preparedness (McLean, 2004; Halaas, *et al*., 2007; Huggett, et al., 2007; Matheson, C.B., Matheson, D., Saunders & Howarth, 2010) for early clinical contact programmes. These studies are detailed below.

2.6.1.1 High quality learning activities and adequate resources

Third year students in an early exposure programme using multiple instruments:

At Adelaide University, Hall (1975) evaluated an early clinical contact course for achieving the course objectives. The participants were third year medical students and staff whose perceptions of their experiences of a two week period in this programme were investigated using questionnaires, free response written accounts and direct observation. Clinical learning was

provided in this session, with videos, lectures and bedside tutorials preceding clinical interviews with hospital patients. The findings of this study demonstrated poor coordination of bedside session teaching between hospital tutor and course staff with students perceiving the teaching method as didactic.

First and second year students' experiences of a CSU programme in a hybrid curriculum using questionnaires and focus groups:

Lam (2002) at the University of Hong Kong, explored Year One and Year Two medical students' perceptions of participation in an early introduction clinical skills programme in a traditional curriculum with small innovations, focusing on factors affecting student learning. The clinical programme incorporated graduate entry and basic clinical skills learning in Years One and Two of a five year integrated curriculum. In this programme, the content took the form of an initial demonstration with audiovisuals which was followed with skills practice in a CSU, but no hospital exposure. The students attended 30 randomly selected focus groups and completed questionnaires covering the basic clinical skills competencies at the end of the academic year. Themes were constructed. An analysis of the results reported positive student perceptions of the early clinical experience in this programme.

First and second year medical students' experiences of an integrated curriculum using mixed methods:

Howe, *et al* (2007) investigated a CSP implemented in Year One of a two year integrated curriculum at a UK medical school, focusing on students' experiences of their participation in learning to gather information from patients. They used a mixed methods case study with student and staff completing encounter forms, questionnaires, interviews and focus groups. The results showed students' positive experiences of their contact with patients and real opportunities for learning to integrate theory with practice.

Third year medical students' perceptions of educational resources in an ambulatory setting in an integrated curriculum using questionnaires:

At Maastricht University Diemers, *et al* (2007) evaluated third year students' perceptions in an integrated PBL curriculum of early patient experience using real patients in an outpatient setting – one exposure per week. Students completed questionnaires at the end of an organ system block in the programme. Their findings showed the integration of theory with practice as being problematic, suggesting the need to select patients carefully, to ensure adequate provision of suitable patients and to institute teacher training courses to enhance this experience in meeting curricula objectives.

The findings in these studies indicate student perceptions of potentially high quality teaching activities associated with encouraging student participation, having authentic patient experiences, good organization and coordination of teaching sessions, and adequate resources for providing the learning opportunities for achieving prescribed outcomes.

2.6.1.2 Tutor characteristics

The following studies demonstrate student perceptions of the quality of tutoring.

Third year medical student perceptions of important tutor characteristics in an early clinical contact programme using questionnaires:

Students' expectations of their clinical learning experience have demonstrated the importance of including their input into programmes affecting their learning (Alweshahi, *et al*., 2007). This study, at a University in Amman, investigated third year clinical students' expectations of effective tutor characteristics (professional and personal demographics) in a four year hybrid curriculum. A student questionnaire comprising 23 items was used. The study findings suggested high student rankings for tutor ability for communication, listening skills, approachability and

encouraging critical thinking skills; ratings of tutors' personal demographics i.e. academic rank, nationality, gender and language skills were of lesser importance (Alweshahi, *et al*., 2007).

Third year students' perceptions of high quality learning activities in a medical rotation using questionnaires:

Torre, *et al* (2003) investigated third year students' perceptions of learning activities they associated with high quality teaching in a two month medical rotation at four sites at the University of Wisconsin. Findings demonstrated students' perceptions of the importance of receiving feedback from faculty tutors which was associated with high quality teaching behaviour.

Second year students' perceptions of effective tutoring at different levels of hospital care in a clinical programme, using questionnaires:

In a USA clinical programme Johnson & Carpenter (1986), investigated the role of written formal feedback to teachers in improving the quality of their teaching. Questionnaires were completed by second year students who "rated time utilisation, tutor characteristics and course attributes in courses taught at teaching hospitals, district hospitals and GP practices evaluating 27 units". Their study findings show that students rate district hospital tutors and GP tutors as significantly better than teaching hospital tutors. The latter were perceived to be poorly prepared and uninterested in students.

Second and third year nursing students' perceptions of tutor characteristics, using questionnaires:

Kelly (2007) explored second and third year nursing students' perceptions of effective clinical teaching by comparing two groups over 14 years: one in a diploma and the other one in a degree course respectively, at an Australian University. Interviews were followed with questionnaires

covering the domains of teaching, contextual influence, and teacher knowledge, feedback and communication skills. The findings reported students' perceptions of tutor knowledge as most important, followed by feedback and communication skills. Less important findings were students' acceptance by staff, student tutor ratios and peer support.

First and fifth year students' perceptions of effective medical tutors, using questionnaires:

In a medical school in Singapore Kua, *et al* (2006) investigated first and fifth year students' perceptions of effective medical teachers, using questionnaires. The findings of this study demonstrated both groups of students perceiving good teachers as having two attributes, viz. being passionate about teaching and motivating and inspiring students. Fifth year students highly rated tutors for encouraging student participation (55%) in contrast with first years (40%); the latter also rated tutoring ability for the integration of learning as important (43).

Second year students' perceptions of tutor characteristics in an ambulatory setting, using reflective journals:

In a private Midwestern medical school in the USA in a longitudinal clinical course Hugget, *et al* (2007) investigated the perceptions of early clinical students regarding effective tutor attributes in a programme with an ambulatory setting. Using reflective student journals the findings demonstrated three perceived attributes of effective tutors: professional competency, ability to create an environment conducive to learning and professionalism.

Early medical student experiences of new curricula and the learning environment, using student questionnaires and interview

Lehman, *et al* (2000) at the Universities of the Transkei and Pretoria compared early medical students' experiences of the implementation of new curricula in their respective institutions. Student questionnaires and interviews were used for investigating the similarities and

differences, and the weaknesses and strengths of 'the learning environment' in the first two preclinical years. In these two programmes, early clinical contact was provided through terms one to four in either a hospital or community setting. Facilitators in the programmes were volunteers who were trained in the course objectives. The findings emphasised staff capacity and staff development needs for implementing programmes. Students reported positive experiences and were motivated to become active participants in their learning.

These evaluations of student perceptions in early clinical contact programmes demonstrate positive student perceptions regarding effective tutoring associated with tutors showing enthusiasm for teaching, encouraging student participation, giving feedback, demonstrating the ability to communicate effectively and inspiring confidence by their knowledge and clinical skills.

2.6.1.3 Students' preparedness for early clinical contact programmes

Whilst early clinical contact programmes have demonstrated benefits, questions have been raised about students' expectations about preparation for such experience. Preparation of students, tutors and patients for early clinical experience has been identified as important for ensuring their "level of comfort, participation in and success of intended learning outcomes" (McLean, 2004; Halaas, *et al.*, 2007; Huggett, *et al*., 2007; Matheson, *et al*., 2010).

The published literature describes these expectations in relation to some of the findings from many such investigations.

Third year students' experiences of preparation for a rural rotation, using questionnaires:

In Minnesota, USA, Halaas, *et al* (2007), describe a course preparing third year medical students for their rural rotation. The course used clinical activities with case scenarios to prepare students in the learning objectives of their intended practice. The activities focused on distinguishing

urgent from non-urgent medical problems, communicating effectively in stressful situations, uncovering hidden agendas in patient consultations and using guidelines for clinical decision making. The evaluation data were collected using questions linked to a Likert scale. Both faculty and students showed enthusiasm for the hands-on practice in preparing students.

First year students' preparedness for early contact using course evaluation data:

At the Nelson Mandela School of Medicine McLean (2004) investigated first year medical students' preparedness for early clinical contact using a student survey as well as course data. Students reported positive experiences of the programme related to its purpose of introducing them to their future practice as doctors; the hands-on practice of ambulance duty and labour ward experience were perceived as most rewarding.

Graduates exposure to shadowing a senior peer using questionnaires:

Matheson, *et al* (2010) surveyed students' experiences eight months after attending a UK foundation year attachment. Positive student responses were obtained about such preparation in increasing their confidence, attitudes, skills and knowledge of their intended future roles, with less than a third perceiving the lecture component of the course as unhelpful.

Hugget, *et al* (2007) investigated an early contact programme previously cited, demonstrating student expectations of being informed of the objectives of their clinical training, prior to the intended practice.

Postgraduates' evaluation of their undergraduate training:

Gottlieb, Rogers & Rainey (2002) described the use of postgraduates' evaluation of their undergraduate training by ratings of their "skills, knowledge and attitudes developed in opportunities in their undergraduate training programme, as a basis for its effectiveness in preparing them for practice" (Gottlieb, *et al.,* 2002).

The findings of these studies emphasise students' expectations concerning input in the planning of these progammes; about being informed of their objectives; and more specifically about provision of opportunities for hands-on clinical practice as preparation for the tasks of their intended role.

This section has concentrated on investigations of student perceptions of their experiences with new clinical training programmes. It is also pertinent to visit the findings of tutor and patient perceptions of their experiences.

2.6.2 Faculty and tutor evaluation of process

Faculty evaluation of programme delivery is important for identifying the challenges associated with clinical training and for meeting the need for adequate resources in achieving curriculum objectives.

Faculty evaluation of process has been identified to be important for informing programme reform and encouraging professional performance (Gottlieb, *et al*., 2002; Eagles, *et al.*, 2007)

Von Below, Hellquist, Rodjer, Gunnarsson, Bjorkelund & Walqvist (2008) evaluated tutor perceptions of an early professional contact course at the University of Gothenburg, in which four students were allocated to a tutor. The hospital attachment was for eight sessions per year in Year One. For Year Two the process was repeated for the students in either Family Practice or a community attachment. Twenty one facilitators completed questionnaires containing 25 items. The findings demonstrated tutors' ability for motivating students in participation. Tutors on the other hand reported increased workloads and received little support from their heads of unit pointing to a conflict in tutors' professional tasks. This study emphasises faculty's role in tutor support with staff training courses and dedicated teaching time.

2.6.3 Patient evaluation

Patients' perceptions of participation in activities with students have been used for programme evaluations in the area of recruitment and creation of a sufficiently large patient base with willing and suitable patients for clerking purposes, student evaluation and feedback (Nair, *et al*., 2007).

A study by Howe, *et al* (2007) investigated patients' experiences of acceptability in participating with student activities in hospital demonstrated positive patient attitudes. The design used a mixed methods case study, gathering information from patients, students and tutoring staff with data encounter forms, questionnaires, interviews and focus groups. Patients were reported to have "enjoyed the interaction with students" and were "willing to attend specifically for this purpose" (Howe, *et al*., 2007).

2.7 Assessment of clinical competence

Evaluations of training programmes would be incomplete if they excluded assessment of student performance.

In traditional clinical curricula the assessment of formal theory typically occurs in written examinations (MCQs and modified essay questions – MEQs) which also examine the related applied theory. Issenberg (2002) describes the testing of students' clinical ability in these traditional curricula by means of a single 'long case'. He points out that this model of clinical examination needs to be complemented by other formats of examination to ensure adequate coverage of clinical curricula. This incidentally describes the form of clinical assessments in the traditional undergraduate medical curriculum at Wits.

An objective method for the assessment of this clinical competence is described below.

2.7.1 Objective assessments of student performance

The Objective Structured Clinical Examination (OSCE) was first described by Harden, Stevenson, Downie & Wilson (1975) as a method for objective assessment of student performance. They noted the design of this method as suited to application in objectives based curricula to assess the intended learning skills outcomes in the competencies of individual programmes (Harden *et al.,* 1975). Introduced in 1975, the OSCE was described for testing a large range of clinical skills domains with large groups of students.

The main provisos for conducting this examination are listed below.

- Strict criteria for ensuring validity and reliability, viz. a certain minimum number of clinical stations.
- Trained examiners to rate students with standardized checklists.
- Observing the performance of the tasks.

A major drawback of this examination has been its huge resource requirements (Harden, *et al*., 1975).

At Wits the results of students' performance in summative OSCEs in the CSP in GEMP I and II have shown consistently high results; the minimum standard for proceeding to the next level of study, has been a mean of 60 % in all examinations including the OSCE. The mean class averages for the OSCEs for GEMP II students' registered in the 2006 to 2009 academic years have been high – in the region of 80%.

2.7.2 Student self-assessment

The practice of self-assessment has been widely used as an indicator of programme delivery. It is frequently employed in higher education settings as a method informing academic progress (Barnsley, Lyon & Ralston, *et al*., 2004).

The findings of self-assessment as useful tools for informing student learning needs have also been investigated in other learning environments, "in the health sciences field as well as in allied clinical disciplines" (Littlewood, *et al*., 2005). Studies in these fields have used a variety of approaches: e.g. surveys and logbooks (journal keeping for describing experience at the time of the exposure, or retrospectively to ensure student recall of relevant experience (Littlewood, *et al.*, 2005).

However, some have questioned the accuracy of self-ratings for identifying students' learning needs (Falchikov & Boud, 1989; Dornan, *et al.*, 2006). In addition, educators are also divided on their opinions regarding the accuracy of such skill as a method of evaluation questioning its validity. It has been suggested that the accuracy of such skills assessment is dependent on several factors, not least of all students' formal training in self-assessment and opportunities for practice in this activity (van der Hem-Stokroos, *et al*., 2001). The methods for evaluating self-assessments as tools for their accuracy in predicting students' performance have been complemented by those of their tutors and peers, comparing self-ratings with students' objective performances as rated by others.

Studies selected from the literature on student self-ratings illustrate the diversity of their reported findings.

Van der Hem-Stokroos, *et al* (2001) at the University Hospital, Amsterdam, investigated students' perceptions of the educational quality of their clerkship at the end of their surgical clerkship, using a 116 item questionnaire. The findings of students' ratings of the quality of their clinical skills demonstrated that students can adequately judge their "ability to correctly diagnose, analyse and manage patient problems for a wide variety of clinical conditions" (van der Hem-Stokroos, *et al*., 2001). They conclude that indirectly students' self ratings are reliable indicators of their ability.

Junior students' ability to rate their skills accurately was investigated by Austin & Gregory (2007). In a study (described below), he compares students' self assessed ratings with those of their tutors, demonstrating significant differences (Austin & Gregory, 2007). Mavis' study (quoted in Wangisooriya *et al's* article, 2004) also indicates that second year students' score significantly lower for clinical competence in their teachers' ratings compared to their own (Wanigarooriya, *et al*., 2004). The study of Weinrich, *et al* (2010) of tutor evaluation of observed student performance demonstrated significantly lower scores for clinical competence from tutors' ratings compared to students' own assessments.

At the University of Sydney, Barnsley, *et al* (2004) compared junior medical officers' self-confidence in routine procedural skills compared with their observed performance. The results of his study revealed a "broad range of reported competency levels for some commonly performed practical procedural skills" (Barnsley, *et al*., 2004), but with some students performing at suboptimal levels when observed – thus indicating a lack of concordance between self-assessed confidence and observed competency in the chosen clinical skills.

Falchikov & Boud (1989) explored students' self-assessments in the clinical skills domains of physical examination, clinical decision making and professional behaviour in their 1989 meta-analysis of studies of students' qualitative self-assessments compared to tutor ratings of students. They identified factors associated with closer correlation of students' self-assessed and teacher ratings of student performance, viz. study design, course level and broad area of study. The findings of their meta-analysis also indicated the tendency for "upper level students with their broader theoretical and experiential knowledge to generally rate themselves lower" (Falchikov & Boud, 1989).

Austin (2007) in the USA investigated senior pharmacy students' accuracy in self-assessments of their interpersonal and communication skills by comparing these results to ratings given by

pharmacy instructors, peers and SPs. As part of the curriculum the students were exposed to opportunities allowing them to practise the skill of self-assessment. The findings demonstrated significant differences in ratings of students' performance across all skills domains, particularly in relation to empathy and logic in interviewing; the accuracy and quality of students' self-assessed ratings in his study were not as strong as expected.

Watts (2009) described the process of developing first year nursing students' self-confidence in self-rating of their psychomotor skills. Videotaping techniques were used during students' performance of clinical tasks followed by immediate self-assessment with a prepared checklist for scoring. The findings of this project indicated again that students generally overrate themselves in comparison with faculty tutors' assessments of the formers' performance. The findings of this study are replicated in similar studies, demonstrating students as overrating themselves (Falchikov & Boud, 1989).

Further studies investigating the relationship between self-assessment and observed competence are described below:

Wangisooriya, *et al* (2004) in a university in Sri Lanka investigated five dental student cohorts in their self-assessment in 46 essential skills in dental surgery at graduation. He used a questionnaire to evaluate their perceptions of competence in these clinical skills. All five groups followed similar curricula and ranked these clinical skills in order of 'least confident' to 'most confident'. He concluded that students' self-assessment results of all five student cohorts were consistent, and that students' self-assessments are therefore reliable indicators of the strengths and weaknesses of the curriculum.

Dornan, *et al* (2005) at the University of Manchester investigated third year medical students' evaluation of the environment, process and outcome of their curriculum and correlated these with their assessment results. The study was conducted in the last week of each module of a

horizontally integrated curriculum using summative assessment and a previously validated scale. Four summary measures were identified. In two of these, 'real patient learning' and 'curriculum coverage' evaluation by students correlated with the students' assessment outcomes. The remaining two measures, viz. 'quality of tutoring' and 'conditions of learning' were not significantly correlated with objective assessment measures (Dornan, *et al*., 2006).

Stackhouse & Furnham (1983) investigated speech therapists' introduction to the skills of self-assessments of their clinical skills, using a 'student centred approach'. The results of students' self-assessments were compared with their end-of-year-practical and written examination results in arriving at a predicted value of these ratings. Their results indicated differences between raters: tutor ratings were higher and student ratings lower (Stackhouse & Furnham, 1983). Their recommendation was for students to practise this skill to master it.

In summary it is not surprising that the accuracy of the skill of self-assessment is perceived by many as dependent on practice in this process, with some recommending "specific training in this process" to assist students in acquiring these skills (Barnsley, *et al*., 2004).

2.8 Quality of clinical training

The quality of clinical training is a phenomenon widely reported in the published literature.

The American Association of Medical Colleges (AAMC) Report (2004) identified the factors perceived to promote clinical learning, to include "the provision of adequate and relevant educational resources in settings appropriate to this learning with opportunities provided longitudinally for successful integrated learning" (Corbett, *et al*., 2004).

Other factors proposed for meeting students' needs for clinical practice are the "attitudes of students, patients and tutors interacting in this environment" (described in 2.5.2.1).

2.8.1 Resources

Adequate resources are crucial for students' effective engagement with their learning. These resources have been identified in three main areas:

- The availability of sufficient numbers of suitable patients for clerking.
- The availability of sufficient numbers of interested and skilled clinical tutors.
- The availability of sufficient volumes of suitable functioning medical and electronic equipment and models.

2.8.1.1 Patient availability

Students' needs for "direct patient opportunity for acquiring practice in the basic clinical skills" have been noted by Dornan, *et al* (2005), and Feddock (2007). These learning opportunities need further refinement to ensure that patients for practice are deemed "suitable" for clerking by an active process of selection for this purpose (Doshi & Brown, 2005). Olsen, *et al* (2005) cited patients who are "either too ill to participate, or post surgery" as "inappropriate for clerking" (Olsen, *et al*., 2005). However, these needs have to be balanced against the realities of the clinical environment and its opportunistic nature for the provision of educational material for the intended learning. This problem is further compounded by the reduced patient base suitable and available for clerking for the many competing cohorts of students needing similar opportunities as reported by Hall (1975), and LaCombe (1997). This occurrence has been ascribed to patients' reluctance to participate in student learning, due to factors such as "prior negative experiences with similar encounters, having already volunteered and concluded participation with a different group of students and not adequately counseled about the process and its objectives" (Corbett, *et al.,* 2004). Further factors in the observed increased student-to-patient ratios are rendered by "patient unavailability for participation, by attendances for prearranged tests, or therapy or the presence of visitors to patients" (Nair, *et al*., 1989; Olsen, *et al.*, 2005).

A NSW cross-sectional audit described the availability, accessibility and willingness of all adult patients for participating in bedside teaching with students at four teaching hospitals (two tertiary, one district and one general Medicine and Surgery). This audit conducted three times two months apart, reported only half of the patients as being accessible to students on any given day. Of those present and accessible, 70% indicated their willingness to see students for teaching purposes. Only 11% of patients were absent, and the most common reason students they could not see patients was them being classified by nurses as "unfit" (25%), or "inappropriate" as a result of being too ill or not relevant to the study block. The study findings reported "no attention given to the selection of patients, patients not available at the time of clerking and large students groups for clerking" as further reasons for the unavailability (Olsen, *et al*., 2005).

The problem of patient availability and relevance for teaching as evidenced in the findings of these studies can be turned to advantage: some educators recommend that these situations should be recognised as potential teaching opportunities (Olsen, *et al*., 2005).

2.8.1.2 Clinical tutors

Adequate numbers of trained clinical tutors are a necessity for guiding student practice in undergraduate medical programmes. However, tutoring in clinical environments has been influenced by individual tutor characteristics. These tutor characteristics are described below.

Tutors' professional demographics, availability, interest in teaching and ability are some of the factors affecting the quality of learning in the clinical context (Ende, 1997; Corbett, *et al*., 2004). The importance of "tutor interest in teaching students, tutor competence, teaching style, time for prior preparation for the session and allowing students to make oral presentations" are prerequisites for student perception of the quality of their learning (Ende, 1997).

Tutor competence may be encouraged by participation in faculty training programmes, but 'tutor unavailability' with resultant large student-tutor ratios around patients' bedsides are amenable to change only if institutions providing this teaching have the necessary funding for improving staff capacity (Eagles, *et al*., 2007). Tutor characteristics not easily manipulated for achieving change in learning outcomes include tutor rank, attitude and interest in teaching (Ende, 1997).

2.8.2 Students' attitude

Student attitude has been frequently reported to influence the opportunities for learning in clinical environments. A positive attitude on the part of the student, viz. motivation for and accepting personal responsibility for learning, is considered a prerequisite for promoting the achievement of intended learning outcomes (Issenberg, 2002; Hudson & Tonkin, 2008; Jaschinski, 2008).

2.8.3 An environment conducive to learning

Finally, the quality of the relationship between tutor and student is thought to be important for nurturing student learning by determining the opportunities for learning in this context and improving outcomes (Corbett, *et al*, 2004). Learning approaches applied in clinical environments affect students' perceptions of their learning experience (Lam, *et al*. 2002).

Evaluation instruments which enable measurement of this clinical context have been developed by some researchers, viz. the DREEM instrument, which combines the modes of student diaries and direct observation (Silverman & Wood, 2004). More recently, some academics in the Wits GEMP have piloted an instrument with multiple groups of participants and instruments, viz. student and tutor questionnaires and onsite observation, for monitoring these processes (Green-Thompson, Mc Inerney & Veller, 2010).

2.9 Challenges of programme delivery

The published literature of new clinical training and assessment initiatives reports numerous instances of programme success as well as challenges to their implementation, with several studies in the literature already quoted reporting problems in implementing new programmes in existing curricula.

Organisational problems and lack of resource capacity for maintaining new programmes have been reported by some evaluators in medical training. The provision of adequate infrastructure, resources and learning opportunities; the provision of suitable educational material and patients, sufficient numbers of trained, available and enthusiastic educators and staff in clinical programmes and funding for successful programme coordination and delivery have been noted in preceding sections of this chapter to be key factors in achieving good results. Reduced dedicated tutor teaching time (Jaschinski, 2008), reduced patient contact time and poor faculty and tutor coordination of clinical sessions (Hall, 1975) are some key challenges. These are real challenges in the face of ever-increasing needs for training larger numbers of students and potential threats for the maintenance of these clinical training programmes.

Programme organization and implementation i.e. coordination, communication, timeously informing students, clinical faculty and patients, and involvement of all relevant stakeholders in participating and negotiating perceived reforms and the processes of their implementations, are some of the considerations in responding to these challenges (Corbett, *et al*., 2004).

The need for collaboration (nationally and internationally) and centralisation of resources for providing the infrastructure to implement clinical training reforms; the sharing of resources, teaching strategy and funding (Hartley, *et al*., 1999; Council of Deans of Medical Schools within Ireland, 2004); "standardisation of national curricula and certified tools of evaluation" (Hartley, *et al*., 1999); financing of medical education in maintaining programme delivery (Cooke, Irby, Sullivan & Ludmerer, 2006); tutor support and training programmes (Ende, 1997); dedicated

teaching time (Johnson & Carpenter, 1986); and improved bedside teaching (Junger, Schafer & Roth, 2005) – all are clear priorities and critical areas of evaluation..

Clinical training is a dynamic field and is subject to constant change, requiring regular programme evaluation and interventions informed by students, tutors, patients and faculty to achieve predetermined educational objectives. The literature discussed in this chapter details many challenges informing future research initiatives.

This literature review has highlighted, globally the implementation of a variety of new clinical training initiatives whilst emphasizing the relatively recent implementation of their evaluation. It has illustrated the diversity in programmes structure and evaluation methods and the many challenges to its successful delivery, in the absence of an ideal clinical training model.

Chapter 3

METHODOLOGY

3.1 Introduction

Chapter 2 highlights studies of early clinical exposure programmes and their evaluation using a variety of research methods. Student perceptions of their educational experiences as one method of programme evaluation provides information on the quality of clinical learning, based on student perceptions of their experiences in learning opportunities and of the human and educational resource requirements for adequate learning experiences. This approach has also employed the practice of student self-assessment as an indicator of programme delivery.

3.1.1 Theoretical Framework

Theories of learning (implicit or explicit) have direct relevance for the choice of learning methods, educational activities and opportunities in the contexts where the learning will be applied (and therefore also of its evaluation This is especially so in relation to clinical learning which ideally occurs by exposure of students to learning activities in specific clinical environments (Conn, *et al*., 2012)

My perceptions of how learning occurs are based on four theories of student learning and form the basis of the theoretical framework which informed my choice of methodology for this study. The strategy of learning and evaluation of the educational activities of the HPD in this CSP is inherent in the structure of the outcome based approach for learning in this programme. An outline of the main principles underlining the alignment is described below.

Beginning in the early 1900s the behaviourist school of psychology proposed its theory for explaining the behaviour of individuals based on their response to stimuli. This theory based on

a theory which views learning as happening in a linear form, i.e. to be' passed down from tutor to student' from gained momentum in the middle of the 20th century but lost favour after its observed shortcomings. This behaviourist school of thought traditionally associated with Skinner (Morris, *et al*., 2005) was followed with the development of other theories, e.g. the cognitive model of learning by Piaget (McCloud, 2007), Vygotsky's 'social development' theory described by Fernyhough (2008) and 'situated learning' theory (Lave & Wenger, 1991). These are described below.

3.1.1.1 Theories of Learning related to this study

Behaviourist theory

This theory developed by Pavlov and developed by Skinner (Morris, *et al.*, 2005) views behaviour as resulting from a stimulus when applied to an action, i.e. a consequence of feedback. It is thought that positive feedback to the learner from the tutor encourages the desired behaviour. Knowledge is seen as a linear construct to be transferred from the tutor to the learner; this type of learning has been described for learning repetitive tasks. The practice of learning the whole skill is achieved by breaking it down into smaller steps and following with hands-on practice. The elements of learning the skills and tasks are not necessarily structured or formally organised, e.g. as in the skills of professional role modelling, teamwork and hands-on clinical skills. An essential feature of this kind of learning is the tutor providing immediate feedback to the learner.

Cognitive / Constructivist theory

Piaget is credited with describing the essential philosophy of this theory. It may be described as viewing learning as happening by the learner receiving information from the environment, processing, storing and then retrieving the information when required. The learning has the components of occurring external and internally, within the learner (McCloud, 2007). Learners

individually construct their own meaning of the learning based on their personal experience of the opportunity assisted by knowledge gained from past experiences, and making the linkages. Learning is thought to occur through interaction with the environment with the learner taking an active role. This method of learning is believed to be strategic for promoting deep learning by concentrating on differentiating the main message in the learning from the perceived unimportant bits to understand the main aim. This process in aided by making the objectives of learning clear to the learner and aligning teaching methods and assessment techniques. Sharing of existing knowledge with peers in the group is followed with performance of practical exercises and feedback.

Social development theory

Vygotsky expanded the theory of constructivism, proposing 'social interaction' as being central to the development of cognition and for acquiring full cognitive ability (Fernyhough, 2008). According to the social theorists the learner functioning on an individual level requires social interaction in order to develop full cognition. The differentiation of cognition lies in what is thought to occur between people as opposed to inside the person (learner). The learner interacts with other learners in the process necessary for developing concepts. The learner is seen as being active in this process but also interacting with more learned senior peers, and the tutor acts as facilitator by giving feedback.

Situated learning theory

Learning as described by Lave & Wenger (1991) occurs within a context. Situated learning theory holds the view of teaching and learning as meaningful only if occurring within authentic contexts; "Learning takes place in specific contexts and skills acquisition and its application takes place within the context where it is required, i.e. 'situated learning'" (Lave & Wenger,

1991). In similarity with the apprenticeship model of learning, the learner is provided with real life experiences in everyday practice with others who share the common goal. Learners learn from more experienced seniors as they move from the state of novice to more advanced stages of their professional development – a process of 'peripheral participation' (Lave & Wenger, 1991).

3.1.1.2 Learning theory and skills learning

Whilst some of the principles of behaviourism align with how learning occurs in the SS, i.e. where students learn by observation in shadowing a senior colleague, in relatively unstructured educational activities in busy hospital environments, other theories are also applicable to this mode of learning. Exposure of students to members of the professional health care team in hospitals, promotes learning of different professional roles. The behaviourist model is more clearly operating in learning hands-on skills under the guidance of a tutor with feedback in learning of skills in the CSU in the CSS.

The principles of cognitive learning theory are applicable for how learning occurs in both the CSS and FS of the HPD where students learn by doing, guided by specific objectives of mastery in structured educational activities. Learning increases incrementally in depth as new experiences with increasing levels of difficulty require the learner to build on previously acquired knowledge and skills. There are also elements of constructivism in the SS, where students are required to construct meaning themselves from external observations.

Social development theory has relevance for both group learning and individual learning in all three sessions of the HPD, the SS, FS and the CSS. In these activities the tutor is the facilitator of the learning and the learner interacts with others, as e.g.in patient clerking and presentation. Learning occurs in the process of developing full cognitive ability by the application of the skills

of problem solving, clinical reasoning and hypotheses generation through student engagement with peers and tutor, with the latter giving immediate feedback.

Situated learning theory has relevance for how students learn in authentic clinical environments in the hospitals in both the SS and the FS of HPD in the clinical skills programme. In the SS students learn appropriate attitudes by observation of seniors in professional role modelling in the context of a busy hospital setting and competing professional responsibilities. This model of learning is akin to that of professional apprenticeship of novices learning by engaging with seniors in environments where this learning needs to be applied. Students learn to work within professional teams with allied health workers and learn about specific roles and responsibilities and the skills of professional networking. The experience of a novice in an apprenticeship role also facilitates learning of soft skills, viz. communication, ethical skills and building a professional identity. In the FS active participation in learning, patient clerking and presentation occurs around the patients' bedside. In both SS and FS the tutor takes on the role of facilitator and feedback on performance is given in both the FS and the CSS.

These theories of learning have clear implications for students in clinical contexts. They learn by observation of seniors; by interacting with peers, tutors, other healthcare professionals and patients; by active participating in the clinical skills associated with patient clerking and case presentation; by applying the cognitive skills of problem solving and hypothesis generation; and by linking with previous learning in these educational opportunities. Student learning can be enhanced by providing learning opportunities in authentic clinical environments with adequate and suitable educational and human resources necessary for learning to occur by interaction with peers, patients and tutors in the activities with feedback and reflection.

At the heart of such learning lies the student. Student perceptions of experiences with learning are therefore crucial for informing appropriate interventions based on evaluation of educational

opportunities to attain desired learning objectives. Student perceptions of learning clarify their responses to learning stimuli; student perceptions show how they construct new knowledge; student perceptions reveal how interactions with others help or hinder their learning; student perceptions evaluate the authenticity of their learning context.

It is against this background, therefore, that student perceptions of their learning was selected as the primary method to obtain data in this study. The methodology used for evaluating the CSP delivery was pursued by investigating GEMP II students' perceptions of their learning in the three educational activities in the HPD.

3.2 Study design

The study design comprised two elements:

a) Firstly, a retrospective cross-sectional descriptive study using a survey design. This section of the study investigates current student perceptions. This study design provided the following main advantages: economy of resources, (viz. the time and the number of researchers needed to carry out the data collection of the survey), guaranteeing participants' anonymity, rapid turnaround time for data receipt and the researcher's familiarity with this study design.

b) Secondly, an analytical design. This section of the study compares the perceptions of two cohorts as well as their overall performance in an OSCE, before and after intervention.

For some of the objectives under 1.4.2 (i.e. the FS), a comparative element was added since data from a previous survey were available. The choice of this study design enabled the collection of numeric data that describe students' experiences of the HPD activities and allowed comparison of data of the two student cohorts in relation to one of the three educational activities investigated, viz. the FS.

For (a) and (b) above, the study was both quantitative and qualitative. Quantitative data items were collected in order to describe the nature and scope of clinical exposure, students' perception of their level of participation, and the process and the quality of their learning. For the objective under 1.4.4 (comparison of student performance as assessed by OSCE final scores for 2 cohorts) quantitative data were also used. In addition to this, a few questionnaire items collected qualitative data investigating students' perceptions of their experience of the sessions in relation to the intended outcomes as well as problems they experienced. The latter data were considered necessary for planning programme delivery interventions aimed at improving students experience of their learning by addressing some of the barriers to learning that were identified.

3.3 Study populations and study samples

Following on the experience of the 2006 survey and the confusing mix of data obtained from different sources it was decided to focus on student survey responses for the 2009 survey, since these had been more thorough and had included the concepts raised by other participants.

There were two study populations and therefore two samples. In the 2009 investigation, the study population was the GEMP II students registered in the 2009 academic year in the undergraduate medical curriculum in the Wits Faculty of Health Sciences. For the 2006 student survey, similar criteria applied. It is important to note that in the original design for the 2006 study, both GEMP I and II groups registered in that academic year were sampled. However at the scheduled time for data collection, GEMP I students were deemed to be novices in the CSP for the purposes of evaluating perceptions of their clinical experiences in this programme and they were thus omitted from the present study. The collection of data in this study therefore concentrated on evaluation of the GEMP II sample; the reasons for the slightly smaller number

of participants in the 2006 sample (about half of the overall sample for GEMP I and II) is thus explained. Initially, there were no exclusions to this study

GEMP I and II students registered in the 2006 academic year and GEMP II students registered in the 2009 academic year: data obtained from official published lists provided by the faculty registrar's office are shown in Table 3.1 below.

Table 3.1 Study population, GEMP I (2006) & II student survey (2006 and 2009)

Cohort	Year of study	No. of students	Sex		% of school entry students	% of graduate entry students
			F	M		
2006	GEMP II	208	129	79	68.7	31.3
2006	GEMP I	213	113	100	70.7	29.6
2009	GEMP II	238	143	95	63.4	36.6

The 2006 student sample comprised initially 92 students (GEMP I and GEMP II) and the 2009 cohort, 75 students.

Approximately a fifth of the GEMP I and GEMP II classes were polled for the 2006 student survey whilst the 2009 study polled approximately a third of the GEMP II class.

A statistician was consulted about the sample size; for 2006 the sample size was 92 and for 2009 it was 75.

For the sampling frame the allocation of students for clinical in the academic hospitals for the HPD in the CSP for the GEMP I and II years was used. This allocation is dependent on the size of the participating clinical department, i.e. its complement of clinical and academic staff members and the number of clinical sites i.e. wards or specialized outpatients clinics, which are available for training of students working in small groups. This process of allocation is negotiated with the academic heads and the assigned clinical coordinators of participating hospital departments after which student groups are allocated to departments. The student groups are formed by CHSE, ensuring that each group is mixed in terms of gender and population

group. A process of random assignment is applied for groups to attend HPD in these allocations for a period of two consecutive blocks, after which they are rotated for subsequent consecutive two block periods.

The allocation of GEMP II students for the clinical rotation for the Musculoskeletal and Endocrine blocks for the 2006 and 2009 academic years is shown in the Table 3.2 below.

Table 3.2 Study populations, GEMP II (2006, 2009 cohorts)

Academic year	(n) %	Hospital								
		CHBH			CMJAH			HJH		RMMCH
		Med	Surg	Paed	Med	Surg	Paed.	Med	Surg	Paed
2006	208	52	33	18	33	22	8	18	8	16
	100	25.0	15.9	8.7	15.9	10.5	3.8	8.7	3.8	7.7
2009	238	38	38	16	38	38	16	22	22	10
	100	16.0	16.0	6.7	16.0	16.0	6.7	9.2	9.2	4.2

The two samples were drawn from these two populations and stratified by hospital and clinical departments. The stratification was proportionate to the numbers of students assigned to each clinical department, in the Chris Hani Baragwanath Hospital (CHBH), the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), the Helen Joseph Hospital (HJH) and the Raheema Moosa Mother and Child Hospitals (RMMCH) in the rotation for the Endocrine and Musculoskeletal blocks. Within each category samples were drawn using random number tables. This process produced a random sample (Lee & Basker, 2003) for both groups. In Table 3.3 data pertaining to these two cohorts of GEMP II students are shown (2006, 2009).

Table 3.3 Study samples, GEMP II student surveys (2006, 2009 cohorts)

Academic year	(n) %	Hospital								
		CHBH			CMJAH			HJH		RMMCH
		Med	Surg	Paed	Med	Surg	Paed	Med	Surg	Paed
2006	46	11	7	4	7	5	2	4	2	4
	100	23.9	15.2	8.7	15.3	10.7	4.4	8.7	4.4	8.7
2009	75	12	12	5	12	12	5	7	7	3
	100	16.0	16.0	6.7	16.0	16.0	6.7	9.3	9.3	4.0

The sample stratification was proportionate to the size of the hospital and the clinical departments in this rotation.

OSCE

All GEMP II students registered in the 2006 and 2009 II academic years, presenting to take the scheduled OSCE I, were included in the study. The two study samples comprised of these two GEMP II student populations (2006, 2009 cohorts) are shown in Table 3.4 below

Table 3.4 Study samples, GEMP II, OSCE 1 (2006, 2009 cohorts)

Academic year	**(n)**
2006	212
2009	229

The GEMP II OSCE I for the 2006 and 2009 cohorts tested the skills taught in the Endocrine, Musculoskeletal and Gastrointestinal blocks completed in the first half of the year prior to the examination. These OSCE comprised 15 stations each. The allocation of OSCE stations to the skills in these blocks is based on the number of skills completed prior to the scheduled examination. Each block contributes a number of skills for that block that were taught. The type of clinical skills that were examined in these OSCEs and their allocation were proportionately similar for both 2006 and 2009 years. The scoring of OSCE stations however, differed for these two cohorts; for the 2006 OSCE only standardised checklists were used for scoring in all stations

whilst in 2009 these scores were complemented by a global rating score for the hands-on-skills. The proportion of skills for the OSCE stations and their scoring in 2009 using these methods are shown in the Table 3.5 below.

Table 3.5 GEMP II, OSCE station allocation (2006, 2009)

	Stations				
Block	**IR**	**History taking**	**Questionnaire for**	**Hands-on skills**	**Follow-on**
Endocrine		1	1	1	1
Musculoskeletal		1	1	2	2
Gastrointestinal				2	2
Other	1				
TOTAL	1	2	2	5	5

Table 3.6 Rating of OSCE stations by method (GEMP I, OSCE II: 2009 cohort

	Rating				
	Standardised checklists			Standardised checklist & global rating	
Block	**IR**	**Follow-on**	**Questionnaires for history**	**Hands-on skills**	**History taking**
Endocrine		1	1	1	1
Musculoskeletal		2	1	2	1
Gastrointestinal		2		2	
Other	1				
TOTAL	1	5	2	5	2

This change in marking method is important to note, because the introduction of global rating scales significantly affects scores (Cox, 1980). The Global Rating Scale has been used as a quality improvement and assessment tool and used widely for performance evaluation.

3.4 Methods of data collection

In Chapter 2, none of the studies included in the literature review used questionnaire prototypes ideally suited to evaluation of the specific clinical skills strategy in the Wits CSP without significant modification. Furthermore, the studies in the published reports describing the nature

and range of student reforms have not included in their purpose on evaluations of interventions. Therefore, this study used a custom designed questionnaire suited to its own evaluating needs**.** Assessment of student performance in an OSCE has been used for informing the success of programme delivery and this method has also been employed in this study.

3.4.1 The research instrument

The research instrument in the main body of this study was a student questionnaire which was designed to collect data on GEMP II students' experiences of the HPD (2009 cohort). As previously noted the questionnaire contained mainly quantitative data items with a few focused on gathering qualitative data. This student questionnaire (Appendix C) comprised 22 items, mainly categorical type questions collecting mainly nominal and ordinal data. Its design conformed to three parts, each designed for data collection on one of the three educational activities of the HPD, viz. the SS, FS and the CSS. A Likert scale was used for some of the items in this questionnaire. The questionnaire and information sheet were presented in English.

The instrument used to collect data pertaining to the FS for the 2006 student survey was also a student questionnaire. The data pertaining to items of this questionnaire related to the questions under the stated objectives for the FS thus enabled comparison between for the 2006 and the 2009 cohorts.

Data for the comparison of OSCE performance for these two cohorts were extracted from the official published final scores of student performance in OSCE. The total scores achieved by each student for every station tested in the OSCE. The mean of the scores for each station tested in the OSCE was used for the purposes of the study, i.e. the final score recorded for each student in the GEMP II OSCE I for the 2006 and 2009 academic years.

In summary, questionnaire items related to study objectives as detailed in Table 3.7 below.

Table 3.7 Relationship of questionnaire items to study objectives

Number	Study objective	Questionnaire item	
		2009	2006
1.4.1.1	Level of student participation in SS units' rostered activities	1.1, 1.2	
1.4.1.2	Interaction with other members of the health team during SS	1.5, 1.6	
1.4.1.3	Number and range of patients examined per SS session	1.3, 1.4	
1.4.1.4	Doctors' perceived role in SS	1.7	
1.4.1.5	Students' perception of their role in SS	1.8	
1.4.1.6	Educational value of the SS for students	1.10	
1.4.1.7	Problems experienced in the SS	1.9	
1.4.2.1	Availability of suitable patients for clerking in FS	2.6, 2.7	5.1,5.2
1.4.2.2	Perceived role of the doctor in FS	2.4	7.4
1.4.2.3	Level of student participation in the FS	2.3, 2.4	7.4
1.4.2.4	Educational value of FS for students	2.9	10.1
1.4.2.5	Use of available time by students in the FS	2.1, 2.2, 2.5	
1.4.2.6	Problems experienced in the FS	2.8	7.8
1.4.3.1	Adequacy of educational facilities and resources in the CSS	3.1	
1.4.3.2	Medical supervision in the CSS	3.1	
1.4.3.3	Educational value of the CSS for students	3.3	
1.4.3.4	Problems in the CSS	3.2	

The data obtained from OSCE results relate to Objective 1.4.4.

3.4.1.1 Validation of data

Validation of the data obtained from students was attempted in two ways Firstly, the data from the GEMP II OSCEs for June 2006 and 2009 which tested skills learnt in blocks corresponding with the study period ere compared. This would enable changes perceived by students to be partly corroborated.

Secondly, the findings of the student end-of-block evaluations for the Endocrine and Musculoskeletal blocks for 2006 and 2009 were considered for inclusion as this evaluation is

administered as a student survey of the entire class and participation is anonymous and voluntary. The data from this evaluation forms an important source of information for elucidating and providing insight of GEMP II students' experiences of the HPD in these blocks for the 2006 and 2009 GEMP II. However, the data for the end-of-block evaluations for the 2006 cohort were not available. Data for the corresponding period for the evaluation of the end-of-block evaluation of GEMP II students in the 2009 academic year are presented in Chapter 4 and will be used to corroborate the student perceptions data from this study.

3.4.2 The procedure for data collection

3.4.2.1 Procedure for the questionnaires

For the 2009 cohort the data collection in this study was timed to occur at the end of the Musculoskeletal Block (the third week of May 2009) in this programme. Questionnaires were distributed to the study participants at the three learning centres associated with the three academic hospitals. (Note: the HJH Learning Centre also serves RMMCH). A total of 75 questionnaires was distributed to the 2009 GEMP II participants as they entered the scheduled CSS and signed off their routine attendance on the official registers for this activity. The questionnaires were distributed to participants by clinical skills tutor staff members not associated with the research study. Students were provided with dedicated time in which to complete the questionnaires but were free to do so during the time allocated for this session (approximately two hours which was judged to be more than adequate for the 22 items. Boxes for completed questionnaires were provided and these were placed in the CSU for easy access for students as they rotated through the practice stations in this session. Students were free to return questionnaires or not at any time in the two hours; and they were free to return unanswered questionnaires. Coercion was therefore not a factor. These boxes were collected at

the end of the CSS by the assigned clinical tutor and returned to the researcher at the end of the day. A total of 68 questionnaires was returned – a response rate of 90.7%.

For the 2006 GEMP II student cohort a total of 46 questionnaires was distributed to study participants by the PBL facilitators at a scheduled PBL session. As the PBL session is also a compulsory session a register is routinely taken. Study participants in this group were given a two week period in which to complete and return their questionnaires to two collection boxes provided for this purpose. These boxes were placed in the CHSE foyer distant to the researcher's office limiting bias and coercion in this process. A total of 32 questionnaires was returned by this group equating with a 69.6% response rate. No further completed questionnaires were entertained as these boxes for collection were removed after the final emptying on the scheduled date, and students were timeously advised of this intended action.

3.4.2.2 Procedure for accessing the OSCE results

The final total score, for all stations tested in the OSCE for each student for the GEMP II OSCE I for the 2006 and 2009 academic years was obtained from the examinations office in the CHSE. Access to data from these OSCEs was restricted to this parameter for the specific purpose of comparing student performance in the OSCE and did not include any demographic data or individual station scores for these students. There was no way of identifying individual students with the data accessed.

3.4.3 The process of informing participants in this study

The process of informing students about the significance of the study as well as the nature of the data to be collected was initially conveyed in a formal address to the entire class. This was followed with the distribution of an official document to student participants, i.e. the participant information sheet (Appendix B) containing detailed documentation explaining the study. An

official covering letter was attached, constituting a formal preamble to the questionnaire which was also circulated at the time of its distribution. Participation to this study was voluntary and students were informed that they had a right to withdraw at any stage of the study without being penalised in any way. There was no financial incentive provided for participating in the study, students were however, informed that findings would be made available to the GEMP II class at the time of their publication.

The information collected in this study was treated as confidential and reported in general terms only, protecting the privacy of individual subjects. As participation in this study for the 2009 cohort was anonymous (the returned questionnaires not having any identifying marks on them) the researcher had no way of identifying the individual participants who returned the completed questionnaires. However, for the 2006 student sample only the researcher had information identifying the respondents.

3.5 The pilot study

The piloting of instruments used in the 2006 study has been described in section 1.3.4.2 in the items in the student questionnaire pertaining to the FS in this study. It was piloted to five students (two GEMP I and three GEMP II students) during the FS on a scheduled HPD in the same week at the CMAH. The purpose of the pilot study was to test the feasibility of using the instrument.

For the instrument used in the 2009 study the purpose again was to test the feasibility of obtaining data using the new instrument for the method used in evaluating the implementation of the new structure in the three activities comprising the HPD in the CSP. The questionnaire was piloted to three individuals in February 2009. The piloted study generated one response only, from a volunteer peer tutor, as the two student volunteers subsequent to this time declined their

participation. No problems were encountered with the phrasing of the questions. The interpretation of responses generated was improved through discussion of the responses with senior peers in the CSP and CHSE who gave their input based on their experience, knowledge and understanding of the delivery of this programme. In view of past experience with the 2006 survey instrument and the lack of problems experienced by the single respondent in the pilot study it was decided to continue. In retrospect further efforts to obtain participants would have been preferable.

3.6 Ethics approval

An application for ethics approval for this study was lodged with the Human Research Ethics Committee (Medical) at the University of the Witwatersrand in August 2008 and approved. Individual participants' decision to volunteer was taken as their consent in participating in this study. A copy of the ethics approval certificate is attached as Appendix A. Prior to this ethics clearance for the 2006 study was obtained from the same body (M050651). The ethics clearance number for the 2006 study is M050651. The clearance number for this study is M080846.

3.7 Study period

This research was undertaken during a period of 11 consecutive weeks near the end of two GEMP II student cohorts, in 2006 and 2009. This period corresponded to the Endocrine and Musculoskeletal blocks, the former representing a general block and the latter a specialised block respectively. These two blocks were assumed to provide comparable data in the overall representation of student dynamics in the CSP delivery in other blocks, and with a peer student cohort (2006) at a corresponding time of their clinical practice in this programme. The research was also timed to assess the new clinical skills structure of the CSP which was implemented in January, 2009. The OSCE data were the scores obtained in the GEMP I OSCE in the 2006 and

2009 academic years for these two student cohorts for the period corresponding with the teaching in the Endocrine and Musculoskeletal block and (study period) and part of the Gastrointestinal skills covered before the OSCE.

3.8 Data analysis

3.8.1 Quantitative data

The data were processed as follows:

- For both cohorts data were manually entered into a database created for this purpose using the Epi Info ™ 7 (CDC, Atlanta, USA).
- Attempts to avoid transcription errors were made by the assistance of a colleague who read out the responses to questionnaire items as these were captured by the researcher.
- Accuracy with transcription was checked again at the end of the process.
- Data analysis was largely completed with the Microsoft Excel 2007. However, some tests were performed with STATA 12.0 (Statcorp, Texas, USA) where these allowed for faster data computation and display.
- Descriptive statistics were used to analyse the data and calculate frequencies for all quantitative data. The main outcome measures included the frequencies of responses to quantifiable questions.
- Inferential statistics were applied to analyse quantitative data obtained for comparison of the two student cohorts.

Statistical tests involving inference were selected as follows:

- Unpaired t-tests were applied for continuous data with a likely Gaussian distribution, for the comparison of the two (unpaired) student cohorts.

- For nominal data Pearson's chi-square test was used for calculating the p value where comparison of the two (unpaired) study groups involved larger numbers in the cells of the contingency tables (i.e. greater than six). In contrast, for nominal data where the numbers were less than six, p values were computed using Fisher's Exact Test.
- Cochran-Mantel-Haenszel (CMH) statistics were used to compare two groups where there was a dichotomous response, and where the effect of the explanatory variable on the response variable was influenced by other controllable variables.

3.8.2 Qualitative data

The qualitative information arising from the survey was analysed according to the following scheme; based on that suggested by Hopkins (1989):

- The data were organized.
- Common themes were identified.
- Themes were then elaborated upon.
- Finally these data were interpreted in accordance with responses obtained from the related quantitative items.

Themes that were identified from analysis of the qualitative data and the subsequent categories that were formed concentrated as far as possible on using the same terms that students used in their description of their communication of their experiences. These categories and the interpretation of these data were verified for alignment by the input from senior peers and academics in the CHSE who checked the categories against the data. In reporting the findings of the qualitative data use has been made of raw data, i.e. direct student quotes as well as analyses based on these categories (Lee & Baskerville, 2003).

3.9 Biases

Several biases are perceived to have potentially operated in relation to this study.

Selection bias

GEMP I students were excluded from this survey and a bias may have occurred as a result of neglecting to collect potentially important data of student experiences in the HPD process from this group.

Sampling bias

A sampling bias in the form of the small number of students polled for the two student cohorts (2006, 2009) for this study. However, the sampling involved stratification which was proportionate to the hospital and academic department to which students were allocated and also randomization within these strata using random number tables. This method would provide a more representative sample of the population of the GEMP II groups.

The blocks used for investigation for the study period, the (Musculoskeletal and Endocrine blocks) may not necessarily have been representative of a specialist and a general block respectively. The Musculoskeletal block as compared with other specialized blocks viz. the Reproductive and Neurosciences blocks may have been perceived to be better planned.

The comparison of overall student performance in the GEMP II OSCE I students registered in the 2006 and 2009 academic years only one parameter (the final student scores) obtained in this OSCE. Differences in station difficulty or changes in methods of rating, was not possible to take into account.

Instrument bias

The questionnaires were distributed to participants in the two cohorts by two different groups of staff members and this may have introduced a bias, as in the case of the 2009 study where clinical tutors in the CSUs were the responsible group overseeing this process. This may have acted by unintentionally exerting pressure on students to comply (although there was no pressure for students to respond in any particular direction).

The 2009 pilot study; failure in pursuing recruitment of other potential participants for piloting the 2009 questionnaire after the two students who initially volunteered for participation, declined may affect the reliability of questions and data. In particular the instrument should have been piloted with English second language volunteers.

The Likert scale was used in this questionnaire for some of the qualitative data items rating student perceptions of their opportunities in the HPD in the CSP and for self rating.

Although several scales are in use, the Likert scale is one that is most commonly use for qualitative data, e.g. those obtained in the evaluation of attitudes therefore frequently used in the Social Sciences. There are limitations imposed in using Likert scales, thus there has been increasing research for describing the ideal attributes of this and similar. Whilst widely discussed in the published literature and there still ongoing debates with currently no recommended standard for application for every situation in research. There are many limitations in the interpretation of responses from Likert scales. In using Likert scales it is important to consider the following factors that may affect the reliability and internal validity for quality of data; getting the information from respondents, interpretation and generalisability.

The following is a list of the important considerations:

- Use of labels.

- Response alternatives, e.g. where a question is badly phrased.
- Implicit assumptions of the question.
- Forcing a Choice.
- Unbalanced Rating Scales.
- Order Effects in Rating Scales.
- The Direction of Comparison.
- The Number of Points.
- Context Effects.
- Type of Overall Evaluation Question.

One of these areas of contention in Likert scaling is in the selection of the ideal number of points (response alternatives) available for rating items. Whilst many investigators of this phenomenon have proposed a seven point scale there is no consensus amongst investigators as to whether a scale with this number of points add any further value for the quality of the information collected with e.g. a five point scale (Cox, 1980). Statistically, it is better to have more levels because as beyond five ordinal levels the variable becomes more interval like and thus you can better use many methods such as regression and ANOVA (if the variable will be dependent). But you have to trade them against the reliability of the data. Whilst, a five point scale allows more options for responses that are only useful if respondents actually can distinguish the phenomenon meaningfully on five points as compared to three.

An important consideration is that if you have a small sample of respondents in your study, using a three point scale will affect the validity of your findings due to the fact that three point samples places your results into items that denote good, average or very bad; but nothing in between.

The choice of the number of points required for individual studies should consider the ability of the respondent for transmitting information that is intended against the risk of increasing error

for responses where too many points can affect discrimination for indicating the strength of perceptions. It has been suggested that the number of responses available for items should also consider the purpose for which the scale is designed and therefore the nature of the systematic variation. Cox (1980) states the lack of evidence for the ability to test the "relationship of the completeness of the information obtained and the points required in this scale depends on the ability to measure information". Many of the studies researching the optimal number of points have used parametric measures, e.g. correlation of the recoverability of information with measures of reliability. Secondly, parametric techniques have also been used for testing reliability but have been described less frequently. Recoverability of data obtained by scales have been evaluated by a number of methods e.g. with non parametric multidimensional scales and factor analysis. There appears to no advantage of using information recovery methods as compared with parametric measure. Thirdly, assumptions have been used for converting poor data into little good data. These have not produced any consensus for the optimal number of responses for scales. Generally the choice of points desired for a scale will need to consider the extent to which the degree of reliability of data can be permitted; correlation has been improved with the use of more scales and the number of more categories. The message appears to be in not making any generalisations for applying a uniform number of points for any scale but the consideration of other factors, e.g. the nature of the research and the choice of scale for collecting responses. However, there is consensus that this decision can be guided by a clear understanding of the research problem.

Likert scales are also limited for responses to items where this measure does not accurately capture quantitative data.

In this study there was limited precision for the analysis of data and drawing inferences from the responses from certain items collecting data with a Likert scale where fewer points were used and those with three. Further, the comparison of responses to questions for similar items in the

FS for the two cohorts were limited by the differences in the number of discrete points in the Likert scale chosen for a number of questions in the two instruments.

Respondent bias

Recall bias may be a possible factor, as participants were expected to rely on their memories of their exposure to patient in the previous three months of the study period without having had to complete logbooks with specific documentation to facilitate recall to this task.

In the 2006 study, consent forms were provided to and signed by some participants in the study and they were therefore potentially identifiable (although not in relation to the data they provided). This was not considered a serious bias in the present study as this demographic data had limited potential; its use was restricted to comparison of the two cohorts only in relation to the educational objectives of the programme. Furthermore, the 2009 survey did not extract demographic data.

The differences in the response rates between these two cohorts may be in part related to the period of time available to participants for return of completed questionnaires.

Peer colleague participants for piloting the study or participating in evaluating responses from these pilots may have been biased as a result of working in the CSP or the CHSE and possessing a fairly good understanding of the delivery of the programme and anticipating certain responses from students or colleagues.

3.10 Limitations of the study

Perceptions of the quality of the learning event were only surveyed using one instrument, a student questionnaire, and not explored with other instruments, populations or sources of data, i.e. not corroborated with tutor opinions, patient perceptions or on-site observations for

triangulation of data. The quality of student learning in the CSP was essentially subjectively determined by the methodology of investigating student perceptions of the new HPD programme and comparison of the FS (2006, 2009 cohorts) as well as, students' performance in an OSCE (2006, 2009 cohorts) to assess students opportunities for learning in the CSP. The data from this the end-of-block evaluations for 2009 study was used to corroborate the data from this study (2009) for improving validity.

The information was collected very early on following the implementation of the interventions.

The limitations apparent in this study suggest possible avenues for future research in relation to the themes explored in this research study.

3.11 End-of- block evaluations, 2009

The data from these evaluations were those pertaining to the Endocrine and Musculoskeletal blocks for the 2009 period.

Population

It was intended that we use both 2006 and 2009 GEMP II cohorts but only the 2009 cohort data were still available.

Sample

All student registered in the class are expected to participate in the evaluation. However, only some do and participation is voluntary and anonymous, so the sample may well be biased.

Instrument

The instrument is a student questionnaire with questions relating to items catergorised under different themes in the GEMP. Information is sought about perceptions of the delivery of the curriculum. Both quantitative and qualitative data are collected.

The process of data collection

All students attending a PBL session at the end of the block are asked to complete the questionnaires. A total of 115 students of the GEMP II class returned questionnaires for the Endocrine and 69 for the Musculoskeletal block, with a response rate of 48.2% and 28.9% respectively.

Analysis

The data of these evaluations were captured and analysed by the Education Development Office in the CHSE.

Access to the data

The data were retrieved upon formal request from the Education Development Office in the CHSE explaining the purpose for accessing these findings from the archive of these evaluations.

Biases and limitations

The data collected does not separate the hospital sessions into the SS and the FS components and therefore students' perceptions of their experience in the SS and the FS exposures cannot be separately analysed. The CSS is evaluated as a separate category in this instrument. The data pertain to students' perceptions of their experience of the HPD using very general and broad items and therefore cannot be compared with the specific data sought in this study.

Chapter 4

RESULTS

The findings of this study are presented in this chapter under the objectives of this study, in relation to the three educational activities of the HPD. The latter has been described in relation to its educational elements in Chapter 1 (1.4) of this dissertation.

THE SHADOWING SESSION: 2009 COHORT

4.1 Objective 1.4.1.1: Level of student participation in the units processes and activities in the SS (2009 cohort only)

Question 1.1 Participation in the unit's scheduled rostered activities

Sixty-two students responded to this question. Student participation in ward rounds was high; however only one third of students attended the other three rostered activities representing the departmental units' functions, viz. outpatient sessions, theatre sessions and the performance of clinical procedures. Some students also had opportunities to take patient histories and examined patients (6) whilst the remaining four attended 'other' activities, viz. academic meetings, casualties and trauma units or assisted with resuscitation. These are represented in Table 4.1 and Figure 4.1.

Table 4.1 Student participation in activities in the SS

Activity	No. of students participating	% (N=62)
Ward rounds	62	100.0
Outpatient sessions	23	37.1
Theatre sessions	26	41.9
Ward procedures	21	33.9
Other	10	16.1

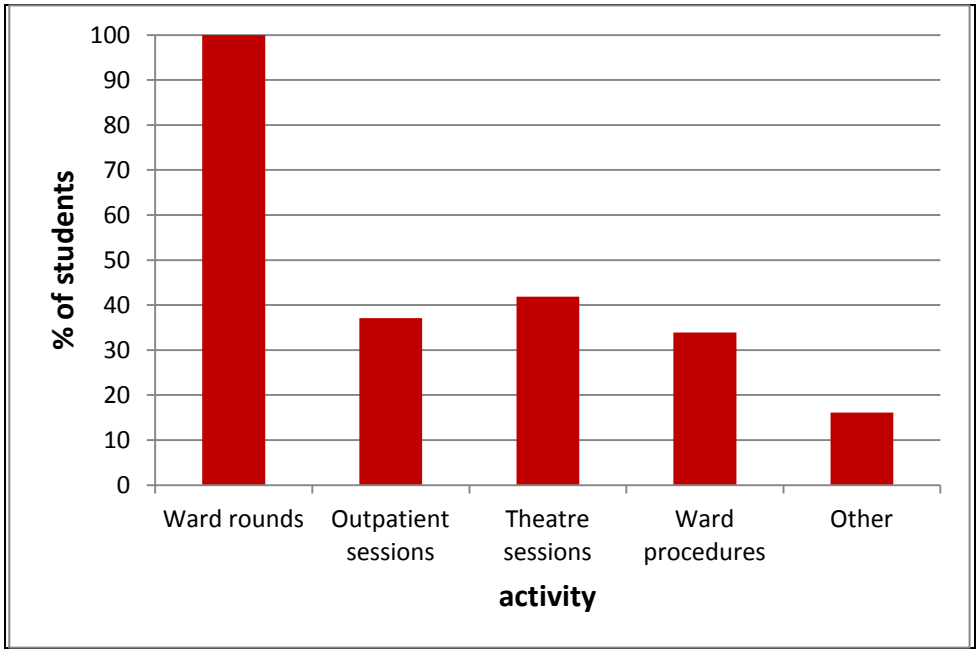


Figure 4.1 Students' participation in the units' rostered activities

Question 1.2 Clinical procedures performed by students

The students participated in a range of commonly performed clinical hands on procedures as well as other less frequently performed procedures, viz. ultrasound examination, bone marrow biopsies and lumbar puncture.

Thirty-five instances of participation in clinical procedures were recorded; however less than a third of all students i.e. 21 (30.9%) reported engagement in these activities, with a few students performing more than one procedure. Intravenous cannulation and venepuncture accounted for more than half (57.1%) of all clinical procedures. The spectrum of these activities reflects those implicit in rendering medical services to patients and training opportunities in academic hospitals. These are represented in Table 4.2.

Table 4.2 Clinical procedures performed

Clinical procedure	Number of students reporting procedure performed	% of students performing procedure (N=68)
Venepuncture	11	16.2
Intravenous cannulation	9	13.2
Ultrasound	4	5.9
Vaccination	2	2.9
Suturing wounds	2	2.9
Removal of chest drains	2	2.9
Bone Marrow aspiration	2	2.9
ECG	1	1.5
Lumbar puncture	1	1.5
Applying a Plaster of Paris cast	1	1.5
Total	**35**	

4.2 Objective 1.4.1.2: Level of student interaction with other members of the hospital health care team (2009 cohort only)

Questions 1.5 and 1.6 Students' interaction with members of the health team

Thirty one students responded (45.5%). It cannot however, be assumed that the other 37 had no meaningful interaction. Students' interacted with a range of allied health professionals, although these accounted for relatively few encounters.

The two student encounters with ultrasonographers were included in the category for 'radiographers'. These data are illustrated in Table 4.3.

Table 4.3 Students' encounters with other members of the hospital health team

Members of the health team	No. of student encounters	Percentage of students encountering (N=68)
Physiotherapist	13	19.1
Radiographer	6	8.8
Social worker	6	8.8
Dietician	5	7.4
Occupational therapist	4	5.9
Speech therapist	1	1.5

Although only reported in a few cases it is likely that most students interacted with nurses. Some (not all) students offered reasons for their interaction with these allied health professionals in this attachment. These data are illustrated in Table 4.4.

Table 4.4 Reasons for students' interaction with members of the hospital health team

Health team member	**Groups of reasons for encounter**
Physiotherapist	Fracture rehabilitation (2) Postoperative orthopaedic rehabilitation (1) Mobilisation of stiff joints and contractured limbs (3).
Radiographer	Performance of a diagnostic procedure (ultrasound) (6)
Social Worker	Social grants (3)
Dietician	Nutrition advice (2)
Occupational therapist	Therapy of patients disabled with arthritis (2)
Speech therapist	Speech rehabilitation for patient with metastatic tumour (1)

Nearly all the interactions with physiotherapists and both interactions with the occupational therapists were for patients with musculoskeletal problems. Some encounters appear to have been opportunistic in nature, e.g. in the words of one student, "*Came to see a patient"*, or a second, *"He was doing an ultrasound*", and a third, *"Encountered radiographer in the theatre session"*. Few active attempts of students, seeking opportunities for interaction with relevant members of the allied health professionals were evident as cited reasons include "*Accompanying patients for procedures"* and *"Getting prognostic information".*

4.3 Objective 1.4.1.3: Level of students engagement with patients in the SS (2009 cohort only)

Question 1.3 The average number of patients examined by students in this attachment.

Sixty-three students (92.6%) responded to this question. Thirty-one students examined a total of 117 patients whilst an equal number (31) of their peers did not. These students examined between one and 15 patients with an average of 3.8 patients per student (for those who did carry

out examinations); there was a large variation in the number of patients examined by individual students.

Table 4.5 Number of patients examined in the SS

No. of patients examined per student	No. of students	% (N=63)
0	32	50.8
1	10	15.8
2	4	6.3
3	4	6.3
4	2	3.1
5	3	4.7
6	3	4.7
7	1	1.5
8	2	3.1
10	1	1.5
15	1	1.5
Total	**63**	

Question 1.4 Range of clinical conditions seen

Sixty-five students (95.6 %) responded to this question. The range of patient diagnoses covered the spectrum of the ten organ systems of the two year CSP in this curriculum. Over a third (40.6%) of these patients had medical problems relating to the Musculoskeletal and Endocrine systems. Two patients (1.4%) were described as having "*HIV related illnesses*" and were placed under the 'other' category. The range of patients examined is illustrated in Table 4.6.

Table 4.6 Range of organ systems relating to patients medical diagnoses

Patient diagnoses	No. of student encounters	% (N=138)
Cardiovascular	17	12.3
Endocrine	2 9	21.0
Musculoskeletal	27	19.6
Neurosciences	9	6.5
Renal	16	11.6
Reproductive	10	7.2
Respiratory	16	11.6
Gastro-intestinal	6	4.3
Haematology	6	4.3
Other	2	1.4
Total	**138**	

The most frequent medical diagnoses included hyperthyroidism, diabetes mellitus, renal failure, tuberculosis, osteoarthritis, fractures and cardiac failure. Whilst some students recorded clinical diagnoses, others recorded pathological diagnoses, or even aetiological diagnoses. Most of these medical conditions are classified as being 'core' in CSP of the HPD.

4.4 Objective 1.4.1.4: Students' perception of the role of the assigned doctor role in the SS

(2009 cohort only)

Question 1.7 The role of the doctor

Sixty-two of the 68 students responded to this question (91.2%). More than half of the students i.e. 34 (52.3%) perceived their assigned doctors as being a 'source of information' with 21.5% describing this role as akin to that of 'role model' or 'mentor'. Nine students (21.5%) described their doctors in varying terms and relate to the 'other' category, e.g. perceived negative tutor behaviour as reflected in the words of one student, *"The doctor was irritated by the students' presence".* These data are shown in Figure 4.2.

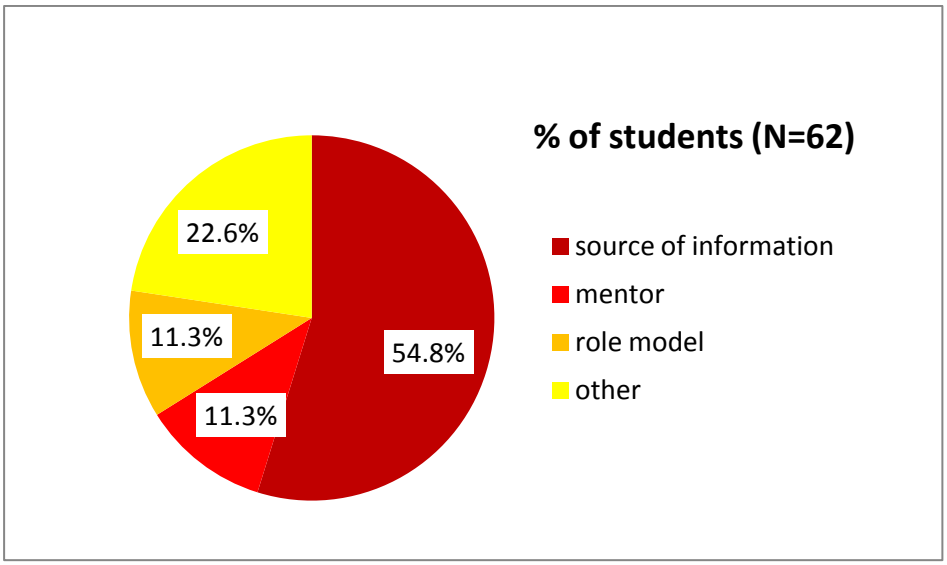


Figure 4.2 Students' perception of the doctors' role in the SS

4.5 Objective 1.4.1.5: Students' perceptions of their role in the SS (2009 cohort only)

Question 1.8 The role of the student

Sixty-five students (95.6%) of the 68 responded to this question. Perhaps because the objectives of a 'Shadowing' activity were not clearly spelt out to parties the vast majority of students perceived their role to be passive; in the words of one student "*We just sat around".* These data are represented in Figure 4.3.

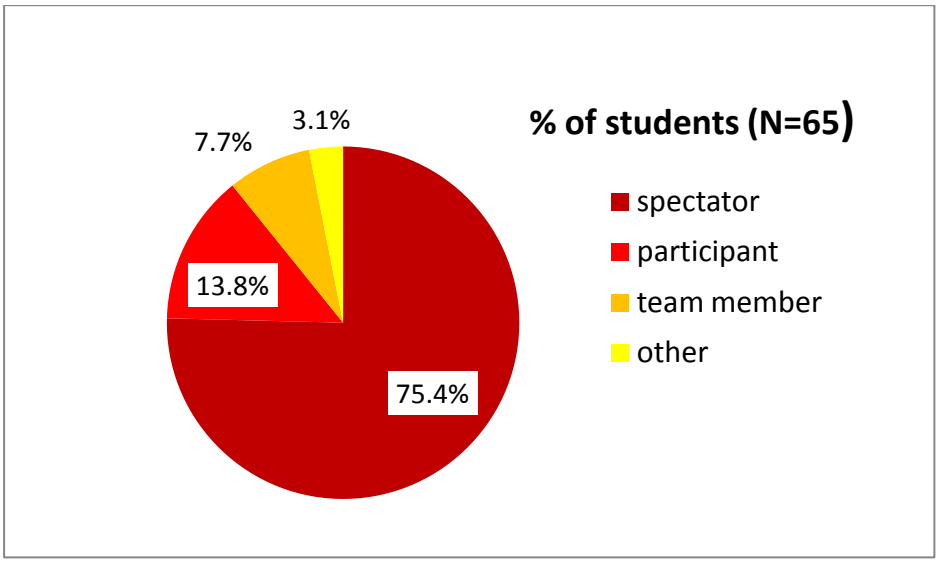


Figure 4.3 Students' perception of their role in the SS

4.6 Objective 1.4.1.6: Student ratings of the educational value of the SS (2009 cohort only)

Question 1.10 Students' perceptions of their skills learning in the SS

There was a reasonably high response rate in students' self assessed ratings level across all clinical skills domains in the SS. However a large number of students rated their skills in clinical procedures poorly, which accords with their reduced exposure. These data are shown in Table 4.7 and Figure 4.4.

Table 4.7 Student ratings of their learning skills opportunities in the SS

Skills domain	No. of students	Response rate (%)
Q 1.21 Skills in history and examination	**n (%) (N= 61)**	**89.7**
Excellent	7 (11.4%)	
Satisfactory	27 (44.3%)	
Poor	27(44.3%)	
No response	7	
Q 1.22 Skills in patient interaction	**n (%) (N=60)**	**88.2**
Excellent	13 (21.7%)	
Satisfactory	29 (48.3%)	
Poor	18 (30.0%)	
No response	8	
Q 1.23 Skills in certain medical conditions	**n (%) (N=62)**	**91.2**
Excellent	26 (41.9%)	
Satisfactory	30 (48.4%)	
Poor	6 (9.7%)	
No response	6	
Q 1.24 Learning about team members	**n (%) (N=59)**	**86.8**
Excellent	7 (11.9%)	
Satisfactory	28 (47.4%)	
Poor	24 (40.7%)	
No response	9	
Q 1.25 Skills in clinical procedures	**n (%) (N=62)**	**91.2**
Excellent	6 (9.7%)	
Satisfactory	21(33.9%)	
Poor	35(56.4%)	
No response	6	
Q 1.26 Skills in patient management	**n (%) (N=62)**	**91.2**
Excellent	18 (29.0%)	
Satisfactory	31 (50.0%)	
Poor	13 (21.0%)	
No response	6	

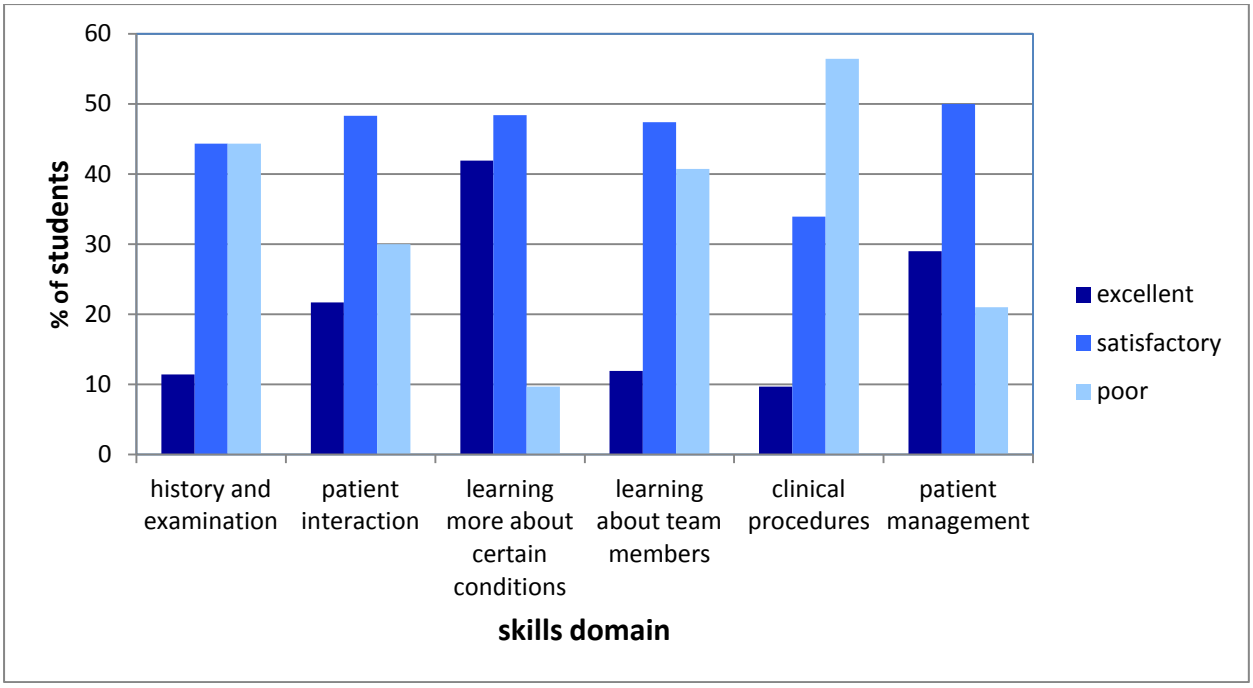


Figure 4.4 Students' learning opportunities for clinical skills in the SS

4.7 Objective 1.4.1.7: Problems experienced by students in the SS (2009 cohort only)

Question 1.9 The nature and frequency of problems reported by students in the SS

The majority of students reported problems with the SS, with some mentioning more than one. However, about a third did not report any problems. Those who did seldom indicated their frequency. After analysing the students' verbatim comments, these problems were broadly categorized into four main themes although some of the problems related to apply to more than one category:

- Lack of opportunities for participation.
- The lack of organization of the session.
- Lack of dedicated tutor time.
- Students' lack of preparedness for this attachment.

Lack of opportunities for participation (19 comments)

Some students perceived the 'lack of participation' to be due to inadequate opportunities in the ward environment, i.e. insufficient patients for this practice and not being allowed to practice; in the words of a student, "*Wasn't allowed to examine patients so no pathologies diagnosed".* A second student reported that *"We weren't assigned to a specific intern because they all just tagged along"* indicating a perceived lack of tutor interest in this activity. A further five students described their unrealised expectations in the following comments, "*Did only 1 tuberculin test",* '*Taking blood – only once",* "*Put up a drip", "I was in paeds. so did not have much opportunity to do procedures"* and *'Took blood samples and assisted with C/S – now at Charlotte Maxeke we do nothing".* Further expectations were expressed in the perceived lack of opportunity for doing skills that had been taught in the curriculum, viz. *"At times I felt as if we didn't get an opportunity to do anything apart from doing a general examination, listen to a chest or palpate an abdomen once in a while".*

Interestingly, a few students affirmed their understanding of the objectives of this attachment, in the following comments, viz*., "We don't personally examine patients, we shadow doctors", "No procedures, we just watched", "I saw no patients before 11h00. I would observe people examining them on ward rounds"* and *"Procedures, not applicable".*

Lack of organization of the session (14 comments)

The students' negative perception of the organisation of this attachment was attributed mainly to communication problems. These were perceived to have occurred between various stakeholders to this programme, i.e. faculty staff and hospital clinical and academic staff, faculty and students and students and hospital clinicians. These communication problems were identified to include the lack of coordination and in tutors' lack of understanding of objectives of this attachment. In the words of four students, *"All doctors (registrars and interns) didn't know we were coming*

and not organized", *"No patient seen because of poor structure on hospital day"* and *"Shunted from ward to ward and attention not given to us"* and *"No shadowing at all at HJH".*

Lack of dedicated tutor time (11 comments)

Other problems were the perceived lack of resources in the academic setting viz. time available to registrars or interns in having student shadowees, as competing academic responsibilities made further demands on trainee tutors heavy workloads. Lack of tutor numbers for shadowing was the primary problem as reflected in the following students' comments *"Lack of sufficient nos. of registrars or interns for student shadowing"*, *"No specific doctor to shadow", "We weren't assigned to a specific intern because they all just tagged along", "Not assigned to a specific doctor", "Dr. didn't exist", "Currently we have no doctor", "None of the doctors assigned were available and we were forced to find another doctor"* and *"Sometimes no doctor in the wards".*

Lack of comfort / preparedness (6 comments)

Students experienced feeling unprepared for this exposure, demonstrated in the words of three students, "*Feeling superfluous and awkward, feeling unprepared because are only in 4th year"*, *"Feeling out of place"* and *"Feeling too inexperienced to be of any use".*

Students were not the only group who perceived discomfort for this experience. Doctors' lack of comfort was evident in the comments of two students, *"Doctor got irritated when asked questions and didn't enjoy us following them around"* and *"The doctor was always stressed out with exams and she did not show any confidence in her work".*

Students summed up their experiences in this attachment in the following negative comments, *"It's a waste of time*" and *"Not at all valuable to my learning experience"*, "*Shadowing many*

people and learning nothing" reflecting unmet expectations and lack of congruence with the educational objectives of the CSP.

However, there were a few unsolicited positive comments of this exposure, viz. *"I did have the opportunities to read and interpret a lot of X Rays although I did not examine patients" and "Ward rounds were interesting and observation is good, but learning through doing is better".*

THE FORMAL SESSION: 2009 COHORT

4.8 Objective 1.4.2.1: Availability of patients for clerking in the FS (2009 cohort only)

There was a 94.1% response rate to the following two questions (Q2.6 and Q2.7)

Question 2.6 Availability of adequate numbers of patients

Patient shortages were reported in 60.3 % of instances.

Question 2.7 Availability of patients appropriate to the block

In contrast to the findings of Question 2.6 (above), in the majority of instances, viz. 65.7%, patients for clerking were appropriate to the block students were studying. These data are shown in Table 4.8 and Figures 4.5 and 4.6 below.

Table 4.8 Availability of adequate numbers of patients appropriate to the block for clerking

Student evaluation	Adequate numbers of patients (N=64)
Regularly	23 (35.9 %)
A few times	33 (51.6 %)
Never	8 (12.5 %)
No response	4

Student evaluation	Patients appropriate to the block (N=64)
Always	9 (14.1 %)
Mostly	33 (51.6 %)
Seldom	22 (34.3 %)
No response	4

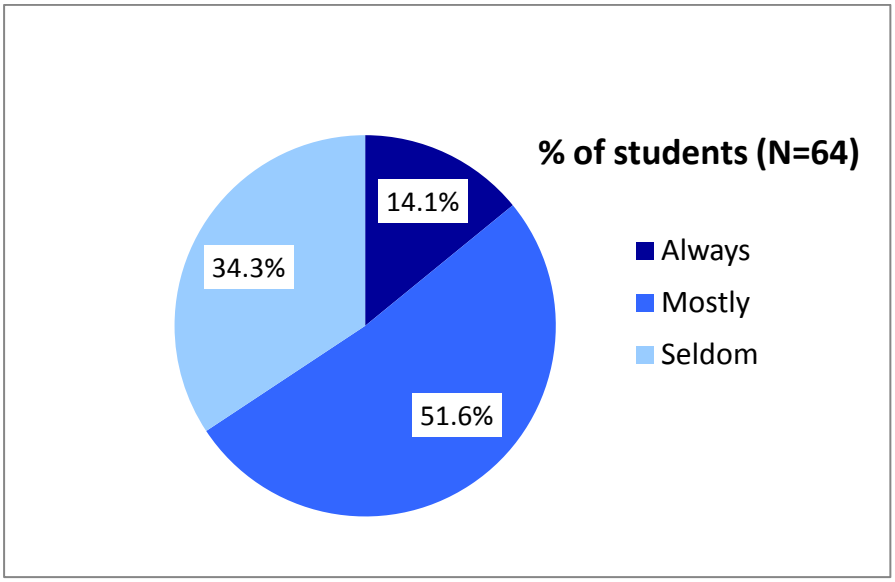


Figure 4.5 Availability of adequate numbers of patients for clerking

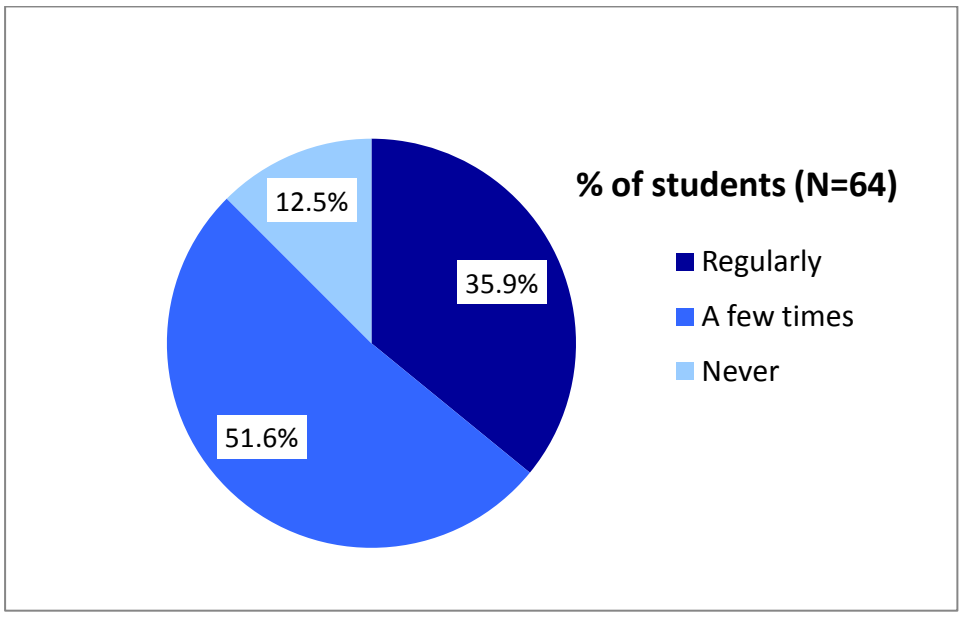


Figure 4.6 Availability of patients appropriate to the block

Over half of the students, i.e. 37 (54.4%) volunteered reasons for the unavailability of suitable patients for clerking. The majority of students suggested one possible reason each for this finding and four students offered more than one explanation. The two main reasons for this occurrence were noted under the headings of being allocated patients with medical problems in

other organ systems and lack of sufficient numbers of suitable patients. A third smaller theme related to the perceived poor organization of the FS.

Patients with medical problems related to other systems (19 comments)

In the FS 65.7% of students report 'always' of 'mostly' having the right reason having the right patient. In contrast to the findings of the SS, in three quarters of instances in the FS, patients had medical problems in blocks other than the blocks they had currently completed viz. the Endocrine or Musculoskeletal systems. One student related the experience of the doctor wanting "to show students an interesting patient" not complying with the objective for the activity and a number of students perceived patient selection to occur as a "random process" and attributed this phenomenon to the perceived lack of communication about objectives for this intended practice.

Lack of sufficient numbers of suitable patients (10 comments)

Large student classes and the occurrence of inpatients classified to be 'too ill for clerking', were reasons, given for the lack of sufficient numbers of patients for clerking.

Poor organisation of the session (6 comments)

Communication problems in the organisation of the FS were evident in the students' verbatim comments. In the words of these students, "doctors and staff responsible for allocating patients to students were not being forewarned about the intended student visit", *"Doctor not adequately warned"*, "*Doctor said he didn't know we were coming – he's doing GIT*" and *"Allocating people didn't know what sort of patients to give us"*.

Less frequently cited problems included patients who were perceived to be inappropriate to the students' skills level (1 comment) and very ill patients (4 comments).

4.9 Objective 1.4.2.2: Students' perceptions of the role of the tutor in the FS (2009 cohort only)

The tutors' tasks were investigated in relation to the tutors' intended role in this session.

Question 2.4 Tutor tasks

In the majority of instances, students' clinical findings of their patients were checked by the tutor. However, in only very few instances was students' examination technique checked by the tutor. These data are presented in Table 4.9 and Figure 4.7.

Table 4.9 Tutors' performance of tasks in the case presentation in the FS

	No. of students	**Response rate (%)**
Tutor checks students clinical findings	**n (%) (N=64)**	**94.1**
Always	16 (25.0 %)	
Usually	26 (40.6 %)	
Sometimes	16 (25.0 %)	
Rarely	5 (7.8 %)	
Never	1 (1.6 %)	
No response	4	
Tutor checks examination technique	**n (%) (N=64)**	**94.1**
Always	5 (7.8 %)	
Usually	7 (10.9 %)	
Sometimes	13 (20.3 %)	
Rarely	28 (43.8 %)	
Never	11 (17.2 %)	
No response	4	
Tutor explains clinical findings	**n (%) (N=63)**	**92.6**
Always	9 (14.3 %)	
Usually	18 (28.6 %)	
Sometimes	25 (39.7 %)	
Rarely	8 (12.7 %)	
Never	3 (4.8 %)	
No response	5	
Tutor gives more information	**n (%) (N=63)**	**92.6**
Always	16 (25.3 %)	
Usually	25 (39.8 %)	
Sometimes	18 (28.5 %)	
Rarely	3 (4.8 %)	
Never	1(1.6 %)	
No response	5	

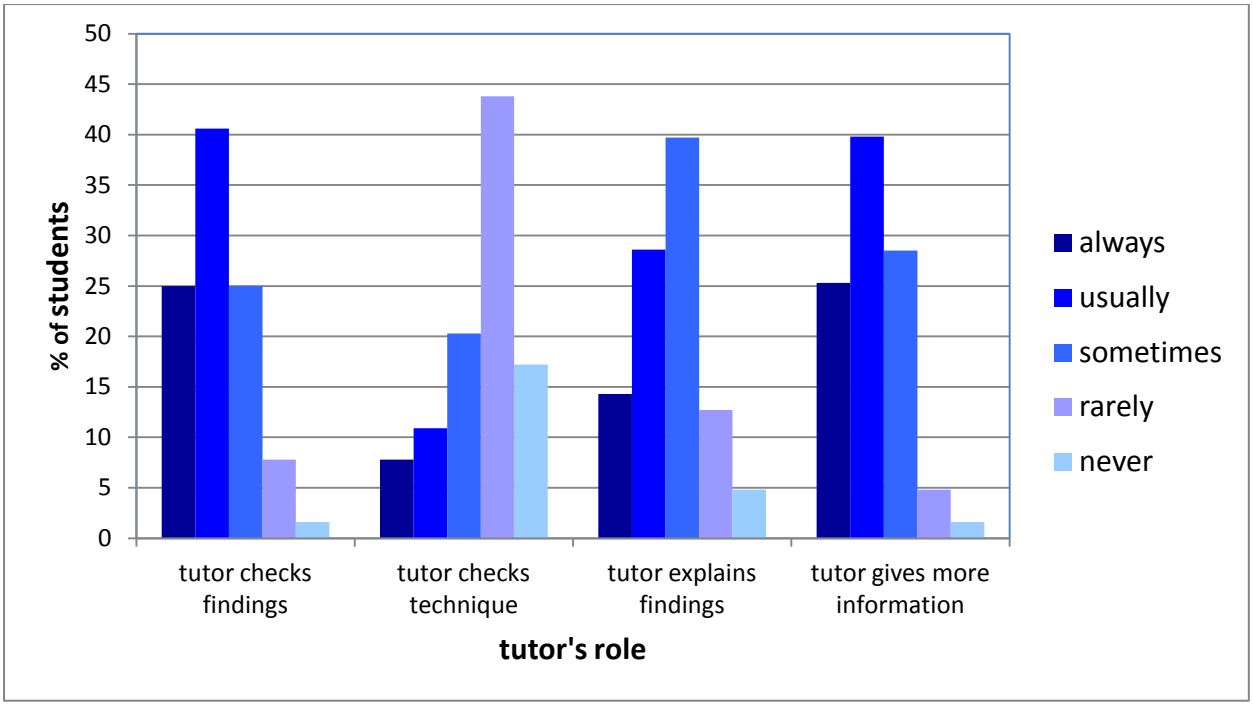


Figure 4.7 Tutors' role in the FS

4.10 Objective 1.4.2.3: Level of student participation in the FS (2009 cohort only)

Ideally in this session, learning opportunities are intended to allow students interaction with their assigned tutor in three groups of no more than three. One student from each group presents the patient findings to the tutor and student peers thus constituted and participation of all students is intended in the discussion that follows. The practice time allocated for this session is ideally divided approximately equally between these two tasks, i.e. an hour each for the patient clerking, and the presentation and discussion with the tutor.

Question 2.3 Number of students per group attending the presentation with the tutor

The response rate for this question was 88.2%. More than three quarters of students attended this session more or less as intended, i.e. in groups of no larger than 12. These data are illustrated in Table 4.10.

Table 4.10 Student group sizes attending the presentation with the tutor

No. of students per group attending presentation	No. of students	% (N=60)
≤ 9 per group	20	33.3
10 – 12 per group	26	43.4
> 12 pergroup	14	23.3

Question 2.4.1 Students present cases

Question 2.4.2 Each group presents their patients

There was a 94.1% response rate to these questions, with 92.1% of students reporting 'always' or 'usually' having the opportunity to present their patient cases to the tutor in the FS. However, only 65.7 % reported that each of the three groups 'always' or 'regularly' presented to the tutor. These data are presented in Table 4.11 and Figure 4.8.

Table 4.11 Opportunities for presentation of cases (individual students and groups)

Students present cases	**n (%) (N=64)**
Always	44 (68.8%)
Usually	15 (23.4%)
Sometimes	4 (6.3%)
Rarely	1 (1.6%)
Each student group presents	**n (%) (N=64)**
Always	17 (26.6%)
Usually	27 (42.2%)
Sometimes	16 (25.0%)
Rarely	4 (6.3 %)

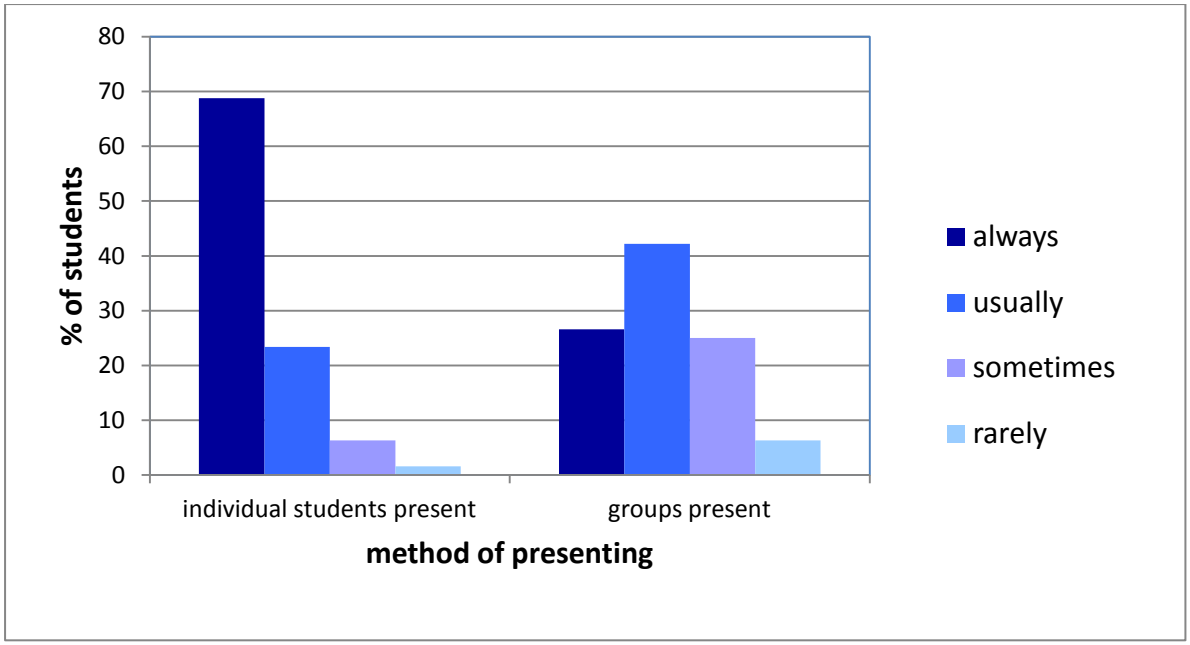


Figure 4.8 Opportunities for case presentation in the FS

4.11 Objective 1.4.2.4: Students' ratings of the educational value of the FS (2009 cohort only)

The vast majority of students rated their opportunities to learn skills in history and physical examination, clinical decision making and learning more about certain conditions as 'satisfactory' and 'excellent'. Nearly two thirds of these opportunities rated similarly their skills level in the domain of patient interaction. These data are presented in Table 4.12 and Figure 4.9.

Question 2.9 Students' rating of their clinical skills learning

The vast majority of students rated their skills in history and physical examination, clinical decision making and learning more about certain conditions as 'satisfactory' and 'excellent'. Nearly two thirds of these opportunities rated similarly their skills level in the domain of patient interaction. These data are presented in Table 4.12 and Figure 4.9.

Table 4.12 Student ratings of their clinical skills learning in the FS

Skills domain	No. of students	Response rate (%)
Q 2.9.1 Skills in history and examination	**n (%) (N=65)**	**95.6**
Excellent	18 (27.7%)	
Satisfactory	37 (56.9%)	
Poor	10 (15.4%)	
No response	3	
Q 2.9.2 Skills in patient interaction	**n (%) (N=65)**	**95.6**
Excellent	16 (24.6%)	
Satisfactory	29 (44.6%)	
Poor	20 (30.8%)	
No response	3	
Q 2.9.3 Skills in clinical decision making	**n (%) (N=65)**	**95.6**
Excellent	17 (26.2%)	
Satisfactory	40 (61.5%)	
Poor	8 (12.3%)	
No response	3	
Q 2.9.4 Learning more about certain conditions	**n (%) (N=65)**	**95.6**
Excellent	25 (38.5%)	
Satisfactory	31 (47.7%)	
Poor	9 (13.8%)	
No response	3	

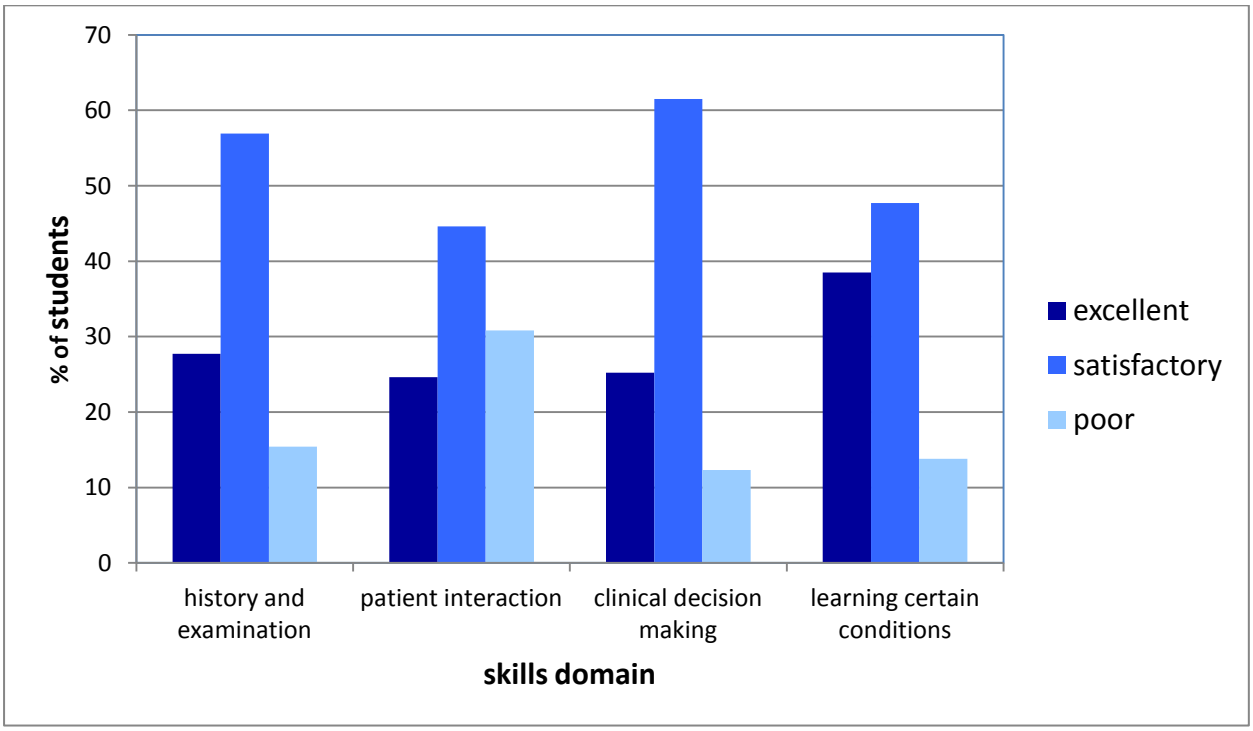


Figure 4.9 Students' ratings of their clinical skills learning in the FS

4.12 Objective 1.4.2.5: Use of available time in the FS (2009 cohort only)

Students reported spending similar periods of time for the tasks of history taking and physical examination with their patients. The majority of student spent approximately half the allocated time on each of the tasks of history taking and examination and case presentation to the tutor.

Question 2.1 Time spent on history taking

Question 2.2 Time spent with examination

Question 2.5 Time spent with tutor

Sixty-four students responded to these questions. The time allocated to the FS was divided between the following two educational activities, viz. clerking the patient and time spent with the tutor in the presentation and discussion of the patient's clinical problems. The majority of students reported satisfactory participation in their attendance and presentation with to the tutor. Less than 5% of students spent fewer than ten minutes for taking a history from a patient, whilst for physical examination this figure was even lower. All students attending the session with the doctor reported this period to be greater than ten minutes duration: and two thirds spent more than 45 minutes. These data are presented in Table 4.13.

Table 4.13 Time spent in the FS

Q 2.1 Time spent on history (min.)	**No. of students**	**% (N=64)**
<10	3	4.6
10 - 30	49	76.6
30 - 45	12	18.8
Q 2.2 Time spent on examination		
<10	2	3.1
10 – 30	59	92.2
30 – 45	3	4.7
Q2.5 Time spent with tutor (min.)		
<10	0	0
10 – 30	8	12.5
30 – 45	13	20.3
>45	43	67.2

4.13 Objective 1.4.2.6: **Problems in the FS** (2009 cohort only)

Q 2.8 Range of Problems

Problems were identified broadly in two main areas; pertaining to the session with tutor and those to patient clerking. Similar numbers of complaints were reported to each of these sessions with slightly more problems in the latter category.

Sixty students (88.2%) responded to this question. A total of 88 complaints were noted in the FS, 43 (48.9%) of which occurred in the session with the tutor and rest (51.1%) with patient clerking.

Problems related to the session with the tutor (43)

It is important to note that 33 students (55.0%) reported no problems – the other 27 students (45.0%) reported one or more problems. A quantitative summary of these data is presented in Table 4.14 below.

Table 4.14 Problems in the session with the tutor in the FS

Nature of problem	**n (%) (N=43)**
Perceived tutor behaviour and attitude to students:	13 (30.2%)
Availability of tutor	17 (49.5%)
- Interruptions	5
- Large student-tutor ratios	6
- Lack of communication	6
Lack of familiarity with the CSP	9 (20.9%)
- Tutors expectations of students clinical skills level	6
- Lack of understanding of session objectives	3
Tutoring style	2 (4.7%)
Lack of expertise	2 (4.7%)

Tutor availability

These problems related to the tutors' availability with time in this session. This perceived lack of dedicated tutor time was related to several factors: interruptions caused by ringing cellular phones, interruptions by other staff members and the tutors' competing service duties.

Tutor familiarity with the objectives of the FS

These include perceived lack of understanding of the objectives of this session (three complaints), heightened expectations of students' clinic skills level (six complaints) and two pairs of students each complaining of the tutors' lack of clinical competence' and the 'didactic style of tutoring'.

Tutors not conversant with the objectives of the skills programme were described by certain students, for example *"Pitching the discussion at a level that students cannot cope with"* and *"Expecting students to practice skills differently*". Problems reported as occurring often were mainly seen with the large student-tutor ratios, tutors' failures with communication with students of the intended times and venues for presentation and tutors' heightened expectations of students' educational level which include interruptions with teaching. Certain students also reported the tutoring as being *"Conducted by lower ranks of hospital medical staff including medical officers and interns"*.

Negative tutor attitude

Students' perceptions of negative tutor attitudes were reported by certain students e.g. those perceived to "*Tutor arrogance"*, students *"Belittled by tutors"* and *"Impatient tutors"* e.g. *"Discouraging active participation"*.

Problems related to patient clerking (45)

These problems have already been presented under Objective 1.4.2.1 above. In responding to this second question students reported a total of 45 problems concerning patient clerking which were attributed to insufficient numbers of patients for practice and the allocation of unsuitable patients for this practice. The nature of the problems was therefore similar to that previously reported.

THE FORMAL SESSION: COMPARISON OF THE 2006 AND 2009 COHORTS

In this section the student experiences of the FS of both cohorts are compared. This enables a judgement to be made of the effects (if any) of improvements introduced at the start of 2009.

In reporting the data below the question numbers of the 2006 and 2009 instruments respectively are given.

4.14 Objective 1.4.2.1: Availability of adequate numbers of suitable patients for clerking (2006 & 2009 cohorts)

Questions 5.1 & 2.6 Availability of patients for clerking

There were significant differences in students' experience of the availability of patients for clerking in this session for the 2006 and 2009 student cohorts with significantly more students in the former group, i.e. over 85% experiencing patient shortages; ($p < 0.001$). These data are shown in Table 4.15.

Table 4.15 Availability of adequate numbers for patient for clerking in the FS (2006 and 2009 cohorts)

	2006	2009	
Adequate numbers of patients for clerking	**n (%) (N=32)**	**n (%) (N=64)**	**Probability (Fisher exact test)**
Regularly	2 (6.3%)	23 (35.9%)	<0.001
A few times	19 (59.4%)	33 (51.6%)	
Never	11 (34.4%)	8 (12.5%)	

Questions 5.2 & 2.7 Availability of patients appropriate to the block for clerking.

Results: There were slight reported differerences in the availability of patients appropriate to the block for clerking with reduced availability occurring in both cohorts, but these differences were not significant ($p = 0.499$). The data are shown in Table 4.16.

Table 4.16 Availability of suitable patients for clerking (2006 and 2009 cohorts)

	2006	2009	
Patients appropriate to block	**n (%) (N=32)**	**n (%) (N=64)**	**Probability (Fisher exact test)**
Always	7 (21.9 %)	9 (14.1 %)	0.499
Mostly	17 (53.1 %)	33 (51.6 %)	
Seldom	8 (25.0 %)	22 (34.4 %)	

4.15 Objective 1.4.2.2: Students perception of the role of the tutor in the FS (2006 & 2009 cohorts)

Questions 7.4 & 2.4 Tutor tasks in the FS

There were small observed differences between the two student cohorts in their reported perception of the tutors' performance of the tasks in this session. However these were all not statistically significant. These data for the four tutor tasks are presented in Table 4.17.

Table 4.17 Comparison of student perceptions of the tutors' performance of their tasks in the FS (2006 and 2009 cohorts)

Tutor task	2006	2009	Probability (Fisher exact test)
Tutor checks findings	**n (%) (N=25)**	**n (%) (N=64)**	
Always	9 (36.0%)	16 (25.0%)	0.779
Usually	10 (40.0%)	26 (40.6%)	
Sometimes	4 (16.0%)	16 (25.0%)	
Rarely	2 (8.0%)	5 (7.8%)	
Never	0 (0.0%)	1 (1.6%)	
Tutor checks technique	**n (%) (N=25)**	**n (%) (N=64)**	
Always	0 (0%)	7 (10.9%)	0.152
Usually	5 (20.0%)	5 (7.8%)	
Sometimes	5 (20.0%)	13 (20.3%)	
Rarely	8 (32.0%)	28 (43.8%)	
Never	7 (28.0%)	11 (17.2%)	
Tutor explains findings	**n (%) (N=25)**	**n (%) (N=63)**	
Always	8 (32.0%)	9 (14.3%)	0.358
Usually	7 (28.0%)	18 (28.6%)	
Sometimes	8 (32.0%)	25 (39.7%)	
Rarely	1 (4.0%)	8 (12.7%)	
Never	1 (4.0%)	3 (4.7%)	
Tutor gives more information	**n (%) (N=22)**	**n (%) (N=63)**	
Always	5 (22.73 %)	16 (25.4%)	0.740
Usually	8 (36.36 %)	25 (39.7%)	
Sometimes	6 (27.27 %)	18 (28.6%)	
Rarely	3 (13.64 %)	3 (4.8%)	
Never	0 (0.00 %)	1 (1.6%)	

4.16 Objective 1.4.2.3: The level of student participation in the session with the tutor

(2006 & 2009 cohorts)

Questions 7.4 & 2.3, 2.4 Student participation in the FS

There was a significant difference between the means for the numbes of students per group attending the presentation to the tutor, for the 2006 and 2009 cohorts. In explaining the large difference between the two groups it should be noted that the data for the 2009 cohort contained two outliers, viz. three studens each reporting that their groups numbered in the region of 30, and one reporting an instance of 60 students present at a patient presentation to a tutor. The latter

four occurences may be explained in the light of some student groups' experiences of allocations for the Musculoskeletal block (concurring with anecdotal reports of perceved lack of opportunites for this period); equally 8 (i.e.25%) of students on the 2006 cohort reported attendances of seven or fewer suggesting student absences for the session.

No difference was demonstrated for the level of student participation in respect of the following two opportunities: students' opportunities for oral presentation of their patients to the tutor, similarly opportunity for each student group for orally presenting their patients to the tutor (p = 0.3.6 and 0.151 respectively).

4.17 **Objective 1.4.2.4: Students ratings of the educational value of the FS** (2006 & 2009 cohorts)

Questions 10.1 & 5.1 Student ratings of the educational opportunities for basic clinical skills

Rating for some of the categories of responses of the four clinical skills domains were small (<5), therefore comparison of the two student cohorts was attempted after combining the data of two categories judged to represent similar rating and collapsed into a single category. Thus the data of the following two categories were combined for analysis: 'excellent' and 'satisfactory' were assigned the common category of 'satisfactory' and the categories of 'moderate' and 'poor' were combined to form a single category, 'unsatisfactory'. The results of this subsequent analysis are illustrated in Table 4.19.

Table 4.19 Students' evaluation of clinical skills learning opportunities in the FS (2006 and 2009 cohorts)

	2006	2009	
Skills domain	**n (%) (N=32)**	**n (%) (N=65)**	**Probability (Chi-square test)**
History taking and examination			
Satisfactory	17 (53.1%)	55 (84.6%)	0.001
Unsatisfactory	15 (46.9%)	10 (15.4%)	
Patient interaction			
Satisfactory	20 (62.5%)	45 (69.2%)	0.507
Unsatisfactory	12 (37.5%)	20 (30.8%)	
Clinical decision making			
Satisfactory	6 (18.8%)	57 (87.6%)	< 0.005
Unsatisfactory	26 (81.2%)	8 (12.4 %)	
Learning more about certain conditions			
Satisfactory	10 (31.2%)	56 (86.2%)	< 0.005
Unsatisfactory	22 (68.8%)	9 (3.8%)	

Comparison of the 2009 and 2006 student cohorts in respect of their learning of clinical skills in history taking and physical examination, learning more about certain conditions and clinical decision making, demonstrated statistically significant differences for these groups in three of the four clinical skills domains ($p < 0.005$). However, no difference was demonstrated for these cohorts in students learning more about patient interaction, ($p=0.507$).

4.18 Objective 1.4.2.6: Reported problems in the FS (2006 and 2009 cohorts)

Questions 7.8 & 2.8 Problems reported by students in the FS

A quantitative summary of the data collected from the two cohorts is given in Table 4.20.

Table 4.20 Student reporting of problems experienced in the FS (2006 and 2009 cohorts)

Problem	No. of times problem reported		% of students reporting this problem		Relative frequency of the problem		Probability calculation	Statistical method
	2006	2009	2006 N=32	2009 N=68	2006 N=31	2009 N=44		
Tutor's perceived behaviour/ attitude	**7**	**7**	**21.9**	**10.3**	**22.6**	**15.9**	**0.038**	**Fisher's exact**
Tutor availability	**11**	**17**	**34.4**	**25.0**	**35.5**	**38.6**	**0.420**	**CMH**
- Interruptions	9	5	28.1	7.4	29.0	11.4	0.007	CMH
- Time coordination/ communication	2	6	6.3	8.8	6.5	13.6	0.020	CMH
- Large student: tutor ratios	0	6	0.0	8.8	0.0	13.6	0.070	CMH
Lack of familiarity with the CSP	**11**	**9**	**34.4**	**13.2**	**35.5**	**20.5**	**0.611**	**Fisher's exact**
- Doctors' expectations of students' level	6	6	18.8	8.8	19.4	13.6	0.193	Fisher's exact
- Doctors do not understand objectives	5	3	15.6	4.4	16.1	6.8	0.090	Fisher's exact
Tutoring style	**2**	**2**	**6.3**	**2.9**	**6.5**	**4.5**	**0.045**	**Fisher's exact**
Tutors' lack of expertise	**0**	**2**	**0.0**	**2.9**	**0.0**	**4.5**	**0.408**	**Fisher's exact**
Other	**0**	**1**	**0.0**	**1.5**	**0.0**	**2.3**	**-**	**-**
TOTAL	**31**	**44**					CMH = Cochrane-Mantel-Haenszel	

These data indicate the following:

- In both cohorts a relatively small proportion of students reported individual problems in response to this question. It may however be that they felt that they had already pointed out some of these problems earlier on in the questionnaire, e.g. when rating patient availability or tutor role fulfillment.
- The students from the 2009 cohort tend to report considerably fewer problems, proportionately. This is noticeable in almost all the categories of problem reported upon.

Some of these differences are significant: tutor attitude and tutoring style, and session coordination (including problems such as interruptions).

THE CLINICAL SKILLS UNIT SESSION: 2009 COHORT

4.19 Objective 1.4.3.1: Resources in the CSS (2009 cohort only)

The majority of students rated the availability of functioning medical, electronic equipment and models to be 'satisfactory'. The students' ratings, shown in Table 4.21 and Figure 4.10, were highest for the provision of models followed by electronic and medical equipment.

Table 4.21 Availability of adequate physical resources in the CSS

Resource		Response rate (%)
Q 3.1 Medical equipment	**n (%) (N= 65)**	**95.6**
Excellent	6 (9.2%)	
Satisfactory	25 (38.5%)	
Poor	34 (52.3%)	
No response	3	
Q 3.1 Electronic equipment	**n (%) (N=60)**	**88.2**
Excellent	14 (22.3%)	
Satisfactory	37 (61.7%)	
Poor	9 (15.0%)	
No response	8	
Q 3.1 Models	**n (%) (N=61)**	**89.7**
Excellent	10 (16.4%)	
Satisfactory	40 (65.6%)	
Poor	11 (18.0%)	
No response	7	

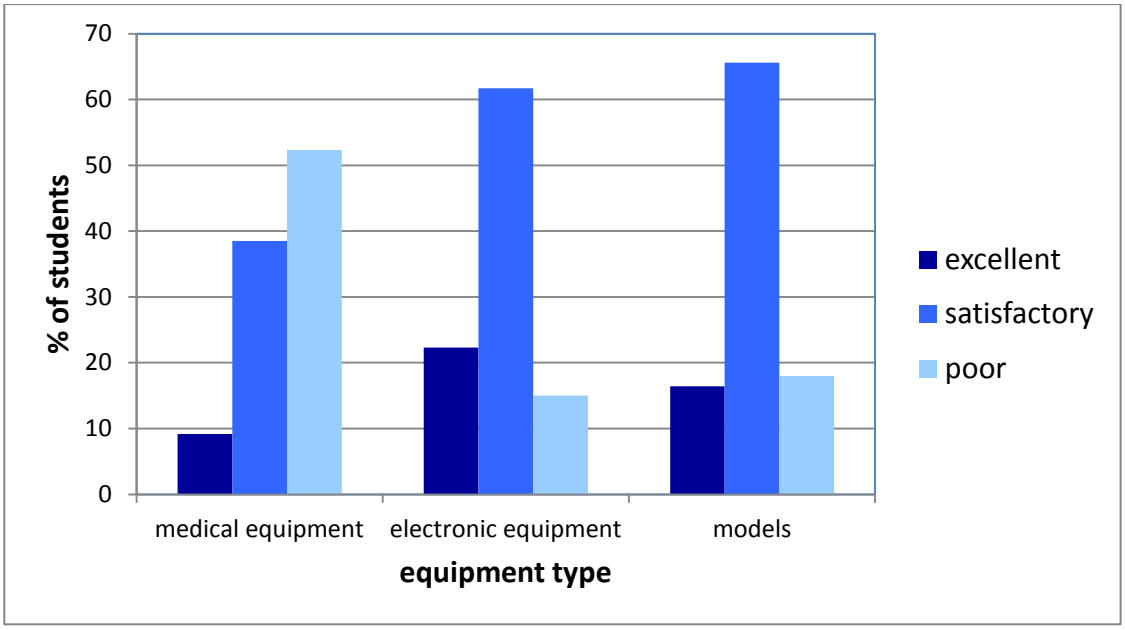


Figure 4.10 Availability of functioning equipment and models in the CSS

4.20 Objective 1.4.3.2: Quality of medical supervision in the CSS (2009 cohort only)

Students' perception of the quality of medical supervision was assessed in respect of the ratio of tutors to skills stations in this session.

Q 3.1 Ratio of tutors to clinical skills stations

Sixty-four students (94.1%) responded to this question with more than half of the students responding to this question, rating the tutor-station ratio as 'unsatisfactory'.

These data are shown in Figure 4.11.

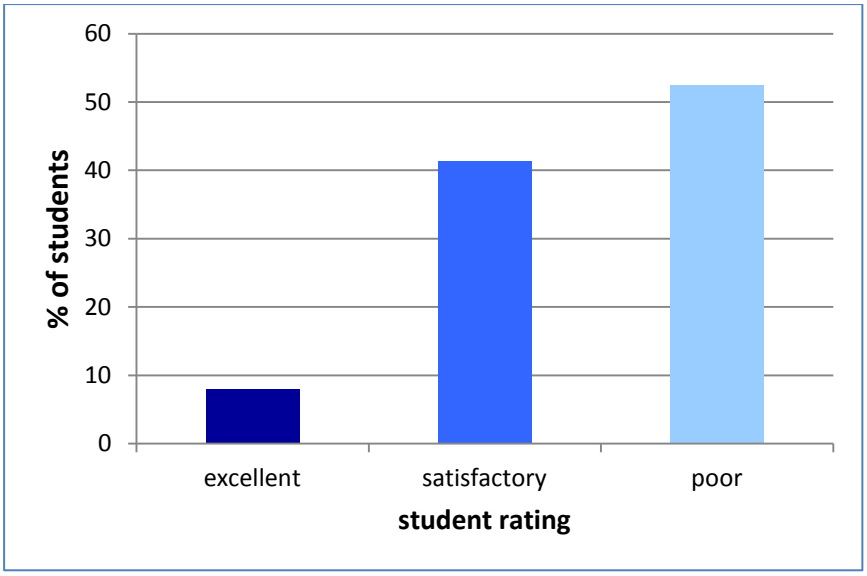


Figure 4.11 Quality of medical supervision in the CSS

4.21 Objective 1.4.3.3: Students' ratings of the educational value of the CSS (2009 cohort only)

Q 3.3 Students' ratings of learning opportunities in the CSS

In this session students' perception of their ability to learn basic clinical skills in the CSS learning, in respect of the five skills domains investigated by this question differed. Overall, most students rated favourably their learning of the skills in history taking, physical examination and integration of the basic sciences. This was reflected in students' scores of over 90 % in their ratings of opportunities to learn in history taking, followed by slightly lower scores for integration of basic sciences with clinical and in physical examination. About half of the students rated opportunities to learn clinical decision making and special investigations favourably with similar ratings for both skills tasks, i.e. 54.2% for each. These data are presented in Table 4.22 and Figure 4.12.

Table 4.22 Students' ratings of clinical skills learning opportunities in the CSS

Skills domain		**Response rate (%)**
Q 3.3.1 Skills in history taking	**n (%) (N= 64)**	**94.1**
Excellent	22 (34.4%)	
Satisfactory	36 (56.3%)	
Poor	6 (9.4%)	
No response	4	
Q 3.3.2 Skills in physical examination	**n (%) (N= 67)**	**98.5**
Excellent	30 (44.8%)	
Satisfactory	24 (35.8%)	
Poor	13 (19.4%)	
No response	1	
Q 3.3.3 Skills in special investigation	**n (%) (N= 61)**	**89.7**
Excellent	5 (8.2%)	
Satisfactory	32 (52.5%)	
Poor	24 (39.3%)	
No response	7	
Q 3.3.4 Skills in clinical decision making	**n (%) (N= 67)**	**98.5**
Excellent	5 (7.5%)	
Satisfactory	32 (47.8%)	
Poor	30 (44.8%)	
No response	1	
Q3.3.5 Skills in integration of basic sciences	**n (%) (N=65)**	**95.6**
Excellent	8 (12.3%)	
Satisfactory	40 (61.5 %)	
Poor	17 (26.2 %)	
No response	3	

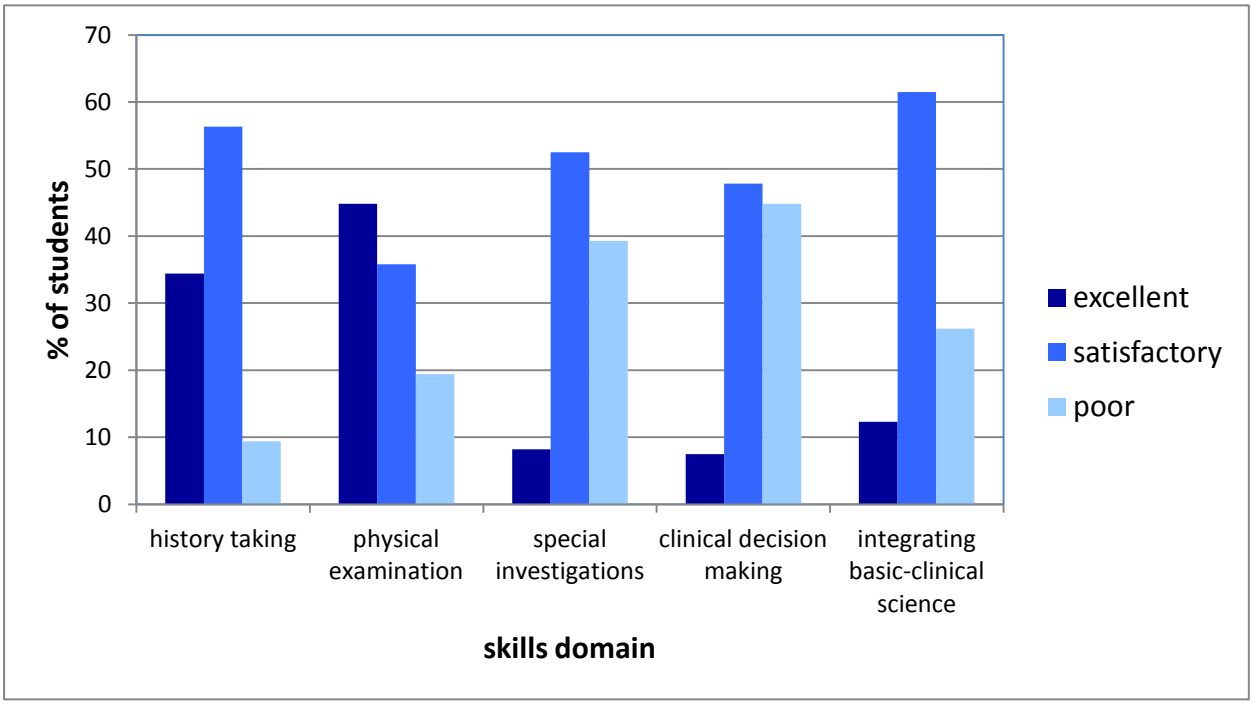


Figure 4.12 Students' ratings of their clinical skills learning opportunities in the CSS

Students were also asked to report on their reasons for negative perceptions of the learning opportunities provided in the CSS. These are shown in Table 4.23.

Table 4.23 Students' reasons for reduced practice opportunity in the CSS

Perceptions and reasons given	n (%) (N=31)
Reduced opportunity for hands on practice	17 (54.8%)
- Too many students in a room	4
- Not everyone gets to practice	8
- Not enough SPs	1
- Only a lecture in the station	1
- Not enough equipment	1
Tutors' reduced skills level	8 (25.8%)
- Teachers not knowledgeable	1
- Poor teaching skills	2
- Tutors lack of briefing	2
- Not as thorough	2
- Tutors lack of language skills	1
Low ratio of tutors to skills stations	6 (19.4%)
- Lack of tutor numbers	6

It should be noted that 37 students (54.4%) did not give any reasons for reduced practice opportunity.

4.22 Objective 1.4.3.4: Problems students experienced in the CSS (2009 cohort only)

Q.3.2 Problems perceived in the CSS

Thirty-nine students (57.4%) responded to this question but it is noteworthy that the other 29 did not report any. Some students reported more than one problem; a total of 51 complaints were reported. These data are reported quantitatively in Table 4.24 below and then expanded qualitatively. It should be noted that these data overlap with, and also confirm, some of the findings in 4.22 above.

Table 4.24 Students' reported problems with the CSS

Problem reported	n	% (N=51)
Lack of practice opportunity	17	33.3
Poor educational value of activities	13	25.5
Poor organisation of session	12	23.5
Poor quality of medical supervision	6	11.7
Other	3	5.8

Problems experienced in this session related to the quality of organization of these sessions, reduced opportunities for clinical practice and time for all students to obtain hands on practice; poor educational value of the provision of adequate numbers of trained tutors for guiding the clinical practice as well as SPs and learning materials; and a resulting lack of value in the activities of the CSS. However, many students' experience of this session does appear to meet with their expectations since (as reported above) a substantial proportion of them did not report problems.

The lack of opportunities to practice skills

These were related to insufficient time allocated for each station and consequent reduced opportunity for all students to practice the skills in all the stations of the session. This category accounted for the majority of complaints. Students attributed these problems to the following elements: large student-tutor ratios (four students), style of supervision (ten students), lack of equipment and SPs (three students).

Perceived disorganisation in the planning of these sessions

This problem accounted for just under a quarter of all complaints with students' perceptions of the inefficient use of time in this session.

The perceived poor quality of the session

These included the 'quality of tutoring' and the preselected clinical skills activities for this practice. Students questioned 'the usefulness of the learning activities'. Eight students perceived tutors lack of competence in the CSS to include tutors' lack of clinical acumen, their communication skills and their knowledge of the objectives for this session (eight students).

The lack of medical supervision was attributed to insufficient numbers of doctors available to guide the practice of clinical skills.

A few unsolicited student comments focused on the short period of scheduled time for clinical demonstration prior to the clinical skills session informing the practice in this CSS.

THE OSCE

4.23 Objective 1.4.4: To compare student performance in an OSCE for the study period.

The numbers of students who presented to take the GEMP II OSCE I were 212 and 229 for the 2006 and 2009 academic years respectively. The OSCE I results for GEMP II students for the 2006 and the 2009 academic years both corresponding with the study period are presented in Figure 4.13 below:

Comparison of the mean scores for the two cohorts is shown in Table 4.25 below.

Table 4.25 Comparison of GEMP II OSCE I results, (2006, 2009)

Year	No. of students	Mean	Standard error	Standard deviation
2006	212	83.2	0.54	8.31
2009	229	74.2	.041	6.16
TOTAL	441	78.6	0.41	8.55

The OSCE I results for GEMPII students for the 2006 and the 2009 academic years both corresponding with the study period are presented in Figure 4.13 below.

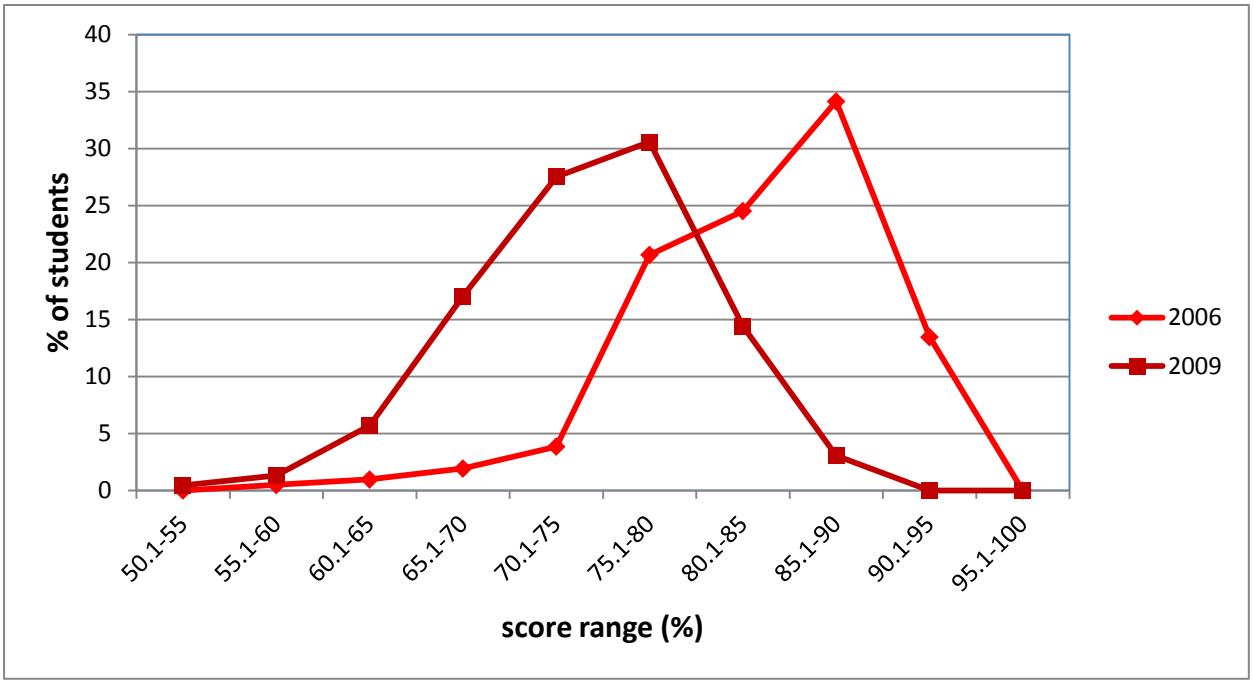


Figure 4.13 Student performance in the OSCE I, GEMP II (2006 cohort)

4.5 The 2009 end-of-block evaluations

One of the methods decided upon to validate the findings of the study is to compare these with data provided by students in their routine end-of-block evaluations. These standard evaluations are anonymous and voluntary, so not all students contribute to them. It would have been ideal to provide data from both the 2006 and 2009 cohorts but only the 2009 cohort data were still available in the system. The data related to HPD are summarised below, combined for the Endocrine and Musculoskeletal blocks.

4.5.1 Quantitative data

Table 4.26 Student end-of-block evaluation of aspects of HPD (2009 cohort) – Endocrine and Musculoskeletal blocks combined

Evaluation item	Positive		Negative		Not sure	
	N	%	N	%	N	%
The sessions (SS and FS) were a valuable component of the block	118	68.6	51	29.7	3	1.7
The sessions (SS and FS) were well organized	123	72.4	40	23.5	7	4.1
The teaching skills of the CSS demonstrators were generally good	134	77.9	34	19.8	4	2.3
CSS sessions were generally relevant to the block/theme	122	70.5	38	22.0	13	7.5
CSS sessions assisted me in clerking and examining patients during hospital visits	143	82.2	25	14.4	6	3.4
Average		**74.3**		**21.9**		**3.8**

Overall student evaluation of HPD in the two blocks was positive – about three quarters of students gave a positive rating to different aspects of HPD.

4.5.2 Qualitative data

Compared to the number of quantitative ratings, qualitative comments were relatively few.

4.5.2.1 The Endocrine block

Positive comments

Of the six volunteered positive perceptions of the visits to the hospital in this block, five referred to these as a result of the introduction of the new structure of the HPD, i.e. the SS. In the words of these students: *"Hospitals were fantastic learning experiences"*, another: *"This new HP day way is much better"*; another student liked *"The few hours on Tuesday mornings shadowing doctors in clinic or theatre"*, a third student appreciated *"Doing ward rounds during hospital days"* and another *"The new structure of hospital days" and "Modification of Health Practice days"*. One student commented briefly: *"Health Practice Day ★★"*.

Negative comments

Two of the comments related to the organization of the CSS, i.e. *"CSS still occasionally disorganized"* and a second, *"Too many students in the room for practice"*. A further two comments related to problems experienced with transport to the CHBH and the fifth with allocations of students to hospitals. One comment related to perceived negative attitude of a tutor.

Suggestions for improvement

There were three comments on suggestions for improving clinical skills sessions. In the words of two of these students: *"Smaller groups in clinical skills focusing on each person doing the skills as opposed to one person demonstrating"*, and *"The PowerPoint should be given for individual reviewing and the extra time spent practicing skills"*.

4.5.2.2 The Musculoskeletal block

In contrast with the Endocrine block (and the quantitative data) most of the comments about this bock were negative. Once again there was a paucity of comments supporting students' overall perceptions.

Positive comments

Four comments related to students positive perceptions of the HPD in this block, viz. *"Tutorials were great"* (related to the FS), and more broadly, *"Health practice days"* and *"CSS"* mentioned as positive aspects. One student commented, *"Thanks for an interesting block"*.

Negative comments

Four comments were directed at the hospital visit and related to perceived poor organisation of the HPD. In the words of these students: *"The hospital days; during the morning shadowing,*

sometimes the doctors did not know what to do with us, and we did not receive much learning"; *"Hospital days and CSU not properly organized. Changing of timetable without adequate notice"*; and (more tellingly) *"Complete lack of adequate delivery of hospital day"*.

Concerning the CSS some comments related to the number and complexity of the skills taught in this block; in the words of these students, *"I felt clinical skills were not adequate – there was not enough time for us to properly be demonstrated and taught the myriad of clinical tests for Musculoskeletal"*; *"Information for clinical skills is not manageable in single sessions, so it would be nice to have extra sessions for Musculoskeletal"* and *"Clinical skills sessions involved too much for students to adequately understand"* . Two students commented on the organizational aspect again, clamming that *"CSU poorly organized"* and *"Skills: no improvement since Endocrine despite comments on the Endocrine block evaluation".*

Suggestions for improvement

There were three suggestions from students for improving the delivery and learning activities in this session; these are reported verbatim: *"The clinical skills lecture could be longer and more interactive and hands-on, and the anatomy lectures were a bit unhelpful – I feel they could be more effective if models or visual aids, as well as movements by the lecturers were used. We need to study from the text book anyway, so a different approach to lecturing the subject matter could perhaps be employed"*. A second was more forthright: *"Improve CSU – I learnt nothing!!! Too many students in a room and not enough doctors & SPs"*. A third shared this perception: *"Organize clinical skills better – give more time to learn skills and have smaller groups no clinical exposure"*.

Chapter 5

DISCUSSION AND CONCLUSIONS

The discussion of the results of this study has been considered under the stated objectives and in relation to those of similar studies in the published literature. Following this discussion common threads relating to each of the three activities of Health Practice Day are drawn together in a conclusion.

Although the 2006 evaluation and the end-of-block evaluations were not a part of the current study, as previously stated, they are important for assisting with the interpretation of the findings of this study

THE SHADOWING SESSION

5.1 Objective 1.4.1.1: Level of student participation in the units' processes and activities in the SS

In the SS, the students were exposed to a spectrum of clinical activities with a high level of participation in ward rounds but less so in other scheduled unit activities and attendances with clinical procedures. These findings are anticipated in clinical environments as ward rounds are an integral part of patient care and management in academic hospitals and form part of service learning as formal opportunities for teaching professionals in this setting. As such, they are conducted in the ward environment around the patients' bedside with most units attending this activity in the morning as part of their daily schedule. The SS in the HPD is the first of the three rostered sessions lasting approximately 2 ½ hours and would be the most likely reason for

student attendance in this activity. Similarly, reduced student exposure with clinical procedures can be attributed to the frequency with which these procedures are performed within discipline specific attachments and in the limited clinical exposure during the time assigned for this session.

Student perceived themselves in this session as *"Merely tagging along with the group on their ward round"*, and *"Not being allowed to actively participate and perform procedures nor in specific attachments with assigned tutors"*.

Students and tutors were briefed about the structure of this session and the reason for its inclusion in the HPD of this CSP. Student attendance in participating in clinical procedures was not expected to be uniform as they were in different attachments and attainment of proficiency in this skill was not an objective of this hospital attachment. Although students in this programme were exposed in CSU practice to the hands-on skills of venepuncture and intravenous cannulation they perceived an unmet expectation of this learning in the SS. However, this finding raises the question the adequacy of student briefing in the objectives of this learning which was also demonstrated by Remmen, *et al* (1998), McGraw (1999) and Jaschinski (2008). The expectation for participation in certain clinical procedures may also have resulted from student comparison of their own experience with that of their peers in different attachments. Student expectation for active involvement with hands-on procedures has to be balanced with the need for supervising them at this stage of clinical development in this programme, which is an important criterion guiding their level of participation in these activities.

Jaschinski (2008) cites reduced student opportunity in hands-on procedures in the clinical context to the quality of partnerships developed between tutors and students. In the current study

most of the student participation in the session consisted of attendance at ward rounds, and they therefore would not have sufficient time for developing quality partnerships with individual tutors (it cannot be assumed that most students in this attachment did not demonstrate active attempts for seeking these opportunities). Kelly (2007) and Hudson & Tonkin (2008) cite partnerships in teaching between student and senior peers and student and tutor for improving the quality of learning, i.e. for improving student satisfaction and comfort with the experience; for interactive learning; for active participation and for receiving feedback from peers. Whilst this is an important factor for student learning in the SS and needs to be encouraged, the feasibility of this opportunity may vary with human resource availability in the hospitals. In the setting of the busy unstructured clinical environment of academic hospitals, doctors in this role assume patient care to take precedence over other competing professional responsibilities and may be feel unequal to the task of providing any dedicated time for teaching students during this session.

The findings of this study demonstrate the importance of adequate communication with students in the objectives of the shadowing session and for providing them and tutors with support when a new educational activity is implemented in the programme.

The SS in the CSP has demonstrated potential for student learning in partnership with shadowing doctors; it is important as an essential component of learning the skills inherent in professional role modelling as also demonstrated by LaCombe (1997), Doshi (2005) and Matheson *et al*. (2010).

5.2 Objective 1.4.1.3: Level of student engagement with patients in the SS

Approximately half of these students participated in the physical examination of patients. Whilst this finding is encouraging (since it reflects students engaging with a clinical activity which is highly relevant in their learning in this programme) it cannot be interpreted as students actively seeking this opportunity in the time for this session: half of the students did not interact with patients. This level of exposure is inadequate for student development of their formal clinical skills.

In contrast half of the students did not examine patients whilst several students reported feeling *"Uncomfortable and unprepared for this activity"*, assumed to their ignorance of the objectives of this session and does not necessarily imply reduced opportunities in the availability of patients for clerking. The four main Wits teaching hospitals together have an excess of 2500 beds, and as a result most units have enough patients for student participation in this practice, providing adequate potential opportunity.

Nair, *et al* (2007) relate the quality of student learning in this context to students' personal motivation and taking responsibility for seeking specific opportunities to examine patients, as with Ende (1997), and Corbett, *et al* (2004), and Doshi & Brown (2005), and Littlewood, *et al* (2005). Together the study findings and the literature highlight the importance of adequate student briefing in the objectives, in order to improve their experience in this programme.

The SS in the CSP is important as an essential component of learning and for practice in the clinical skills domains of history taking, physical examination, clinical decision making and for learning the skills of patient management in common with the findings of Hall (1975), van der Hemm-Stokroos, *et al*. (2001), and Olsen, *et al*., (2005) and in this study has demonstrated potential for meeting this objective and which needs to be encouraged.

5.3 Objective 1.4.1.2: Level of student interaction with other members of the hospital health team.

Very few interactions occurred with other health professionals of the hospital team in this period and involved less than half of the student complement. This is an anticipated finding for this session as many of the daily ward rounds in academic hospitals are conducted as 'business rounds' and as such would involve essentially professional medical and nursing staff in those wards in this activity. The reasons for student interaction with allied health professionals occurred mainly in opportunistic settings and may be interpreted as student presence in the wards coinciding with these therapists in their attendance with specific patients for treatments. The nature of these interactions, have also been representative of student assignments to specific wards, and therefore, a potentially increased likelihood for these interactions to have occurred.

The small number of student encounters with these professionals may also be attributed to the formers' relative lack of exposure to the latter as students' previous learning experiences in the hospital visit in the HPD prior to 2009 was structured for patient clerking and case presentation in the FS and did not specifically include these professionals. As novices some of these students would not necessarily have perceive comfort for initiating opportunities for interactions with these members of the hospital team.

In this session student interactions with other health professionals was restricted mainly to interaction with nurses and needs to be improved for student learning of professional roles and responsibilities and for professional networking. This view is in agreement with Corbett, *et al* (2004) on the importance of students shadowing tutors for exposure to working in groups with other health professionals in this setting.

5.4 Objective 1.4.1.4: Doctors' role in the SS

Approximately half of the students perceived their assigned doctor in this role to have functioned in 'providing more information about patients' medical conditions'. This was followed with nearly a quarter perceiving the doctor as 'role model' and of 'mentor'. Less than a quarter of students used other terms for describing the doctors' role in the session. This finding is confirmed by Kua, *et al* (2006) who found students perception of the doctors' role to include passion for teaching, motivating and inspiring students and encouraging student participation.

5.5 Objective 1.4.1.5: Students' role in the SS

In this study the vast majority of students perceived their role in the SS akin to that of 'spectator', mainly in observation of senior peers in their professional duties in hospital. This finding may be interpreted to be due to their perceived lack of understanding of their expanded role in the SS for optimising their learning in shadowing of tutors. Doshi & Brown (2005) confirm this view emphasising the student's passive role in shadowing senior doctors by observation in different clinical settings around patients to have potential in offering extensive opportunities for students based on their active involvement by taking responsibility for their own learning.

5.6 Objective 1.4.1.6: Students' ratings of the educational value of the SS

Overall the student self-rating of their clinical skills was poor in this session; ratings for the skills in history taking and physical examination, participation in clinical procedures, interaction with patients and learning about the role of team members were unsatisfactory, in contrast with their ability for patient management. Only half of the students reported having examined patients and many were "not sure of the objectives of the learning in this session", "perceiving discomfort", all of which may be reasons for perceived potential opportunity to practice in these basic clinical skills domains and thus their self-rating of opportunities. This finding of perceived

lack of opportunity for practice in these domains of learning in student exposure in this session may also be interpreted to mean a fair degree of accuracy with self-rating.

However, this view of students' ability in self-evaluation needs to be balanced against their accuracy for evaluation of their self-rating for reliably indicating the success of programme delivery, which has not always demonstrated consistent findings. Van der Hem-Stokroos, *et al* (2001); and Wanigarooriya, *et al* (2004) demonstrated their student self-ratings to be accurate for predicting student ability; Barnsley, (2004), and Watts, (2009), and Weinrich, *et al* (2010) demonstrate in their studies, tutor ratings of medical students assessed student performance lower in comparison with student-ratings; and Falchikov & Boud, (1989) state accurate predictions of student ability for self-rating to be related to those in more advance courses and prior practice in this skill. Admittedly students in this SS were novices in this programme, at a junior level of their clinical training and not exposed to formal courses of self-rating or specific practice with this skill and therefore, this finding needs to be considered against this evidence.

5.7 Objective 1.4.1.7: Problems in the SS

Overall student evaluation of HPD in the end-of-block evaluation in the two blocks was positive with approximately three quarters of students rating this experience positively to different aspects of HPD; students positively perceived the SS for its organization and value to the learning in the blocks concurrent with the study period. Only two student comments were received for problems with the organisation in the SS.

In contrast in this study students reported negative perception for the organisation of this session, opportunity for participation, dedicated tutor time and comfort and preparedness for this learning, in agreement with McLean (2004) but in contrast with Kelly (2007). Students perceived the organization of this programme negatively for effective coordination and

communication of the processes. Students in this study described their experience with their tutor, negatively, demonstrated also by Kua, *et al* (2006). In common with Huggett, *et al* (2007), and Halaas, *et al* (2007), in this study tutors were perceived to be unprepared for this activity as the experience of Lehman, et al (2000) and von Below, *et al* (2008). In this study tutors were perceived to lack interest and involvement in this partnership. These two findings in common with Johnson & Carpenter (1986) and the views expressed by Ende (1997). Many students' expectation was for dedicated teaching time and for structured learning. This expectation and lack of tutoring in this environment may be responsible for student perception of negative tutor attitudes toward this task. Relative unavailability of tutors with students in this session may be interpreted to high tutor workloads and competing professional responsibilities making dedicated tutoring a challenge; tutors may also be unfamiliar with their role in this session.

Conclusions of findings in the SS

Students in this session reported exposure to a wide range of clinical activities and medical conditions of the patients they encountered in this learning. This engagement with learning was most frequent in attendance in ward rounds and with patients whose clinical conditions were mostly appropriate to the blocks concurrent with student learning. However, a substantial proportion of students did not examine patients and even less interacted with other members of the hospital health team. As a result they rated the opportunities for learning in this session poorly. In contrast three quarters of students in the end-of-block evaluation for this period evaluated the organisation of this session positively and reported the opportunities in the SS to be a valuable component of the learning in these blocks.

In summary, student experiences in the SS indicate lack of congruence between the intended and observed curriculum. Whilst students' experience of their shadowing encounters provides evidence that the delivery of this programme was not always effective for allowing them

satisfactory engagement with the clinical process, this was not fully corroborated in the findings of their evaluations of the session in their end-of-block evaluation for this period.

It needs to be stated that the main reason for the inclusion of the SS in the HPD in the CSP was to extend the time for student exposure to the clinical environment for interacting with patients; to practise their clinical skills with patients; to learn about professional roles and responsibilities and networking with other members of the hospital team; to learn appropriate attitudes; and to learn about ethics, in the shadowing of senior doctors. The potential opportunities for acquiring at least some of these skills with patients and the skills inherent in professional role modelling of the doctors they are shadowing in the hospital are clear.

The findings of this evaluation suggest the need to address and implement effective communication, adequately briefing students and tutors in this programme to increase the students' opportunities for learning the skills intended in this session in the HPD in the CSP. These are listed in more detail in Chapter 6.

THE FORMAL SESSION

5.8 Objective 1.4.2.1 Availability of patients for clerking in the FS

One of the main findings of the FS in this study demonstrated above average satisfaction of the majority of students regarding the availability of patients for clerking, with a statistically significant improvement from the 2006 experience. The availability of appropriate patients with medical conditions concurrent with student learning in this block was unchanged.

Where patient shortages were reported these were related to relative patient unavailability attributed to three main factors, viz. patients not being in their beds at the time of clerking practice, patients attending scheduled diagnostic or therapeutic procedures, or patients receiving visitors. Patients reported to be unsuitable for practice were either 'medically unfit patients', i.e. too ill or unable to communicate, including those patients with language barriers.

These findings and the main reasons for patient unavailability for clerking practice with students concur with the findings of Hall (1975), Nielsen, *et al* (2003), Corbett, *et al* (2004) and Olsen (2005). The former also cited large student-patient ratios as causing student distraction and inattentiveness, an anecdotal finding reported by tutors in the CHSE. Patient unwillingness for student practice however was not a finding of this study, supported by evidence of Huggett, *et al* (2007) who demonstrate patients in hospitals to be "willing participants with student practice and for attending specifically for this purpose".

Patients in this study were mainly appropriate to students' theoretical learning concurrent in the blocks of the study period. The reasons for patients who were classified inappropriate for clerking were similar to those demonstrated by Olsen, *et al* (2005) who with Dornan, *et al* (2006) both emphasise the need for patients to be actively selected for clerking practice with patients. The skill for effectively communicating with patients is taught and learnt in the PD theme in the GEMP. In the HPD in the CSP students are allowed the opportunity for using this skill in interacting with patients.

The findings of the FS in 2009 demonstrated the majority of patients suitable for clerking and significantly more patients readily and available for participation. These findings were interpreted to improved tutor selection of patients for this learning and an indirect indication of tutor understanding of this role.

Student opportunity with patients for clinical practice is an important factor in developing students' clinical acumen (hitherto discussed in 5.3; 1.4.1.3) but more needs to be done to further improve this opportunity.

In this study the tutors were perceived to observe most of the professional tasks associated with this role, except for checking students' examination technique and demonstrating the clinical signs of the patients clerked. However these findings were not statistically different in comparison with the 2006 student experience. The significance of findings of Ramani (2003) and Corbett, *et al* (2004) both indicate clinical tutors to be inadequately prepared for their tasks; They do not check students' clinical findings and examination technique, nor demonstrate examination technique and use didactic styles of teaching (Corbett, et al., 2004) emphasizes the need for efforts for improving tutor training to include all the tasks assigned to the tutor. Again this would relate to improvements in CHSE staff communication with clinical tutors in the hospital and effective briefing of the tutors in the FS and provision of formal courses to improving tutoring.

Student opportunity with patients for clinical practice is an important factor in developing students' clinical acumen (hitherto discussed in 5.3; 1.4.1.3) but more needs to be done to further improve this opportunity.

5.9 Objective 1.4.2.5: The use of available time for the FS

Student perception of the use of available time in this session conformed to the intended duration for this activity and did not differ in relation to this finding for the previous evaluation (2006), despite anecdotal evidence from hospital tutors and CHSE staff to the contrary. One explanation for the efficient use of time may be related to regular student attendance for the clinical demonstration and briefing session preceding the clinical practice for the HPD. This finding may

also reflect the good communication with and briefing of hospital tutors by CHSE staff, for student learning in the FS.

The use of available time in this session was suitablably divided for the activities of patient clerking and presentation of cases to the tutor in common with Johnson & Carpenter (1986).

5.10 Objective 1.4.2.2 Role of the tutor in the FS

The majority of students perceived satisfactory participation in this session with their tutor. In more than two thirds of instances students had opportunities for orally presenting their patients, individually and in groups. Student also report adequate opportunities for case presentation and discussion. The majority of students in the 2009 cohort attended this session with the tutor in groups of a satisfactory size except for two instances in one of the blocks when tutor absences for attending with writing higher examinations and for a conference resulted in very large groups of students with the tutor for the oral presentation of cases.

In this study relative 'reduced tutor availability' was perceived in a minority of cases, in the reduced numbers of tutors in the hospitals owing to tutor absences for leave, i.e. vacation, maternity and sick leave. These occurences may be responsible for the large student-tutor ratios reported by 23% of students. This imbalance in the ideal ratio of student, tutor and patient, resulting in overcrowding around the patients' bedside and a perceived decline in medical supervision, was also found by Nair, *et al* (1989), and Diemers, *et al.* (2007), and Jaschinski (2008). Although student-tutor ratios are important for student participation in clinical contexts, Ende (1997) and Torre (2003) both describe effective tutoring despite large student-tutor ratios.

5.11 Objective 1.4.2.3 Level of student participation in the FS

The majority of students perceived satisfactory participation in this session with their tutor. In more than two thirds of instances students had opportunities for orally presenting their patients, individually and in groups. Student also report adequate opportunities for case presentation and discussion. The majority of students in the 2009 cohort attended this session with the tutor in groups of a satisfactory size (although there were two exceptions due to an unexpected occurrence when some of the assigned tutors were absent owing to attendance at a conference and for taking higher examinations.

In this study relative 'reduced tutor availability' was perceived in a minority of cases, in the reduced numbers of tutors in the hospitals owing to tutor absences for leave, i.e. vacation, maternity and sick leave. These occurences may be responsible for the large student-tutor ratios reported by 23% of students. This imbalance in the ideal ratio of student, tutor and patient, resulting in overcrowding around the patients' bedside and a perceived decline in medical supervision, was also found by Nair, *et al* (1989), and Diemers, *et al.* (2007), and Jaschinski (2008). Although student-tutor ratios are important for student participation in clinical contexts, Ende (1997) and Torre (2003) both describe effective tutoring despite large student-tutor ratios.

5.12 Objective 1.4.2.4: Students' ratings of opportunities for learning clinical skills in the FS

In comparison with their 2006 peers students in the 2009 cohort demonstrated significantly improved ratings for their opportunities to practise in three of the four clinical skills domains, viz. clinical decision making, history taking and learning more about certain conditions. Their rating for interaction with patients was unchanged.

Improved ratings in these skills domains may be due to increased efforts in 2008/2009 to orientate hospital staff and students in this programme about the objectives of the CSP. Furthermore, in this session significantly more patients were available in the hospital for practice

with students of the 2009 group in comparison with their 2006 peers. The parallel opportunity of the SS for increasing student exposure to the clinical environment may be another factor for the perceived increase in learning opportunity and therefore increased student rating of their opportunities for learning in the basic clinical skills domains. Other explanations for the improved student rating in 2009 may be more effective peer tutoring, improved CSS tutoring and learning, and parallel experiences in the GEMP, i.e. the PBL process which includes clinical reasoning. The relatively positive perceptions of the 2009 cohort are also confirmed by the end-of-block student evaluations.

In this regard, Kua, *et al* (2006) and Hugget, *et al* (2007) both emphasise perceive improved student rating for effective tutoring; tutoring to motivate students for applying themselves actively with their learning, tutors who are "*passionate about teaching and motivating and inspiring students and encouraging student participation*" and "*those able to create an environment conducive to learning*", Hugget, *et al* (2007).

However, the interpretation of improved rating may be limited by the data manipulation where two categories were constituted from the original four as a result of the small numbers of students in each category. Another factor in the interpretation of this finding may be in students' relative unfamiliarity for the skill in self-rating (discussed in 5.6). Also, this study did not include comparison of student self-assessment with those of their tutor for corroboration of data.

5.13 Objective 1.4.2.6: Problems in the FS

Overall the number of problems reported for this session remained low with relatively fewer problems reported by the 2009 cohort in comparison with their 2006 peers; improvements in 2009 were marked especially for perceived tutor attitude, tutoring style and improved tutor

understanding of the CSP. This is confirmed by the largely positive opinions of the 2009 cohort as expressed in their end-of-block evaluations.

The majority of students did not experience problems with the tutor, however where reported these were identified in three main areas: tutor availability, perceived professional competence and familiarity with the CSP.

Tutor unavailability was mainly due to interruptions with telephone calls and difficulties with tutor coordination of sessions; these were also reported by Nair, *et al* (1989), and Hall, (1975). Reports of student inattentiveness and distraction as consequent on large student numbers around patients' bedsides (Mackie, 2005) whilst not formally demonstrated in this study were mentioned anecdotally. Other problems, viz. noisy wards, patient anxiety and lack of privacy in wards which have been described before (Nair, *et al*., 1989) were not observed in this study.

In this study, problems in the FS relating to tutor unavailability can easily be understood in the light of the following contributory factors, viz. communication problems between students, tutors and faculty in respect of scheduled teaching times; and problems with lack of dedicated tutor time resulting from interruptions and tutor need for attending to urgent patient problems. Corbett, *et al* (2004) emphasise shortages of skilled and interested tutors in clinical settings, and Alweshi, *et al* (2007), tutor approachability, as important factors in student learning.

In this study there was little mention made of unrealistic tutor expectations as a problem. On the other hand Hall, (1975) and Bliss (1999) both report student perception of varying tutor expectation of students' clinical level and technique of physical examination.

Very few students perceived tutoring by junior ranks of medical staff, viz. medical officers and interns in this activity as tutoring by those 'lacking in clinical ability' as compared with tutoring by consultants. This is in common with findings by van der Hem-Stokroos, *et al* (2001), Olsen,

et al (2005) and Hall (1975). Perceptions of tutor ability as an important attribute in student perception of the quality of their learning was also demonstrated by Ende,(1997), Corbett, *et al* (2004), Kelly (2007) and Jaschinski (2008), although Alweshi, *et al* (2007) indicated this to be of lesser importance for their students.

Conclusion of the findings of the FS

In the for the 2009 cohort FS opportunities of students to learn have improved, compared to the 2006 group. More opportunities for clerking patients were reported. As perceived by students tutors demonstrated an improvement in their understanding of student ability as well as their understanding of the tutoring role; they were also perceived to demonstrate favourable attitudes in their behaviour towards students. All of this may be attributed to tutors greater familiarity with the CSP. A further reason for these findings may be improvements to communication and briefing of tutors in the CSP. Together these factors may well reflect improved student learning outcomes as indicated by improved student perceptions of the quality of their learning in the opportunities for participation and interaction with their tutor in the learning.

THE CLINICAL SKILLS SESSION

5.14 Objective 1.4.3.1: Resources in the CSS

For addressing resource needs in 2009 improvements were made by acquiring additional physical resources and establishing two new skills training sites. CHSE secured funds for purchasing sufficient volumes of new equipment and learning materials anticipated for the practice needs of all students in the CSP.

As a result students overall reported that the CSS provided sufficient volumes of functioning electronic equipment and models for clinical practice, whereas the situation was less than satisfactory with medical equipment.

5.15 Objective 1.4.3.2: Quality of medical supervision in the CSS

Medical supervision was unsatisfactory in this session. This was mainly due to the inadequate provision of tutors for guiding students in the clinical practice in the skills selected for this learning, and insufficient time for all students to obtain practice in the skills selected for this learning. This lack of supervision and opportunity for all students to get hands-on practice affected more than half of the students. The resultant negative student perception for the quality of their learning was found to consist in the following three reasons: large tutor-student ratios, large station-tutor ratios, and to a lesser extent, deficient tutoring skill – all resulting in insufficient time for students to practice hands-on skills.

At the time of this study the need for increasing the number of clinical tutors for supervision for all stations in the CSS had already become apparent. One of the strategies for addressing this problem therefore had been to increase peer teaching in the CSU. Students perceived the opportunity for learning under the supervision of senior peer tutors in this session positively, describing their experience of comfort and an interactive environment (as described for the SS), also demonstrated by Hudson & Tonkin (2008). Van der Hem-Stokroos, *et al* (2001) highlighted the problem of novice clinical tutors "overwhelming students with medical detail which has little bearing on the intended outcomes of this learning"; the current study did not demonstrate similar findings.

In contrast with this finding, more than three quarters of students in the end of block evaluation rated the teaching skills of the CSS demonstrators positively.

5.16 Objective 1.4.3.3: Students' rating opportunities to learn basic clinical skills in the CSS

The majority of students rated their clinical skills learning opportunities as satisfactory in the three domains of history taking**,** physical examination and integrating basic and clinical sciences learning. This is in line with the learning objectives for the CSS, aligned with the learning of 'core' clinical skills in GEMP I and II years.

Reduced student rating for learning about special investigations and clinical decision making in the CSS is explained by the level at which these skills are taught and learnt in this programme: competence in the principles of management of medical problems is not a priority at this stage. . Despite student perceptions of reduced learning owing to overcrowding and not all getting hands-on practice, more than three quarters of students perceived the CSS to have assisted them in clerking and examining patients during hospital visits.

Further, the interpretation of these ratings needs to be considered in the light of limited student training in for self-rating at this level of the programme (as discussed for the SS).

5.17 Objective 1.4.3.4: Problems in the CSS

Problems that were reported in this session focused largely on the lack of opportunities for clinical practice, the educational value of this session and the organization of this session. These have already been dealt with under student rating of the clinical skills level.

When investigated problems with the organisation of the CSS in one of the clinical blocks, a major contributory factor was found to be student non-compliance with attendance rules for scheduled activities in the CSS. The latter was anecdotally reported by CHSE staff to include students moving in an uncoordinated fashion and ignoring the preset time intervals for stations,

regulated by an electronic bell to streamline student rotations through these stations. Furthermore, some students were regularly observed to attend earlier rostered sessions and ignoring scheduled allocations, refusing to cooperate with CHSE staff and perpetuating a pattern of behaviour which reinforced a vicious cycle of overcrowding of stations, further reducing practice opportunity.

Students' negative perceptions of the educational value of the learning activities selected for this practice was reported as an unnecessarily large emphasis on history taking stations, with some students regularly avoiding attendance at sessions where the learning comprised practice in history taking. Some students complained about the monotony associated with practising an only too familiar clinical approach which is taught for the method in taking a history and ignored tutor advice for their engagement in deliberate repetitive practice to attain proficiency in the basic clinical skills. On the other hand more than three quarters of students in their end-block evaluation perceived CSS opportunities as generally relevant to the block/theme.

Despite some negative student perception for the organization of CSSs in this session, the majority was clear about its benefits, as also found by Ende (1997), Johnson & Carpenter, (1986), Nair, *et al* (1989), Dent (2002), and Mackie (2005).

Conclusion of the findings of the CSS

Students in this session reported perceived lack of medical supervision and opportunities for hands-on practice with very little time in this session. They however experienced improved opportunities with peer tutoring and overall their rating of CSS opportunities was positive in the majority of instances. In common with the views of the GMC (2009) and the findings of both Issenberg (2002), and of Ahmed (2008) CSUs are important for the attainment of proficiency in

clinical skills learning, however, students need adequate opportunity for practice. The need for improving human resource capacity for tutoring has to be further encouraged for creating opportunities for student repetitive clinical practice under the guidance of adequate numbers of trained and interested clinical tutors with adequate facilities for supporting this practice. Students need more time with clinical practice in the CSS. Recommendations for addressing these needs are listed in Chapter 6.

THE OCSE

5.18 Objective 1.4.5 Comparison of student performance in the OCSE

Whilst the overall performance in the GEMP II OSCE I for the students of the 2009 cohort as assessed by final scores was high, student OSCE performance had declined in comparison with their peers of 2006; this difference was statistically significant. The main reason for this seemingly anomalous observation is judged to be the inclusion in 2009 of a 'global rating' to complement scoring with standardised checklists for the hands-on stations, and in the variations in weighting for these two methods for the assigned skills stations. The combination of standardised checklists and global rating for scoring student observed performance in clinical skills increases the accuracy for rating students in these skills in an OSCE (NHS Improvement, 2012). Hence the 2009 student final scores may be interpreted as a more accurate reflection of student ability than was obtained for the 2006 cohort.

OSCE scores were therefore not a useful parameter for assessing the validity of comparative data about the FS in the 2006 and 2009 cohorts.

5.19 Generalisations from the data in this study

An important consideration in this study is the generalisability of its findings. Albeit limited by the small sample sizes for these cohorts samples involved proportionate stratification to categories by clinical site and discipline; randomization was applied within these categories; and participation was both voluntary and anonymous. Similarly, the pilot study albeit small, was designed to test the feasibility of using this instrument for the method of evaluation chosen in this study; the student survey for the FS in the 2006 was successfully piloted. Qualitative data from both pilot studies were also analysed to extend data validity and trustworthiness – particualrly in the case of items collecting data with a Likert scale using a small number of points for discrimination.

Therefore it can be argued that generalisability of the findings of this study can extended to include the population of GEMP II students in the academic years of the study period and to GEMP 1 students in the CSP. The findings from this study can also be valuable for CSPs in the undergraduate medical curricula of other institutions where the setting for this learning include inpatients in academic hospitals and in a CSU. These findings can also be applied to simulation settings, viz. training of students in the CSU in the CSP of many academic institutions already using this modality of teaching in their undergraduate curricula or those considering such implementation.

However, generalisability to settings such as ambulant sites in the community, hospital outpatients and rural settings is limited, as it is for for other structured clinical learning in the GEMP at Wits and those at other academic institutions which are involved in the training of medical students. The structure of the HPD in the CSP in the GEMP I and II programmes at Wits differs in many ways from those in CSPs of undergraduate medical curricula in other universities; however the experiences of student learning and the resources necessary for this training and its evaluation have universal application.

At Wits, the findings of this study will enable planning of further intervention and evaluation in the CSP.

The objective of this investigation was the evaluation of the delivery of the HPD in the CSP from the students' perspective. However future evaluations of this programme would benefit from an all inclusive methodology with the evaluation to include other stakeholders and instruments as well as other relevant data sources in the GEMP, viz. the findings of student summative examinations, end-of-block evaluations and other evaluations of the GEMP I and II curriculum which are identified as potentially relevant for triangulation.

At the time of this report interventions had already begun in the form of increasing clinical teaching sites to include other settings e.g. non-academic hospitals; regular visits by CHSE clinical tutors to attend and improve coordination of the FS and the SS on the days of and prior to scheduled for GEMP I and II hospital visits; and 'face to face' and 'on the ground' meetings with all stakeholder in the CSP, viz., hospital tutors, students, patients and nurses participating in this progarmme.

Chapter 6

RECOMMENDATIONS

In this final chapter recommendations are made for changes to the HPD experience in the CSP, for GEMP II students. These are based on the findings of this study and in relation to its objectives, also taking into account the attempts of some institutions reported in the literature to address similar problems in their programmes..

The following recommendations for changes to the delivery of the HPD in the CSP are aimed at addressing the roles and responsibilities of all stakeholders in this progmme for improving its delivery and therefore the intended outcomes. It focuses on the need for establishing successful partnerships between relevant parties and the acceptance of mutual responsibility for its effectiveness.

The main findings of this study are highlighted:

In the SS, the findings were in poor organization, few opportunities for interaction with the health team and with patients, students' passive role, not participating and staff and students not prepared/ not sure what to do and tutors lack time for students.

In the FS the main findings were in patients not always enough/ suitable, tutors not clear on role, don't check findings and examination technique, tutors not always available – poor organization and tutors not clear about their role.

In the CSS the main findings were too few tutors – student groups' too big, too little time to practise properly.

The findings which have been considered in formulating these recommendations focus on identifying resources for building staff capacity for teaching, motivating students for taking an active role in their learning, providing an adequate patient base for clerking in the opportunities available for this activity, making more dedicated time available for clinical practice, providing ongoing support for tutors and students and engaging these parties in participating in new programme initiatives, implementation and their ongoing evaluation. In essence it involves motivating all parties to assume ownership for the programme.

Although the research did not involve GEMP I students the recommendations are equally applicable to the GEMP I programme, since its structure is virtually identical.

6.1 Students' role

The students need to attend forums with faculty to receive feedback on the findings of this study. At these events their role in HPD must be clarified and they must be encouraged to become motivated to take the initiative in their skills learning. Active steps in student facilitation of this process are:

- Form positive student-tutor partnerships by assuming an active role in this learning.
- Seek out patients for clerking by consulting with tutors and other ward staff and patient registers when faced with too few patients.
- Recognise that potential learning opportunities are present in each patient and in all rostered ward activities.
- Make regular use of the CSU facilities for practising clinical skills in free time in the curriculum.
- Cooperate with clinical tutors in abiding by prepared scheduled attendances and participation for this practice.

- Take personal responsibility to ensure that they attend in the predetermined groups to avoid overcrowding and allow each student hands-on practice time in the learning activities in the CSU stations.

This should be done for the current group of GEMP I and II students and for all future groups.

6.2 Tutors' role

Tutors for the SS, FS and CSS

The tutors need to be invited to attend a forum with faculty to receive feedback on the findings of this study. Attention is needed to the following:

- Improve attempts for achieving the intended objectives of the CSPby making these completely clear to all tutors on an ongoing basis.
- Assume personal responsibility for selecting suitable patients and informing them about the clerking process.
- Delegate a colleague who would be responsible to attend the teaching in circumstances which demand the allocated tutor's attendance to service responsibilities.
- Plan scheduled sessions with attention to preventing unnecessary interruptions to the teaching.
- Identify teaching opportunities and actively engage students in its participation.
- Provide immediate feedback to students and creating time for reflecting on this practice and how it could be improved.
- Attend one of the regular short courses on aspects of teaching offered by the Centre for Health Science Education (CHSE).

CSS clinical tutors

In addition to the recommendations above the following recommendations pertain particularly to this group:

- Attend the student briefing session preceding each CSU practice and familiarise themselves with the objectives of the teaching.
- Ensure that all students attending the clinical skills practise in their assigned groups have opportunities in the hands-on activities in all stations.

All these actions involving tutors need to be carried out regularly in a scheduled fashion since there is a relatively high turnover of tutors (e.g. registrars in the clinical departments)

6.3 Faculty's role

Faculty needs to undertake the responsibility for this programme – in particular, the clinical skills team in the CHSE. This group should inform and work closely with a number of Faculty committees: the GEMP I and II Curriculum Committee, the MBBCh Undergraduate Committee, the School of Clinical Medicine Executive Committee and the Faculty Quality Assurance Committee. Together these groups need to attend to the following:

6.3.1 General recommendations

- Provide training for tutors in the objectives of the CSP and their expected role in these sessions.
- Provide tutors with formal courses in the approaches to tutoring and in updating their clinical skills.
- Explore practical ways for securing dedicated time for clinical teaching, e.g. by recruiting retired or 'outside' faculty: interested, volunteer professionals willing to assist with teaching students on the wards.

- Extend the peer tutor base by actively recruiting senior students, pointing out the benefit to them of such additional practice.
- Select tutors and SPs on their merits; clinical skills abilities and interest in teaching
- Regularly assess tutors and SPs for quality assurance purposes.
- Provide formal training for students to learn the skills for self-rating and opportunities for this practice (with feedback); recruit such students for the evaluation of interventions in the CSP
- Explore further opportunities for students' formative practice to enable them to take the initiative to improve their skills.
- Provide regular forums for allowing students, tutors and faculty to debate the merits of new programmes, to reflect critically on them and suggest improvements
- Continue the work in keeping open the channels for communication and support for students and tutors – primarily by regular scheduled meetings between them and CSU staff

6.3.2 Recommendations for the SS

- State specific objectives for the SS and clarify its potential for learning.

6.3.3 Recommendations for the FS

- Motivate tutors for preparation for bedside teaching and positive attitudes for teaching by motivating students, giving timeous feedback and adequate time for students practice of their clinical skills.
- Explore the feasibility of regular structured observation of students clerking practice, with feedback.

6.3.4 Recommendations for the CSS

- Recruit peer tutors for assisting with tutoring and medical supervision in the CSU.

6.3.5 Recommendations for future studies

Improve the quality of evaluation of the HPD in the CSP to incorporate an all inclusive methodology:

- Include the input of other stakeholders, viz. tutors, faculty, patients and SPs, in participation and direct observation of student practice in the wards
- Consider other sources of data for their value in complementing the findings of the evaluation of the HPD in the CSP, e.g. the end-of-block evaluations.
- Conduct further evaluations of student performance in OSCE to explain the findings in this study and its potential for inclusion in the evaluation of the HPD in the CSP.

Finally, it is the responsibility of the staff in the CHSE organizing the CSP to ensure that the findings of this study are brought to the attention of the Faculty of Health Sciences at all relevant levels, so that joint decisions for remedial action can be made and implemented.

APPENDICES

APPENDIX A

ETHICS APPROVAL CERTIFICATE

This research has been approved by the Wits Ethics committee for research on human subjects.

ETHICS CLEARANCE No: M080846 (2009)

ETHICS CLEARANCE No: M050651 (2006)

APPENDIX B

STUDENT INFORMATION SHEET

Thank you for taking the effort and time in completing the survey.

We advise that this document be read and understood before you begin the survey.

I am a lecturer and clinical skills tutor employed by the University of the Witwatersrand and wish to inform you that I am currently studying the hospital day experiences of our GEMP I and II students.

The study is being conducted as part of my Masters degree at Wits, registered in the Department of Medicine and supervised by Professor Prozesky at the Centre of Health Science Education in the Faculty of Health Sciences at this University. The purpose of this research study is to describe the experiences of the Hospital Day Visit from a GEMP II student's perspective following the restructuring of the activities relating to the Clinical Skills Programme and the hospital day Practice to identify problems in the organization of hospital visits and the quality of what students learn. In order to collect data on these activities we need volunteers who will give us needed information.

The study will be performed on all GEMP II students registered in the 2009 academic year participating in the educational activities of the Hospital Practice Day at the four teaching hospitals, namely, Helen Joseph, Raheema Moosa Mother and Child, Chris Hani Baragwanath and Charlotte Maxeke Academic hospitals. Approximately 70 student participants will take part in this study at the CSUs at the three learning centres.

You have been invited to take part in this study because you are a GEMP II student. In volunteering for this study, we would like you to answer the questions on the hospital visits using the questionnaire you will be given. The questionnaire will take about 20 minutes to complete. The information you share with us will provide clues on how this process is happening, therefore assisting in formulating strategies for further intervention for improving the hospital visits

You will not be required to undergo any procedures, tests or be administered any medication that may cause you discomfort, pain or side effects.

Please give your most candid response to these questions as the information you share with us is very important to ensure that we have accurate data. All information obtained during the study will be kept confidential. Your name and any material identifying you as a study participant will never be released. Only your research number will be used during analysis of the information collected. No one outside of the research team will be able to trace any information back to you.

The information collected will be processed, analysed and reported in my Master's dissertation. The written study results will be made available to authorities (the Centre for Health Science Education, The Health Sciences Faculty, the university and the hospital management to make necessary interventions) and GEMP II students.

Remember that your participation in this study is strictly voluntary. You may sign the consent form after making a decision to participate. After you have made the decision to participate, you still have a right to withdraw from this study at anytime and this will not affect your position as a student. Refusal to participate will not result in your being penalized in any way.

Apart from the improved organization and quality of the hospital day visits, which you might find desirable, there are no direct benefits for taking part in this study.

Finally, the study protocol has been approved by the University of the Witwatersrand, Human Research Ethics Committee (HREC) and written approval has been granted by the committee.

Kindly complete the all items in the questionnaire and deposit the completed questionnaire in the box provided for this purpose placed on the table outside the print room in the Centre for Health Science Education on 14th April, 2009.

Thank you for your time and decision in agreeing to participate in this valuable study.

APPENDIX C

Date:

STUDENT QUESTIONNAIRE, 2009

Kindly answer the questions below.

The following questions relate your participation and experience of the Activities of Hospital Day for the period covering the Endocrine and Musculoskeletal Blocks

Question 1 applies to the your official attachment to a doctor before 11h00 in the hospital you were assigned on Health Practice Day

1. About the unit's scheduled rostered activities

1.1. What unit activities did you attend/ participate in before 11h00 ***during the past 3 months?***

Ward rounds	Outpatient sessions	Theatre	Performing clinical	Other(please specify)

1.2 If you performed any hands- on clinical procedures, please list these.

……
……..
……..
…….
……

About the patients that you examined in these sessions:

1.3 How many patients on average did you personally examine before 11h00 on an average morning?

1.4 About the range of patients that you examined in the past 3 months.
Select the categories / blocks that patients related to and enter their diagnoses that you remember

.	Diagnosis / es
Endocrine	
Musculoskeletal	
Reproductive	
Neurosciences	
Haematology	
Renal	
Respiratory	
Cardiovascular	
Other (please	

(Note: If the patient had multiple pathologies enter them in all relevant blocks).

In your interaction with other members of the Health team

1.5. Indicate which members you have needed to interact with by ticking the relevant blocks
Tick the boxes that apply below, and
1.6 What were the reason / s for these encounters? *Please enter this information in the relevant boxes below*

	Reasons /s for encounter
Dietitian	
Social worker	
Physiotherapist	
Occupational therapist	
Speech therapist	
Radiographer	
Other (please specify)	

1.7 In what capacity / role did the doctor you were officially attached to function in?
You may tick more than 1 category.

Role model
Mentor
Source of information
Other *(specify)*

1.8 How would you describe your overall role in the session before 11h00?

Spectator
Participant
Team member
Other (*please specify)*

1.9. Please record any problems you have experienced in your official attachment to a doctor in your assigned unit ***in the past 3 months***:

Nature of the problem	How often has it happened?

1.20 Please rate the educational value of the attachment as a learning opportunity. *(Tick the appropriate boxes)*

	Excellent	Moderate	Poor
Practicing my skills in history taking and examination			
Practicing my skills in interaction with patients			
Learning more about certain disease conditions			
Learning about the members of the health team			
Practicing my skills in clinical procedures			
Learning more about the clinical management of patients			

.....

Question 2 applies to the Formal teaching session in the hospital (11h00 – 13h00).

About your work in groups of three: report what has been happening ***over the past 3 months***.

2.1 How much time does a group normally spend on taking a history from the patient? *(in minutes)*

2.2 How much time does a group normally spend on examining a patient? *(in minutes)*

About your meetings (presentations and discussion) with the doctors: report was has been happening ***over the past 3 months***.

2.3 How many students usually attend the meetings/ discussions with the doctor?

2.4 Please complete the following about the format of your meeting with the doctor: *(please tick the appropriate square in each row)*

	Always	*Usually*	*Sometimes*	*Rarely*	*Never*
We present our cases: the findings of the history and					
Each of the three groups presents its patient to the					
The doctor checks our findings: did we identify all					
The doctor checks our examination technique by					
The doctor explains how to get to the diagnosis,					
The doctor gives us more information about the					

2.5 How much time does the doctor usually spend with you in a morning *(in minutes)*

About the number and suitability of the patients allocated to you:

2.6 Has it ever happened that all nine of you get one patient to work with? *(please tick)*

Never	A few times	Regularly

2.7 Over the past 3 months, have the patients allocated to you for clerking been appropriate to the block that you were studying at the time? *(please tick)*

Always	Mostly	Seldom

If the patients have not always been suitable, please explain why not:

2.8 Please note any other problems that you have experienced during the discussions with the doctor (e.g. interruptions):

Nature of the problem	*How often has it happened?*

About the quality of the hospital visits as learning experiences: ***comment on the past 3 months***

2.9 Please rate the effectiveness of the hospital visits as learning opportunities. *(please tick the appropriate box in each row)*

	Excellent	*Moderate*	*Poor*
Practising my skills in history taking and examination			
Practising my skills in interacting with patients			
Learning more about clinical decision making			
Learning more about certain disease conditions			

……

Question 3 applies to the Clinical Skill Session in the Learning centre (14h00 – 16h30).

3.1 Comment on your experience of the facilities for the clinical skills practice at the learning Centres ***in the last 3 month.*** *(Tick 1 box in each row).*

	Excellent	*Satisfactory*	*Poor*
Quality of medical supervision			
Ratio of doctors to clinical skills stations (History / examination)			
Availability of functioning medical equipment (ophthalmoscopes,			
Availability of functioning electronic equipment (computer / on line			
Availability of models			

3.2 Please report any other problems that you have experienced in your practice at the skills unit at the learning centre ***in the last 3 months***.

Nature of the problem	*How often has it happened?*

3.3 Please rate the effectiveness of the skills laboratory training as learning opportunities.
(please tick the appropriate box in each row)

	Excellent	*Moderate*	*Poor*
Practising my skills in history taking			
Practising my skills in examination			
Learning more about special investigations			
Learning more about clinical decision making			
Integration of basic sciences with clinical			

Thank you very much!

APPENDIX D

QUESTIONNAIRE FOR STUDENTS: 2006

Kindly answer the questions below.

Your name:	Year of study:	Date:

1. What are the reasons for the hospital visits, as you understand them? What are you supposed to learn during the visits?

2. About the transport arrangements for the visits:

   2.1 How do you get the information you need about the transport arrangements? *(please tick)*

Timetable on website	Fellow students	Asked CHSE staff	Other (specify)

   2.2 Please record problems you have experienced with the transport ***over the past 3 months***:

Nature of the problem	How often has it

3. About the roll call/ attendance register:
   3.1 Who usually administers the roll call? *(Tick one or more blocks)*

The 'hospital coordinator'*	The doctor	One of the students	Other (please specify)

   * *= the persons who meet you at the hospitals Mrs Ditlopo. Mrs Ludick, Ms Tumahole*

   3.2 At what stage of the visit is the roll call usually done? *(Tick one or more blocks)*

When we arrive at the hospital	When we arrive in the ward	While we are busy in the ward	When we leave the hospital	Other (please specify)

4. About finding the patients you are meant to work with:

   4.1 How do you get the information you need about where to find your patient for the day? *(please tick)*

Fellow students	Hospital notice board	The 'hospital coordinator'	Other (specify)

4.2 Please record the problems that you may have experienced with ***finding*** the patients allocated to your group, ***over the past 3 months***:

Nature of the problem	*How often has it happened?*

5. About the number and suitability of the patients allocated to you:

5.1 Has it ever happened that all nine of you get one patient to work with? *(please tick)*

Never	A few times	Regularly

If this does happen:

- During which block(s) did this happen?
- In which departments did this happen?

5.2 Over the past 3 months, have the patients allocated to you for clerking been appropriate to the block that you were studying at the time?

(please tick)

Always	Mostly	Seldom

If the patients have not always been suitable, please explain why not:

6. About your work in groups of three: report what has been happening ***over the past 3 months***.

6.1 How many students are usually in your small group? *(please tick)*

Less than 3	3	More than 3	Other (specify)

6.2. When you are with the patient, how many of you usually take the history? *(please tick)*

None of us	One of us	All of us	Other (specify)

Who usually takes the history? *(please tick)*

We take turns	It's always the same person	Other (specify)

Which aspects of the history do you normally take? *(tick one or more boxes)*

Personal data	Main	Past medical	Family	Social	Systems review
Only the history related to the system we are studying in the					Other (specify)

How much time does a group normally spend on taking a history from the patient? *(in minutes)*

Do you feel you are getting enough experience in taking a history, during these visits?

Yes	Partly	No
If 'partly' or 'no': why is this?		

6.2 When you are with the patient, how many of you do the examination? *(please tick)*

One of us	All of us	Other (specify)

Who usually does the examination? *(please tick)*

We take turns	It's always the same person	Other (specify)

Which aspects of the examination do you normally carry out? *(tick one or more boxes)*

General assessment	Vital signs/ CAJCOL	General examination	All systems fully
Only the examination related to the	Other (specify)		

How much time does a group normally spend on examining a patient? *(in minutes)*

Do you feel you are getting enough experience in doing examination, during these visits?

Yes	Partly	No
If 'partly' or 'no': why is this?		

6.4 How do you decide who is going to present the patient to the doctor later? *(please tick)*

Someone volunteers	We take turns	Other (specify)

7. About your meetings (presentations and discussion) with the doctors: report was has been happening ***over the past 3 months***.

7.1 Do you see the doctors before you break up in threes to clerk your patient? *(please tick)*

Yes	No	Sometimes

7.2 Do the doctors arrive on time for the presentations and discussion? *(please tick)*

Yes	No	Sometimes

If they are often late, what is the reason for this do you think?

7.3 How many students usually attend the meetings/ discussions with the doctor? ☐

7.4 Please complete the following about the format of your meeting with the doctor:

	Always	*Usually*	*Sometimes*	*Rarely*	*Never*
We present our cases: the findings of the history and examination					
Each of the three groups presents its patient to the doctor					
The doctor checks our findings: did we identify all the problems					
The doctor checks our examination technique by watching us examine					
The doctor explains how to get to the diagnosis, based on the findings					
The doctor gives us more information about the patients' diseases					

7.5 What form does the discussion with the doctor take?

	Always	*Usually*	*Sometimes*	*Rarely*	*Never*
A lecture with the doctor doing most of the talking					
An interactive discussion with the students taking part					

7.6 Where do the ***patient presentations*** usually take place?

	Always	*Usually*	*Sometimes*	*Rarely*	*Never*
At the bedside					
In a side ward					
In a passage/ hallway					
In a seminar room					
Does the presentation ever take place in another venue? If so where?					

7.7 Where do the ***discussions about the cases*** normally take place?

	Always	*Usually*	*Sometimes*	*Rarely*	*Never*
At the bedside					
In a side ward					
In a passage/ hallway					
In a seminar room					
Does the discussion ever take place in another venue? If so where?					

7.8 Please note any other problems that you have experienced during the discussions with the doctor (e.g. interruptions):

Nature of the problem	*How often has it happened?*

7.9 How much time does the doctor usually spend with you in a session? | min. |

7.10 Did the doctor appear to understand what her/ his role was?*)*

Yes	No	Partly

7.11 Have the doctors been good role models for you, as regards their relationship with the patients and other staff members?

Always	Usually	Sometimes	Rarely	Never

Please describe briefly some of the problems you have noticed in this regard (if any):

8. Whom do you normally contact when you experience problems during your visit? *(please tick one or more of the boxes)*:

‘Hospital coordinator’	The doctor allocated to your	Another doctor
Nurses in the wards	Other CHSE staff	Other (please specify)

Which of these persons would you normally contact first?

9. About your interaction with the ‘hospital coordinator’:

9.1 Are you able to get in touch with this person when you need her? *(please tick)*

Yes	Sometimes	No	Don’t know – never needed to get in touch with her

If you have had problems contacting the hospital coordinator, please describe them:

9.2 When you contact the coordinator, is she able to deal effectively with your problem?

Yes	Sometimes	No	Don't know – never needed to get in touch with her

9.3 Please mention any other problems that you have experienced with her?

Nature of the problem	*How often has it happened?*

10. About the quality of the hospital visits as learning experiences: in the past 3 months

10.1 Please rate the effectiveness of the hospital visits as learning opportunities. *(please tick the appropriate box in each row)*

	Excellent	*Moderate*	*Poor*
Practising my skills in history taking and			
Practising my skills in interacting with patients			
Learning more about clinical decision making			
Learning more about certain disease conditions			

How many patients have you personally examined in the hospital, in the past 3 months?

10.2 Please rate yourself, in terms of the amount of effort you have put into learning during hospital visits: *(please tick one of the boxes)*

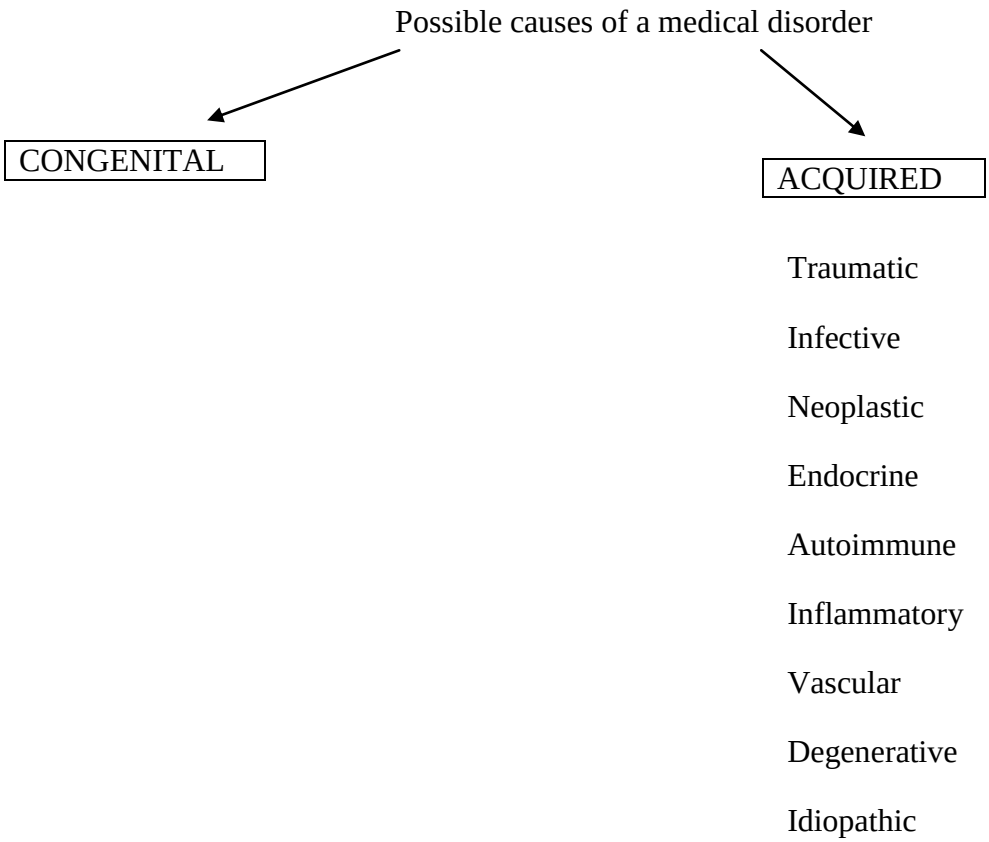
I have tried my best to use the opportunity to the full	I could have tried harder

Thank you very much!

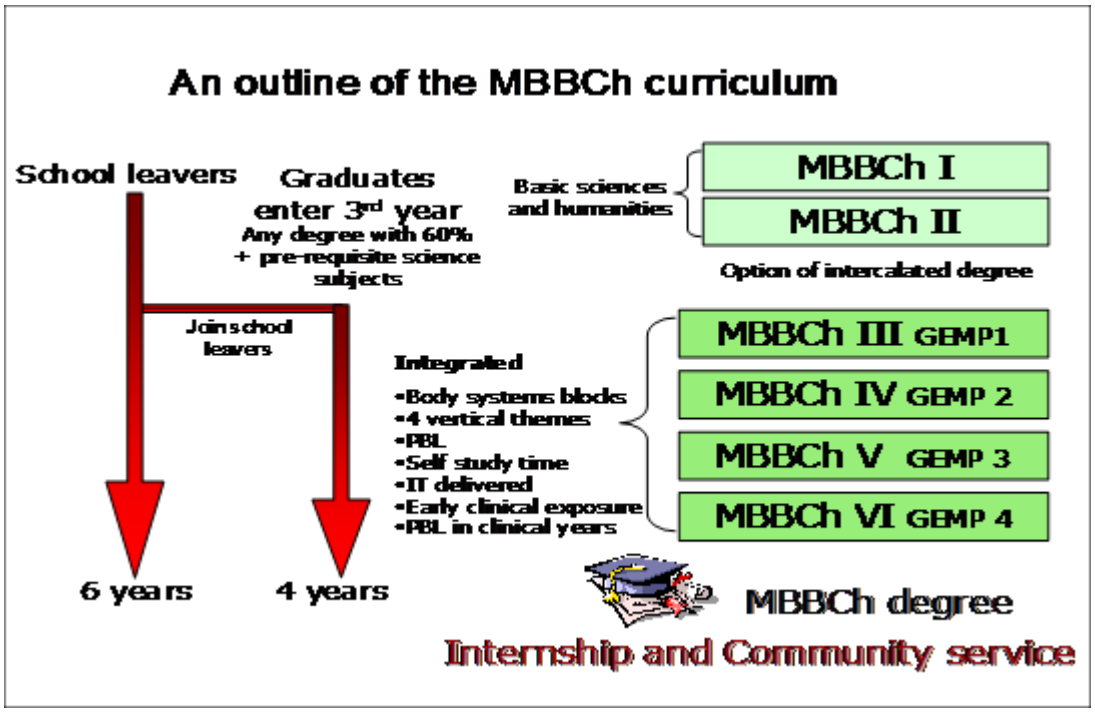
APPENDIX E

"SURGICAL SIEVE"

A philosophy prevalent in many tertiary institutions which supports a paradigm which aligns with the thought of enabling the making of diagnoses by classification in a structured way viz. both systematic and logical (an example of a "surgical sieve" is illustrated below):



APPENDIX F


An outline of the MBBCh curriculum
School leavers
Graduates enter 3rd year
Any degree with 60% + pre-requisite science subjects
Basic sciences and humanities
MBBCh I
MBBCh II
Option of intercalated degree
Join school leavers
Integrated
•Body systems blocks
•4 vertical themes
•PBL
•Self study time
•IT delivered
•Early clinical exposure
•PBL in clinical years
MBBCh III GBMP1
MBBCh IV GBMP 2
MBBCh V GBMP 3
MBBCh VI GBMP 4
6 years
4 years
MBBCh degree
Internship and Community service

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