

**A FRAMEWORK FOR A SKILLS LABORATORY
CURRICULUM IN AN UNDERGRADUATE
MEDICAL PROGRAMME IN SOUTH AFRICA**

by

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DECLARATION

I hereby declare that the work submitted here is the result of my own independent investigation. Where help was sought, it was acknowledged. I further declare that this work is submitted for the first time at the University of the Free State, Faculty of Health Sciences, towards a Ph.D. HPE degree in Health Professions Education and that it has never been submitted to any other university or faculty for the purpose of obtaining a degree.

.....
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TABLE OF CONTENTS

DECLARATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	viii
LIST OF FIGURES	xi
LIST OF APPENDICES	xii
LIST OF ACRONYMS	xiii
SUMMARY	xv
OPSOMMING	xviii
CHAPTER 1 ORIENTATION TO THE STUDY	1
1.1 INTRODUCTION AND BACKGROUND	1
1.2 RATIONALE FOR THIS RESEARCH	2
1.3 STATEMENT OF THE PROBLEM.....	6
1.4 GOAL AND OBJECTIVES OF THE STUDY	10
1.4.1 Overall goal.....	10
1.4.2 The aim	10
1.4.3 Objectives of the study:.....	10
1.5 DESIGN AND PROCEDURE	11
1.5.1 Phase 1	11
1.5.2 Phase 2.....	12
1.5.3 Phase 3.....	12
1.5.4 Phase 4.....	12
1.5.5 Phase 5.....	13
1.6 SIGNIFICANCE OF THE STUDY	13
1.7 DEFINING THE TERMINOLOGY	14
1.8 ARRANGEMENT OF THE THESIS	16
CHAPTER 2 OVERVIEW OF THE LITERATURE AND DISCUSSION	17
2.1 INTRODUCTION.....	17
2.2 THE CHARACTERISTICS OF CLINICAL SKILLS	24
2.3 THE DEVELOPMENT OF SKILL CENTRES	34
2.4 STAFFING OF CLINICAL CENTRES	39
2.5 EQUIPMENT FOR CLINICAL SKILLS CENTRES	43
2.6 TEACHING OF CLINICAL SKILLS	48
2.7 EXAMPLES OF CLINICAL SKILLS TAUGHT IN MEDICAL SCHOOLS	51
2.8 CURRICULA	58
2.8.1 An overview of the skills curricula of some medical schools.	58
2.8.2 The content of some clinical skills centres on the internet	73
2.9 ASSESSMENT OF CLINICAL SKILLS	76
2.10 CONCLUSION	79

CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY.....	81
3.1 INTRODUCTION	81
3.2 THEORETICAL PERSPECTIVES ON THE RESEARCH METHODOLOGY	82
3.2.1 The Questionnaire	82
3.2.2 The Delphi Technique	83
3.2.3 Different Delphi Types.....	84
3.2.4 Different phases of The Delphi.....	85
3.2.5 Advantages of the Delphi Technique	85
3.2.6 Limitations of the Delphi Technique	86
3.3 METHODS AND PROCEDURES	87
3.3.1 Introduction	87
3.3.2 Literature Review	88
3.3.3 The Questionnaire	88
3.3.3.1 Development of the questionnaire	88
3.3.3.2 Structuring the questionnaire	89
3.4 PILOT STUDY OF THE QUESTIONNAIRE	91
3.4.1 The participants of the pilot study	91
3.5 QUESTIONNAIRE SURVEY	92
3.5.1 Target Population.....	92
3.5.2 Sample Size.....	93
3.5.3 The Questionnaire Process.....	93
3.6 THE DELPHI TECHNIQUE OF THE RESEARCH.....	94
3.6.1 The participants of the Delphi technique	94
3.7 DATA ANALYSIS	98
3.8 SCOPE OF THE STUDY	98
3.9 RELIABILITY, VALIDITY AND TRUSTWORTHINESS OF THE MEASURING INSTRUMENTS	99
3.10 ETHICAL CONSIDERATIONS.....	101
3.11 CONCLUSION	101
 CHAPTER 4 RESULTS AND DISCUSSION.....	 103
4.1 INTRODUCTION	103
4.2 DRAFT QUESTIONNAIRE AS COMPILED BY THE RESEARCHER	103
4.3 THE PILOT STUDY QUESTIONNAIRE.....	105
4.3.1 Demographics of the pilot study participants.....	105
4.3.2 Results of the pilot study	106
4.4 THE QUESTIONNAIRE SURVEY.	114
4.4.1 Demographics of the respondents who participated in the questionnaire survey	114
4.4.2 Results of the questionnaire survey	114
4.4.2.1 Additional topics suggested by the respondents participating in the questionnaire survey	124
4.4.2.2 Semesters in which the specific topic should be taught as recommended by the respondents of the questionnaire survey ..	127
4.4.2.3 Topics eliminated by the respondents of the questionnaire survey	130

4.4.2.4	Topics eliminated by the questionnaire survey but again introduced by the Delphi experts.....	133
4.4.2.5	Comments of the respondents about their own fields.	134
4.4.3	Questionnaire survey: The semesters indicated when the topic should be presented	136
4.4.4	Questionnaire survey: Comments on the choice of the lecturer..	137
4.4.4.1	Questionnaire survey: The topics with no majority vote to specify the lecturer	138
4.4.5	General comments and recommendations by respondents of the questionnaire survey.	140
4.4.5.1	Recommendations from the respondent of the Department of Surgery.	140
4.4.5.2	Recommendations made by the respondents from the Department of Internal Medicine	142
4.4.5.3	Recommendations made by the respondent from the Department of Family Medicine	143
4.5	THE DELPHI TECHNIQUE – FINDINGS OF THE STUDY.....	145
4.5.1	The questionnaire for the Delphi technique.....	145
4.5.2	Demographic information of the participants of the Delphi technique and the questionnaire	145
4.5.3	The results of the first round of the Delphi technique	146
4.5.3.1	Topics for which consensus was reached on the time frame in the curriculum.....	158
4.5.3.2	Topics for which consensus was reached on the lecturer	159
4.5.3.3	Comments and recommendations made by the Delphi panel after the first round	159
4.5.3.3.1	Topics recommended by the panel to be taught by the skills laboratory personnel on condition that they first should be trained	160
4.5.3.3.2	Topics recommended by the panel to be taught on patients rather than in the skills laboratory	160
4.5.3.3.3	Topics recommended by the Delphi panel to be taught on manikins and repeated in the clinical years.....	161
4.5.3.3.4	Comments by the Delphi panel on diverse topics	162
4.5.4	The second round of the Delphi technique.....	164
4.5.4.1	The questionnaire	164
4.5.4.2	Results and findings of the second round.	165
4.5.4.3	Comments by the panel on the second round.....	178
4.5.4.4	Additional topics recommended by the panel in the Delphi second round	180
4.5.5	Third round of the Delphi technique	181
4.5.5.1	The questionnaire third round	181
4.5.5.2	Results and findings of the third round.....	182
4.6	FINAL ANALYSIS OF THE DELPHI TECHNIQUE	197
4.6.1	Comments on the choice of topics	199
4.6.2	Consensus reached for topics to be taught in specific time slots of the curriculum	200
4.6.3	Delphi technique: Comments on the choice of the lecturer	204
4.7	CONCLUDING REMARKS	207

CHAPTER 5 DESIGNING A FRAMEWORK FOR A SKILLS LABORATORY CURRICULUM IN AN UNDERGRADUATE MEDICAL PROGRAMME IN SOUTH AFRICA	210
5.1 INTRODUCTION	210
5.2 CURRICULUM FRAMEWORK AS SUGGESTED BY THE DELPHI PANEL	212
5.3 A COMPARISON BETWEEN THE SKILLS LABORATORY FRAMEWORK PRESENTED BY THE DELPHI TECHNIQUE AND THE CURRICULA OF OTHER UNIVERSITIES	230
5.4 CONCLUSION	249
CHAPTER 6 CONCLUSION, RECOMMENDATIONS AND FINAL FRAMEWORK.....	250
6.1 INTRODUCTION	250
6.2 THE SIGNIFICANCE OF THE STUDY	250
6.2.1 The Delphi panel and process	250
6.2.2 Value of the questionnaire survey	252
6.3 THE LIMITATIONS OF THE STUDY	253
6.3.1 Time used to complete and return questionnaires	253
6.3.2 Feedback to the panel.....	254
6.3.3 Diverse backgrounds of the panel members.....	254
6.3.4 Panel members who dropped out	255
6.3.5 The significance of topics for the skills laboratory	255
6.3.6 Topics not included in the Delphi questionnaire but included by other medical schools in their clinical skills curricula	258
6.3.7 Topics identified by work groups which were not included in the Delphi questionnaire.....	258
6.4 CONCLUSION, RECOMMENDATIONS AND FINAL FRAMEWORK	259
6.4.1 The final framework.....	260
6.4.2 Recommendations on the implementation of the skills curriculum framework.....	274
6.5 POTENTIAL PROBLEMS FOR IMPLEMENTATION	275
6.6 CONCLUDING REMARKS	277
REFERENCE LIST.....	278

LIST OF TABLES

Table 2.2/1:	Clinical skills	24
Table 2.2/2:	Communication skills defined	25
Table 2.2/3:	Undergraduate skills as defined by Bradley	27
Table 2.2/4:	Surgical procedures done in general practice	30
Table 2.2/5:	Surgical and obstetric procedures in Kwazulu-Natal	31
Table 2.2/6:	Department of Health - skills for rural doctors	32
Table 2.3/1:	Objectives of a skills centre	35
Table 2.3/2:	Features of a well-planned skills laboratory	37
Table 2.5/1:	Range of manikins and simulators	44
Table 2.5/2:	Features of a high technology manikin	45
Table 2.7/1:	Benefits of simulated patients.....	51
Table 2.7/2:	Recommendations for physical examinations done on fellow-students	53
Table 2.8.1/1:	Skills taught in a Sudan medical school	59
Table 2.8.1/2:	Instructor and methodologies used for sessions at the University of Alberta.	62
Table 2.8.1/3:	Skills modules at Manchester University	63
Table 2.8.1/4:	Manchester skills type groups	64
Table 2.8.1/5:	Manchester Basic Skills Course	65
Table 2.8.1/6:	Manchester nutrition, metabolism and excretion skills:	66
Table 2.8.1/7:	Heart, lungs and blood skills.....	66
Table 2.8.1/8:	Nutrition and metabolism and excretion skills.....	67
Table 2.8.1/9:	Manchester: Mind and movement skills	67
Table 2.8.1/10:	Manchester: Families and children skills	68
Table 2.8.1/11:	Advanced communication skills.....	68
Table 2.8.1/12:	Manchester: Year five skills.....	69
Table 2.8.1/13:	Nebraska University mandatory skills for residents	70
Table 2.8.1/14:	Sherbrooke University skills programme	71
Table 2.8.1/15:	Sherbrooke University skills mandatory topics	71
Table 2.8.1/16:	Stanford University skills not taught at Manchester University.....	72
Table 2.9/1:	The key issues of a test.....	78
Table 3.5.1/1:	The disciplines which completed the questionnaire.....	92
Table 4.3.2/1:	Final questionnaire for the questionnaire survey	107
Table 4.4.2/1:	Analysis of the questionnaire survey.	116
Table 4.4.2/2:	Questionnaire survey: Topics with no majority vote for the lecturer	123
Table 4.4.2.1/1:	Additional topics with anatomical basis suggested by the lecturer from the Department of Surgery	125
Table 4.4.2.1/2:	Additional topics suggested by the lecturer from the Department of Dermatology	126
Table 4.4.2.1/3:	Additional topics suggested by the lecturer from the Department of Ophthalmology.....	127
Table 4.4.2.2/1:	Choice of semesters when a specific topic should be taught as indicated by five or more of the 20 respondents.....	128

Table: 4.4.2.3/1:	Topics not included in the Delphi questionnaire and the comments by the specific discipline.	130
Table 4.4.2.4/1:	Topics reintroduced by the Delphi panel as well as the comments made by the panel of the questionnaire survey	133
Table 4.4.2.5/1:	Comments of respondents on topics related to their own speciality	134
Table 4.4.3/1:	Topics in the questionnaire survey indicated for semester 6.....	136
Table 4.4.4.1/1:	Questionnaire survey: Topics with no majority vote for the lecturer.	139
Table 4.4.5.1/1:	Recommendations made by respondents from the Surgical Department.....	140
Table 4.4.5.2/1:	Recommendations made by respondents from the Department of Internal Medicine	142
Table 4.4.5.3/1:	Recommendations made by the respondent from the Department of Family Medicine.....	144
Table 4.5.3/1:	Results of the first round of the Delphi technique	147
Table 4.5.3/2:	Analyses of consensus reached on the “Essential” category in the main topic groups.....	157
Table 4.5.3.3.4/1:	Comments by the Delphi panel on diverse topics.....	162
Table 4.5.3.3.4/2:	Additional topics suggested by the Delphi panel after round one	163
Table 4.5.4.2/1:	Second-round Delphi questionnaire and analysis	166
Table 4.5.4.2/2:	Delphi second round: Analyses of consensus reached on the “Essential” category in the main topic groups.....	175
Table 4.5.4.3/1:	Topics identified during the second round recommended to be repeated during the clinical phase	179
Table 4.5.4.4/1:	Additional topics recommended by the Delphi panel after round two.....	180
Table 4.5.5.2/1:	Third round Delphi questionnaire and analysis.....	182
Table 4.5.5.2/2:	Delphi third round: Analyses of consensus reached on “Essential” category in the main topic groups.....	192
Table 4.5.5.2/3:	Topics indicated by the Delphi panel as useful and not essential	194
Table 4.5.5.2/4:	Topics on which consensus was not reached on importance by the Delphi panel.....	194
Table 4.6/1:	Final Delphi analysis: Topics which by consensus were indicated as useful by the Delphi panel	197
Table 4.6/2:	Final Delphi analysis: Topics on which consensus was not reached.....	198
Table 4.6.2/1:	Final Delphi analysis: Topics which by consensus were indicated as essential for the first third of the curriculum.....	200
Table 4.6.2/2:	Final Delphi analysis: Topics which by consensus were indicated as essential for the last third of the curriculum.....	201

Table 4.6.2/3:	Delphi technique: Possible explanations why the middle third of the curriculum was chosen for the majority of topics.	203
Table 4.6.3/1:	Final Delphi analysis: Topics on which consensus was not reached as to who the lecturer should be	205
Table 5.2/1:	Essential topics to be taught in a skills laboratory in the first third of the curriculum, including the choice of the lecturer	212
Table 5.2/2:	Essential topics with no consensus on the time frame in the curriculum but with a majority vote for the first third of the curriculum	214
Table 5.2/3:	Essential topics to be taught in a skills laboratory in the middle third of the curriculum.....	216
Table 5.2/4:	Essential topics with no consensus on the time frame in the curriculum but with a majority vote for the middle third of the curriculum	221
Table 5.2/5:	Essential topics to be taught in the last third of the curriculum in a skills laboratory	222
Table 5.2/6:	Essential topics with no consensus on the time frame in the curriculum but with a majority vote or the last third of the curriculum	224
Table 5.2/7:	Essential topics with no consensus on the time frame in the curriculum and no majority vote	225
Table 5.2/8:	Useful but not essential topics.....	226
Table 5.2/9:	Topics with no consensus on importance for the skills unit.....	227
Table 5.3/1:	A comparison of the essential Delphi topics in the first third of the curriculum with the curricula of different universities	232
Table 5.3/2:	A comparison of the essential Delphi topics in the middle third of the curriculum with other universities	234
Table 5.3/3:	A comparison of the essential Delphi topics with other universities in the last third of the curriculum.....	239
Table 5.3/4:	A comparison of the essential Delphi topics with no time frame consensus in the curriculum with other universities	241
Table 5.3/5:	A comparison of the useful but not essential Delphi topics with other universities	243
Table 5.3/6:	A comparison of the topics with other Universities with no consensus on importance for the skills unit.....	244
Table 5.3/7:	Topics not included in the Delphi but taught by different universities	246

Table 6.3.5/1:	Topics to be taught in other venues	256
Table 6.3.5/2:	Ambiguous topics	257
Table 6.4.1/1	Final framework for a skills curriculum for the first third of the curriculum.....	260
Table 6.4.1/2	Final framework for a skills curriculum for the second third of the curriculum.....	262
Table 6.4.1/3	Final framework for a skills curriculum for the last third of the curriculum.....	268

LIST OF FIGURES

Figure 2.3/1:	An example of a purpose built skills unit.....	38
Figure 3.3.3.2/1:	Diagram to illustrate the development of the framework for a skills curriculum.	90
Figure 4.4.4/1:	Questionnaire survey: Choice of lecturer.....	138
Figure: 4.5.3/1:	Delphi first round: Consensus reached on the three main categories	156
Figure 4.5.3.1/1:	Delphi first round: Number of topics consensus was reached on the time frame.....	158
Figure 4.5.4.2/1:	Consensus for the number of topics on time frame in the curriculum for the first and the second rounds.	177
Figure 4.5.4.2/2:	Delphi second-round consensus: Comparison between topics left over from the first round and new topics recommended by the panel.	178
Figure 4.5.5.2/1:	Consensus for the number of topics on the time frame in the curriculum for the first, second and third rounds	195
Figure: 4.5.5.2/2:	Delphi final round: Consensus reached on the three main categories	196
Figure 4.6/1:	Delphi panel choice of importance of topics for the skills unit.....	198
Figure 4.6.2/1:	Time slots indicated in the curriculum.....	204
Figure 4.6.3/1:	Delphi: Topics indicated for specialist or staff of the skills laboratory.....	205
Figure 5.2/1:	The choice of lecturers for the middle third of the curriculum.....	220
Figure 5.2.8/1:	Summary of the main outcomes of the Delphi process	229

LIST OF APPENDICES

Appendix A: Questionnaire of Pilot Study

Appendix B: Introductory letter with information to the respondents of the questionnaire survey

Appendix C: Roster of the School of Medicine at the University of the Free State

Appendix D: Introductory letter with an explanation to the participants of the Delphi technique.

Appendix E: Form of Consent.

Appendix F: Questionnaire for Delphi technique first round

Appendix G: Letters with information on the second round Delphi technique.

Appendix H: Delphi analysis round 2.

Appendix I: Letter with information on the third round Delphi technique.

Appendix J: Approval of the ethics committee.

LIST OF ACRONYMS

ACLS	Advanced Cardiac Life Support
AIDS	Acquired Immunodeficiency Syndrome
AMA	American Medical Association
APLS	Advanced Paediatric Life Support
ATLS	Advanced Trauma Life Support
BMI	Body Mass Index
BP	Blood pressure
CD-ROM	Compact disk – Read only memory
CME	Continuous Medical Education
CPK	Creatine phosphokinase enzyme
CPR	Cardio-pulmonary resuscitation
CT	Computed tomography
DoH	Department of Health
ECG	Electrocardiograph
ENT	Ear, nose and throat
GMC	General Medical Council
HIV	Human Immunodeficiency Virus
HPCSA	Health Professions Council of South Africa
ICU	Intensive Care Unit
i.m.	Intramuscular
IMCI	Integrated Management of Childhood illness

IT	Information technology
i.v.	Intravenous
NHS	National Health Service of the United Kingdom
OSCE	Objectively Structured Clinical Examination
PPD	Purified Protein Derivative
Rh	Rhesus blood group
RPR	Test for syphilis
Sf	Symphysis to fundus measurement
Sk	Skills laboratory staff as lecturer
SOAP	S – Subjective; O – Objective; A – Assessment; P – Plan (System for consulting and writing notes of patients)
Sp	specialist as lecturer
SPICES	S – Student-centred; P – Problem-based learning; I – Integrated; C – Community-orientated; E = Electives; S = System-based Education
TB	Tuberculosis
UFS	University of the Free State
UK	United Kingdom
USA	United States of America

SUMMARY

KEY WORDS:

Skills laboratory; Skills Unit; skills; clinical skills; framework; curriculum; undergraduate medical education; Delphi method; Delphi technique.

The last decade has been characterised by profound worldwide changes in undergraduate medical education. These changes have included a new approach for training in clinical skills.

The change has been brought about by a change in the disease profile of patients as well as the increase in medico-legal litigation against doctors in South Africa. The disease profile has changed, especially due to the big increase in AIDS related diseases, as well as illness among the aged. When students come into contact with patients, they should already have mastered certain skills, for example venesection in a secure and safe environment, such as a skills laboratory. The student should be skilled in this procedure of venesection, because in this way needle pricks with contaminated blood can - in the majority of cases - be prevented, as well as the concomitant morbidity and serious side effects of anti-retroviral drugs. The other example is that patients are more aware of their human and legal rights and that litigations against doctors are increasing. This makes it important that students become acquainted with intimate physical examinations in a skills laboratory. These are some of the

reasons why skills laboratories were developed in medical schools. Presently all the medical schools in South Africa have developed their own skills curriculum.

The aim of this study was to develop a framework for a skills curriculum which can be used as a guideline for the training of undergraduate medical students. This framework should be able to comply with the needs of South African circumstances, where doctors after their intern years very often have to work alone in remote hospitals and clinics.

The Delphi technique was used to develop the curriculum framework. Initially a questionnaire with skills topics was compiled from the literature. This list was sent to heads of departments of the Medical School at the University of the Free State. They had to indicate which topics were important and also suggest additional topics for a skills laboratory. Subsequently seven experts who were closely involved in skills laboratories at different universities over South Africa were approached to participate in the research. The Delphi technique was then used to determine which skills topics were essential for a skills laboratory. The Delphi panel also had to make suggestions for additional topics.

In this way a list of skills topics was developed which can serve as a framework for a skills curriculum. After three Delphi rounds, consensus (80% or more votes) was reached on 89,9% topics as essential. Only 4% of the topics were indicated as useful but not essential and on 6,1% of the topics no consensus was reached. The Delphi panel also indicated the ideal time frame in the curriculum for each

topic, as well as the lecturer who should present the specific topic. The panel indicated 58% of the essential topics for the middle third of the curriculum, 10 % for the first third and 12,49% for the last third of the curriculum. The Delphi panel also indicated in 50,4% of topics the specialist from an appropriate discipline as the lecturer. In 34,9% of the topics the panel indicated the staff from the skills unit and in 14,7% no consensus was reached on who the lecturer should be.

The outcome of this research makes a unique contribution to undergraduate medical training in South Africa. For the first time a framework for a skills laboratory curriculum is now available for local as well as national use.

OPSOMMING

SLEUTELWOORDE:

Vaardigheidslaboratorium; Vaardigheidseenheid; vaardighede; kliniese vaardighede; raamwerk; kurrikulum; voorgraadse mediese onderwys; Delphimetode; Delphitegniek.

In die afgelope dekade is die voorgraadse geneeskundige onderrig gekarakteriseer deur ingrypende wêreldwye veranderinge. Hierdie veranderinge het ook 'n nuwe benadering tot die opleiding in kliniese vaardighede ingesluit.

Die verandering is meegebring deur die veranderde siekteprofiel van pasiënte, asook die toename in medies-geregtelike eise teen geneeshere in Suid Afrika. Die siekteprofiel onder andere het verander ten opsigte van die groot toename in MIV-verwante siektes asook siektes by bejaardes. Wanneer studente met pasiënte te doen kry, behoort hulle reeds sommige van die vaardighede, - byvoorbeeld die trek van bloed - in 'n veilige omgewing soos 'n laboratorium baas te geraak het. Deur vaardig hiermee te wees, kan voorkom word dat 'n student 'n naaldeprik met besmette bloed opdoen met die gepaardgaande morbiditeit en moontlike ernstige newe-effekte van anti-retrovirale middels. Die ander voorbeeld is die pasiënte wat meer bewus geword het van hul menseregte en van litigasie teen dokters. Dit het dit noodsaaklik gemaak dat studente reeds in 'n beskutte omgewing vertrou met intieme ondersoeke ontwikkel. Hierdie is

van die redes waarom vaardigheidslaboratoria by mediese skole ontwikkel het. Tot dusver het elke skool sy eie vaardigheidskurrikulum ontwikkel.

Die doel van hierdie navorsing was om 'n raamwerk vir 'n kurrikulum daar te stel wat as riglyn kan dien vir die opleiding van voorgraadse geneeskundestudente. Hierdie raamwerk behoort aan die vereistes van Suid-Afrikaanse omstandighede te voldoen; omstandighede waar geneeshere reeds na hul internjare alleen in afgeleë hospitale en klinieke moet werk.

Die Delphimetode is gebruik om hierdie raamwerk saam te stel. Aanvanklik is 'n lys van vaardighede uit die literatuur opgestel. Daarna is hierdie lys voorgelê aan die hoofde van verskeie kliniese dissiplines aan die Skool van Geneeskunde van die Universiteit van die Vrystaat. Hulle moes die belang van die onderwerpe aandui en ook voorstelle maak vir addisionele onderwerpe. Vervolgens is sewe deskundiges genader wat nou betrokke was by voorgraadse geneeskundige opleiding in vaardigheidseenhede by verskillende universiteite dwarsoor die land om deel te neem aan die navorsing. Hulle moes deur middel van hierdie Delphimetode aandui welke onderwerpe belangrik vir 'n vaardigheidseenheid is. Hulle moes ook met voorstelle van nuwe onderwerpe kom.

Met hierdie metode is 'n lys van vaardighede saamgestel wat kan dien as 'n raamwerk vir 'n vaardigheidskurrikulum. Na drie Delphirondtes was daar konsensus (80% of meer stemme) bereik vir 89,9% van vaardigheidsonderwerpe. Slegs 4% van die onderwerpe is as nuttig aangedui,

maar nie essensieel nie en vir 6,1% van die onderwerpe is geen konsensus bereik nie. Die ideale tydperk of fase in die kurrikulum asook watter dosente die betrokke vaardighede moet aanbied, is ook deur die Delphitegniek aangedui. Die paneel het aangedui dat in 58,1% van die noodsaaklike onderwerpe in die middelste derde van die kurrikulum aangebied behoort te word, terwyl 10% vir die eerste derde en 12,49% vir die laaste derde geallokeer is. Die paneel het ook aangedui dat 50,4% van die onderwerpe deur 'n spesialis van 'n betrokke dissipline aangebied behoort te word, terwyl 34,9% van die onderwerpe deur die personeel van die vaardigheidseenheid aangebied kan word. By 14,7% van die onderwerpe is geen konsensus bereik oor wie die dosent behoort te wees nie.

Die resultate van hierdie navorsing maak 'n unieke bydrae tot voorgraadse geneeskundige onderrig in Suid Afrika. Vir die eerste keer is 'n raamwerk vir 'n vaardigheidslaboratorium kurrikulum nou beskikbaar vir plaaslike asook nasionale gebruik.

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION AND BACKGROUND

Skills laboratories were not part of medical curricula in South Africa pre 1996. The first skills laboratory was established in Maastricht, the Netherlands in 1976 (Al-Yousuf 2004:549). Later many skills laboratories were founded after the World Summit on Medical Education, held in Edinburgh in 1993 (World Summit 1993:142). In South Africa the first skills laboratory was established at the University of Pretoria in 1996 (Personal communication, I. Treadwell 2006). New challenges in health care were the motivation for convening the summit. At the summit global challenges that would have a profound effect on medical education were identified, such as vast increases in population in some countries; extensive shifts in national and regional political structures; economic recession; shrinking resources; wars and violence; the spread of the Acquired Immunodeficiency Syndrome (AIDS) pandemic; health care systems in disarray with inadequate coverage of populations; and costs rising out of control. A public perception that medical schools fall seriously short in their response to these challenges was also identified (World Summit 1993:142).

Some of the recommendations at the World Summit were that the institutional behaviour of medical schools needed study, with special attention to the formulation and implementation of their missions. At the same time medical faculties should create teams from different disciplines to design and implement programmes of general medical education that would be more responsive to local needs (World Summit 1993:145-146). In the document it was stated that the skills acquired in reformed curricula should be relevant to the needs of the practice setting of the community (World Summit 1993: 144).

1.2 RATIONALE FOR THIS RESEARCH

The question can be asked why it has become necessary to pay specific and more attention to skills and along with it, skills laboratories. In a paper by Ledingham and Harden (1998:503) from the medical school in Dundee, Scotland, on the development of a skills training facility, they motivated this by stating the following: "With large numbers of students, changes in the health care delivery system and pressure on clinical resources, desirable educational goals are not always easy to achieve. The hospital ward, outpatient clinic and more recently the community setting are all proven, rich learning experiences for students. These environments, however, are by

their nature opportunistic and student experience may vary in amount and quality. In addition, they are not always the most appropriate setting in which to introduce students to clinical skills and later allow them to practise and master the essential techniques. Clinical skills laboratories were introduced to provide an environment in which students could receive training in clinical skills in a systematic, safe and protected fashion using effective educational strategies and graded to the needs and experiences of students”(Ledingham & Harden 1998:503; Engel 2000:41).

The necessity for a skills laboratory and by implication also a curriculum framework was addressed in the United Kingdom (UK). In the same year as the World Summit, the General Medical Council (GMC) of the UK identified shortcomings in the acquisition of clinical skills during training of medical students. The GMC recommended that students should acquire and become more proficient in basic clinical skills, such as the ability to obtain a patient’s history; to undertake a comprehensive physical and mental state examination and interpret the findings; and to demonstrate competence in the performance of a limited number of basic technical procedures (GMC 1993:13).

The GMC, UK, identified the following general essential skills outcomes: At the end of the course of undergraduate education the student should have

acquired and should have demonstrated his or her proficiency in communication and the other essential skills of medicine, including:

- a) Basic clinical method, including the ability to
 - (i) obtain and record a comprehensive history;
 - (ii) perform a complete physical examination, and assess the mental state;
 - (iii) interpret the findings obtained from the history and the physical examination;
 - (iv) reach a provisional assessment of patients' problems and formulate with them plans for investigation and management.
- b) Basic clinical procedures including
 - (i) Basic and Advanced Life support;
 - (ii) venepuncture;
 - (iii) insertion of intravenous line and
- c) Basic computing skills.

The GMC emphasised that this was a restricted list and indicated that schools could identify and list the range of procedures that should be undertaken by their students. Students would have to demonstrate competence in each of these procedures by the time they qualified (GMC 1993:14).

In South Africa too, the availability of patients; the changing profile of patients due to the AIDS endemic; the larger number of students; and the emphasis on human rights necessitated the development of skills

laboratories where skills could be developed on models and simulated patients.

The South African Medical and Dental Professions Board of the Health Professions Council of South Africa (HPCSA), produced guidelines in 1999 on "Education and Training of Doctors in South Africa". In this document it specifically addressed the question of the skills students should have mastered before they qualify. It stated: "Skills should be developed, using 'skills labs', simulated patients, models for practical procedures and ultimately patients" (HPCSA 1999:2). The skills it mentioned were: Basic clinical skills such as taking a history; performing a physical examination and assessing the mental state; interpreting findings and making a diagnosis; formulating a plan for treatment and management based on sound professional reasoning and problem-solving skills. It also mentioned basic clinical procedures; basic computer and management skills; communication skills; the ability to work in a multi-disciplinary team, as well and referral skills (HPCSA 1999:7).

1.3 STATEMENT OF THE PROBLEM

A framework for a skills laboratory curriculum for South Africa could not be found in a literature search done by the researcher. The literature research was done from 1966 until 2005 on Medline, Yahoo, as well as the Google search engine on the internet. A search was also done by the Medical Library of the University of the Free State (UFS). The curriculum for the skills laboratory at some of the universities in the United States of America (USA) and the United Kingdom (UK) could be found on the internet (see Chapter 2.8). (The key words that were used were "clinical skills", "skills curriculum", "skills laboratory" and "skills centre"). Five medical schools in South Africa were contacted and only two responded and sent their curriculum (see Chapter 5.3).

At the Universities of Antwerp and Ghent in Belgium (Remmen, Derese, Scherpbier, Denekens, Hermann, van der Vleuten, van Royen, & Bossaert 1999:604) poor basic skill performances by students were identified by their senior faculty and trainers in general practice, indicating poor skills training. Subsequently the necessity of a skills laboratory in a medical school was illustrated in a study done by the Department of General Practice at the University of Antwerp, Belgium, where it was found that its medical schools could not rely on clerkship experiences only to provide adequate basic skills

training. Three groups (n = 33, 26, 44) of pre-speciality trainees from the Antwerp and Ghent Universities were assessed with an objectively structured clinical examination (OSCE). Two of the groups were general practitioner trainees and one group was from trainees in other specialities. The following skills were assessed, namely examination of the cardiovascular system; abdomen; pulses in the lower extremities hip and back; basic life support, vaginal examination and pap smear; neurological examination of the newborn; cranial nerves; skin lesions; eye examination, including a vision test as well otoscopy; and the assessment of hearing with a tuning fork examination. The unsatisfactory results mostly related to the smaller disciplines such as ophthalmology, ear-, nose- and throat (ENT) and dermatology, where the scores ranged from 30,8% to 57,6%. The overall picture that emerged from the results was one of generally poor performance in basic skills, which underlined the need for increased and systematic attention to undergraduate skills training (Remmen *et al.* 1999: 602).

Another study was done in Bristol in the UK on medical students after passing their final examinations (Board & Mercer 1998:104). They had to complete a questionnaire on skills and indicate their experience and confidence in specified skills. Skills such as naso-gastric intubation, IV antibiotic administration and bag and mask ventilation were indicated as

areas where many of the students did not have adequate exposure (Board & Mercer 1998:105).

No standardised framework for a skills laboratory curriculum could be found in the literature (cf. 1.3) and the need to develop a unique curriculum framework model for a skills laboratory in this country was subsequently identified. The aim should be that, on completion of the undergraduate programme, students must, among other things, demonstrate that they have gained proficiency in basic clinical skills, including the ability to take a history; perform a physical examination and assess a patient's mental state; interpret the findings; as well as diagnose and treat diseases which occur commonly. Before exposure to patients exposure should initially take place in the skills laboratory on models and simulated patients.

At the University of the Free State School of Medicine the need was identified to develop a curriculum for skills training in undergraduate medical students. Several brainstorming sessions were held with members from the School of Medicine and a document called the Clarens Document was developed, which addressed the need for a new curriculum that included the need for a skills laboratory (School of Medicine UFS 1998:9). According to this document a skills laboratory was planned as an essential part of the training of students in the second and third years. It was envisaged that classes

divide into small groups and that they should be trained in a skills laboratory. The skills laboratory should concentrate on the following, namely clinical examination skills, for example the clinical examination of the cardio-vascular system; the neurological examination; the interpretation of special investigations; general procedures such as suturing of wounds, putting up intravenous infusions, management of emergencies, data collection, writing skills and research methods; and so forth. Basic nursing skills such as lifting a patient in bed would have to be included as well. In the year 2000 this new curriculum was implemented at the School of Medicine of the University of the Free State and a Skills Laboratory for Phase I and II (2nd and 3rd year) was developed for the M.B., Ch.B. students.

The aim of the new curriculum is therefore to produce a doctor who has a wide knowledge base, good communication skills, good clinical skills, is a lifelong learner, and knows his/her limitations (Bezuidenhout, Nel & Vosloo 2000:1).

South African conditions differ from those in countries such as Europe, due to the fact that doctors in our rural areas often have to do procedures which their counterparts in the urban areas and other countries do not do. These procedures are, for example, giving general and local anaesthetics; surgical procedures like caesarean sections, laparotomies for ectopic pregnancies,

appendicectomies, orthopaedic procedures; as well as operative treatment of fractures, and so forth (Pistorius 1983:418).

Against this background no existing validated national or international framework for a curriculum could be found.

1.4 GOAL AND OBJECTIVES OF THE STUDY

1.4.1 Overall goal

The overall goal was to determine the content of a framework model for the skills training of medical students to enable them to face the challenges of a doctor who has to function independently.

1.4.2 The aim

The study was aimed at designing a framework for a clinical skills curriculum for a South African medical school undergraduate medical curriculum.

1.4.3 Objectives of the study

To achieve this aim the following objectives were formulated:

a) Conceptualising and contextualising the problem of a lack of sufficient information on curricula for skills laboratories in the South African context.

- b) Identifying the broad categories of skills which are essential to be taught in a skills laboratory.
- c) Finalising the specific categories which could be used to compile a curriculum framework.
- d) Developing a framework for a skills laboratory undergraduate programme in South Africa.

1.5 DESIGN AND PROCEDURE

The design of the research is quantitative with some qualitative elements. The topics for the curriculum had to be investigated (quantitative) and comments were also requested from the participants (qualitative) (Katzenellenbogen, Joubert & Karim 1999:176). Subsequently the different phases will be discussed.

1.5.1 Phase 1

Phase 1 consisted of a literature search and a study which were done on skills laboratories (cf. Chapters 2 and 3).

1.5.2 Phase 2

A pilot study was done to ensure that the questions were unbiased and clear (cf. 3.4).

1.5.3 Phase 3

A questionnaire survey was done to identify the curriculum content by sending a questionnaire to the departmental heads who represented the clinical departments. The questionnaire was initially explained to them personally by the researcher, as well as later in a letter. In the questionnaire different topics as well as pre-knowledge required for the skills laboratory were identified and the respondents were required to indicate the necessity on a Likert scale (cf. 1.7). There was also space for comments and ideas for skills.

1.5.4 Phase 4

Phase four of the research entailed applying the Delphi technique to obtain the final list of topics.

The indicators derived from the literature survey (cf. 3.3.2), as well as the pilot study and the questionnaire survey were presented as a questionnaire to seven experts in the field of skills units and medical education. These

experts had knowledge of health care in South Africa and all of them were attached to medical schools. The questionnaire was sent out in three different rounds and after each round it was appropriately adjusted according to the opinion of the experts.

1.5.5 Phase 5

The final report consists of a curriculum framework for a skills unit in a medical school, defining content and procedures.

A full discussion of the methods is provided in Chapter 3.3.

1.6 SIGNIFICANCE OF THE STUDY

This framework will be to the benefit of medical education and training, as there is a trend towards earlier patient contact and the use of a skills unit in training. But up to now, however, this has taken place without scientific evidence regarding the content and implementation, which may prove to be an ideal tool for monitoring progress in skills development.

The suggested framework for the curriculum can be used in South Africa as well as internationally.

1.7 DEFINING THE TERMINOLOGY

Several concepts will often be referred to in this research and therefore, for the purpose of this study, these concepts are defined as follows:

Framework: It is described in the *Merriam-Webster Online Dictionary* as A basic conceptual structure (as of ideas) (*Merriam-Webster Online Dictionary 2004*).

Curriculum: This is described as a set of ideas, conditions, or assumptions that determine how something will be approached, perceived, or understood (*Merriam-Webster Online Dictionary 2004*).

Skills laboratory (unit): Clinical skills units are dedicated areas where students can learn about clinical examination skills with models or simulations (Bligh 1995:730).

Likert scale: This is a method of measuring attitudes that asks respondents to indicate their degree of agreement or disagreement with statements; according to a three-or a five-point scoring system such as: "strongly agree" "no opinion" or "strongly disagree" (*The On-line Medical Dictionary 2000*).

Delphi technique: “Delphi” may be characterised as a method for structuring a group communication process so that the process is effective in allowing a group of individuals as a whole to deal with a complex problem (Linstone & Turoff 1975:3).

Phase I: The first two semesters of the M.B.,Ch.B curriculum at the School of Medicine at the UFS.

Phase II: Semesters three to six of the M.B.,Ch.B curriculum at the School of Medicine at the UFS.

Phase III: Semesters seven to ten of the M.B.,Ch.B curriculum at the School of Medicine at the UFS.

SOAP System: This is a system for notation of the history, examination and treatment of a patient.

S = Subjective (history)

O = Objective (physical examination)

A = Assessment (diagnosis, differential diagnosis and problem list)

P = Plan (Rx – medication and referral; Dx – further diagnostic tests; Cx – counselling the patient regarding aspects such as prognosis, treatment and further appointments).

1.8 ARRANGEMENT OF THE THESIS

In this chapter the orientation; an overview of the rationale; the statement of the problem; the goal and objectives; the significance and value of this research; as well as the method of the research have been discussed.

Chapter 2 contains an overview and a discussion of the literature study on skills laboratories.

Chapter 3 describes the research design and the methodology.

Chapter 4 presents and analyses the data as well as the results.

Chapter 5 presents the framework which was developed by the Delphi research and compares it with the skills laboratory curricula of other universities.

Chapter 6 presents recommendations and conclusion to the research.

CHAPTER 2

OVERVIEW OF THE LITERATURE AND DISCUSSION

2.1 INTRODUCTION

In this overview of the literature the following aspects will be addressed, namely what clinical skills are; the development of skill centres or laboratories; the staffing of skills laboratories; the equipment needed in a skills laboratory; the teaching of skills; some examples of skills and, in the last place, the references in the literature which addresses a skills curriculum.

An Internet literature search was done on Medline from 1966 as well as on ERIC from 1966 and the search engines Google and Yahoo. The key words were "clinical skills, "skills centre", "skills unit", "skills laboratory", "skills curriculum" and "clinical skills centre". The Frik Scott Medical Library at the

School of Medicine at the UFS was also utilised to find books and literature on clinical skills units and curricula.

Competency in clinical skills is part and parcel of being a doctor. Hippocrates (460-375 BC) was one of the earliest physicians who mentioned the importance of skills. Talbot (1970:4,5) states that Hippocrates rejected the mysticism of his predecessors and founded the bedside method for the study of a patient with a disease. He used his clinical experience and senses as diagnostic instruments. Hippocrates described medicine as an art and the physician as the servant of the art. In this way the skills of observation and communication were pointed out by Hippocrates (Talbot 1970:4,5). The name Robert James Graves (1796-1853) lives on because he described the clinical signs of the exophthalmic goitre. This description can be attributed to his skills of observation. He too was one of the first clinicians who advocated clinical clerkship for medical students. He advocated that the responsibility for patient care should begin in the teaching hospital under supervision in order to spare the patient the hazards of achieving clinical experience by the unsupervised trainee (Talbot 1970:1045). The renowned William Osler (1849-1919) also regarded clinical skills of the greatest importance. While being professor in principles and the practice of medicine at John Hopkins Hospital, Baltimore, he introduced small group teaching. The students served as clinical clerks in the wards and were responsible for case histories and the

physical examination of their patients (Talbot 1970:1139). Already in 1892 Osler emphasised the importance of the necessity of ample, full and prolonged clinical instruction and on the importance of bringing the student and the patient into close contact (Osler 1944:31).

Acquiring the necessary competency takes time, patience and practice in a range of suitable settings. Clinical skills are slowly acquired and most are vulnerable to disuse atrophy. In the absence of practice, the useful half life of resuscitation skills is measured in months, therefore the need for medical students and young graduates to receive structured and systematic teaching and to be assessed in a comprehensive range of clinical skills is now widely accepted (Liddell, Davidson, Taub & Whitecross 2002:1041). A student's ability to demonstrate proficiency in clinical skills is now considered to be as important a determinant of progress as any other component of the curriculum (Ledingham & Dent 2001:86). According to Du Boulay and Medway (1999: 185) clinical skills centres have developed in response to changing health care policy, curricular initiatives and increasing emphasis on the quality of assessments and competencies. Du Boulay also states that there is increasing recognition that clinicians are no longer able to effectively teach all skills to students in traditional ways and that clinical skills training and assessment, particularly for undergraduates, is an area of deficiency (Du Boulay & Medway 1999: 185). In a comparison of third-year students who

had had skills training in a skills unit, and sixth-year medical students who had had only conventional training, the third-year students did much better. The authors conclude that skills training in the early years of medical school makes a great contribution to the development of clinical skills (Guldal, Ozcakar, Yeneceri, Dontlu & Ulusel 2005:21). This statement was confirmed by a study done at the Aarhus University, Denmark (Nielsen, Moercke, Wickmann-Hansen & Eika 2003), as well as at the University of Pretoria (Treadwell & Grobler 2001:481).

Skills laboratories are not the only solution to the shortage of real patients and not necessarily the second-best option for skills training, because in many other professions skills training is important. As an example in this regard is air pilots who are trained in simulated situations as an important part of their training programme (Lowry 1993:255). Simulations are used in transportation, legal proceedings, professional sports training, business executives training, as well as homicide investigation training (Keys & Wolfe as quoted by Ziv, Small & Wolpe 2000:490).

According to Leventhal and Goodman (1981:880), there are a number of factors which inhibit the development of clinical skills of medical students. Interns and residents, for example, compete to develop their own clinical skills, while the students have to be observers; the profiles of patients in

hospitals are unpredictable and some students may go through medical school without even witnessing some important and life-saving skills (Leventhal & Goodman 1981:889). They also state that, although simulators are not a replacement for actual patients, prior instructions in a skills laboratory should lead to better performance by a doctor when faced with a clinical situation for the first time (Leventhal & Goodman 1981:891; Da Costa, Santos, Maio, Santos & Paredes 2001:179). The quality of teaching in wards is not optimal, because interns often have to do the teaching, wards are noisy and patients not available (Nair, Coughlan & Hensley 1998:159). In addition, the atmosphere in a ward is not conducive to learning, as the bedside is not the place for students to ask questions on how to perform a procedure. Such questions are not going to engender great confidence on the part of the patient. It is much better to discuss and explain the procedure in a non-threatening atmosphere, before having to perform the procedure on the patient (Nelson & Traub 1993:927). Sebiany (2003:1045) too stated that medico-legal considerations, where medical schools are being held accountable for a doctor's training, make it even more necessary to train the skills on simulated patients and manikins in a skills laboratory before being exposed to real patients (Jafari, Hakimian & Saburi 2002:21; Ziv *et al.* 2000:489; Kneebone, Scott, Darzi & Horrocks 2004:1095).

Especially intimate clinical examinations are teeming with ethical and legal pitfalls and it is stated that intimate examinations, such as vaginal and rectal examinations, are the tip of a much larger iceberg related to ethical challenges in medical education (Singer 2003:63). Singer also maintains that every medical school should develop and implement guidelines for ethics in clinical teaching; evaluate their impact; and share the findings of these evaluations. This also applies to invasive procedures which pose a number of difficult ethical issues, because patients want the most experienced clinician to perform the procedure and not a medical student who does it for the first time (Rosenson, Tabas & Patterson 2004:291; Nelson 1990:333). Coldicott Pope and Roberts (2003:97), state that: "Students must learn, but patients must be protected" and point out - that in some instances - rectal examinations are done by students on patients who are anaesthetised and, in some instances without consent from the patients (Dent & Hesketh 2004:207). At the University of Umeå, Sweden, patient experiences in clinical teaching were investigated and it was found that 41% of the respondents had once or several times participated without being informed that they were participating in the clinical training of students (Lynöe, Sandlund, Westberg & Duchek 1998:465). This emphasises the importance of the skills laboratory where students are taught and can practise procedures on models and manikins, which limits the ethical minefields. At the University of Sherbrook in Quebec, Canada, research was done on central venous line placement by

final year students. It was found that, in their clerkship rotation, doctors cause a high incidence of pneumothoraces when placing central venous lines. The students were then trained on manikins and the incidence of pneumothorax decreased significantly and consequently decreased serious morbidity (Martin, Scalabrini, Rioux, & Xhignesse 2003:437). The safety of the patient, which is improved by initial training in a skills laboratory, also links onto the medico-legal aspects (Ziv *et al.* 2000:489).

Patients also have the right to refuse to be used as teaching models and therefore it is a good thing for the student to have practised intimate examinations on a model before performing them on real patients. Ethical guidelines to practise procedures on patients are an absolute necessity (University of Toronto 2002:1; World Health Organization 1994:2). The cardiovascular and respiratory examination in a female patient where the breast has to be lifted and in patients where the bladder has to be catheterised, are also intimate skills and a ward simulation exercise using static models and simulated patients can be used to evaluate behaviour changes in intimate examinations (Ker, Mole & Bradley 2003:35). In many instances students have to apply their skills to patients without the help of a lecturer or peer supervision and, in view of the above information, it becomes a practice full of legal pitfalls.

Even practising certain skills on newly deceased have ethical and legal complications (Orlowski, Kanoti & Mehlman 1988:440; Ardagh 1997:289; Burns, Reardon & Truog 1994:1654). The Council on Ethics of the American Medical Association (AMA) states that, if a trainee wishes to practise a procedure on a newly deceased, then permission from the relatives should first be sought (Council on Ethical and Judicial Affairs of the AMA 2002:1215). In two countries, Norway and Great Britain, the practice of intubation on the newly dead has been banned (Ardagh 1997:292).

2.2 THE CHARACTERISTICS OF CLINICAL SKILLS

Knowledge, skills and attitudes have each been defined as being of equal importance in the training of a doctor (GMC 1993:13). Aspects of each of these are combined in the term “clinical skills”, which includes the following abilities as depicted in Table 2.2/1:

Table 2.2/1: Clinical skills

Communication and history-taking
Professional attitudes and awareness of the ethical basis of health care
Physical examination, procedural and clinical laboratory skills
Resuscitation
Clinical thinking, reasoning and problem-solving
Teamwork, organisation and management
Information technology (IT)

Source: Ledingham & Dent (2001:87,88)

One of the major strengths of skill centres is the opportunity they afford for multi- and inter-professional learning (Ledingham & Dent 2001:88).

The skill of communication is now ranked as a core clinical skill (Laidlaw, MacLeod, Kaufman, Langille & Sargeant 2002:115). Good communication improves relations between the doctor and his patient and diminishes the risk of litigation (Goodwin 1995:1281). Communication skills were more broadly defined in Manchester by O'Neill, Metcalfe and David (1999:127) as depicted in Table 2.2/2:

Table 2.2/2: Communication skills defined

COUNSELLING
Explain a procedure
Explain a diagnosis or a problem
Explain treatment and management
Explain prognosis
Consent to a procedure and treatment
Breaking bad news
Communication with other professions and other doctors
Refer to or consult other professions and doctors; organisation of services and multidisciplinary care

Source: O'Neill, Metcalfe & David (1999:127).

Harden (1996:275) emphasised that poor communication was the commonest cause of complaints in the National Health Service (NHS) and that it was the cause of many medico-legal complaints. He was of the opinion that "How to break bad news" should be included in the undergraduate curriculum.

According to Brown (as quoted by Preston-Whyte 1999:93), the key to communication skills of the consultation are questioning, listening, responding and explaining. In the interview the skills of questioning, listening and responding are particularly important, whilst explaining is a skill which should be used sparingly, although eventually explaining is the skill which is most important, since it includes negotiation and cooperation skills (Preston-Whyte 1999:93).

At a workshop held at the Charité Campus, Virchow-Klinikum (Bradley 2002:210), the following skills were identified as skills that should be learned in the undergraduate curriculum and are depicted in Table 2.2/3:

Table 2.2/3: Undergraduate skills as defined by Bradley (2002:210)

Administrative skills, such as paperwork, sickness certification, death certification, referral procedures, admissions procedures, etc.
Attitudinal awareness and professionalism, such as codes of conduct, professional behaviour, responsibilities of a doctor.
Clinical reasoning skills.
Communication skills, such as verbal/non-verbal communication, breaking bad news, dealing with the "difficult" patient, written communications.
Critical appraisal skills, including evidence-based medicine.
Documentation skills.
Economic skills.
Ethical/legal considerations, such as obtaining valid informed consent, confidentiality and statutory notifications.
Health and safety and manual handling, including hand hygiene and universal precautions.
History-taking skills, adult medical and surgical, paediatric, obstetrics and gynaecology and psychiatric skills.
Information and communication technology, including information retrieval, handling, generic IT skills and Internet use.
Investigative skills, including selection of tests and interpretation of results data.
Learning skills.
Organisational skills, such as time management
Patient management and prescribing skills.
Physical examination skills.
Practical procedures and techniques.
Presentation skills, including small and large audience presentations, bedside presentations, written materials.

Continuation of Table 2.2/3

Resuscitation skills, both adult and paediatric basic life support and adult advanced life support.
Teaching skills including basic educational principles and practical teaching sessions.
Team working and leadership skills

Source: Bradley (2002:210)

The workshop described this as an extensive list that could resort under the umbrella of a clinical skills learning facility.

In a survey done among 89 Internal Medicine Clerkship Directors in the USA and Canada, it was found that over 80% had the opinion that medical students needed to learn to interpret X-rays, perform phlebotomies, interpret electrocardiograms, perform throat cultures, obtain blood cultures, perform urinalysis, and perform Pap smears during their third year of medical school. The other procedures, namely peripheral blood smear interpretation, venous catheter insertion, purified protein derivative (PPD) placement, gram stain interpretation, arterial blood sampling, cardiopulmonary resuscitation, nasogastric tube insertion, spirometry interpretation, urethral catheter insertion and lumbar puncture, were considered as necessary procedures for third year medical students by the majority of the respondents. Thoracentesis, paracentesis and cardio version were considered to be inappropriate for even

final year medical students to learn by the majority of the respondents (Elnicki, Van Londen, Hemmer, Fagan & Wong 2004:1110).

In Finland some advanced emergency procedures are taught to the medical students. A survey was done among graduating medical doctors from the five medical faculties in Finland. They had to indicate which emergency procedures they knew in theory and if they had done these procedures. The procedures suggested by professors of internal medicine, anaesthesiology, surgery and paediatrics were the following: Insertion of intravenous lines for adults and infants; planning and starting intravenous infusion for dehydrated infants; advanced cardiopulmonary resuscitation; ventilation by mask; endotracheal intubation of adults and children; chest tube insertion; pericardiocentesis; and emergency tracheostomy. The majority of the students knew the theory of all these procedures, except in pericardiocentesis where only 47% knew the theory. There were only three skills that had not been practised by the majority of the students, namely intravenous infusion in adults; ventilation by mask; and endotracheal intubation of adults (Remes, Sinisaari, Harjula, & Helenius 2003:150).

Procedural skills in South Africa as described in rural practice encompass a variety of especially surgical skills. Pistorius (1983:418) researched and identified the surgical skills which were done in a rural general practice over

a period of 10 years as follows: Tonsillectomy, myringotomy, appendisectomy, abscess drainage, removal of skin moles and sebaceous cysts, treatment of plantar warts, excision of breast tumours, repair of hernias, and skin transplants (Pistorius 1983:418). The following obstetric and gynaecology procedures were performed, namely dilatation and curettage of the uterus, caesarean section, cervix repair, sterilisation, ectopic pregnancies and operations for bartholin cysts. Urologic procedures were vasectomies, circumcisions and hydrocoele repairs. Orthopaedic procedures were reduction of fractures, excision of ganglia, amputation of fingers, tendon repair, reduction of dislocations, and the excision of ingrown toe nails. Pistorius (1983) also did a survey among general practitioners to determine the profile of surgical skills and found much the same procedures as reported above. Ten practitioners completed the questionnaire and the results are illustrated in Table 2.2/1:

Table 2.2/4: Surgical procedures done in general practice

Tonsillectomy	17,5%
Abscesses	10,4%
Suturing of lacerations	9,5%
Dilatation and curettage	9,2%
Sterilisation	7,5%
Caesarean section	6,1%
Fractures	5,6%

Continuation of Table 2.2/4

Appendisectomy	3,6%
Excision of skin lesions	3,2%
Lipomas and sebaceous cysts	2,6%
Hernias	2,0%
Circumcision	1,9%
Skin graft	1,5%
Vasectomy	1,1%

Source: Pistorius (1983:422)

The skills needed for rural hospitals were analysed by Reid, Chabikuli, Jaques and Fehrsen (1999:771). They reported on the types of operative procedures performed in Kwazulu-Natal and Natal provincial hospitals. The frequencies of the operative procedures were general surgical 44%; obstetrics and gynaecology 40%; and orthopaedic procedures 9%. The surgical procedures were in order of frequency as illustrated in Table 2.2/5:

Table 2.2/5: Surgical and obstetric procedures in Kwazulu-Natal

SURGICAL PROCEDURES	OBSTETRIC PROCEDURES
Incision and drainage of abscesses	Caesarean section
Suturing – major and minor lesions	Evacuation of the uterus
Debridement	Tubal ligation
Removal of foreign bodies	Hysterectomy
Skin grafts	Ectopic pregnancy
Laparotomy	
Circumcision	

Source: Reid *et al.* (1998:771).

Anaesthetic procedures included: Ketamine anaesthesia, spinal anaesthetics and general anaesthetics (Reid *et al.* 1998:771).

In another report on South African needs, a task team of the Department of Health (DOH) issued a report on the skills necessary for interns and community service doctors who have to work in rural hospitals. Their findings are listed in order of priority as indicated in Table 2.2/6:

Table 2.2/6: Department of Health - skills for rural doctors

Caesarean section
Common emergencies, resuscitation skills, including intra-partum, neonates and intubations
Anaesthetics and emergency medicine
Regional blocks (anaesthetics)
Clinical decision-making in the absence of full information (without laboratory investigations)
Common surgical principles and procedures, including closed fracture reductions
Communication skills: Indigenous languages

Source: Claassen, Mannie, Mashaphu, Manthebula, Mhlanga, Mutamba, Reid & Shipalana (2000:13).

Regarding orthopaedic skills, another committee, namely the subcommittee for undergraduate education and training of the HPCSA, advised that the following skills should be taught and mastered by medical students: The emergency treatment of fractures, such as cast application, traction, evaluation and care before transport; the debridement and initial care of open fractures; the emergency treatment of muscle, tendon and nerve injuries; the reduction of shoulder and elbow dislocations; reduction of Colles fracture; and the application of modified shoulder splint and elbow Plaster of Paris (South African Orthopaedic Association 2004:38-44).

With the high incidence of HIV/AIDS, the correct use and safety of instruments and needles have become essential. In preventing incidents, such as needle prick injuries, the skills laboratory is playing an essential role by teaching safety measures for sharp instruments. Osborne, Maxine, Papadakis and Gerberding (1999:45) state that instruction in universal procedures and clinical procedures is not sufficient to prevent exposures to blood during medical training. Medical schools must assume greater responsibility for ensuring that students are proficient in the safe conduct of clinical procedures and must develop systems that protect students so that they can report and learn from their mistakes.

2.3 THE DEVELOPMENT OF SKILL CENTRES

According to Infante (as quoted by Du Boulay & Medway 1999:189), "The purpose of a Clinical Skills Laboratory is to provide a simulation of reality so that the reality can be better understood, controlled and practised."

The first skills laboratory was already established in Maastricht, Limburg University, the Netherlands in 1976. Soon other countries followed until currently only few medical schools do not have a skills laboratory (Hanno 1994:168). In South Africa all medical schools now have skills laboratories.

The idea of a skills centre, a skills laboratory, or a resource centre, is to provide an environment for the students where they can acquire skills to be able to function as doctors. The centre should provide protected time, where students can not only be taught the necessary skills, but where they can practise their skills at their own pace and receive feedback with regard to their performance (Bradley & Postlethwaite 2003:7). According to research done by the University of Nebraska College of Medicine it was indicated that residents in Internal medicine should do a certain minimum of procedures before they could master them, for example, lumbar puncture – four times; ECG interpretation – 50 times; interpretation of chest roentgenograms – 25; endotracheal tube placement - five times; and so forth (Wigton, Blank,

Nicholas & Tape 1989:936). This emphasises that students should have facilities where they can practise their skills.

The objectives of a skills centre are described as follows in Table 2.3/1 by Wilson and Jennet who are attached to the Calgary Medical School in Canada (Wilson & Jennet 1997:46):

Table 2.3/1: Objectives of a skills centre

To provide a predictable teaching environment through the use of real and standardised patients, in which learners may be exposed to a variety of clinical skills, patient problems and professional/ethical issues.
To standardise the teaching of medical skills by using specially trained staff, lay teachers and volunteer patients.
To provide students with the opportunity to address specific educational and programme needs relating to clinical contact and research requirements.
To provide appropriate resources, including real and standardised patients for examination preparation, evaluation and remedial training.
To provide professional development to faculty and community doctors by offering specific courses and small groups workshops.
To facilitate interactive learning in emergency and unique problem situations through the use of medical informatics.
To develop and maintain a medical informatics database highlighting the sensitivity and specificity of clinical findings for the purpose of patient management.
To develop a team of doctor-teachers who are committed to the activities of the medical skills centre
To facilitate research in teaching and evaluation of clinical competence.

Source: Wilson & Jennet (1997:46)

According to Kutrtz, Silverman and Draper (as quoted by Bradley & Postlethwaite 2003:7) a wide range of learning methods can be used in a skills laboratory, for example small group work, role-play, real patients, simulated and standardised patients, as well as audio and video recordings, especially when training communication skills.

Many health care institutions have set up clinical skills learning facilities either by adapting existing space or constructing new, purpose-built areas.

An example of a purpose built centre in Dundee, Ireland, has a mixture of demonstration rooms, resuscitation suites, a simulated ward, consultation rooms, in addition to specialised treatment areas (Ledingham & Dent 2001:89).

A clinical skills centre benefits from good planning, as can be seen from Table 2.3/2:

Table 2.3/2: Features of a well-planned skills laboratory

Readily accessible to major users
Of adequate size
Designed, furnished and equipped to meet a range of perceived needs
Attractive to students, staff and patients
Provided with appropriate telecommunication links
Audio-visual
Computer facilities

Source: Ledingham & Dent (2001:90); University of Puerto Rico Medical Sciences Campus (2005)

It is important that the available space is kept flexible. Certain items may need to be fixed, such as ceiling hoists and plumbed facilities. Computer points, telephone lines and sinks should be in every room, so that rooms can be arranged to suit specific training needs (Du Boulay & Medway 1999:188). Different venues could be simulated in the skills centre, such as a simulated consulting room, a simulated ward, a simulated procedure room, a simulated intensive care/resuscitation unit, a simulated domestic environment to simulate a home visit as well as a simulated outpatient clinic (Dent 2001:484). At the University of Calgary, the consultation and examination rooms are fitted with observation mirrors and video cameras and each room contains a computer terminal and a CD-ROM, making it possible to link to the medical library (Wilson & Jennet 1997:45).

The following diagram depicted in Figure 2.3/1 illustrates the floor plan of a skills unit as described by Ledingham and Dent (2001:89).

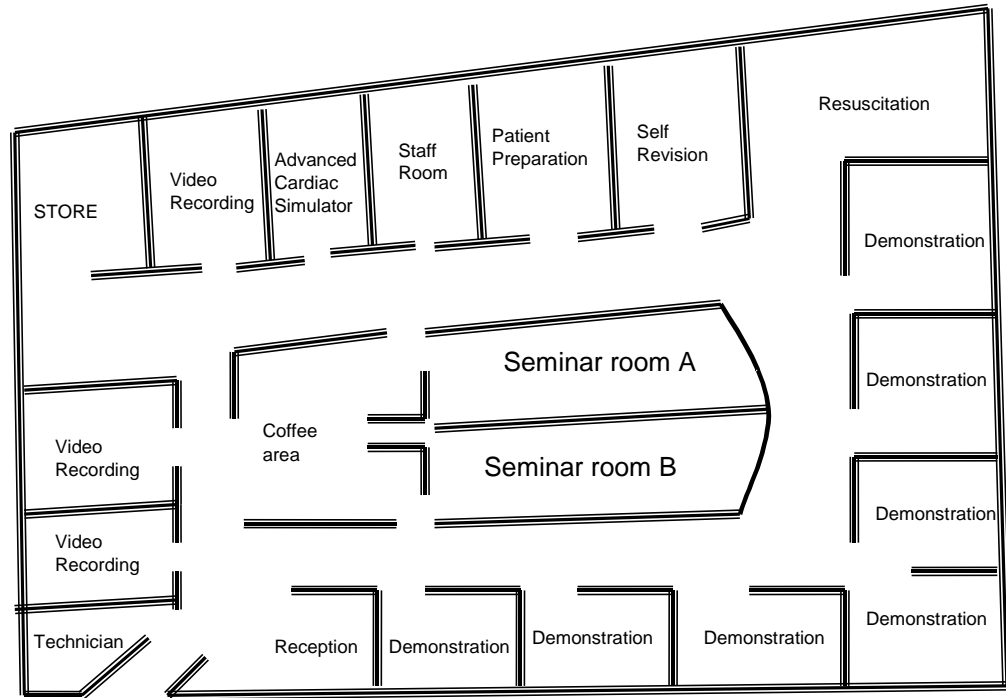


Figure 2.3/1: An example of a purpose built skills unit

This floor plan shows the basic rooms necessary in a skills laboratory. The number of rooms should coincide with the size of the student groups in the medical school. In the resuscitation room a manikin with the necessary equipment - such as Ambu bags, intubation equipment, defibrillator, ventilator and drip sets - should be permanently on display, the same as in a room in an emergency department.

The video recording rooms are available to video record consultations by students on patients or simulated patients, which should afterwards be discussed with them by the tutors.

The advent of clinical skills centres has provided an opportunity to introduce students to new skills in a protected environment, allowing them to learn in their own time (Dacre, Nicol, Holroyd & Ingram 1996:321). As early as 1972 the University of Illinois College of Medicine established a "Learning Resource and Development Centre" to assist its medical faculty in the development and evaluation of instructional simulation. Simulation techniques were used to teach and train clinical skills for health professionals. Sajid, Lipson and Telder (1975:970) emphasise that this was not designed to replace clinical skills experiences but to provide additional opportunities for students to strengthen their skills in patient examination (Kneebone *et al.*2004).

2.4 STAFFING OF CLINICAL CENTRES

Staffing of clinical skills centres is very variable. Some centres are staffed by permanent staff, such as in Liverpool (UK) where the staff consists of a full-time director (clinical), two full-time nurse tutors and two part time honorary lecturers. They also receive additional support on a voluntary basis from 10 clinicians drawn from the community. The tutors are involved in various

ways, including demonstrating to small groups, supervising student practice, and acting as an expert resource when students are undertaking self-directed learning (Bradley & Bligh 1999:115). Some clinical skills centres have clinical skills teachers from nursing backgrounds who teach medical students (Du Boulay & Medway 1999:187).

Other centres only have a director and clinical disciplines are required to come in and do the majority of the teaching. By contrast, other centres offer a comprehensive teaching programme and are responsible for providing tutors whose principal professional commitment is to teach. This has the advantage of ensuring the educational construction and content of the clinical skills session and that students receive adequate exposure to “core” clinical skills teaching under the supervision of a group of enthusiastic trained tutors (Ledingham & Dent 2001:90).

In a large skills centre administrative staff is a prerequisite, for example, a manager/administrator, a patient/simulated patient coordinator who is responsible for maintaining a database of real patients, and simulated patients who will be used in learning and assessment of clinical skills. Receptionists/secretaries and a technician to maintain and ensure the availability of models, manikins, clinical and diagnostic and therapeutic equipment are also necessary (Bradley & Postlethwaite 2003:10).

According to Du Boulay and Medway (1999:188), experience has showed that existing clinical staff do not often cooperate willingly to teach in the skills centre, partly because they are unaware of both the function and the scope of a skills laboratory and the equipment available and partly because they feel that first-hand teaching at the bedside should not be threatened (Du Boulay & Medway 1999:188). In a survey among 80 consultants in London hospitals it was found that few consultants made use of the skills laboratory, largely due to ignorance about the centres and insecurity about using modern methods (McLure, Dacre & Bromley 1999:217). A common compromise involves a small, multidisciplinary team of skills centre tutors and clinicians who together develop and coordinate delivery of the learning programmes in collaboration with convenors of the various systems. The advantage of this model is that of a wider ownership of the teaching programme, although the clinicians will require to undertake relevant staff development, often supplemented by appropriate "job" training. Clinical skill centres contribute best by fostering close collaboration among clinical teachers and by complementing and enhancing the other components of the curriculum. They should not develop an alternative form of clinical teaching (Ledingham & Dent 2001:90).

In the skills laboratory the ideal situation is to teach the students in small groups. Unfortunately the small groups need more tutors, who are not always readily available. At the University of Arkansas, Dwyer, Deloney, Cantrell and Graham (2002:page 7 of 9) describe how they use senior students with success as tutors to teach the skills of assessing vital signs. The director of the skills laboratory has a view of all the rooms via video and a glass screen, so that there is adequate supervision. Using students as peer teachers has the added benefit that the senior students too, brush up their skills knowledge and techniques. The disadvantages are that senior students do not have teaching experience and take much more time to teach the material. Therefore at universities where adequate teaching staff is a problem, peer teaching may be a solution.

Staffing of a skills unit depends on the way the skills laboratory functions. As described in 2.4, the staff may only consist of one or two medical officers who arrange all procedures with the help of all the other disciplines in the medical school or the staff may be large with enough hands to do all the training. Both of these have their advantages. In the first instance where the whole medical school participates, the advantage is that the integration of the curriculum could be more sensible. All the clinicians take responsibility so that they know what the students were taught when they see them in their clinical rotations (Bradley & Bligh 1999:115). The advantage of full staffing of the skills unit with its own personnel (Ledingham & Dent 2001:90) is that the

same standard of teaching is maintained for all modules. The problem of teachers not turning up for their sessions, will for example, not occur. This method is, however, much more costly than having the help of the whole faculty of medicine.

2.5 EQUIPMENT FOR CLINICAL SKILLS CENTRES

Educational skills have advanced beyond all recognition in recent years. Perhaps the most impressive technological advances have been in relation to manikins, telecommunications and computer facilities. Realistic anatomy models and manikins are now available to facilitate training in a wide range of clinical simulations, including physical examinations, as well as diagnostic and therapeutic procedures (Ledingham & Dent 2001:90; Asahikawa Medical College 2004).

The advantages of simulators are that, unlike patients, they can provide learner-centred education without risk to patient safety. They give the student the opportunity to make mistakes without detrimental consequences (Dent 2001:484). Skills can be practised repeatedly; retention and accuracy are increased; and the transfer from classroom to real situation is enhanced (Maran & Glavin 2003:23; Hao, Estrada & Tropez-Sims 2002:152). Research

done at the Miami School of Medicine in the USA on simulators and computer systems proved that they also taught enhanced student efficiency and confidence when examining real patients, resulting in less anxiety and more time to communicate with the patient (Gordon, Issenberg, Mayer & Felner 1999:36). Human patient simulators are presently used by one-third of the medical schools in the USA (Good 2003:15).

The range of simulators increases continuously, as can be seen from the following examples in Table 2.5/1:

Table 2.5/1: Range of manikins and simulators

Some of these simulators are anatomical models for the practice of skills such as, rectal, vaginal and breast examinations
Screen based simulators, illustrating most body systems, as well as realistic high-technology procedural simulators (task trainers) such as advanced cardiology simulators and ultrasound simulators
Realistic high-tech interactive simulators – realistic patient simulators, which comprise a computer-enabled full-length manikin that interfaces with emergency room or operating theatre devices.

Source: Dent (2001:485); Gordon *et al.* (1999:32)

The latest high technology manikin has the following features as indicated in Table 2.5/2:

Table 2.5/2: Features of a high technology manikin

Eyes that can blink and pupils that dilate and constrict to light. The eyes also close during anaesthesia and reopen when consciousness is regained.
It inhales air and exhales real carbon dioxide, while it can also be intubated and ventilated.
Tracheotomies can be performed on the trachea.
The heartbeat is audible and can be changed to mimic arrhythmias, while it also responds to defibrillation.
A pneumothorax which responds to a needle thoracostomy or an intercostal drain can be simulated.
A pericardial effusion can be simulated which responds to needle aspiration.
A pulse can be felt at both wrists, while intravenous cannulae can be inserted in the arm.
The genitalia are interchangeable and a urethral catheter can be inserted and drain urine.
A pulse can be felt in both thighs, the popliteal areas and the dorsum of the foot.
The skin is malleable and soft where it should be soft and hard where it should be hard.

Source: Egan (200:s.p.)

This sophisticated manikin is controlled and operated by computer. Scenarios can be created such as an asthmatic patient with chronic heart disease who has to take a handful of drugs and is currently in anaphylactic shock. The medical student has to figure out how to treat the patient. If medication is required, the drugs are “administered” by scanning a bar code on a syringe. The computer then produces the physiologic response a real patient would experience (Egan 2004:s.p.).

Research done in Australia showed that computer simulations increased the confidence in emergency skills for registrars. Registrars are evaluated

according to the following skills: Speak calmly and effectively with patients in emergency situations; develop a management plan for an emergency situation; manage an emergency situation in the community; recognise an emergency situation; successfully use a laryngeal mask; manage a patient's airway in an emergency situation; do standard emergency intubation; mask ventilate a patient; insert an intravenous line; and administer parenteral drugs (Mugford, Martin & Owen 2004:280). The response of students to these simulated experiences is overwhelmingly positive (Gordon 2000:522; Forrest & Taylor 1998:654).

At the Harvard Medical School, Massachusetts General Hospital, the Department of Internal Medicine conducted a survey on the high fidelity manikin. Students were evaluated on the following two scenarios, namely in the first case a trauma patient with hypovolemic shock and a tension pneumothorax and, in the second place, a cardiac patient with marginal stable ventricular tachycardia. The students were instructed to evaluate and treat the manikin. The evaluators too, were exposed to a scenario of a simulated case of anaphylactic shock. The instructors commented on the breadth of potential applications and they identified "practice without risk" as the primary advantage of realistic simulation. Cost, however, was cited as the major obstacle (Gordon, Wilkerson, Shaffer & Armstrong 2001:470,472). It should nevertheless be realised that any simulator device can only be as

good as the educational programme in which it is embedded (Maran & Glavin 2003:27).

As described above, the high technology simulated patient manikins have many possibilities for hands on skills training, but a limiting factor is that these manikins are expensive as well as time consuming and labour-intensive (Tsai, Harasym, Nijssen-Jordan, Jennett & Powell 2003:72).

The high technology manikins can only be of value if the skills unit has a dedicated person or persons who can manage the scenarios and train the students. If this manikin is left to all and sundry to work with, it would not last very long. These sophisticated manikins are very expensive. At this stage the cost range is from R500 000 up to R1,5 million. This is the reason why, in some skills laboratories, a technician is part of the permanent staff (Bradley & Postlethwaite 2003:10).

It must be emphasised that the training on simulators does not replace the real patient and that simulated pathology cannot always be realistic, for example, vaginal examination on a pelvic manikin allows a structured approach, but simulated pathology cannot always be identified (Macintosh & Chard 1997: 196). Gallagher and co-workers (2005:365) from the Emory University School of Medicine, Atlanta, state that simulations are only part of

the training programme and their power can only be realised if they are integrated into a well-thought-out curriculum (Gallagher, Ritter, Champion, Higgins, Fried, Moses, Smith & Savata 2005:365).

In one institution affordable hand made models were developed, such as a placenta and foetal membranes, as well as a model to examine and describe subcutaneous nodules (Personal communication, W.F. Mollentze 2005).

2.6 TEACHING OF CLINICAL SKILLS

According to Ledingham and Dent (2001:94), the teaching of clinical skills can be summarised in the SPICES model as described by Harden, Sowden and Dunn (1984:285).

Student-centred: Students are given more responsibility for their own learning. More emphasis is placed on meeting the needs of the individual student.

Problem-based learning: Clinical skills instruction may be part of overall problem-based learning strategy or may introduce this approach to learning.

Integration: Clinical skills afford an excellent opportunity to unite the different subjects and disciplines.

Community-orientated: Although clinical skills centres are often in hospitals, they should reflect the totality of health care and involve input from all relevant professionals.

Electives: Competency in clinical skills is a core curricular requirement but students may choose to study the subject in more depth either in elective programmes or in special study modules.

Systems-based: By means of clearly defined sessional commitments, all students should experience an adequate range of clinical skills instruction and achieve an adequate level of performance throughout their course (Ledingham & Dent 2001:94).

Another approach to skills training at Liverpool is described as follows by Bradley (1999:216): The attendance for the course is compulsory. An average of 24 students attend each session, which lasts for one and a half hours. The clinical skills run parallel with the problem-based tutorials so that the skill reflects the module content of the tutorials. The students receive a study guide for each session which outlines the tasks and learning objectives. The students can practise the skills on models or simulated models after a tutor demonstrated to them. They also use role play to develop history-taking skills. The students evaluate the course for each

session on a five-point Likert scale. Tutors, peer- and self-assessment are used at each station and, at the end of the year, a structured clinical skills examination is run. Bradley also found that students can learn a wide range of skills in their first year, although they are concerned about the retention and development of the skills.

Good (2003:18), Professor of Anaesthesiology at the University of Florida College of Medicine, describes the skills first-year medical students are taught as follows: Groups of 20 students attend a two-hour hands on workshop, which consists of five clinical scenarios, lasting 20 minutes each. These scenarios include a medication error causing accidental neuromuscular blockade; opioid-induced hypoventilation; and congestive cardiac failure with pulmonary oedema, spontaneous pneumothorax, and hypercarbia caused by increased equipment dead-space. The learning objectives for these sessions are the gaining of an understanding of the basic concepts of respiration (such as tidal volume, minute ventilation, dead space ventilation, shunt fraction, alveolar gas concentrations, alveolar ventilation, hyperventilation and respiratory quotient); exposure to clinical decision-making; and the use of physiological monitoring instruments.

2.7 EXAMPLES OF CLINICAL SKILLS TAUGHT IN MEDICAL SCHOOLS

The varieties of clinical skills that can be taught in a skills laboratory are extensive and depend on the innovative ideas of the teachers. The following are examples of skills taught in some medical schools:

Simulated patients are now widely used in the training for not only history-taking, but also for the simulation of symptoms, for example the pain of angina (University of Connecticut 2005:1; UTD (The University of Texas at Dallas) 2005:2; Monash University Victoria, Australia 2005:1; Adamo 2003:262). Some of the advantages of simulated patients are depicted in Table 2.7/1:

Table 2.7/1: Benefits of simulated patients

They are always available.
They are less liable to fatigue than real patients.
Staff and students can talk freely in front of them.
Student anxiety is reduced.
Complications and unrelated problems that might confuse students do not occur.
Simulated patients can adjust their performance to suit students with different levels of experience.
They can be trained to provide feedback on how the students perform.
They can be used for student assessment.

Source: (Lowry 1993:256)

The disadvantages where simulated patients are concerned are that it can take up to 25 hours to train them and they have to be paid (Lowry 1993:256). At the University of Dundee, Scotland, 100 unpaid volunteers simulate patients. The only remuneration they receive is their travel fees (Davis & Harden 2003:603). On the negative side too, it has been noticed that some simulated patients could experience stress symptoms. In a survey done on simulated patients at Maastricht University, it was found that as many as 73% of its simulated patients experienced stress symptoms, with a mean of four symptoms per simulated patient. The symptoms included fatigue, dissatisfaction with own or others' performance, nervousness, as well as anxiety. In their conclusion they advise that, even though the symptoms were relatively mild, they recommend that staff should be on the alert to this phenomenon and consider post-performance Delphi-briefing (Bokken, Van Dalen & Rethans 2004:1093).

Even for intimate examinations simulated patients can be used as described at the University of Calgary Medical School in Canada where actors are used for intimate examinations such as breast and genital examinations (Wilson & Jennet 1997:46).

The use of fellow-students to examine the normal person, for example, taking blood pressure; feeling pulses; and examining the heart, lungs,

abdomen and the nervous system, is a logical way of learning normal function before attempting to examine patients. The advantages of examining fellow-students are that students feel what it is like to be examined. They prefer to practise on normal people rather than on patients and they can develop certain skills by repetition, such as heart sounds, the different reflexes and, as already mentioned, taking the blood pressure, examining the tympanic membrane and the retina. There are, however some limitations (O'Neill, Larcombe, Duffy & Dorman 1998:433: Ledingham & Harden 1998:505). O'Neill *et al.* (1998) report with regard to a questionnaire put to students at Manchester University that many students are prepared to practise some clinical skills on their peers, but some were not. The latter should not be forced to do so, particularly if they have serious religious objections. Their recommendations are summarised in Table 2.7/2:

Table 2.7/2: Recommendations for physical examinations done on fellow-students

Peer examination on fellow-students should not be the sole method of acquiring clinical skills.
Students should be allowed to choose who they wish to work with.
Non-intimate examinations should be performed with appropriate privacy and tutors should be available to supervise on request.
Female breast and male genital examination are unacceptable to most students and should not form part of the programme.

Source: O'Neill *et al.* (1998:437); Dobbie, Passmore & Schneider (2002)

At the University of Maastricht Medical School the communication skills of students are developed in their skills laboratory (Van Dalen, Zuidweg & Collet 1989:55). The sessions take place once every two weeks, from year one to year six. The degree of complexity increases, for example, initially basic interview skills and later full interviews and problem patients. They start with role-play, and then have simulated patients and lastly real patients.

According to Harden (1996:276), a recognised step in the development of a skill is to observe when the skill is being performed by a competent person. Watching a video tape of a bad and a good example of breaking bad news is educational.

Another example is that of cancer screening. A cancer screening skills laboratory was described at the St. Louis University School of Medicine (Merlo, Luketich & Gilyon 1987:225). A one-hour skills laboratory session was introduced, using anatomical models for the instruction of screening for cervical, breast, prostate and colorectal cancer. Emphasis was placed on professional interaction with patients. A cancer skills laboratory for second-year medical students, as described by Geller, Prout, Sun, *et al.* (2000:197), was also developed, consisting of two hours of training with 15 minutes per station (six to eight students assigned to a station). Stations were on prostate cancer, breast cancer, colorectal cancer, skin cancer, counselling for

smoking cessation, and discussion of anti-tobacco advertisements. Students completed pre- and post-laboratory surveys consisting of 10 brief questions (Geller *et.al.* 2000:197).

Thirteen Canadian schools of Medicine were reviewed about their undergraduate anaesthesia training and it was found that 10 schools provided seminars; eight used videos; six used computers; six used an airway skills laboratory; and four used an anaesthesia simulator (Brull & Bradley 2001:147). The most common topics taught in these anaesthesia seminars are airway management and fluid therapy. According to Cheung, Critchley, Hazlett, Wong, and Oh, (1999:1) in a survey done at 73 universities from the UK, Ireland, Canada, South-East Asia and Australasia, 46% had a skills laboratory and practical skills were taught mainly using patients and simulators. 92% of anaesthesia departments teach basic life support to undergraduate students and 71% teach advanced life support.

In a controlled trial with fourth-year medical students at the Toronto University in Canada an appendisectomy model was used to teach students to assist with an appendectomy (Lossing & Groetzsch 1992:50-51). There were eight stations, namely a scrubbing station, gowning and gloving, prepping, cautery and suturing cutting station, instrument handling, using the needle driver and stapling. The researchers concluded that the teaching

significantly improved technical skills in the model, although these results were not validated in the operating room.

At the University of Montreal with regard to its 10-year experience with a psychomotor skills laboratory at the Department of Surgery, it is reported that, since 1983, first-year trainees were freed of hospital duties for "a week of surgical techniques" to develop their basic surgical techniques and perioperative skills. Teaching videos, suture boards, biologic substitutes, animal laboratory round table discussions and formal lectures were the techniques used. Cognitive sessions were designed to provide information on instrumentation, adequate preoperative preparation, and general organisation of the operating room, intensive care, and endoscopy units. The programme helped residents to achieve surgical dexterity in a less stressful and more controlled manner than in the operating room (Heppell, Beauchamp & Chollet 1995:27).

The use of a CD-ROM to teach students skills was described by Treadwell, De Witt & Grobler (2002:476,477). The students had to study a specific skill using the CD-ROM and then they practised it in the Skills Laboratory, supported by lecturers who provided formative evaluation. The aims of this study were to assess the students' perspectives on the new strategy, as well as to compare the skills of students following the new curriculum with those of students following the traditional curriculum who did not follow structured

programmes on practical skills, but experienced a practical neonatology rotation. According to the results of this research, the evaluation of the CD-ROM programme was very favourable. The majority of the students still preferred live demonstrations but found the CD-ROM useful for revision purposes. With the exception of one skill, namely endotracheal intubation, the new curriculum students were found to be as competent as the students following the traditional curriculum and performed mask ventilation and cardiac massage significantly better than they did (Treadwell, De Witt & Grobler 2002:477).

At the University of Michigan a CD-ROM was developed to improve the skills of cardiac consultations (Mangrulkar, Judge & Stern 1999:572). On this CD-ROM are live interviews with patients, auscultation phonograms, electrocardiograms and chest radiographs designed to cover all important normal and pathologic heart sounds and cardiac diagnostic techniques. The CD-ROM teaching has its limitations when compared with classroom tuition. In the classroom in small groups there is a natural dialogue between students and teacher, leading to misconceptions and emphasis on important concepts which students may have difficulty with. This cannot happen to the same extent with the CD-ROM (Finley, Sharratt, Nanton, Chen, Roy & Paterson 1998:359)

According to Del Mar and Isaacs (1992:54,58), at the University of Queensland, Australia, interviewing skills of students were evaluated after video taping interviews by students. It was found that interviewing skills increased statistically significantly. These authors concluded that videotaping of students' consultations with real patients and using feedback improved their consultation skills. The students too, felt that their skill at analysing and evaluating consultations had improved and would have liked to have more consultations taped and reviewed.

With modern technology, the vast variety of ways, skills teaching can be implemented, is a big challenge to medical schools to be able to use the skills laboratory to its full extent (Du Boulay & Medway 1999:188). The function of the skills laboratory can only be developed to its full potential if there is committed and full cooperation by all the disciplines in the medical school.

2.8 CURRICULA

2.8.1 An overview of the skills curricula of some medical schools

Bradley and Postlethwaite (2003:8) as well as Harden (2000:551) stated that whatever the range of skills to be considered and included within a

programme, it is important that these are seen within the context of the whole curriculum, such as modules relating to the gastro-intestinal tract could be integrated and run along with the interview of a patient with gastro-intestinal problems, the physical examination and ano-rectal examination. This integration within the curriculum is a key element to the success of clinical skills learning.

A curriculum in clinical skills for medical residents in Family Medicine was described by Leventhal and Goodman (1981:890). Their curriculum consisted of airway management and intubations; orthopaedic casting; obstetric skills, including intrapartum monitoring and the use of outlet forceps; suturing techniques; and cardiopulmonary resuscitation (CPR), which included advanced CPR life support.

In 1991 Malik described the skills which were taught at the medical school in Sudan. The comprehensive list of skills taught at the Gezira Medical School contains the following topics as depicted in Table 2.8.1/1:

Table 2.8.1/1: Skills taught in a Sudan medical school

Laboratory skills
Urine examination and microscopy
Stool examination and microscopy
Prepare and stain blood films
Hb estimation

Continuation of Table 2.8.1/1

Blood grouping and cross matching
Sputum microscopy
Culture preparation
Paediatric skills
Parenteral therapy i.m. and i.v.
Intraperitoneal infusion
Venesection
Taking blood samples
Anthropometric measurements
Insert stomach and rectal tube
Measure temperature
Measure blood pressure
Apply oxygen mask and steam tent
Abdominal paracentesis
Rectal examination
Lumbar puncture
Bone marrow puncture
Skills in Medicine
Use of diagnostic set
Fill in of different laboratory forms
Measure temperature
Measure blood pressure
Insert naso-gastric tube
Abdominal paracentesis
Pleural fluid aspiration
Electrocardiographic (E.C.G.) tracing
Enema

Continuation of Table 2.8.1/1

Bone marrow aspiration
Lumbar puncture
Obstetric and gynaecologic skills
i.v. and i.m. injection
i.v. infusion
Blood transfusion
Taking blood sample
Vaginal examination
Surgical skills
Incise superficial abscess
Dress wounds
Suture simple wounds
Immobilise fractures
Cardio-pulmonary resuscitation
Sigmoidoscopy
Catheterisation of bladder
Supra-pubic puncture
Endotracheal intubation
Identify surgical instruments

Source: Malik (1991:69)

In 1992 the skills programme for preclinical medical students at the Faculty of Medicine at the University of Alberta in Edmonton, Canada, was described by Taylor and his colleagues (Taylor, Vergidis, Lovasik & Crockford 1992:450). They included their method and stated who the instructors were as illustrated in Table 2.8.1/2:

Table 2.8.1/2: Instructor and methodologies (*) used for sessions at the University of Alberta.

Session	Instructor	Lecture	Video/slide/film	Manikin demo	Manikin practice	Practice on classmate volunteers
Injections	Nursing	*	*	* i.m.	* i.m.	Subcut and intradermal
Venipuncture	Nursing	*		*	*	Yes
Peripheral venous lines	Nursing	*		*	*	Yes
Central venous lines	Nursing and medicine	*		*	*	No
Bladder catheterisation	Nursing and medicine	*		*	*	No
Isolation and infection control	Nursing	*				Not applicable
Lumbar puncture	Medicine	*	*	*	*	Patient positioning, location of vertebral space
Oxygen therapy and arterial blood gases	Respiratory technology	*	*	*	*	Arterial blood gases
Electrocardiography and blood pressure monitoring	Nursing and medicine	*				Yes
Pelvic examination	Medicine	*	*	*	*	No
Breast examination	Medicine	*	*	*	*	Axillary examination only
Nasogastric intubation	Medicine	*	*	*	*	Yes

i.m. = Intramuscular; Subcut = Subcutaneous

Source: Taylor *et al.* (1992:450)

According to Kopelman (1997:18) from St Bartholomew's School of Medicine in London, the skills that do not receive adequate attention are skills of time

management, prioritisation, administration, presentation, team working and the recognition of self-limitation.

At the Hope Hospital in Manchester the students can access a web page with the skills curriculum where they can evaluate their different skills and also see which of their skills are still lacking (Dornan, Maredia, Hosie, Lee & Stopford 2003:500). The skills curriculum at Manchester Medical School can be found on their web page, which is excellently developed. (Lee, Stopford, Dornan, Hosie, Maredia & Drury 2000). The main menu is displayed either by module or by skill type. These modules on their web page are illustrated in Table 2.8.1/3:

Table 2.8.1/3: Skills modules at Manchester University

Basic skills course skills
Nutrition, metabolism and excretion skills
Heart, lungs and blood skills
Mind and movement skills
Families and children skills
Intermediate level communication skills
Advanced communication skills
Year five skills

Source: Lee *et al.* (2000: Page 2 of 4)

The content of their main menu displaying skills by skill type is illustrated in Table 2.8.1/4:

Table 2.8.1/4: Manchester skills type groups

Consultation skills
Examination skills
Visual image interpretation
Laboratory skills
Procedural skills
Therapeutic skills
Management skills

Source: Lee *et al.* (2000: Page 3 of 4)

On the web page the students can click on any of these topics to see the specific skill and can then enter for training or have a look at the recipe or protocol for the skill.

The skills curricula at Manchester Medical School are also arranged according to the different years. Subsequently the different skills for every year group are listed in the following tables: Table 2.8.1/5; Table 2.8.1/6; Table 2.8.1/7; Table 2.8.1/8; Table 2.8.1/9; Table 2.8.1/10; Table 2.8.1/11 and Table 2.8.1/12.

MANCHESTER YEAR THREE SKILLS

Table 2.8.1/5: Manchester Basic Skills Course in Year Three

Put a patient at his/her ease	Specimen storage
Determine the reason for a patient's attendance	Safe handling of blood specimens
Obtain a factual medical history	Complete request forms
Elicit a patient's perceptions, feelings and expectations	Basic life support
Manage time effectively in a consultation	Venous cannulation
Write effective notes	Basic airway management
Temperature measurement	Put on sterile gloves and gown
Skin examination	Subcutaneous injection
Blood pressure measurement	Intramuscular injection
Abdominal examination	Venepuncture
Cardiovascular examination	Set up and care for a venous infusion
Respiratory examination	Give first aid
Dipstick test urine	Dress a wound
Label specimens	

Source: Lee *et al.* (2000: Page 2 of 4)

In a questionnaire answered by 62 medical schools in the USA, certified CPR (cardio, pulmonary resuscitation) proficiency of medical students was required by 91% of the schools (Sanders, Janine, Edwards & Burdenski 2004:875; LSU Health Sciences Center 2002:1).

The other clinical skills in year three at Manchester are listed in Tables 2.8.1/6 and 2.8.1/7.

Table 2.8.1/6: Manchester nutrition, metabolism and excretion skills:

Rectal examination	Proctoscopy
Neck examination, including thyroid	Nasogastric intubation
Interpret an abdominal radiograph	Male urethral catheterisation
Blood glucose measurement	Female urethral catheterisation
Assist in theatre	

Source: Lee *et al.* (2000: Page 2 of 4)

Table 2.8.1/7: Heart, lungs and blood skills

Assessment of hydration/volume	Perform endotracheal intubation
Lymph node examination	Arterial puncture
Interpret ECG	Perform emergency defibrillation
Interpret chest radiograph	Use a bronchodilator inhaler
Perform an ECG	Use a nebuliser
Measure peak flow	

Source: Lee *et al.* (2000: Page 2 of 4)

MANCHESTER: YEAR FOUR SKILLS

In Table 2.8.1/8 nutrition and metabolism and excretion skills (a continuation from year three) are listed.

Table 2.8.1/8: Nutrition and metabolism and excretion skills

Eye examination
Inguinal examination
Testicular examination

The other year four skills are listed in Table 2.8/9:

Table 2.8.1/9: Manchester: Mind and movement skills

Take a substance abuse history	Mental state examination
Ear examination	Suicide risk assessment
Take a psychiatric history	Interpret a locomotor radiograph
Oropharyngeal examination	Fracture immobilisation
Neurological examination	Lumbar puncture
Locomotor examination	Knee joint aspiration
Conscious level assessment	Assess rehabilitation needs of a disabled patient
Assessment of functional status	Ophthalmoscopy
Cognitive assessment	

Source: Lee *et al.* (2000: Page 3 of 4)

In Table 2.8.1/10 the Manchester families and children skills are listed.

Table 2.8.1/10: Manchester: Families and children skills

Take a sexual history	Assessment and staging of sexual development
Build a rapport with child and parents through history-taking	Examination of the pregnant abdomen
Construct a family tree	Ability to approach and examine a child
Vaginal examination, including use of speculum	Perform cervical smear and take swabs
Breast examination	Take swabs from cervix, urethra and vagina
Developmental assessment	Take male urethral swabs
Neonate examination	Follow patient through labour and delivery
Assessment of stages of labour	Establish drug dose for a child
Measurement and plotting of height and weight	

Source: Lee *et al.* (2000: Page 3 of 4)

In Table 2.8.1/11 Year four advanced communication skills are listed

Table 2.8.1/11: Advanced communication skills

Take a history from a third party/carer.
Sensitively inform a patient of a serious situation.
Deal with an anxious or angry patient.

MANCHESTER: YEAR FIVE SKILLS

The year five skills are be listed in Table 2.8.1/12

Table 2.8.1/12: Manchester: Year five skills

Advanced communication skills Develop team management plan with colleagues	
Wound assessment	Set up and operate a syringe pump
Examination of a seriously ill patient	Implement a management plan
Confirmation of death	Write follow-up notes
Measurement and recording of pain	Construct a management plan
Remove drains/sutures	Create a problem list
Suture a wound	Make a discharge plan
Pleural aspiration	Perform an anaesthetic assessment
Intercostal aspiration/drainage of pneumothorax	Make a referral to another professional
Write a prescription	Construct an investigation plan
Treat pain appropriately	Implement an investigation plan
Sedate a patient	Write a death certificate
Prescribe controlled drug	Resuscitate a seriously ill patient
Treat constipation appropriately	Notify the coroner
Manage a blood transfusion	Write a cremation form
Prescribe intravenous fluids	Coordinate multi-agency care
Monitor aminoglycoside levels	Notify an infectious disease
Give intravenous drug injection	Construct a management plan for a seriously ill/intensive care unit (ICU) patient
Administer a local anaesthetic	Construct a management plan for terminal care
Prepare chemotherapy or antibiotic	

Source: Lee *et al.* (2000:Page 4of 4)

At the University of Nebraska a survey was done amongst faculty members and residents in internal medicine to determine which procedures they considered mandatory for all residents (Wigton 1981:512). Many of these skills overlap with the above undergraduate curriculum of Manchester and, as can be expected, the undergraduate curriculum has many skills that are regarded as superfluous for postgraduate candidates. Examples in this regard are writing clinical notes, notifying the coroner, notifying infectious disease, and obtaining a sexual history. The skills that overlap and are therefore emphasised as important are those listed in Table 2.8.1/13:

Table 2.8.1/13: Nebraska University mandatory skills for residents

Cardiopulmonary resuscitation	ECG interpretation
Pelvic examination	Joint aspiration
Local infiltration anaesthesia	Endotracheal intubation
Lumbar puncture	Interpretation of chest radiograph
Proctoscopy	Repairing and closure of lacerations
Thoracocentesis	

Source: Wigton (1981:512).

The University of Sherbrooke, Fleurimont, Quebec has a skills programme for the fourth-year (final year) medical students with the emphasis on practical surgical skills. Its programme follows in Tables 2.8.1/14 and 2.8.1/15.

A) Beginning of the fourth year

Trauma evaluation and management for medical students

B) Five weekend programmes

Table 2.8.1/14: Sherbrooke University skills programme

Instrument handling and knots	Oral intubation
Removing sutures and skin staples	Chest tube insertion
Nasal packing,	Central venous line insertion
Peripheral intravenous lines (IV's),	Abscess drainage
Arterial punctures	Diagnostic peritoneal lavage
Pleural paracentesis	

Source: Martin *et al.* (2003:438).

Table 2.8.1/15: Sherbrooke University skills mandatory topics

Mandatory Advanced Trauma Life Support	Control of airway
Advanced Cardiac Life Support	Central venous line insertion
Fundamental in critical support	Chest tube
Surgical principles	Diagnostic peritoneal lavage and ultrasound
Difficult intubation	Simulation of trauma resuscitation

Source: Martin *et al.* (2003:438).

Since 1988 to 2002 the curriculum at the Stanford University in California included certain procedures in its skills laboratory not mentioned in the Manchester curriculum. These procedures are outlined in Table 2.8.1/16:

Table 2.8.1/16: Stanford University skills not taught at Manchester University

Splinting and casting	Diagnostic peritoneal lavage
Nasal packing	Gastric lavage
Dental examination	Fingernail removal
Needle decompression of pneumothorax	Venous cutdown
Thoracostomy and thoracotomy (observation of procedure on a human cadaver)	

Source: Nelson & Traub (1993:927); Van der Vlugt & Harter (2002:44)

In Australia at the of University Department of Rural Health, Northern New South Wales, they teach advanced cardiac life support, CPR, advanced airway management, as well as difficult airway management in their skills laboratory (Barak 2005).

2.8.2 The content of some clinical skills centres on the internet

A number of web pages about clinical skills centres are available on the internet. Their approaches, however, differ. Some give a short overview of the function of their clinical skills laboratory (The Ohio State University 2003; Mayo Clinic College of Medicine 2005; University of Newcastle upon Tyne 2004; Hasanuddin University, Indonesia 2005:1; University of Louisville, School of Medicine 2005; Flinders University Adelaide, Australia 2002:1), while other give a detailed curriculum of their skills (Clinical Skills Laboratory NHS 2003; Indiana University School of Medicine 2004). Some add a web page where students or lecturers can book time in the skills unit to practise specific skills (City University London 2005).

As can be expected, many of the topics are basic skills. The web page of the University of Kansas School of Medicine (Mills 2002) is comprehensive and the students can access any skill they wish to practise and make an appointment on the web page with the skills laboratory. The models available are also shown on the web page to give an idea of their training facilities. The following procedures/skills items are displayed, namely arms for arterial puncture and injection; injection models for the knee and shoulder joints; central lines trainer; spinal injection simulator; female and male catheter simulators; arm for practising sutures; sigmoidoscopic

examination simulator; Spirometer function tests; and endoscopy simulator. The Physical Examination Items displayed are breast examination model, prostate examination model; eye retinopathy trainer; ophthalmoscopy trainer; diagnostic ear trainer; and strabismus model. Emergency life support items on the web page are, for example, infant and newborn manikins; cardiac simulator; baby ECG monitor; advanced cardiac life support; as well as advanced life support self-learning courses (Mills 2002).

The web page of the University of Cincinnati College of Medicine (2005) divides the skills in the different years of a four-year curriculum. The following procedures not previously mentioned in other curricula are: Ear and eye simulators with pathological slide series; heart and lung sound simulators; birthing stations; knot tying boards; suturing simulators; dual panel x-ray view boxes; mini office laboratories; including wet preps; urinalysis and glucose testing; peak flow testing; and an excision pad simulator; as well as skin biopsy simulators for dermatology (University of Cincinnati 2005). At the Wirral Hospital, Clinical Skills Laboratory NHS TRUST (2003:2), the following skills not yet mentioned can be taught, namely, gastrostomy tube placing, epidural injections, gastroscopy, colonoscopy, testicular examination, bronchoscopy and patient suction techniques. Wirral Trust Hospital state that all health professionals can make use of the skills

laboratory and this explains why some of these skills are more applicable to registrars (Clinical Skills Laboratory NHS 2003:2).

A concept not previously discussed can be viewed on the web site of the Southern Illinois University School of Medicine (2005). Its web site displays skills selected by the Nurse Educator. The students can select any of these skills they are interested to practise. The skills are not compulsory and thus non-assessment activities. The following skills were not previously mentioned in this chapter, namely, nasogastric tube removal; surgical drain removal; suture and staple removal; change of dressings; isolation techniques; patient handling (transfers, positioning); physical restraint application; obtaining urine specimens, SOAP notes; and medical record review (Southern Illinois University School of Medicine 2005).

The skills mentioned by Kopelman (1997:18) (cf. 2.8.1) need to be emphasised. Especially the skill of recognition of self-limitation is important, especially in underdeveloped countries where junior doctors often find themselves confronted with complicated cases. If they do not know their limitations, they can very easily find themselves in deep water. Unfortunately Kopelman does not explain how the skill of the recognition of self-limitation should be developed.

Many of the skills described by Dornan *et al.* (2003:500) at the Manchester University can be acquired by students during their clinical rotations. When they work in wards they can, for example learn to complete death certificates; notify the coroner; write a cremation form; and plan terminal care. It is important that students should be able to manage these skills, which could be left to their clinical rotations, especially if they have to complete a logbook where these skills are all described.

2.9 ASSESSMENT OF CLINICAL SKILLS

Wass, Van der Vleuten, Shatzer and Jones (2001:945) state that assessment drives learning. Students feel overloaded by work and respond by studying only for the parts of the course to be assessed. To promote learning, assessment should be educational and formative – students should learn from the tests and receive feedback on which to build their knowledge and skills (Wass *et al.* 2001:945).

Skills-based assessments are designed to measure the knowledge, skills and judgement required for competency in a given domain (Smee 2003:703; Elnicki & Taylor 1997:560). A reliable measure of clinical skills has to be assessed over a wide range of patient problems, diagnostic and therapeutic

skills. The objectively structured clinical examination (OSCE) is designed to assess these different skills (Harden, Crosby & Davis 1999:13). The OSCE was introduced 30 years ago as a reliable approach to assessing basic clinical skills and its flexible test format makes it suitable (Harden *et al.* 1999:13). According to a survey done by Jain (in Ladyshevsky 1999:266) in 1997, 113 out of 136 medical schools in the USA used the OSCE as an assessment in their curriculum. Smee (2003:705) also points out the limitations of the OSCE as being that the simulated patients perform isolated aspects of the clinical examination, which is not constructive for the doctor-patient relationship. The OSCEs also rely on specific check lists which tend to be thorough but does not give any flexibility and the type of simulated patient problems are limited (Smee 2003:705). Smee also notes the factors leading to decreased reliability, such as too few stations and too little testing time per station; as well as unreliable patients and examiners who do not score consistently (Smee 2003:706). The number of stations should be at least 10, because fewer stations are inadequate for a satisfactory range of topics to be examined, although more than 20 stations become unwieldy (Selby, Osman, Davis & Lee 1995:1188).

With adequate training, the simulated patients in the OSCE can be used to evaluate the quality of performance of students as reliably as experts (Ladyshevsky 1999:268). The simulated patients are valid and reliable tools which can be used with confidence to evaluate clinical competence,

especially in the OSCE. (Ladyshevsky 1999:268; Ledingham & Harden 1997:506; Wass *et al.* 2001:948).

According to Wass *et al.* (2001:948), the key issues in any test are those outlined in Table 2.9/1:

Table 2.9/1: The key issues of a test

KEY ISSUES	DESCRIPTION
Summative/formative	Be clear on the purpose of the test.
Blueprinting	Plan the test against the learning objectives of the course or competencies essential to the speciality.
Validity	Select appropriate test formats for the competencies to be tested. This action invariably results in a composite examination.
Reliability	Sample adequately. Clinical competencies are inconsistent across different tasks. Test length is crucial if high-stakes decisions are required. Use as many examiners as possible.
Standard-setting	Define endpoint of assessment. Set the appropriate standard - such as, minimum competence – in advance.

Source: Wass *et al.* 2001:948

If the OSCE examination is measured against these issues, it complies with all these requirements, keeping in mind the limitations as pointed out by Smee (2003:705).

In a survey done in the USA and Canada on Internal Medicine Clerkship Directors, only 39 of 89 respondents (43.8%) tested the competency of students in performing procedures. Twenty six used instructors' evaluations; 16 used written examinations; while 15 used an OSCE and 13 a clinical skills examination (Elnicki *et al.* 2004:1111)

2.10 CONCLUSION

Professional competence is the ultimate aim of medical training and competence builds on a foundation of basic clinical skills, scientific knowledge and moral development (Epstein & Hundert 2002:226).

Over the past decade clinical skills laboratories developed in South Africa and over the past two decades virtually all over the world, for example in the UK, the USA, Europe, the United Arab Emirates, Hong Kong, Canada and Australia. Skills laboratories have come to stay. Initially they were developed in countries where clinical patients were not readily available, but in South Africa the patients too have become less available due to the increase in the number of patients who have Medical Aid Insurance and the growing awareness of human rights and ethics (Personal opinion). It is therefore

more appropriate to let students first develop their skills by practising on models, manikins and simulated patients before they approach the real patient.

In the following chapter the research design and methodology will be discussed.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

More than one method was used to determine the items for a curriculum for a skills laboratory. A quantitative as well as elements of a qualitative survey was used. Initially a literature survey was done. Subsequently a pilot study as well as a questionnaire survey was launched to determine the items which had to be included in the final questionnaire. Indicators were included in the questionnaire to select the most appropriate year in which a topic had to be addressed. After finalising the questionnaire, a Delphi technique was applied. The column on pre-knowledge was omitted from the questionnaire presented for the Delphi study. The questionnaire was finalised by including topics which had a majority vote as well as those indicated by specific disciplines. The items were grouped according to the different disciplines (cf.3.3.3.).

3.2 THEORETICAL PERSPECTIVES ON THE RESEARCH METHODOLOGY

3.2.1 The Questionnaire

A questionnaire can be defined as a list of questions which is answered by respondents and that gives indirect measures of the variables under investigation (Katzenellenbogen *et al.* 1999:82). Questions can be asked by means of self-administration or by interview. In a self-administered questionnaire the respondents fill in a questionnaire by themselves and in their own time.

The steps to develop a questionnaire are as follows:

1. List the variables to be measured.
2. Formulate the questions. The questions may be open-ended or closed. The advantage of open-ended questions is that the respondent can give his/her opinion. In closed questions the answers can be "yes" or "no", or a number or predetermined categories. Closed questions have the advantage that they are quicker to answer and have a standardised form for data collection, although they limit the responses.
3. Decide on the detailed practical logistics of the questions, for example if it is necessary to explain the questions.
4. The sequence of the questions should be carefully planned.

5. The layout and design of the questionnaire have to be attended to in order to keep the questionnaire as uncomplicated as possible.
6. The scale of measurement of the variables has to be considered.
7. The coding of the data collections should be considered once the questionnaires have been completed.
8. The means of data analysis has to be planned – either by computer or by hand.
9. The pilot study or test run to refine the instrument has to be run.
10. After the pilot study changes should be introduced as suggested by the respondents where applicable (Katzenellenbogen, Joubert & Karim 1999:82-89).

The development of the questionnaire for this research on the framework for a curriculum for a skills laboratory for undergraduate medical training went through all ten of the steps described in the above paragraph.

3.2.2 The Delphi Technique

“The Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals as a whole to deal with a complex problem” (Linstone & Turoff 1975:3). The term “Delphi” relates to the “Oracle of Delphi”, an ancient Greek myth which held that a “chosen one” on the island of Delphi was able to predict the future in infallible authority (Clayton 1997:375).

3.2.3 Different Delphi Types

The Delphi exists in two distinct forms (Linstone & Turoff 1975:5). The most common is the paper-and-pencil version, which is commonly referred to as a "Delphi exercise". In this situation a small monitor team designs a questionnaire, which is sent to a larger respondent group. After the questionnaire has been returned the monitor team summarises the results and, based on the results, develops a new questionnaire for the respondent group. The respondent group is usually given at least one opportunity to re-evaluate its original answers based upon examination of the group response. This method was used in the research on the curriculum framework for a skills laboratory.

The second form, sometimes called a "Delphi conference", is run by computer, which carries out the compilation of the results. Linstone and Turoff (1975:5) call it "Real-time Delphi." This has the advantage that it can give the results much quicker than the pencil-and-paper model, as it can occur during a meeting or a conference.

3.2.4 Different phases of The Delphi

Usually Delphi, whether it be conventional or real-time, undergoes four distinct phases (Linstone & Turoff 1975:5,6). The first phase is characterised by exploration of the subject under discussion, wherein each individual contributes additional

information he feels is pertinent to the issue. The second phase involves the process of reaching an understanding of how the group views the issue (such as, where members agree or disagree and what they mean by relative terms such as "importance", "desirability", or "feasibility"). If there is significant disagreement, then that disagreement is explored in the third phase to bring out the underlying reasons for the differences and possibly to evaluate them. The last phase, a final evaluation, occurs when all previously gathered information has been initially processed and the evaluations have been fed back for consideration.

3.2.5 Advantages of the Delphi technique

The advantage of the Delphi method is that it provides a medium of communication whereby individuals can participate without needing to travel long distances to a group meeting place (Clayton 1997:375). Individuals participate anonymously as a strict requirement of the Delphi process. Anonymity reduces the social-emotional behaviour often found when using other methods, which allows participants to focus on task-oriented activities.

Clayton (1997:375) also states that the Delphi method tries to obtain the most reliable consensus of opinion of a group through a series of intensive questionnaires interspersed with controlled feedback. The technique involves repeated questioning

of the individuals and avoids direct confrontation of group members with one another.

3.2.6 Limitations of the Delphi Technique

According to Clayton (1997: 380), there are some limitations which should be considered to have a better understanding of the Delphi.

The following were pointed out:

- a) The members of the Delphi panel have different backgrounds and experiences, which may influence their decisions.
- b) Due to personal and professional obligations, the time spent to complete the questionnaire differs from person to person and it may effectively reduce a member's ability to consider all the aspects of the problem.
- c) The aim of Delphi is to achieve consensus among the panel members. This consensus is assisted by feedback the researcher gives after each round about the group tendency. The researcher may provide both individual as well as the mean group rating. It is not certain whether the panel members rethink their next decision or if they are influenced by decisions of the group.
- d) The results of the group of experts may be regarded as valid, although they may not be an exhaustive or all-inclusive set of ideas. The value of the information is for the individual reader to decide and is limited due to constraints

imposed by the panel selection, as well as by the backgrounds, experiences and biases of each member.

- e) The results of the analysis can also be biased by the researcher's analysis of the results.

According to Clayton (1997:380), the Delphi has great strength and utility, as it collects judgements in a systematic fashion, gains input, establishes priorities, and builds consensus. He further states that the Delphi cannot be overlooked as a useful and potent tool when attempting to harness expert opinion for critical decision-making tasks in education.

3.3 METHODS AND PROCEDURES

3.3.1 Introduction

A total of four stages were used to conclude the data collection, namely a literature review to compile the draft questionnaire; a pilot study to test the questionnaire; a questionnaire survey to finalise the questionnaire; and, in the last place, the Delphi research technique.

3.3.2 Literature Review

A Medline search dating back to 1966 was conducted, using the following key word: "skills unit", "skills laboratory", "clinical skills", "skills curriculum" and "skills teaching". Different text books (Talley & O'Connor:2000; Browse:1991) were also researched to compile the initial list of topics for the questionnaire. No reference in the literature regarding a published comprehensive curriculum could be found, although lists of skills taught in skills laboratories were published in some articles (Bradley & Bligh: 1999:118,119; Bligh 1995:732).

3.3.3 The Questionnaire

3.3.3.1 Development of the questionnaire

An initial list of skills was compiled, based on the literature study mentioned in 3.3.2, as well as on personal discussions with clinicians and on personal observations and communications, which included the promoters and biostatistician. (cf. Appendix A).

3.3.3.2 Structuring the questionnaire (Appendix A)

The topics were classified in disciplines. This included history-taking, the physical examination and special investigations.

The questionnaire focused on six areas per topic:

- a) The respondents had to indicate on a Likert scale which of the proposed topics was deemed necessary for a skills laboratory.
- b) A choice had to be made in which semester in Curriculum 2000, School of Medicine of the UFS, the topic should be addressed.
- c) Respondents had to comment on the most suitable venue where a particular topic should be taught, for example in the skills laboratory, clinics, lecture halls or during ward rounds.
- d) Respondents had to indicate which discipline should teach the topic or whether the staff of the skills laboratory could do the teaching.
- e) Respondents had to indicate what pre-existing knowledge students should ideally have when they are taught the specific topic.
- f) Respondents were allowed to propose additional topics not included in the questionnaire.

The path followed in the development of the questionnaire and the Delphi process is indicated in Figure 3.3.3.2/1.

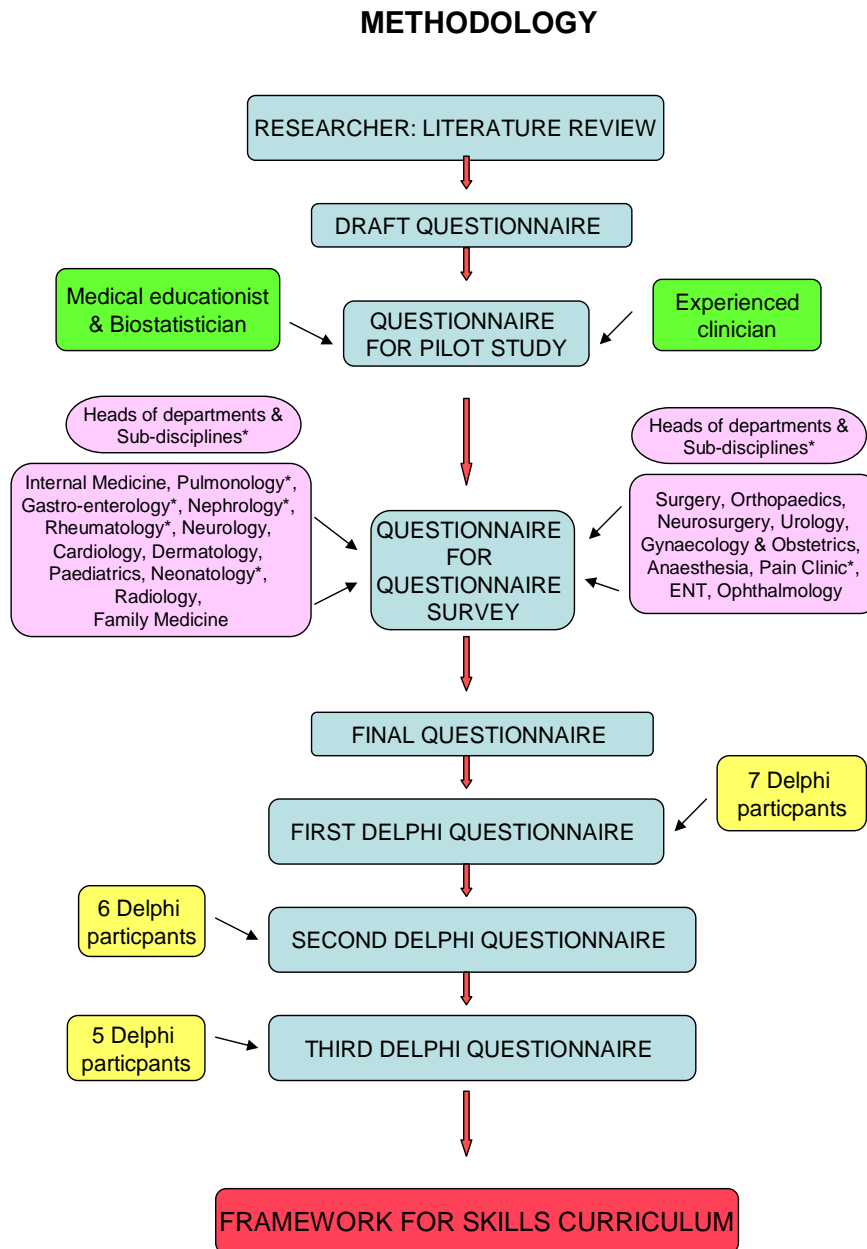


Figure 3.3.3.2/1: Diagram to illustrate the development of the framework for a skills curriculum.

3.4 PILOT STUDY OF THE QUESTIONNAIRE

The questionnaire was tested in a pilot study to ensure that the questions were clearly formulated and to determine the time necessary to complete.

3.4.1 The participants of the pilot study

The draft questionnaire was administered to the following persons, namely the head of a clinical department; one person with teaching qualifications, who is also a head of a clinical department; and a biostatistician. These persons were free to add or remove topics and to clarify questions. They made suggestions on additional topics, pointed out duplication and indicated where any misunderstanding might occur. The biostatistician made additional suggestions regarding the Likert scale, as well as on a scale to indicate during which phase of the curriculum the specific topic had to be addressed. The final questionnaire (cf. Table 4.3.2/1) had 106 topics with four areas per topic.

The final draft questionnaire was then administered to a fourth clinician to determine the time needed to complete the questionnaire. The time recorded was 40 minutes.

3.5 QUESTIONNAIRE SURVEY

3.5.1 Target Population

The heads of all the different clinical departments at the Medical School of the UFS were then requested to complete the questionnaire. The different clinical departments which participated are indicated in Table 3.5.1/1

Table 3.5.1/1: The disciplines which completed the questionnaire

Surgery	Orthopaedics
Internal Medicine	Dermatology
Paediatrics	Ophthalmology
Obstetrics and Gynaecology	Urology
Family Medicine	Plastic surgery
Otorhinolaryngology	Gastro-enterology
Radiology	Pulmonology
Cardiology	Neurology
Anaesthetics	Rheumatology

In the Paediatric and Anaesthetics disciplines two consultants participated.

3.5.2 Sample Size

Twenty questionnaires (cf. Table 3.4.2/1) and an accompanying letter as well as the roster for the undergraduate medical curriculum of the second and third years, were personally taken to these clinicians (cf. Appendices B and C).

After the results were processed, a final questionnaire was compiled for the Delphi study. During the Delphi the participants were requested to add additional topics which they regarded as important for a skills laboratory. The instructions to the respondents were communicated to them in person as well as by means of a letter (cf. Appendix D).

3.5.3 The Questionnaire Process

Twenty questionnaires were thus sent out and all 20 were returned.

The results of the questionnaire survey will be addressed in Chapter 4.

The questionnaire was initially explained to each respondent and then confirmed in a letter. In the questionnaire different topics had to be indicated by the respondents as either essential, useful, or unnecessary for a skills laboratory. Pre-knowledge required for the skills laboratory also had to be identified. The respondents were required to indicate the necessity of each topic on a Likert scale. There was also space for comments and new

ideas for skills. This information was entered in a database (cf. Table 4.4.2/1).

The final list for the Delphi technique was compiled from the information derived from the results of the questionnaire survey.

3.6 THE DELPHI TECHNIQUE OF THE RESEARCH

3.6.1 The participants of the Delphi technique

The Delphi method requires that a panel of experts on the study subject be selected. An expert is someone who possesses the knowledge and experience necessary to participate in a Delphi (Clayton 1997:376).

The indicators derived from the literature as well as the results of the questionnaire survey were presented as a questionnaire to seven experts in this field, from different medical schools, who had knowledge and experience of undergraduate education and skills training in South Africa.

Initially the heads of eight skills laboratories at the different universities in South Africa were approached by e-mail and later by telephone to ask if they would participate in the survey.

All but one person responded. When the specific person eventually responded, the survey was already under way. Another participant was not "suitable" as this person was a paramedic. One of the participants was selected as a person with a Master's degree in medical education, but was not in charge of a skills unit. One of the medical schools did not yet have a skills unit and was in the process of developing one. The dean of the relevant medical school who also was head of the department of Internal Medicine and who was involved in the planning of its skills unit, was prepared to act as a participant.

The Delphi technique was subsequently performed on the results of the questionnaire survey. The seven participants were sent introductory letters, as well as consent forms on which they had to agree in writing that they were willing to participate.

For the Delphi study, the questionnaire was adapted as follows:

1. The **unnecessary** column was changed to **inappropriate**, due to the fact that respondents in the questionnaire survey to the heads of departments may have included topics that were necessary, but inappropriate for a skills laboratory. This description of "inappropriate" was chosen due to the fact that some topics are essential but inappropriate to teach in a skills laboratory.

2. The column on the **semester** was divided into 10 parts and the participants had to indicate where in the curriculum on a scale of one to 10 they would want the topic to be taught.
3. The column on **pre-knowledge** was omitted. All respondents to the questionnaire survey indicated that students should have anatomical and physiologic pre-knowledge.

The questionnaire was sent in three different rounds and after each round appropriately adjusted according to the opinions of the experts. With the first questionnaire an introductory letter as well as a contract form which the respondents had to sign was included. The questionnaire and letters were sent by e-mail as well as per land mail with a franchised envelope included. All the participants responded.

For the second round all the responses of the first round were included on the questionnaire. The questions in which consensus had already been achieved in the first round, were marked by colouring the specific cell in green.

During the second round only an e-mail was sent to those who had responded by e-mail in the first round. To the others an e-mail as well as a hard copy was mailed. After the second round the researcher had difficulties

with some of the respondents who took quite a time to return the questionnaires. A certain respondent took six weeks. Subsequently, in the third round, the researcher sent the questionnaire by e-mail as well as by land mail, to make sure that the respondents received their copies of the questionnaire and also that they could choose in which way to respond. In this round the responses of the second round were again included and cells marked in blue indicating the questions where consensus had been achieved.

In both the second and third rounds a letter with information was again sent out. One of the respondents fell ill after the first round and could not be included in subsequent rounds. This left six respondents to complete the Delphi process.

The final report consists of a framework for a skills unit in a South African Medical School, defining content and including procedures. This framework may benefit undergraduate medical education and training, allowing earlier patient contact.

3.7 DATA ANALYSIS

The Department of Biostatistics, School of Medicine, of the Faculty of Health Sciences at the UFS, assisted in analysing the quantitative data of the questionnaire survey, while frequencies were also recorded. The data was arranged in table form. This data was then processed by the researcher and used to identify the topics, which had to be included in the Delphi research.

The researcher himself collated and organised the information yielded by hand. The responses of the participants were entered by hand. Consensus was reached in all topics, which had a majority of 80% of the votes (Larson & Wissman 2000:45; Wikipedia 2006). Where some topics were concerned, consensus was reached after the first round and, in a minority group, no consensus could be reached. Items where 60% agreement had been reached were also indicated and were included in the final analysis with motivation.

3.8 SCOPE OF THE STUDY

The scope of the study lies within the domain of Health Professions Education, focusing on that part of clinical skills training that should take place in a skills unit for undergraduate medical training.

3.9 RELIABILITY, VALIDITY AND TRUSTWORTHINESS OF THE MEASURING INSTRUMENTS

“Reliability” refers to the degree of similarity of the information obtained when the measurement is repeated on the same subject or the same group (Katzenellenbogen, Joubert & Karim 1999:90). The question is: “Is the same value arrived at every time the measurement is taken, or do the values vary a great deal on repeated administration?” There are different levels of validity, namely “Face validity”, which refers to the extent to which the questions make sense and “Content validity”, which requires that the measure includes all the elements of variables being investigated. There are three other kinds or levels of validity, namely “Criterion-related validity”, “Predicted validity” and “Inconsistent validity” (Katzenellenbogen *et al.* 1999:92,93). These three levels are not relevant to the research on the Framework for a skills laboratory.

In this study the reliability was initially established by means of the pilot study and subsequently the questionnaire survey and the three rounds of the Delphi technique, as well as the response rate for the Delphi, which was more than 80%.

According to Katzenellenbogen, Joubert and Karim (1999: 90), "The validity refers to the extent to which a measure actually measures what it is meant to measure. The measure lacks validity if an observer or instrument measures the characteristic in the same individual or group repeatedly higher or lower than the real value".

The validity of the findings of this research rests on the response of the heads of clinical departments; the experts working in skills laboratories who responded fully; and the proven scientific Delphi technique.

According to Lincoln and Guba [as quoted by UWE (The University of the West of England) 2001:1of1], when establishing trustworthiness as applicable to qualitative data research, the data must be auditable through checking that the interpretations are credible, transferable, dependable and confirmable. In most instances the Delphi process, in the way it is conducted, meets these requirements. This applies especially to the credibility and dependability of the participants as well as the confirmability of the data.

3.10 ETHICAL CONSIDERATIONS

Approval to conduct this research was obtained from the Ethics Committee of the Faculty of Health Sciences of the UFS (ETOVS No. 16/02; cf. Appendix J). Approval and consent was obtained from all the respondents in the questionnaire survey as well as from the participants in the Delphi technique. The participants of the Delphi study were all anonymous and they had to sign a letter of consent to participate in the research.

3.11 CONCLUSION

With the questionnaire survey 100% returns were achieved, but in the Delphi technique unfortunately there was one participant who was not able to continue after the first round. In the subsequent rounds the respondents who answered gave valuable inputs with regard to the items in the questionnaire.

In this chapter the methodology was described. The theoretical perspectives on the research methodology were discussed and the Delphi technique was explained (cf. 3.2).

The design of the pilot study, the questionnaire survey, and the Delphi technique were discussed and described. This included a profile of the participants (cf. 3.3.4).

The data analysis and the role of the Department of Biostatistics were explained. It was also explained that the choices of the previous rounds were indicated to the participants of the Delphi technique in the questionnaire of the subsequent round. The questions where consensus had been reached, were also indicated to the participants.

In addition, the concepts of reliability, validity and trustworthiness were discussed (cf. 3.7).

The content of the next chapter will describe and discuss the results of the research.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

In this chapter the results and findings of the pilot study, the questionnaire survey, as well as the Delphi survey are presented after the comments and suggestions of the individual participants were analysed. The results of the pilot study and the questionnaire survey among the heads of the clinical departments at the UFS therefore appear first, followed by the Delphi study by the heads of skills laboratories. Thereafter the discussion of the results is presented.

4.2 DRAFT QUESTIONNAIRE AS COMPILED BY THE RESEARCHER

As explained in Chapter 3.3.2, a literature review was conducted to compile the initial questionnaire. A Medline search as well as a literature search in the Frik Scott Library, the Medical School library of the UFS, as well as an Internet search involving Google and Yahoo and two different text books on physical examination

and clinical signs of patients was conducted (Talley & O'Connor 2000; Browse:1991). The search in the two books mentioned was done by carefully going through each chapter and selecting topics which could be used in a skills laboratory. The purpose of this search was to compile a comprehensive list of topics to be used in the questionnaire. The Medline search which dated back to 1966, was conducted by using the key words "skills unit," "skills laboratory," "clinical skills," "skills curriculum" and "skills teaching". The literature search in the library was based on publications in journals found on the Internet and on Medline. Subsequent discussions with clinicians as well as personal observations were also instrumental in determining the topics for the questionnaire. The researcher next developed the template for the questionnaire on a spreadsheet of an Excel programme in Microsoft Office (see Table 4.3.2/1).

The questionnaire consisted of 106 questions grouped into the different systems of the body such as cardiovascular; respiratory; breasts; gastro-intestinal tract; genito-urinary system; obstetrics; the haematological system; the endocrine system; the nervous system; the skin; musculoskeletal; ophthalmology; ear, nose and throat (ENT); anaesthetics; paediatrics; and emergency care (cf. Table 4.3.2/1).

The participants had to indicate four items for each question. The questionnaire was structured as follows: In the first column each topic was allocated a number. The second column made provision for a particular topic suitable to be taught in a skills laboratory. The third triad of columns was based on a three-point Likert scale (cf.1.7) and the respondents had to indicate whether the topics were unnecessary,

useful, or essential to be taught in a skills laboratory. The fourth group of four columns included semesters in which the topics should be taught, while in the fourth column the participants had to indicate in which venue they would prefer to teach the specific topic, for example the skills laboratory, a lecture hall, an outpatient clinic, or at the bedside of the patient. In the fifth pair of columns participants had to indicate who should teach the topic, namely the specialist discipline or the skills laboratory staff. In the last place they had to indicate which pre-knowledge they deemed necessary for the students to master before teaching of the topics took place.

4.3 THE PILOT STUDY QUESTIONNAIRE

4.3.1 Demographics of the pilot study participants

The draft questionnaire (Appendix A) was sent to three persons for comments after explaining to them the purpose of the study. They had to do brainstorming and make recommendations. Two were clinical heads of departments, of which one had a Master's degree in medical education; one was actively involved in skills laboratory training; and the third was a biostatistician.

4.3.2 Results of the pilot study

The two clinical participants completed the questionnaire and made suggestions and comments on the validity of the questionnaire, as well as on the appropriateness of the topics and questions (Katzenellenbogen, Joubert & Karim 1999:92). The biostatistician did not fill in the questionnaire, but made comments on the structure thereof and had to confirm the face as well as the content validity (Katzenellenbogen *et al.* 1999:92). The suggestions were incorporated into the questionnaire.

The following additional topics were suggested by the respondents of the pilot study and these were also incorporated in the questionnaire for the questionnaire survey (see Table 4.3.2/1): Pap smears, insertion of intra-uterine devices, bone marrow puncture, and ring block of the fingers with local anaesthetic.

The average time took by the respondents of the pilot study to complete the questionnaire was between 40 and 55 minutes. This questionnaire was subsequently used for the questionnaire survey.

Table 4.3.2/1: Final questionnaire for the questionnaire survey

	TOPIC	UNNECESSARY			USEFUL			ESSENTIAL			SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE
		1	2	3	3	4	5	6	3	4			5	6	
	GENERAL														
1	History Taking of all systems	1	2	3	3	4	5	6					YES	NO	
CARDIOVASCULAR SYSTEM															
2	General principles of the physical examination of the healthy patient :appearance (BMI, anthropometry,); vital signs; facies; hair; nails; etc.														
		1	2	3	3	4	5	6	Where:	YES	NO				
3	Pulses and blood pressure														
		1	2	3	3	4	5	6	Where:	YES	NO				
4	Cardiovascular system: appropriate history; pulses; blood pressure; carotid arteries; jugular venous pressure														
		1	2	3	3	4	5	6	Where:	YES	NO				
5	Precordium: inspection; palpation; percussion; auscultation														
		1	2	3	3	4	5	6	Where:	YES	NO				
6	Abnormal heart sounds and murmurs														
		1	2	3	3	4	5	6	Where:	YES	NO				
7	Chest X-rays: cardiac and lung conditions														
		1	2	3	3	4	5	6	Where:	YES	NO				
8	ECG														
		1	2	3	3	4	5	6	Where:	YES	NO				
ARTERIES, VEINS AND LYMPHATICS															
9	Clinical evaluation of arterial circulation of a limb														
		1	2	3	3	4	5	6	Where:	YES	NO				
10	Clinical evaluation of the venous circulation of the lower limb														
		1	2	3	3	4	5	6	Where:	YES	NO				
11	Examination of the lymphatic system														
		1	2	3	3	4	5	6	Where:	YES	NO				
RESPIRATORY SYSTEM															
12	HISTORY														
		1	2	3	3	4	5	6	Where:	YES	NO				
13	Inspection; sputum; hands; face; thorax														
		1	2	3	3	4	5	6	Where:	YES	NO				
14	Palpation: trachea; thorax; (expansion; apex; vocal fremitus)														
		1	2	3	3	4	5	6	Where:	YES	NO				

	TOPIC	UNNECESSARY			USEFUL			ESSENTIAL			SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE			
		1	2	3	1	2	3	1	2	3			3	4		5	6	Where:
		1	2	3	1	2	3	1	2	3	3	4	5	6				
15	Percussion	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
16	Auscultation	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
17	Lung functions	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
	MAMMAE																	
18	Inspection; palpation; evaluation of lumps													Where:	YES	NO		
		1	2	3	1	2	3	1	2	3	3	4	5					6
	DIGESTIVE SYSTEM																	
19	HISTORY	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
20	Appropriate history: pain; weight loss; nausea and vomiting; diarrhoea; etc.	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
21	Examination: inspection; palpation; percussion; auscultation	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
22	General: mass; skin; hands; nails; face; mouth; neck; chest													Where:	YES	NO		
		1	2	3	1	2	3	1	2	3	3	4	5					6
23	Abdomen; inspection; palpation; percussion; auscultation (techniques)													Where:	YES	NO		
		1	2	3	1	2	3	1	2	3	3	4	5					6
24	Hernias: examination	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
25	Rectal examination													Where:	YES	NO		
		1	2	3	1	2	3	1	2	3	3	4	5					6
26	Proctoscopy and sigmoidoscopy													Where:	YES	NO		
		1	2	3	1	2	3	1	2	3	3	4	5					6
27	Urine: examination Dipsticks and microscopy													Where:	YES	NO		
		1	2	3	1	2	3	1	2	3	3	4	5					6
28	Abdominal X-rays	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
	GENITO-URINARY SYSTEM																	
29	History: urinary obstruction; incontinence; menstruation													Where:	YES	NO		
		1	2	3	1	2	3	1	2	3	3	4	5					6
30	Examination: General appearance; limbs; face; neck; chest; abdomen; pelvis													Where:	YES	NO		
		1	2	3	1	2	3	1	2	3	3	4	5					6
31	Prostate: examination	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
32	Male genitalia	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
33	Urethral catheterisation	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	
34	Female genitalia and vaginal examination	1	2	3	1	2	3	1	2	3	3	4	5	6	Where:	YES	NO	

	TOPIC	UNNECESSARY			USEFUL			ESSENTIAL			SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE
		1	2	3	3	4	5	6	3	4			5	6	
		1	2	3	3	4	5	6							
35	Vaginal speculum examination														
		1	2	3	3	4	5	6	Where:		YES	NO			
OBSTETRICS															
36	Ante- and postnatal visit	1	2	3	3	4	5	6	Where:		YES	NO			
37	Examination of pregnant abdomen	1	2	3	3	4	5	6	Where:		YES	NO			
38	Vaginal delivery														
		1	2	3	3	4	5	6	Where:		YES	NO			
39	Episiotomy														
		1	2	3	3	4	5	6	Where:		YES	NO			
40	Breastfeeding	1	2	3	3	4	5	6	Where:		YES	NO			
HAEMATOLOGICAL SYSTEM															
41	History: anaemia; fatigue; dizziness	1	2	3	3	4	5	6	Where:		YES	NO			
42	Examination: general appearance; hands and limbs; lymphatic glands; abdomen														
		1	2	3	3	4	5	6	Where:		YES	NO			
43	Haemoglobin test														
		1	2	3	3	4	5	6	Where:		YES	NO			
44	Blood group and Rh determination	1	2	3	3	4	5	6	Where:		YES	NO			
45	Blood slide	1	2	3	3	4	5	6	Where:		YES	NO			
46	Bone marrow puncture														
		1	2	3	3	4	5	6	Where:		YES	NO			
ENDOCRINOLOGICAL SYSTEM															
47	History: change in weight; bowel habits; sweating; hair distribution; energy; skin pigmentation; potency; menstruation; urine														
		1	2	3	3	4	5	6	Where:		YES	NO			
THYROID															
48	Examination for hyper-hypothyroidism; nodules	1	2	3	3	4	5	6	Where:		YES	NO			
49	Observation; palpation; auscultation	1	2	3	3	4	5	6	Where:		YES	NO			
PITUITARY GLAND															
50	Examination for hypofunction or Acromegaly	1	2	3	3	4	5	6	Where:		YES	NO			
ADRENAL GLANDS															
51	Examination for Cushing's; Addison's	1	2	3	3	4	5	6	Where		YES	NO			
52	PARATHYROIDS	1	2	3	3	4	5	6	Where:		YES	NO			

	TOPIC	UNNECESSARY			USEFUL			ESSENTIAL			SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	
		1	2	3	1	2	3	1	2	3			3	4		5
53	SYNDROMES WITH SHORT STATURE: Turner, Down's, Rickets												Where:			
		1	2	3	3	4	5	6						YES	NO	
54	DIABETES Examination for complications												Where:			
		1	2	3	3	4	5	6						YES	NO	
	NERVOUS SYSTEM															
55	Neurological history: headache; facial pain; syncope; dizziness; visual disturbance; ataxia; sensation fall out and weakness of limbs; tremors; and involuntary movements															
		1	2	3	3	4	5	6					Where:	YES	NO	
	NEUROLOGICAL EXAMINATION															
56	General signs; level of consciousness; neck stiffness; higher centres and speech															
		1	2	3	3	4	5	6					Where:	YES	NO	
57	Parietal, temporal, frontal and occipital lobe function.															
		1	2	3	3	4	5	6					Where:	YES	NO	
58	Cranial nerves															
		1	2	3	3	4	5	6					Where:	YES	NO	
59	Limbs and body; general; motor- and sensory system; reflexes; proprioception; etc.															
		1	2	3	3	4	5	6					Where:	YES	NO	
60	Lumbar puncture															
		1	2	3	3	4	5	6					Where:	YES	NO	
	NEUROSURGERY															
61	Evaluation comatose patient and Glasgow scale															
		1	2	3	3	4	5	6					Where:	YES	NO	
62	Craniotomy	1	2	3	3	4	5	6						YES	NO	
	SKIN															
63	Benign and malignant lesions	1	2	3	3	4	5	6					Where:	YES	NO	
64	Ulcers; sinuses and fistulae	1	2	3	3	4	5	6					Where:	YES	NO	
65	Suturing techniques	1	2	3	3	4	5	6					Where:	YES	NO	
	SUBCUTANEOUS TISSUES															
66	Benign and malignant lesions; sebaceous cysts; dermoid cysts; ganglions; bursa; etc.	1	2	3	3	4	5	6						YES	NO	
	MUSCLES															
67	Examination	1	2	3	3	4	5	6					Where:	YES	NO	
	TENDONS AND TENDON SHEATHS															

	TOPIC	UNNECESSARY			USEFUL			ESSENTIAL			SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	
		1	2	3	1	2	3	1	2	3			3	4		5
68	Examination for disruption/ruptures															
		1	2	3	3	4	5	6								
		1	2	3	3	4	5	6								
	BONE															
69	Examination for abnormalities															
		1	2	3	3	4	5	6								
	JOINTS															
70	Examination of individual joints, e.g. hip, knee, shoulder, ankle, wrist															
		1	2	3	3	4	5	6								
	HANDS															
71	Examine: musculoskeletal; circulation; nerves - motor and sensory															
		1	2	3	3	4	5	6								
	FEET															
72	Deformities															
		1	2	3	3	4	5	6								
	RHEUMATOLOGICAL SYSTEM															
73	History: joint pains and swelling; back pain; limb pain; dry eyes and mouth; red eyes; systemic symptoms															
		1	2	3	3	4	5	6								
74	Examination: Observation - deformities; muscle atrophy; palpation; movement of joints; measurement															
		1	2	3	3	4	5	6								
	ENT															
75	History															
		1	2	3	3	4	5	6								
76	Ear examination															
		1	2	3	3	4	5	6								
77	Nose and throat examination															
		1	2	3	3	4	5	6								
78	Cryothyroidotomy															
		1	2	3	3	4	5	6								
	OPHTHALMOLOGY															
79	History															
		1	2	3	3	4	5	6								
80	Examination: Snellen chart; Amsler chart, confrontation eye fields; red reflex, pupil reactions															
		1	2	3	3	4	5	6								
81	Ophthalmoscopy															
		1	2	3	3	4	5	6								

	TOPIC	UNNECESSARY			USEFUL			ESSENTIAL			SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE				
		1	2	3	1	2	3	1	2	3			3	4		5	6	YES	NO
		1	2	3	3	4	5	6	Where:	YES			NO						
82	Eye pressure (Schiotz tonometer)																		
	ANAESTHESIA																		
83	CPR																		
84	Intubation																		
85	Cricothyroidotomy																		
86	Defibrillation/ dysrhythmias																		
87	Infusions per cannula intravenously																		
88	Central lines: placing																		
89	Spinal injection simulator- spinals; epidurals; sacral block.																		
	PAEDIATRICS																		
90	History taking																		
91	Technique of examination and systemic examination																		
92	Neonatal examination																		
93	Neurological examination																		
94	Intubation																		
95	Placement of IV lines (scalp veins; peripheral; tibia; umbilical)																		
96	Arterial puncture																		
97	Under water drain (thoracic/ paediatric)																		
	EMERGENCY CARE																		
98	Primary evaluation and resuscitation of the trauma patient																		
99	Secondary evaluation - trauma patient																		

	TOPIC	UNNECESSARY	USEFUL	ESSENTIAL	SEMESTER				COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE			
					1	2	3	3		4	5		6	YES	NO
100	Use of the trauma board and splints														
		1	2	3	3	4	5	6	Where:	YES	NO				
101	Wound care and dressings and bandages									YES	NO				
102	Extrication equipment: use														
		1	2	3	3	4	5	6	Where:	YES	NO				
103	Shock														
		1	2	3	3	4	5	6	Where:	YES	NO				
104	Fracture and dislocations														
		1	2	3	3	4	5	6	Where:	YES	NO				
105	Thoracic injuries and under water drain														
		1	2	3	3	4	5	6	Where:	YES	NO				
	ADDITIONAL TOPICS														

4.4 THE QUESTIONNAIRE SURVEY.

4.4.1 Demographics of the respondents who participated in the questionnaire survey

The questionnaire survey (see Table 4.3.2/1) was completed by the heads of the relevant clinical disciplines and in some instances heads of divisions within disciplines. The researcher visited each of the respondents personally, explained to them the motivation for, as well as the structure of the questionnaire. An introductory letter (see Appendix B), a printout of the programme structure of the medical school of the University of the Free State (first six semesters) (see Appendix C), as well as the questionnaires were then handed to them. The disciplines involved were Surgery, Internal Medicine, Paediatrics, Obstetrics and Gynaecology, Family Medicine, Otorhinolaryngology, Radiology, Cardiology, Anaesthetics, Orthopaedics, Dermatology, Ophthalmology, Urology, Plastic Surgery, Gastro-enterology, Pulmonology, Neurology, and Rheumatology. In Paediatrics and Anaesthetics each, two respondents participated. The response rate was 100% as all the questionnaires were completed.

4.4.2 Results of the questionnaire survey

There were 20 questionnaires and respondents. The majority of the respondents of the main disciplines, namely Surgery, Internal Medicine, Paediatrics, and Obstetrics and Gynaecology answered all the questions, while the respondents of the other

disciplines only completed the questions related to their own disciplines such as Radiology, Urology, Anaesthetics, Plastic Surgery, ENT, Rheumatology, Dermatology and Ophthalmology.

The Department of Biostatistics processed the results (see Table 4.4.2/1) thereafter and the final questionnaire for the Delphi survey was compiled. The topics which were included were those that had 10 or more votes as essential (cf. Table 4.4.2/1; shaded in green), as well as those topics indicated by the specific discipline to be essential, even though there were not 10 votes for this topic (cf. Table 4.4.2/1; shaded with vertical lines). Proctoscopy is such an example, as seven participants indicated it as unnecessary and only four indicated it as essential, including the department of Urology. Therefore it was included in the Delphi survey.

Regarding the fourth groups of columns where the respondents had to indicate during which semester they preferred to teach each topic, many indicated more than one semester. In some instances they indicated all the semesters, so that when the results were processed, the semesters were grouped as follows (see Table 4.4.2/1): semesters 3 and 4, 4 and 5, 3, 4, 5, 6, 5 and 6, 3 to 6, and 4 to 6.

The number of votes for each item is indicated in the third group of columns where another column was added for those respondents who had not voted for the specific topic. The same applies to the last two columns where an additional column was also added for those who did not give an indication of the lecturer.

Table 4.4.2/1: Analysis of the questionnaire survey.

	TOPIC	NOT MARKED	UNNECESSARY	USEFUL	ESSENTIAL	SEMESTERS										LECTURER	DISCIPLINE	
						3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6	NONE		YES	NO
	GENERAL APPROACH																	
1	History taking of all systems	6	1	0	13	1	0	5	1	1	2	0	1	1	0	6	4	
	CARDIOVASCULAR SYSTEM																	
2	General principles of the physical examination of the healthy patient :Appearance Body mass index (BMI), Anthropometry, vital signs; facies; hair; nails; etc.																	
		7	2	0	11	1	0	2	2	1	1	0	1	1	0	4	5	
3	Pulses and blood pressure																	
		7	1	0	12	1	0	3	3	0	1	0	0	2	0	1	12	
4	Cardiovascular system: Appropriate history; pulses; blood pressure; carotid arteries; jugular venous pressure																	
		7	1	0	12	1	0	1	5	0	1	1	0	1	0	4	5	
5	Precordium: inspection; palpation; percussion; auscultation																	
		7	2	0	11	1	0	1	5	0	1	1	0	0		3	5	
6	Abnormal heart sounds and murmurs																	
		7	5	0	8	0	0	1	1	0	2	3	0	0	0	4	2	
7	Chest X-rays: Cardiac and lung conditions																	
		6	1	0	13	0	0	2	3	0	2	1	1	0	0	4	6	
8	ECG																	
		7	1	0	12	1	1	1	3	1	1	0	0	1	0	3	3	
9	Clinical evaluation of arterial circulation of a limb																	
		6	1	0	13	0	0	2	4	1	2	0	1	1	0	4	5	
10	Clinical evaluation of the venous circulation of the lower limb																	
		7	1	0	12	0	0	2	4	1	2	0	1	0	0	4	5	

	TOPIC	NOT MARKED	UNNECESSARY	USEFUL	ESSENTIAL	SEMESTERS										LECTURER DISCIPLINE		
						3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6	NONE	YES	NO	
11	Examination of the lymphatic system	6	1	2	11	0	0	1	3	0	2	1	0	1	0	4	4	
RESPIRATORY SYSTEM																		
12	History																	
		8	0	0	12	1	0	2	1	4	1	1	0	0	0	6	3	
13	Inspection; sputum; hands; face; thorax																	
		8	2	0	10	1	0	3	1	2	1	0	0	0	0	1	3	
14	Palpation: trachea; thorax; (expansion; apex; vocal fremitus)																	
		8	2	0	10	1	0	2	1	3	1	0	0	0	0	4	3	
15	Percussion	8	2	0	10	0	0	2	0	4	1	1	0	0	0	4	3	
16	Auscultation	8	2	0	10	1	0	2	0	4	1	0	0	0	0	5	2	
17	Lung functions	8	3	2	7	0	0	0	1	1	3	0	0	0	0	1	3	
MAMMAE																		
18	Inspection; palpation; evaluation of lumps														0	4	3	
		9	1	0	10	0	0	1	1	1	3	0	1	0				
DIGESTIVE SYSTEM																		
19	History	7	0	0	13	1	0	1	2	4	2	1	0	0	0	6	4	
20	Appropriate history: pain; weight loss; nausea and vomiting; diarrhoea; etc.	8	1	0	11	1	0	1	1	4	1	1	0	0	0	4	4	
21	Examination: inspection; palpation; percussion; auscultation	8	2	0	10	0	0	1	1	3	2	0	1	0	0	4	3	
22	General: Mass; skin; hands; nails; face; mouth; neck; chest	8	1	0	11	1	0	2	1	1	4	0	0	0	0	3	5	
23	Abdomen; Inspection; palpation; percussion; auscultation (techniques)																	
		8	1	0	11	1	0	1	1	3	3	0	0	0	0	5	3	
24	Hernias: examination	8	4	0	8	0	0	1	0	1	3	0	1	0	0	3	2	
25	Rectal examination	8	2	0	10	0	0	0	1	2	6	1	0	0	0	4	3	
26	Proctoscopy and sigmoidoscopy																	
		8	7	1	4	0	0	0	0	0	1	0	0	0	0	1	1	
27	Urine: examination Dipsticks and microscopy	7	0	0	13	1	0	1	4	1	2	0	0	1	0	4	5	
28	Abdominal X-rays	6	3	3	8	0	0	0	0	2	6	0	1	0	0	3	2	
GENITO-URINARY SYSTEM																		
29	History: Urinary obstruction; incontinence; menstruation	8	0	0	12	0	0	1	2	2	2	1	0	1	0	2	5	

	TOPIC	NOT MARKED	UNNECESSARY	USEFUL	ESSENTIAL	SEMESTERS										LECTURER DISCIPLINE			
						1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6	NONE	YES
	Examination: General appearance; limbs; face; neck; chest; abdomen; pelvis	9	2	0	9	0	0	1	1	1	2	1	0	0	0	2	3		
30																			
31	Prostate: examination	9	2	0	9	0	0	0	2	1	3	1	0	0	0	4	2		
32	Male genitalia (photos)	8	3	0	9	0	0	1	2	1	2	1	0	0	0	2	4		
33	Urethral catheterisation	9	2	0	9	0	0	0	2	2	2	1	0	0	0	2	4		
34	Female genitalia and vaginal examination (+photos)	9	1	0	10	0	0	1	2	1	2	2	0	0	0	2	4		
35	Vaginal speculum examination	9	2	0	9	0	0	0	1	3	2	1	0	0	0	3	3		
OBSTETRICS																			
36	Ante- and post natal visit	11	2	0	7	0	0	1	0	1	2	1	0	0	0	4	1		
37	Examination of pregnant abdomen	11	2	0	7	0	0	0	1	0	3	1	0	0	0	3	2		
38	Vaginal deliveries	11	1	0	8	0	0	0	0	1	3	1	0	0	0	4	2		
39	Episiotomy	11	2	0	7	0	0	0	0	1	2	1	0	0	0	3	2		
40	Breastfeeding	11	1	0	8	0	0	0	1	0	3	0	1	0	0	1	5		
HAEMATOLOGICAL SYSTEM																			
41	History: anaemia; fatigue; dizziness	8	0	0	12	1	0	0	5	1	2	0	0	1	0	3	6		
42	Examination: general appearance; hands and limbs; lymphatic glands; abdomen	8	1	0	11	1	0	1	5	0	1	1	0	0	0	3	5		
43	Haemoglobin test	8	0	0	12	1	0	1	6	0	1	0	0	1	0	1	8		
44	Blood group and Rh determination	8	3	1	8	0	0	2	3	0	1	0	0	0	0	2	4		
45	Blood slide	8	3	2	7	1	0	1	3	0	0	0	0	0	0	2	4		
46	Bone marrow puncture (video)	8	6	1	5	0	0	0	1	1	0	1	0	0	0	1	2		
ENDOCRINOLOGICAL SYSTEM																			
47	History: change in weight; bowel habits; sweating; hair distribution; energy; skin pigmentation; potency; menstruation; urine.	8	1	0	11	1	0	1	1	5	1	1	0	0	0	4	4		
THYROID																			
48	Examination for hyper- hypothyroidism, nodules	9	2	0	9	0	0	1	1	3	2	1	0	0	0	3	2		

	TOPIC	NOT MARKED	UNNECESSARY	USEFUL	ESSENTIAL	SEMESTERS										LECTURER DISCIPLINE		
						1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6	NONE
49	Observation; palpation; auscultation	11	2	0	7	0	0	1	1	1	2	0	1	0	0	1	2	
	PITUITARY GLAND																	
50	Examination for hypo-function and Acromegaly																	
		9	4	1	6	0	0	0	0	3	1	0	1	0	0	1	2	
	ADRENAL GLANDS																	
51	Examination for Cushing's; Addison's																	
		9	4	0	7	0	0	0	0	3	2	0	1	0	0	2	2	
	PARATHYROIDS																	
52	Examination for hypo- and hyperfunction	9	5	1	5	0	0	1	0	1	2	0	0	0	0	1	1	
53	SYNDROMES WITH SHORT STATURE: Turner, Down's, Rickets	9	5	1	5	0	0	1	0	0	3	0	0	0	0	2	0	
	DIABETES																	
54	Examination for complications	9	5	0	6	0	0	0	0	2	3	0	0	0	0	2	1	
	NERVOUS SYSTEM																	
55	Neurological history: headache; facial pain; syncope; dizziness; visual disturbance; ataxia; sensation fall out and weakness of limbs; tremors and involuntary movements																	
		9	2	0	9	1	0	0	0	1	6	0	0	0	0	5	1	
	NEUROLOGICAL EXAMINATION																	
56	General signs; level of consciousness; neck stiffness; higher centres and speech																	
		8	2	0	10	0	0	1	0	0	8	0	0	0	0	4	2	
57	Parietal, temporal, frontal and occipital lobe function.																	
		8	2	1	9	1	0	1	0	0	5	0	0	0	0	3	2	
58	Cranial nerves																	
		8	2	0	10	1	0	2	1	0	4	0	0	0	0	4	2	
59	Limbs and body; general; motor- and sensory system; reflexes; proprioception; etc.																	
		8	1	0	11	1	0	2	1	0	4	1	0	0	0	6	1	
60	Lumbar puncture																	
		9	2	0	9	0	0	0	0	0	6	1	0	0	0	6	1	
61	NEUROSURGERY Evaluation of the comatose patient and Glasgow coma scale																	
		11	2	0	7	0	0	0	0	1	4	0	1	0	0	4	0	

	TOPIC	NOT MARKED	UNNECESSARY	USEFUL	ESSENTIAL	SEMESTERS										NONE	LECTURER DISCIPLINE	
						1	2	3	3+4	4+5	3	4	5	6	5+6		3,4,5,6,	4,5,6
62	Craniotomy	11	6	1	2	0	0	0	0	0	1	0	0	0	0	0	1	0
	SKIN																	
63	Benign and malignant lesions	8	5	0	7	0	0	0	2	0	3	0	0	1	0	2	1	
64	Ulcers; sinuses and fistulae	9	4	2	5	0	0	1	1	0	2	0	0	0	0	3	0	
65	Suturing techniques	9	2	1	8	1	0	1	2	1	0	0	0	0	0	3	2	
	SUBCUTANEOUS TISSUES																	
66	Benign and malignant lesions; sebaceous cysts; dermoid cysts; ganglions; bursa; etc.	10	6	0	4	0	0	0	2	0	1	0	0	0	0	1	1	
	MUSCULO-SKELETAL SYSTEM																	
	MUSCLES																	
67	Examination	9	0	0	11	0	0	5	0	1	2	0	1	1	0	6	2	
	TENDONS AND TENDON SHEATHS																	
68	Examination for disruption/ruptures	11	4	0	5	0	0	3	0	0	0	0	0	0	0	1	1	
	BONE																	
69	Examination for abnormalities	11	5	0	4	0	0	3	0	0	0	0	0	0	0	2	0	
	JOINTS																	
70	Examination of individual joints, e.g. hip, knee, shoulder, ankle, wrist	9	0	0	11	0	0	5	2	0	1	1	1	0	0	5	3	
	HANDS																	
71	Examine: musculoskeletal; circulation; nerves - motor and sensory	9	0	0	11	0	0	5	2	0	1	1	1	0	0	2	4	
	FEET																	
72	Deformities	10	3	0	7	0	0	3	1	0	1	1	0	0	0	1	2	
	RHEUMATOLOGICAL SYSTEM																	
73	History: Joint pains and swelling; back pain; limb pain; dry eyes and mouth; red eyes; systemic symptoms	8	2	0	10	1	0	4	0	1	2	0	0	1	0	5	1	
74	Examination: Observation - deformities; muscle atrophy; palpation; movement of joints; measurement	8	2	0	10	1	0	3	0	1	2	0	0	1	0	4	1	
	ENT																	
75	History	11	0	0	9	0	0	1	1	4	1	0	1	0	0	4	3	

	TOPIC	NOT MARKED	UNNECESSARY	USEFUL	ESSENTIAL	SEMESTERS										LECTURER DISCIPLINE		
						1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6	NONE
76	Ear examination	11	0	0	9	0	0	1	1	4	1	0	1	0	0	4	3	
77	Nose and throat examination	10	0	0	10	0	0	1	1	4	2	0	1	0	0	4	3	
78	Crycothyroidotomy	11	1	2	6	0	0	0	0	2	3	0	0	0	0	2	0	
OPHTHALMOLOGY																		
79	History	11	1	0	8	0	0	2	1	1	2	0	1	0	0	3	3	
80	Examination: Snellen chart	11	1	0	8	1	0	2	1	1	2	0	0	0	0	3	3	
81	Ophthalmoscopy	9	0	0	11	0	0	1	0	2	6	0	1	0	0	4	3	
82	Eye pressure (Schiotz tonometer)	10	5	1	4	0	0	0	0	2	1	0	0	0	0	2	0	
ANAESTHESIA																		
83	CPR	11	3	0	6	1	0	0	0	2	3	0	0	0	0	4	1	
84	Intubation	11	1	0	8	0	1	0	0	2	4	0	1	0	0	5	1	
85	Crycothyroidotomy	11	4	2	3	0	1	0	0	2	0	0	0	0	0	2	0	
86	Defibrillation/dysrhythmias	11	4	0	5	0	0	0	1	3	0	0	1	0	0	2	2	
87	Infusions per cannula intravenously	11	0	0	9	0	0	3	4	1	0	0	1	0	0	3	5	
88	Central lines: placing	11	2	3	4	0	0	0	1	1	2	0	0	0	0	2	1	
89	Spinal injection simulator-spinals; epidurals; sacral block	11	3	1	5	1	0	0	1	0	0	0	0	0	0	1	1	
PEDIATRICS																		
90	History-taking	12	0	0	8	1	0	3	0	0	5	0	0	0	0	4	1	
91	Technique of examination and systemic examination	12	0	0	8	1	0	1	0	0	4	0	0	0	0	5	0	
92	Neonatal examination	12	3	0	5	0	0	1	0	0	3	0	0	0	0	3	0	
93	Neurological examination	12	2	0	6	0	0	0	1	0	4	0	0	0	0	4	0	
94	Intubation	12	2	1	5	0	0	0	0	0	3	0	0	0	0	5	0	
95	Placement of IV lines (scalp veins; peripheral; tibia; umbilical)	12	3	0	5	0	0	0	0	1	2	0	0	0	0	2	1	
96	Arterial puncture	12	4	2	2	0	0	0	0	0	0	0	0	0	0	2	0	

	TOPIC	NOT MARKED	UNNECESSARY	USEFUL	ESSENTIAL	SEMESTERS										NONE	LECTURER DISCIPLINE	
						1	2	3	3+4	4+5	3	4	5	6	5+6		3,4,5,6,	4,5,6
97	Under water drain (paediatric)	12	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
EMERGENCY CARE																		
98	Primary evaluation and resuscitation of the trauma patient	11	3	0	6	0	0	0	4	3	1	0	0	0	0	0	2	2
99	Secondary evaluation - trauma patient	11	3	2	4	0	0	0	1	2	0	0	0	0	0	0	1	1
100	Use of the trauma board and splints	14	2	0	4	1	0	0	1	3	1	0	0	0	0	0	2	2
101	Wound care and dressings and bandages	14	1	1	7	0	0	1	3	0	2	0	0	0	0	0	1	3
102	Extraction equipment	10	2	3	5	0	0	0	0	2	2	0	0	0	0	0	3	0
103	Shock	10	1	0	9	0	0	0	2	2	3	0	1	0	0	0	4	2
104	Fractures and dislocations	11	4	0	5	0	0	0	0	2	2	0	0	0	0	0	1	2
105	Thoracic injuries and under water drain	12	3	0	5	0	0	0	0	2	2	0	0	0	0	0	1	2
	Topics which had 10 or more votes																	
	Topics identified by the specialist discipline				(cf. 4.4.2)													

Comment: When columns 3 to 6 are added up, their total must be 20, as this is the number of respondents. As can be seen, some of the respondents did not answer all the questions. The reason for this is twofold. First, all the respondents did not complete the whole questionnaire and only filled in the questions related to their own discipline. Second, when a respondent indicated that a specific question was unnecessary, the rest of the columns for this question were not completed.

In a decision made by the researcher and the biostatistician as to which topics should be included in the Delphi questionnaire, it was decided that all topics that had more than 10 votes (50%) as well as those which were indicated by the

specific discipline as essential - even though 50% had not been attained - should be included, as can be seen in Table 4.4.2/2.

Table 4.4.2/2: Questionnaire survey: Topics with no majority vote for the lecturer

No.	TOPIC
8	ECG
11	Examination of the lymphatic system
19	History: Gastro-Intestinal tract
26	Proctoscopy and sigmoidoscopy
51	Adrenal glands: Examination of Addison's and Cushing's diseases
52	Parathyroid: Examination for hyper- and hypo function
63	Benign tumours of the skin
68	Tendons: examination of rupture of tendons
79	Ophthalmology: History
80	Ophthalmology: Examination Snellen Chart
86	Defibrillation/dysrhythmias
89	Spinal and epidural injections
98	Trauma patient: Primary and secondary evaluation and resuscitation
99	Secondary evaluation of the trauma patient
100	Spine board and splints

Comments: In many of these topics the specialist of the specific discipline indicated that he would be the lecturer, even though the other respondents did not share the same opinion or did not fill in the column indicating who the lecturer should be. This was the case in the following topics: ECG; history of the gastro-intestinal tract; proctoscopy and sigmoidoscopy; examination for dysfunction of the adrenal glands and parathyroid glands; examination of rupture of tendons; ophthalmologic history and the Snellen chart; defibrillation/dysrhythmias; and spinal and epidural injections.

4.4.2.1 Additional topics suggested by the respondents participating in the questionnaire survey

The lecturers from the Department Internal Medicine suggested that the measurement of capillary blood glucose should be added, as well as bone marrow aspiration and biopsy.

The lecturers from the Department of Surgery suggested topics on anatomy to be demonstrated on cadaver dissections or on specimens in the anatomy museum. These topics should be demonstrated in a time slot of the skills laboratory.

The additional topics suggested by the respondent from the department of Surgery can be seen in Table 4.4.2.1/1.

Table 4.4.2.1/1: Additional topics with anatomical basis suggested by the lecturer from the Department of Surgery

Abdomen - abdominal wall and basic anatomical organs
Inguinal area - anatomy
Lower limb – especially the blood vessels.
Mammary glands – especially the lymphatic drainage
Neck – lymph glands, thyroid and parathyroid arteries and veins
Neurovascular bundle at the thoracic inlet
Upper limb – especially the blood vessels

These topics on Anatomy are not applicable to the skills laboratory, but may be demonstrated in the time slot of the skills laboratory and were not included in the Delphi questionnaire.

The lecturer from the Department of Dermatology suggested five additional topics which are listed in Table 4.4.2.1/2

Table 4.4.2.1/2: Additional topics suggested by the lecturer from the Department of Dermatology

No.	TOPIC
57	Dermatological definitions
60	Dermatological skin biopsy techniques
61	Recognition of skin lesions
58	Wet smear microscopy
59	Wood's light

These topics on dermatology were all included in the Delphi questionnaire.

The respondent from the Radiology department suggested a topic on "Special radiological investigations". This topic was not included in the Delphi questionnaire. Two topics recommended by the lecturer from the Ear, Nose and Throat (ENT) Department, namely hearing tests with the tuning fork and indirect laryngoscopy, were not included in the Delphi questionnaire due to an oversight by the researcher.

The lecturer from the Department of Ophthalmology suggested four additional topics which are listed in Table 4.4.2.1/3

Table 4.4.2.1/3: Additional topics suggested by the lecturer from the Department of Ophthalmology

No.	TOPIC
76	Amsler chart Confrontation eye fields Test for the red reflex Pupil reactions

Comments: These topics are all relevant skills used for a systematic examination of the eye. All the above topics were included in the questionnaire for the Delphi survey in the same group as the Snellen chart used for vision testing. The respondent from the department of Ophthalmology also suggested the "Pinhole vision test." For an unknown reason, the computer did not register it and it was not included in the Delphi questionnaire. This topic was however included in the final framework (cf. Table 6.4.1/2).

4.4.2.2 Semesters in which the specific topic should be taught as recommended by the respondents of the questionnaire survey

The respondents had to choose between semesters three to six, as these are the semesters allocated to the skills laboratory at the Free State School of Medicine (cf. Table 4.4.2/1). Many indicated more than one semester. Some indicated all four

semesters; others indicated that the topics should be taught in the clinical phase of the curriculum, which is from semesters seven to 10. There was a big variation in choices for the semesters (see comments p. 129). All the results are presented in Table 4.4.2.2/1.

Table 4.4.2.2/1: Choice of semesters when a specific topic should be taught as indicated by five or more of the 20 respondents. (cf. Table 4.4.2/1)

TOPIC NUMBER AND TOPIC	SEMESTER	COMMENTS OF THE RESPONDENTS
1. The taking of a history	3	
4 and 5. The cardiovascular system history and physical examination, excluding the auscultation of the abnormal heart sounds and murmurs (Phase III of the curriculum)	4	The cardiologist indicated semester 5 for the abnormal heart sounds. This respondent also indicated that they preferred semester 3 for the rest of the cardiovascular history and examination and they would repeat cardiology in the clinical years. Internal medicine: Normal examination in the skills laboratory and the abnormal in wards and clinics. Semesters 5 and 6 were preferred for most of these topics.
25. The rectal examination	6	Urology: Semester 7 and 8 in the skills laboratory.
28. Abdominal X rays	6	Radiology Dept. indicated Neutral on the Likert scale.

Continuation of Table 4.4.2/1

TOPIC NUMBER AND TOPIC	SEMESTER	COMMENTS OF THE RESPONDENTS
41. The haematological history and examination; haemoglobin determination	4	Internal medicine: Add infections and bleeding tendencies to the topic. Normal in skills laboratory – abnormal in wards and clinics. Preferred semesters 4 to 6.
47. The endocrine system – history	5	Internal medicine: semesters 5 and 6.
56. Neurological history and examination	6	Neurology indicated semester 6
60. Lumbar puncture	6	Neurology indicated semester 6
67. Musculo-skeletal system examination	3	Orthopaedics: indicated semesters 3 to 6 in both skills laboratory and clinics. Rheumatology: semester 3 in skills laboratory and wards. Use of videos.
70. Joints: examination	3	Orthopaedics: indicated semesters 3 to 6 in both skills laboratory and clinics.
71. Hands: examination – musculoskeletal, circulation, motor and sensory	3	Orthopaedics: indicated semesters 3 to 6 in both skills laboratory and clinics.
81. Ophthalmoscopy	6	Ophthalmology: indicated semester 5 in the skills laboratory.
90. Paediatric history	6	Paediatrics: Suggested the addition of child development, child nutrition, and obstetric history.

Comments: The explanation why the figure five was used to indicate semesters was that there were so many different choices that the highest number of votes for a

specific semester or group of semesters was five or six. Five votes and more per topic were chosen to highlight them.

4.4.2.3 Topics eliminated by the respondents of the questionnaire survey

Some of the topics which were initially suggested by the researcher were eliminated by the respondents of the questionnaire survey. Several of these topics were again recommended by the Delphi panel and reintroduced in the Delphi questionnaire as indicated in Table 4.4.2.3/1. The topics reintroduced by the Delphi panel are shown Table 4.4.2.4/1.

Table: 4.4.2.3/1: Topics not included in the Delphi questionnaire and the comments by the specific discipline.

No.	THE TOPIC	COMMENTS BY THE SPECIFIC DISCIPLINE
6	Abnormal heart sounds	The cardiologist and four other respondents preferred to discuss this topic in the ward during semester 5 and the clinical years.
17	Lung functions tests;	Should be taught in the lung function laboratory.
25	Examination of hernias;	Preferred to do the examination in the department of Surgery.
36	Antenatal and postnatal examination;	Should be taught in outpatients and maternity wards.

Continuation of Table 4.4.2.3/1

No.	THE TOPIC	COMMENTS BY THE SPECIFIC DISCIPLINE
37	Examination of the pregnant abdomen	Essential – prefer to teach this topic in the antenatal clinic.
38	Vaginal deliveries	Essential – preferred to teach this topic in the obstetric ward.
40	Breastfeeding	Clinical years in clinics and rotation in the maternity ward. One of the respondents noted that it could be taught during teaching of Integrated management of childhood illness (IMCI).
44	Blood grouping and Rh determination	Unnecessary for the skills laboratory.
50	Pituitary gland – examination for hypo-function and acromegaly	To be taught in the clinic.
51	Adrenal glands – examination for Cushing’s and Addison’s	To be taught in the clinic. Use of slides.
54	Diabetes Mellitus – examination for complications	To be taught in the outpatient department and at the bedside.
61	Evaluation of the comatose patient (Glasgow coma scale)	Should be taught in the clinical years as part of Emergency Medicine.
62	Craniotomy	Not applicable to skills unit. Clinical years.

Continuation of Table 4.4.2.3/1

No.	THE TOPIC	COMMENTS BY THE SPECIFIC DISCIPLINE
66	Subcutaneous tissues diseases	To be taught in the clinical years in the clinics and at bedsides.
96	Paediatric – arterial puncture	To be taught in the clinical years at the bedside.
97	Paediatric – intercostal drain	To be taught in the clinical years at the bedside.
102	Emergency care Extrication equipment	In semester four at the ambulance college.
104	Emergency care Fractures and Dislocations	To be taught in the clinical years – on patients.
105	Emergency care. Thoracic injuries and drains.	To be taught in the clinical years – on patients.

Comments: A number of these topics eliminated by the questionnaire survey were again reintroduced by the Delphi panel when they had the opportunity to make suggestions for additional topics. A possible explanation why the respondents from the questionnaire survey eliminated these topics is that they were not aware of the facilities in a skills unit and preferred to do the training at the bedside or in clinics. It should be emphasised that the skills laboratory only does the initial training, which has to be followed up with teaching on patients in the clinical environment. The skills laboratory does not replace the training of skills on patients.

4.4.2.4 Topics eliminated by the questionnaire survey but again introduced by the Delphi experts

The results of the questionnaire survey were used to compile the questionnaire for the Delphi study (see Table 4.5.3/1). The questions eliminated by the respondents of the questionnaire survey were excluded from the Delphi questionnaire. After the first round the Delphi experts suggested additional topics and some of these coincided with those that had fallen out in the questionnaire survey. The Delphi panel did not know which topics had been excluded by the respondents of the questionnaire survey. These topics are displayed in Table 4.4.2.4/1.

Table 4.4.2.4/1: Topics reintroduced by the Delphi panel as well as the comments made by the panel of the questionnaire survey

No.	TOPIC	COMMENTS BY PANEL OF THE QUESTIONNAIRE SURVEY
36	Antenatal examination	Theory to be taught in the skills unit, but the practical in a clinic.
37	Examining of the pregnant Abdomen	In the antenatal clinic.
38	Normal vaginal delivery	In the obstetric ward.
65	Basic suturing techniques	To be taught in the trauma unit.
105	Tension pneumothorax	To be taught in the trauma unit.

These topics are well suited for teaching in a skills unit on models such as a model of a pregnant abdomen and a pelvis with doll (as baby) for demonstration of the mechanics of the labour process, are available for tuition. Some skills can also be

easily improvised, for example skin suturing. The high prevalence of HIV/AIDS in our population increases the probability of needle stick injuries and infection with HIV, therefore it is important that students are initially taught in a skills unit to handle instruments in a safe way before they have to work on patients.

4.4.2.5 Comments of the respondents about their own fields

The comments of the respondents about their own fields and indicating if they preferred to teach the topics themselves will also be dealt with. These topics are displayed in Table 4.4.2.5/1.

Table 4.4.2.5/1: Comments of respondents on topics related to their own speciality

TOPIC NUMBER AND TOPIC	COMMENTS OF THE RESPONDENTS	LEC-TURER
2. Cardiovascular system	Normal in skills laboratory and abnormal in clinics and wards. Semesters 3 to 6.	Sp
12. Respiratory system	Normal in skills laboratory and abnormal in clinics and wards. Semesters 5 and 6.	Sp
19. Gastro-intestinal system	Normal in skills laboratory and abnormal in clinics and wards. Semesters 5 and 6.	Sp
27. Urine tests	Normal and abnormal in skills laboratory. Semester 6. Videos can be used.	Sp
29. Genitourinary system	Phase III. In Division of Nephrology. Dept. of Urology: Urethral catheterisation in semester 6.	Sp Sk

Continuation of Table 4.4.2.5/1

TOPIC NUMBER AND TOPIC	COMMENTS OF THE RESPONDENTS	LEC-TURER
36. Obstetrics	Dept. of O and G: semester 6. Theory in skills laboratory. Practical in wards and clinics. Episiotomy: semester 6 in skills laboratory – video.	Sp Sk
47. Endocrinological system	Internal Medicine: semester 6. Normal in skills laboratory and abnormal in wards and clinics. Use slides.	Sp
55. Nervous system	Dept. of Neurology. Semester 6. In skills laboratory.	Sp
67. Musculoskeletal	Dept. of Orthopaedics. Semesters 3 to 6. In the skills laboratory and clinics.	Sp
73. Rheumatologic system	Division of Rheumatology. Semester 6. In skills laboratory and wards. Use videos.	Sp
75. Ear, Nose and Throat	Dept. of ENT. Semester 5. Skills laboratory. Cricothyroidotomy in dissection venue.	Sp
79. Ophthalmology	Dept. of Ophthalmology. Semester 5.	Sp
83. Anaesthetics	Dept. Anaesthesia. CPR and intubation. Semester 3. Skills laboratory. CPR and defibrillation. Semester 6 and phase III in skills laboratory and Anaesthetic Dept. Central lines and spinals phase III, in theatre.	Sp
90. Paediatrics	Dept. of Paediatrics. Semester 6. Neonatal examination: In skills laboratory and wards. To be repeated in phase III. Intercostal chest drain and arterial puncture in phase III.	Sp
98. Emergency Medicine	Dept. of Family Medicine: Semester 5. In skills laboratory. Extrication – video and ambulance college. Wound care	Sp Sk

(Legend: Sp = specialist; Sk = skills unit lecturer)

Comments: These comments were incorporated in the Delphi questionnaire where applicable. The semesters 3 to 6 and the venue for the skills training were not incorporated in the Delphi questionnaire. The semesters 3 to 6 were replaced by a 10- point scale. The venue was not mentioned in the Delphi questionnaire, as the questionnaire only applied to skills to be taught in the skills laboratory and not in another venue.

4.4.3 Questionnaire survey: The semesters indicated when the topic should be presented

There was a large variation in the semesters indicated for different topics. In only a few instances a majority indicated a specific semester (cf. Table 4.4.2/1). Some chose all four semesters, while others chose pairs such as 3 and 4 or 4 and 5; 5 and 6; or 4, 5 and 6. The physicians and surgeons preferred to repeat the whole physical examination in the sixth semester. Twelve topics had a majority vote for semester 6. These 12 topics are:

Table 4.4.3/1: Topics in the questionnaire survey indicated for semester 6.

No.	TOPIC
26	Rectal examination
29	Abdominal X-Rays
47	Endocrinological history
55	History of the Nervous System

Continuation of Table 4.4.3/1

No.	TOPIC
57	Examination of the Nervous System
58	The Cranial nerves
61	Lumbar puncture
62	Evaluation of the comatose patient and Glasgow scale
81	Ophthalmoscopy
90	Paediatric History
92	Neonatal examination
94	Paediatric neurological examination
94	Paediatric intubation

The topics indicated for the sixth semester by the panel of the questionnaire survey are all topics which need a thorough knowledge of anatomy and physiology. This information is emphasised by Bradley and Postlethwaite (2003:8) (cf. 2.6.1; 2.8.1), who stated that the skills curriculum should run side by side with the clinical topics.

4.4.4 Questionnaire survey: Comments on the choice of the lecturer

When analysing the main topics such as the respiratory, the cardiovascular and the gastro-intestinal systems, 15 respondents indicated the specialist discipline as the lecturer, while only in three instances the skills unit staff were identified as the lecturer (cf. Table 4.4.2/1).

When the individual topics are analysed, then the majority prefer that the specialist disciplines teach them in the skills laboratory. 57 topics were indicated for the

specialist disciplines and 30 for the staff of the skills unit (cf. Table 4.4.2/1; Fig. 4.4.4/1).

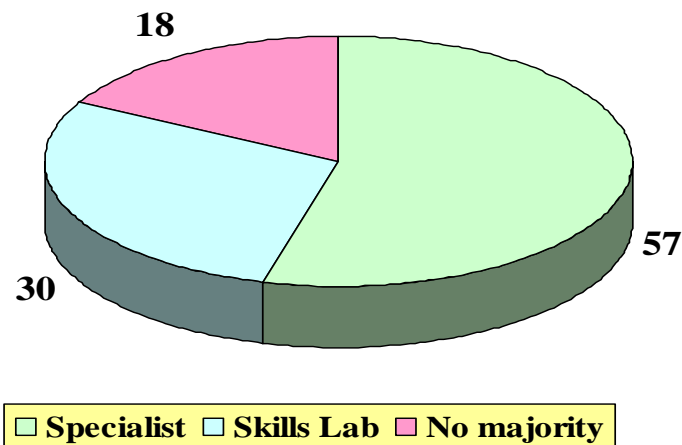


Figure 4.4.4/1: Questionnaire survey: Choice of lecturer

As indicated in the Figure 4.4.4/1, the specialist disciplines preferred to present the majority of the topics (54,3%) in the skills laboratory. 30 (28,6%) topics were indicated to be presented by the skills unit staff and 18 topics could be presented by either of the two groups.

4.4.4.1 Questionnaire survey: The topics with no majority vote to specify the lecturer

Some topics did not get a majority vote for the choice of the lecturer. These topics are listed in Table 4.4.4.1/1.

Table 4.4.4.1/1: Questionnaire survey: Topics with no majority vote for the lecturer.

No.	TOPIC
9	ECG
12	Examination of the lymphatic system
19	History: Gastro-intestinal tract
26	Proctoscopy and sigmoidoscopy
49	Parathyroid: Examination for hypo- and hyperfunction
61	Benign tumours of the skin
64	Tendons: Examination of rupture of tendons
75	Ophthalmology: History
76	Ophthalmology: Examination Snellen Chart
81	Defibrillation/dysrhythmias
84	Spinal and epidural injections
95	Trauma patient: Primary and secondary evaluation and resuscitation
97	Spine board and splints

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oratory lecturers, although some of the choices of lecturers are difficult to clarify, because a number of these topics are specialist topics, such as, spinal and epidural injections; the physical examination of the function of adrenal and parathyroid glands; rupture of tendons; as well as proctoscopy and sigmoidoscopy.

4.4.5 General comments and recommendations by respondents of the questionnaire survey.

The respondents from the Departments of Surgery and Internal Medicine made the majority of the recommendations while the respondent of the Department of Family Medicine also made valuable recommendations. These recommendations are of practical importance and should be considered in the curriculum for the skills laboratory.

4.4.5.1 *Recommendations from the respondent of the Department of Surgery.*

The recommendations made by the respondent from the Department of Surgery are summarised in Table 4.4.5.1/1

Table 4.4.5.1/1: Recommendations made by respondents from the Surgical Department

Recommendations by the respondents from Surgery
Regarding pre-knowledge required from students, students should have a sound knowledge of basic physiology, anatomy and pathology before they can be taught clinical examination skills and procedures.
The clinical skills unit should be freely accessible to disciplines to use at their own convenience.

Continuation of Table 4.4.5.1/1

Recommendations by the respondents from Surgery
There should be facilities to make appointments when disciplines want to use the skills laboratory.
Students should be able to make appointments at the skills laboratory to do revision by using CDs and videos and practise on the models and manikins.
The skills laboratory should be open from 08:00 until 17:00
Departments should arrange their own assessments at a time and date that suit them.
Physical examinations of an intimate nature in wards should be done only from the 7 th semester.
The acquiring of skills should be a continuous process and students should be exposed to the skills throughout the curriculum.
Groups of students who have time off during skills laboratory time should be engaged in the anatomy museum or dissection hall to do revision.
At the end of semester 6 a skills block is recommended for the students when the physical examination skills on patients can be revised and sharpened so that when they come into contact with patients in semester 7, they will be well prepared.

Comments: These comments relate mostly to the logistical organisation of the programme in the skills laboratory and could not be incorporated in the Delphi questionnaire. These comments will later be addressed in Chapter 6.

4.4.5.2 Recommendations made by the respondents from the Department of Internal Medicine

Recommendations from the respondents from the Department of Internal Medicine is summarised in Table 4.4.5.2/1.

Table 4.4.5.2/1: Recommendations made by respondents from the Department of Internal Medicine

Recommendations by the respondents from Internal Medicine
Taking of the history of the different systems should be included in the questionnaire.
Models should be used for the rectal and vaginal examination.
The examination of the urine, the use of dipsticks, as well as microscopical examination can be taught in the skills laboratory (normal as well as abnormal) by using a video presentation.
Slides and visual material can be used in many of the sessions.
Students should be gradually introduced to the examination of the male and the female genitalia by using photos and the Prader orchidometer. Eventually, when introduced to patients, not more than three students should be allowed per patient.
Bone marrow aspiration/biopsy should be demonstrated by using a video of the procedure. When discussing this procedure, the blood and bone marrow results must be integrated.

Continuation of Table 4.4.5.2/1

Recommendations by the respondents from Internal Medicine
The blood slide examination should be done in the haematology laboratory. This should not be done in isolation – the patient, the blood slide and the bone marrow should be integrated.
Ophthalmoscopy should be taught in the same modules as neurology, diabetes and hypertension.
The examination of normal anatomy and physiology should be done in the skills laboratory, while the abnormal anatomy should be taught in the wards and outpatient departments.
Lung function technique should be taught in the lung function laboratory.
When doing the respiratory examination, the students should not only have a pre-knowledge of anatomy and pathology, but they should have knowledge of normal radiology of the chest too.
The rheumatologic examination should be done in the wards and in the outpatient department and not in the skills laboratory. This applies to both the normal and the abnormal examinations.
At the end of semester 6 the complete clinical examination should be repeated – including side-room tests and diagnostic tests.

4.4.5.3 Recommendations made by the respondent from the Department of Family Medicine

The recommendations made by the respondent from the Department of Family Medicine are shown in Table 4.4.5.3/1.

Table 4.4.5.3/1: Recommendations made by the respondent from the Department of Family Medicine

Recommendations by the Respondent from Family Medicine	Concluding remarks on the questionnaire survey
The obstetric clinical examination should be taught in the clinical years – from semester 7.	
Skins lesions and tumours of the subcutaneous tissues should be demonstrated with slides.	
Some skills such as vaginal and rectal examinations, lumbar puncture, CPR, intravenous infusions, and intubation with an endotracheal tube and thoracic injuries with underwater drain should only be demonstrated and practised in the skills laboratory only if models or manikins are available.	
The following skills should be demonstrated and practised at the bedside or in clinics: the examination of hernias, the examination of the nervous system, the examination of bone for deformities and the measurement of ocular pressure.	
The endocrinological physical examinations should be done either by video demonstration in the skills laboratory or otherwise in a clinic or at the bedside of a patient.	

ey:

These recommendations were not included in the final questionnaire for the Delphi technique, but will be included in the final discussion in chapter 6. With the information from the questionnaire survey, the questionnaire for the Delphi technique (see Table 4.5.3/1) was compiled.

4.5 THE DELPHI TECHNIQUE – FINDINGS OF THE STUDY

4.5.1 The questionnaire for the Delphi technique

The questionnaire for the Delphi technique was compiled from the results and recommendations of the questionnaire survey. The additional topics as suggested by the respondents of the questionnaire survey were added (cf. 4.4.2.1) and some topics that did not have the support of at least 10 respondents or at least the support of the head of a specific department, were left out (cf. comments after Table 4.4.2/1). The topics not included are indicated in Table 4.4.2.3/1. The researcher used a template in the Excel programme of Microsoft Office, which was used to compile the questionnaire for the questionnaire survey to develop the questionnaire for the Delphi research study.

4.5.2 Demographic information of the participants of the Delphi technique and the questionnaire (cf. 3.6)

Seven persons agreed to participate in the Delphi technique. Five of the participants in the Delphi technique were heads of skills laboratories at different universities in South Africa. One was head of the department of Internal Medicine and in the process of developing a skills laboratory. The seventh member of the panel was a clinician with an interest in the skills unit and with a Master's degree in medical education (cf 3.6.1).

4.5.3 The results of the first round of the Delphi technique

All seven participants completed the questionnaire. The results were processed by the researcher by adding and marking all the choices of the participants. Each topic which had six (80%) or more votes were identified and it was concluded that consensus had been reached. The cut off point for consensus was 80% (Larson & Wissman 2000:45). These results were marked in green on the questionnaire sheet (cf. Table 4.5.3/1). The same applied to the choice of the ideal time in the curriculum and the choice of lecturer.

Owing to the widespread indications obtained for the ideal semester (1-10), it was decided to divide the semesters into three groups, namely one to three, four to seven, and eight to 10. When any of these groups obtained six or more votes, a consensus of at least 80% was reached and this period was then also marked in green. The same 80% consensus principle was applied to the choice of lecturers. Where six and more votes were recorded, consensus was determined and the "Yes" or "No" area was also coloured in green.

The results of the first round of the Delphi technique are indicated in Table 4.5.3/1.

Table 4.5.3/1: Results of the first round of the Delphi technique

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
	GENERAL APPROACH																	
1	Taking a history	Consensus Essential round 1			Consensus										III	III		
				3	1	2	3							YES	NO			
	CARDIOVASCULAR SYSTEM																	
2	Cardiovascular system: appropriate history	Consensus Essential round 1			I		III	III						III	IIII			
				3	1	2	3							YES	NO			
3	General principles of the physical examination of the healthy patient :appearance (BMI, Anthropometry);	Consensus Essential round 1			Consensus									II	IIII			
				3	1	2	3							YES	NO			
4	Vital signs; facies; hair; nails; gait	Consensus Essential round 1			Consensus									II	IIII			
				3	1	2	3							YES	NO			
5	Pulses and blood pressure	Consensus Essential round 1			Consensus									II	IIII			
				3	1	2	3							YES	NO			
6	Jugular venous pressure		II	IIII			II	III			I			Consensus				
			1	2	3	1	2	3	4	5	6	7	8	9	10		NO	
7	Praecordium: inspection; palpation; percussion; auscultation	Consensus Essential round 1					IIII	II						II	IIII			
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		
8	Chest X-rays: cardiac and lung conditions		II	I	IIII		II	I			I	I	I	IIII	II			
			1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
9	ECG			II	IIII			I	I	III			I	I	IIII	II		
			1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
10	Clinical evaluation of the arterial circulation of a limb		II		IIII		I	I	II				I	I	III	IIII		
			1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
11	Clinical evaluation of the venous circulation of the lower limb		II		IIII		I		II	I			I	I	IIII	III		
			1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE	LECTURER: SPECIFIC DISCIPLINE	COMMENTS									
		II	III	III				1	2	3	4	5	6	7	8	9
12	Examination of the lymphatic system	II	III	III	I I I I I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
RESPIRATORY SYSTEM																
13	History	Consensus Essential round 1			I III II I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
14	Inspection; sputum; hands; face; thorax	Consensus Essential round 1			I III II I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
15	Palpation: trachea; thorax; (expansion; apex; vocal fremitus)	Consensus Essential round 1			I III II I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
16	Percussion	Consensus Essential round 1			I II III I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
17	Auscultation	Consensus Essential round 1			I II III I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
MAMMAE																
18	Inspection; palpation; evaluation of lumps	Consensus Essential round 1			I II I I I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
DIGESTIVE SYSTEM																
19	History	Consensus Essential round 1			I III II I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
20	Appropriate history: pain; weight loss; nausea and vomiting; diarrhoea; etc.	Consensus Essential round 1			I III II I	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
21	Examination: inspection; palpation; percussion; auscultation	Consensus Essential round 1			I II II II	II IIII										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
22	General: mass; skin; hands; nails; face; mouth; neck; chest	Consensus Essential round 1			I I III II	III III										
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
23	Abdomen; inspection; palpation; percussion; auscultation (techniques)	Consensus Essential round 1						III	II	I							II	IIII
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		
24	Hernias: examination	II	I	IIII					I	I		I	I			Consensus		
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES			
25	Rectal examination	II	I	IIII				I	I	II		II		I		IIII	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
26	Proctoscopy and sigmoidoscopy	II	II	III				I	I		I		II	I		III	II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
27	Urine examination: Dipsticks and microscopy	Consensus Essential round 1						I	IIII	II							II	III
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		
28	Abdominal X-rays	I	II	IIII				I		I		I	I	I		III	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
GENITO-URINARY SYSTEM																		
29	History: urinary obstruction; incontinence; menstruation	Consensus Essential round 1							III	II	I						III	III
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		
30	Examination: General appearance; limbs; face; neck; chest; abdomen; pelvis; secondary sexual characteristics- male and female (photos)	Consensus Essential round 1						I	I		II	II		I		IIII	II	
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		
31	Orchidometer	III	II	II				I		II		I	I		Consensus			
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES			
32	Prostate: examination	II		IIII				II		II		I	I		Consensus			
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES			
33	Male genitalia (photos)	I	I	IIII				II	II	II		I			IIII	II		
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
34	Urethral catheterisation	Consensus Essential round 1						I	III	I	I			I		I	III	
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE	LECTURER: SPECIFIC DISCIPLINE		COMMENTS									
		1	2	3		1	2		3	4	5	6	7	8	9	10	YES
35	Female genitalia and vaginal examination (photos)	II	IIII				II	I	II	I	I				III	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
36	Vaginal speculum examination	Consensus Essential round 1						II	I	III	I		I		III	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
37	Pap smear	Consensus Essential round 1							I		III	I		I	III	II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
38	Insertion of intra uterine device (IUD)	I	III	III					II		I		I	I	Consensus		
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES		
OBSTETRICS																	
39	Episiotomy	II	I	IIII	CONSENSUS										Consensus		
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES		
HAEMATOLOGICAL SYSTEM																	
40	History: anaemia; fatigue; dizziness	Consensus Essential round 1						I	II	II	II				III	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
41	Examination: general appearance; hands and limbs; lymphatic glands; abdomen	Consensus Essential round 1						I	I	II	I				I	II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
42	Haemoglobin test	Consensus Essential round 1						I	II	II	I	I			II	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
43	Blood slide		III	III				III	III	I				III	II		
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
44	Bone marrow puncture (video)	III	III	I				I		III		I		Consensus			
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES		
ENDOCRINOLOGICAL SYSTEM																	
45	History: change in weight; bowel habits; sweating; hair distribution; skin pigmentation; potency; menstruation; urine	Consensus Essential round 1						I	II	I	II		I		III	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
DIABETES																	
46	History	Consensus Essential round 1						II	I	II		II			II	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
47	Capillary blood glucose test	Consensus Essential round 1						III	II	I		I					II	III
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		
	THYROID																	
48	Examination for hyper-hypothyroidism; nodules	III		III			I		I	I		I				I	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
	PARATHYROIDS																	
49	Examination for hyper- and hypofunction	II	III	II					I	I	II		I	I		III	II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
50	SYNDROMES WITH SHORT STATURE: Turner; Down's; Rickets	II	III	II				I	I	II		I		I		II	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
	THE NERVOUS SYSTEM																	
51	Neurological history: headache; facial pain; syncope; dizziness; visual disturbance; ataxia; sensation fall out and weakness of limbs; tremors and involuntary movements	Consensus Essential round 1						II	II		I	I		I		Consensus		
				3	1	2	3	4	5	6	7	8	9	10	YES			
	NEUROLOGICAL EXAMINATION																	
52	General signs; level of consciousness; neck stiffness; higher centres and speech	Consensus Essential round 1						I	II	I	I	II				III	III	
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		
53	Parietal, temporal, frontal and occipital lobe function	II	I	IIII				I	I	I	I		I		Consensus			
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES			
54	Cranial nerves	Consensus Essential round 1						I	II	II	I	I				II	IIII	
				3	1	2	3	4	5	6	7	8	9	10	YES	NO		
55	Limbs and body; general; motor and sensory system; reflexes; proprioception; etc.	Consensus Essential round 1						I	I	I	I	I		I		Consensus		
				3	1	2	3	4	5	6	7	8	9	10		NO		
56	Lumbar puncture	I	II	IIII					I	III		II	I		III	III		
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE	LECTURER: SPECIFIC DISCIPLINE	COMMENTS						
		1	2	3									
THE SKIN													
57	Dermatological definitions	II	I	IIII	CONSENSUS	Consensus							
		1	2	3	4	5	6	7	8	9	10	YES	
58	Wet slide microscopy	II	IIII	I	I	II	I					II	III
		1	2	3	4	5	6	7	8	9	10	YES	NO
59	Wood's lights	IIII	IIII		I		II	I	I			IIII	II
		1	2	3	4	5	6	7	8	9	10	YES	NO
60	Biopsy techniques	IIII	I	II	I							IIII	II
		1	2	3	4	5	6	7	8	9	10	YES	NO
61	Benign and malignant lesions	IIII		IIII	I	I		I	I	I		Consensus	
		1	2	3	4	5	6	7	8	9	10	YES	
62	Ulcers; sinuses and fistulae	II	I	III	Consensus				I			Consensus	
		1	2	3	4	5	6	7	8	9	10	YES	
MUSCULO-SKELETAL SYSTEM													
MUSCLES													
63	Examination	Consensus	Essential	round 1	I	I	II	III				IIII	III
		1	2	3	4	5	6	7	8	9	10	YES	NO
TENDONS AND TENDON SHEATHS													
64	Examination for disruption/ruptures	II	II	III	Consensus							IIII	II
		1	2	3	4	5	6	7	8	9	10	YES	NO
BONE													
65	Examination for abnormalities	I	I	IIII	Consensus							IIII	II
		1	2	3	4	5	6	7	8	9	10	YES	NO
JOINTS													
66	Examination of individual joints, e.g. hip, knee, shoulder, ankle, wrist	Consensus	Essential	round 1	Consensus							IIII	II
		1	2	3	4	5	6	7	8	9	10	YES	NO
HANDS													
67	Examine: musculoskeletal; circulation; nerves - motor and sensory	I	I	IIII	I	I	II	II				IIII	
		1	2	3	4	5	6	7	8	9	10	YES	NO
68	FEET Deformities	I	I	IIII	I		II	II		I		IIII	I
		1	2	3	4	5	6	7	8	9	10	YES	NO

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
	RHEUMATOLOGICAL SYSTEM																
69	History: joint pains and swelling; back pain; limb pain; dry eyes and mouth; red eyes; systemic symptoms		II	IIII			II		IIII	I							Consensus YES
70	Examination: observation - deformities; muscle atrophy; palpation; movement of joints; measurement		II	IIII			I	I	II	II							IIII YES NO
EAR-, NOSE- AND THROAT																	
71	History	Consensus Essential round 1					II	I	III								III II YES NO
72	Ear examination	Consensus Essential round 1					III	I	III								III II YES NO
73	Nose and throat examination	Consensus Essential round 1					III	I	III								III II YES NO
74	Cryothyroidotomy	I	IIII	I				I	I		I	I	I				Consensus YES
OPHTHALMOLOGY																	
75	History	Consensus Essential round 1					I	II	I	I	I	I					III III YES NO
76	Examination: Snellen chart; Amsler chart, confrontation eye fields; red reflex; pupil reactions	Consensus Essential round 1					II	I	IIII	I	I						III III YES NO
77	Ophthalmoscopy	Consensus Essential round 1					II		II	I	I						IIII III YES NO
78	Ocular pressure (Schiotz tonometer)	Consensus Essential round 1							I	I	I	III	I				IIII III YES NO

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE	LECTURER: SPECIFIC DISCIPLINE		COMMENTS
79	CPR	Consensus Essential round 1			I II I I I I	III II		
			3		1 2 3 4 5 6 7 8 9 10	YES NO		
80	Intubation	Consensus Essential round 1			I II I I I I	III III		
			3		1 2 3 4 5 6 7 8 9 10	YES NO		
81	Defibrillation/ dysrhythmias	Consensus Essential round 1			I II I II I	III II		
			3		1 2 3 4 5 6 7 8 9 10	YES NO		
82	Infusions/cannula intravenously	Consensus Essential round 1			II I III I	Consensus NO		
			3		1 2 3 4 5 6 7 8 9 10	YES NO		
83	Central lines: placing	Consensus Essential round 1			Consensus	III II		
			3		8 9 10	YES NO		
84	Spinal injection simulator - spinals; epidurals; sacral block	III II II			I I I II I	Consensus		
		1 2 3			1 2 3 4 5 6 7 8 9 10	YES		
85	Ring block of fingers	I I III			I I II I II	Consensus		
		1 2 3			1 2 3 4 5 6 7 8 9 10	YES		
PAEDIATRICS								
86	History - taking	Consensus Essential round 1			II II I II	III II		
			3		1 2 3 4 5 6 7 8 9 10	YES NO		
87	Technique of examination and systemic examination	Consensus Essential round 1			II II I II	Consensus		
			3		1 2 3 4 5 6 7 8 9 10	YES		
88	Neonatal examination	Consensus Essential round 1			Consensus rnd 1	Consensus		
			3		4 5 6 7	YES		
89	Neurological examination	Consensus Essential round 1			Consensus rnd 1	Consensus		
			3		4 5 6 7	YES		
90	Child development	Consensus Essential round 1			Consensus rnd 1	Consensus		
			3		4 5 6 7	YES		
91	Intubation	Consensus Essential round 1			I I I III I	III II		
			3		1 2 3 4 5 6 7 8 9 10	YES NO		

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO		
92	Placement of IV lines (scalp veins; peripheral; tibia; umbilical)	Consensus Essential round 1		3				II				I	III		I	III	II	
93	Arterial puncture		II	IIII				I				I	I	II	II	IIII	II	
94	Under water drain		II	IIII				I				I		III	I	III	III	
EMERGENCY CARE																		
95	Primary evaluation and resuscitation of the trauma patient	Consensus Essential round 1		3				I	II	II		I			I	IIII	II	
96	Secondary evaluation - trauma patient	Consensus Essential round 1		3				CONSENSUS							III	II		
97	Use of the trauma board (spine board) and splints	Consensus Essential round 1		3				II	I	III						Consensus		
98	Wound care and dressings and bandages		I	IIII				II	II	III						Consensus		
99	Shock	Consensus Essential round 1		3				CONSENSUS							III	II		
1 st round Consensus ≥ 80%																		

These results of the first round of the Delphi technique were used for the second round. The additional topics recommended by the Delphi panel were also included (see Table 4.5.4.2/1).

SUMMARY:

i) In the first round 58 out of 99 (58.6%) topics achieved 80% consensus as “essential” to be taught in a skills laboratory (see Figure 4.53/1).

ii) The panel reached consensus on the time frame where topics should be taught for 17 topics after the first round, namely 4 in the first third, 11 in the middle third and two in the last third of the curriculum (see Figure 4.5.3.1/1).

iii) The panel reached consensus on the lecturer for 21 topics (cf. 4.5.3.2).

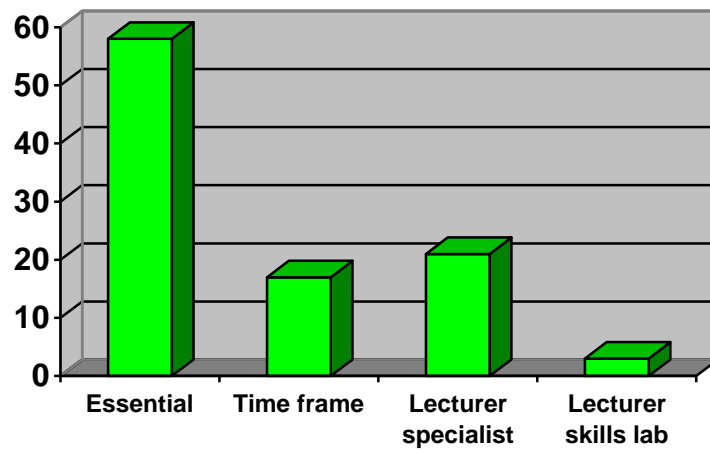


Figure: 4.5.3/1: Delphi first round: Consensus reached on the three main categories

The main groups of topics that reached consensus as essential in the first Delphi round are shown in Table 4.5.3/2.

Table 4.5.3/2: Analyses of consensus reached on the “Essential” category in the main topic groups

MAIN CATEGORIES OF TOPICS	Essential	Number of topics	Percentage
Cardiovascular system	5	11	45.5%
Respiratory system	5	5	100%
Digestive system	5	8	62.5%
Urogenital system	6	12	50%
Endocrine system	3	6	50%
Nervous system	4	6	66.7%
Haematological system	3	5	60%
Musculoskeletal	2	8	25%
Ear, nose and throat	3	4	75%
Ophthalmology	4	4	100%
Anaesthesia	5	7	71.4%
Paediatrics	7	9	77.8%
Emergency care	4	5	80%
Skin – no topics reached consensus	0	6	0

SUMMARY:

According to this analysis, the majority of the main groups reached more than 50% consensus as essential. There is no clear explanation why the topics in the cardiovascular category only attained 45,5% consensus. The reason why the

dermatological topics did not reach any consensus may be attributed to the fact that none of the panel members were dermatologists.

4.5.3.1 Topics for which consensus was reached on the time frame in the curriculum

The panel reached consensus on the time frame when topics should be taught for 17 topics after the first round ($17/99 = 17\%$). Four (24%) were in the first third of the curriculum, 11 (65%) in the middle third and two (12%) topics in the last third (cf. Figure 4.5.3.1/1).

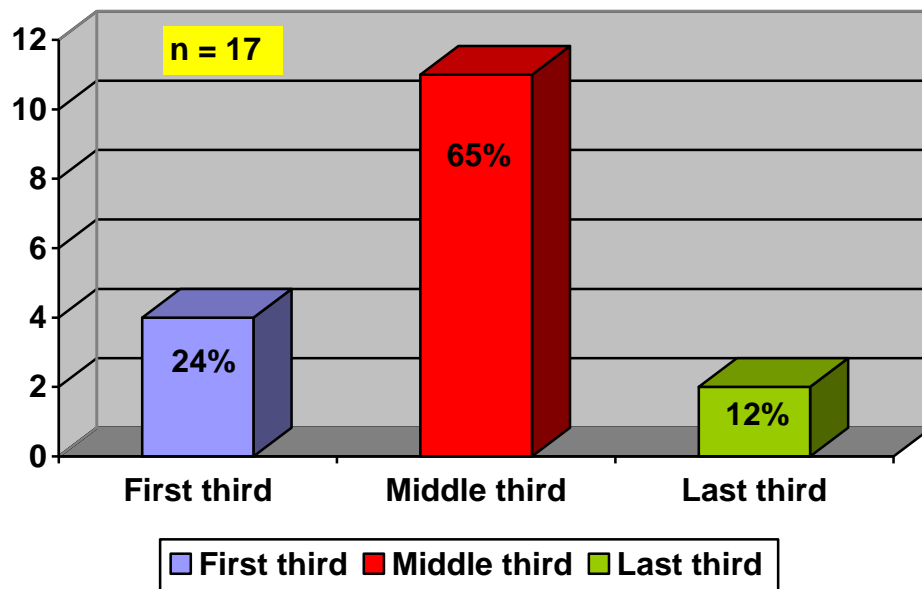


Figure 4.5.3.1/1: Delphi first round: Number of topics consensus was reached on the time frame

SUMMARY:

The time frame, after the first round, indicates that the middle part of the curriculum is more important for skills teaching than the rest of the curriculum. The four topics for the first third of the curriculum are the taking of the general history and the cardiovascular history, as well as the examination for vital signs and the different pulses.

4.5.3.2 Topics for which consensus was reached on the lecturer

For the person who had to teach the topics, 24 reached consensus (24/99 = 24%). In 21 cases (87.5%) the specialist disciplines were voted as the lecturers and the staff of the skills laboratory were indicated for only three topics (cf. Table 4.5.3/1).

4.5.3.3 Comments and recommendations made by the Delphi panel after the first round

Most of the comments were related to the last column in the questionnaire, namely the choice of the lecturer (see Table 4.5.3./1). It was emphasised that, if the staff of the skills laboratory did the teaching, they should be trained to teach the right protocols. Other comments were on topics which should be taught on manikins in the skills laboratory and, lastly, additional topics recommended by the panel. The comments will be discussed in the following paragraphs.

4.5.3.3.1 *Topics recommended by the panel to be taught by the skills laboratory personnel on condition that they first should be trained*

The training of skills laboratory personnel applies to the following topics: Taking a general history (no.1); appropriate history of the cardio-vascular system, as well as examination of the cardio-vascular system (numbers. 2 – 12); the digestive system; history of the genito-urinary system (numbers. 29, 35 – 37); haematological system (41-43); endocrine system (45, 46, 48); neurological examination (52,54,55); skin: wet slide microscopy (57, 58); musculoskeletal system: examination (63-67); ENT: examination (71-73); ophthalmology (75-77); paediatric history and intercostal drain (86,94).

4.5.3.3.2 *Topics recommended by the panel to be taught on patients rather than in the skills laboratory*

Some topics should be taught on patients, such as jugular venous pressure (6); examination of the venous circulation (11); abdominal physical examination (23); hernias, rectal examination, proctoscopy and sigmoidoscopy (24-26); insertion of IUD (38); episiotomy (39); endocrinological system: thyroid, syndromes with short stature (48-50); skin: Wood's light, biopsy techniques, benign and malignant lesions, ulcers and sinuses (59-62); rheumatologic system: history and examination (69, 70); paediatrics: neonatal and neurological examination (88, 89). These

comments were made by only two participants. The other five participants did not have any comments.

4.5.3.3.3: Topics recommended by the Delphi panel to be taught on manikins and repeated in the clinical years

The following procedures were recommended to be demonstrated and practised on manikins and repeated in the clinical years on patients: examination of the breasts (18); male and female genitalia (33, 35); urethral catheterisation (34); lumbar puncture (56); intubation (80); defibrillation (82); intravenous cannulation (82); placing central lines (83); arterial puncture (93); and examination of the pregnant abdomen (106). Emergency medicine: one of the respondents made the remark that students should learn this early in the curriculum and that they should recap on a regular basis (95-99).

These topics suggested by members of the panel to be taught on manikins are intimate physical examinations (examination of the breast and genitalia) and skills which may harm the patient if not correctly executed (placing of central lines and lumbar puncture).

4.5.3.3.4 Recommendations by the Delphi panel on diverse topics

The recommendations on diverse topics are listed in Table 4.5.3.3.4/1.

Table 4.5.3.3.4/1: Comments by the Delphi panel on diverse topics

NO.	TOPIC	COMMENTS
1	The taking of a general history	General communication skills should be included in this topic.
6	Blood pressure and pulses	Can be taught by registered nurses.
47	Capillary blood glucose test	Can be taught by registered nurses.
103	Naso-gastric intubation	Can be taught by registered nurses.
8	Chest X-rays	The normal X-ray should first be taught followed by common clinical conditions.
80	Intubation	Emergency as well as elective intubation should be taught.
79	Cardio-pulmonary resuscitation	Can be taught by paramedics.

Comments: The recommendations in Table 4.5.3.3.3/1 will again be addressed in Chapter 7. The topics mentioned which registered nurses can teach, should be kept in mind when organising the skills curriculum. The recommendation that the paramedics can teach cardio-pulmonary resuscitation should only apply to basic life support and not advanced life support. Advanced life support should be taught by emergency trained doctors or anaesthetists. Teaching the technique of X-ray interpretation makes more sense when common pathological conditions are included. The comment on intubation is significant, because usually only the

elective intubation is taught on manikins and the emergency and crash intubations are not included in the training.

After the first round the Delphi panel suggested additional topics which were added to the questionnaire for the second Delphi round. These topics are depicted in Table 4.5.3.3.4/2.

Table 4.5.3.3.4/2: Additional topics suggested by the Delphi panel after round one

COMMUNICATION	SKILLS IN THE WARD
The SOAP system as an approach to the consultation- and record keeping of patients.	Hand washing and gowning for theatre.
Breaking bad news.	Blood cultures
HIV test counselling.	Injections: Intramuscular and subcutaneous.
Language.	OBSTETRIC PROCEDURES
EMERGENCY PROCEDURES	Examination of the pregnant abdomen.
Heimlich manoeuvre.	Normal vaginal deliveries.
Tracheostomy.	Examination of the rape victim.

Continuation of Table 4.5.3.3.4/2

EMERGENCY PROCEDURES	ADMINISTRATIVE PROCEDURES
Tension pneumothorax.	Completion of the following charts:

Naso-gastric intubation.	Road to Health charts, ante-natal cards and progress of labour (Partogram).
Basic suturing techniques.	Certification of death and completion of the death certificate.
Splinting of fractures.	Visits to wards.
Pleural tap and pleural biopsy.	The Stock Exchange.
Ascites paracentesis.	

All these topics were included in round two of the Delphi technique. Some of these topics, namely basic suturing technique; splinting of fractures; examination of the pregnant abdomen; and the normal delivery were eliminated in the questionnaire survey but again reintroduced by the Delphi panel.

4.5.4 The second round of the Delphi technique

4.5.4.1 The questionnaire

The questionnaire for the second Delphi round was compiled by adding the additional topics recommended by the participants after the first round.

All the other previous topics were retained. Those topics which reached an 80% consensus were again included for the information of the participants. These topics were coloured in green to indicate to the participants that they did not have to mark these topics again. The votes of the previous round on the topics and the questions that did not achieve 80% consensus were also indicated on the

questionnaire so that the respondents could see what the choices of the previous round were. In this way they could make an informed decision if they wished to reconsider their choice of the first round (cf. Table 4.5.3/1). The participants who had returned the questionnaire by e-mail in the previous round were only sent an e-mail copy, while the others were e-mailed the questionnaire and a hard copy as well. A post-paid return envelope as well as an explanatory letter with the new information on the questionnaire (see Appendix G) was included with this questionnaire.

4.5.4.2 Results and findings of the second round.

Unfortunately one of the respondents withdrew from the Delphi due to acute illness. The Delphi process was continued with only six participants on the panel. Consensus between five of the six participants was now regarded as essential for consensus (actually 80%).

The results of the second round are summarised in Table 4.5.4.2/1 and consensus items indicated in blue.

Table 4.5.4.2/1: Second-round Delphi questionnaire and analysis

	TOPIC	INAPPROPRIATE	USEFUL	ESSENTIAL	WHERE IN THE COURSE										LECTURER SPECIFIC DISCIPLINE		
					1	2	3	1	2	3	4	5	6	7	8	9	10
GENERAL APPROACH																	
1	Taking a history	Consensus			Consensus										Consensus		
				3	1	2	3										NO
CARDIOVASCULAR SYSTEM																	
2	Cardiovascular system: appropriate history	Consensus			III III										I	IIII	
				3	1	2	3										YES NO
3	General principles of the physical examination of the healthy patient: appearance (BMI; Anthropometry)	Consensus			Consensus										Consensus		
				3	1	2	3										NO
4	Vital signs; facies; hair; nails; gait	Consensus			Consensus										Consensus		
				3	1	2	3										NO
5	Pulses and blood pressure	Consensus			Consensus										Consensus		
				3	1	2	3										NO
6	Jugular venous pressure	I III			II III										Consensus		
		1	2	3	1	2	3	4	5	6	7	8	9	10			NO
7	Praecordium: inspection; palpation; percussion; auscultation	Consensus			IIII I I										I	IIII	
				3	1	2	3	4	5	6	7	8	9	10	YES	NO	
8	Chest X-rays: cardiac and lung conditions	III			Consensus										IIII		
		1	2	3				4	5	6	7				YES	NO	
9	ECG	IIII													III I		
		1	2	3				4	5	6	7				YES	NO	
10	Clinical evaluation of the arterial circulation of a limb	Consensus			I III I										I	II	
				3	1	2	3	4	5	6	7	8	9	10	YES	NO	
11	Clinical evaluation of the venous circulation of the lower limb	Consensus			II I										I	II	
				3	1	2	3	4	5	6	7	8	9	10	YES	NO	
12	Examination of the lymphatic system	II III			I II I										II	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
RESPIRATORY SYSTEM																	
13	History	Consensus			IIII I I										Consensus		
				3	1	2	3	4	5	6	7	8	9	10			NO
	Examination:																

	TOPIC	INAPPROPRIATE	USEFUL	ESSENTIAL	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
14	Inspection; sputum; hands; face; thorax	Consensus			Consensus	Consensus
				3	1 2 3	NO
15	Palpation: trachea; thorax; (expansion; apex; vocal fremitus)	Consensus			Consensus	Consensus
				3	1 2 3	NO
16	Percussion	Consensus			Consensus	Consensus
				3	1 2 3	NO
17	Auscultation	Consensus			Consensus	Consensus
				3	1 2 3	NO
MAMMAE						
18	Inspection; palpation; evaluation of lumps	Consensus			Consensus	Consensus
				3	4 5 6 7	NO
DIGESTIVE SYSTEM						
19	History	Consensus			Consensus	Consensus
				3	1 2 3	NO
20	Appropriate history: pain; weight loss; nausea and vomiting; diarrhoea; etc.	Consensus			III II I	Consensus
				3	1 2 3 4 5 6 7 8 9 10	NO
21	Examination: inspection; palpation; percussion; auscultation	Consensus			III I I	Consensus
				3	1 2 3 4 5 6 7 8 9 10	NO
22	General: mass; skin; hands; nails; face; mouth; neck; chest	Consensus			Consensus	Consensus
				3	1 2 3	NO
23	Abdomen; inspection; palpation; percussion; auscultation (techniques)	Consensus			III II	Consensus
				3	1 2 3 4 5 6 7 8 9 10	NO
24	Hernias: examination	Consensus			Consensus	Consensus
				3	4 5 6 7	YES
25	Rectal examination	Consensus			II III	III II
				3	1 2 3 4 5 6 7 8 9 10	YES NO
26	Proctoscopy and sigmoidoscopy	III I			I I I II	Consensus
		1	2	3	1 2 3 4 5 6 7 8 9 10	YES
27	Urine examination: Dipsticks and microscopy	Consensus			III I I	Consensus
				3	1 2 3 4 5 6 7 8 9 10	NO
28	Abdominal X-rays	Consensus			Consensus	III I

	TOPIC	INAPPROPRIATE	USEFUL	ESSENTIAL	WHERE IN THE COURSE										LECTURER SPECIFIC DISCIPLINE		
					1	2	3	4	5	6	7	8	9	10	YES	NO	
				3				4	5	6	7					YES	NO
GENITO-URINARY SYSTEM																	
29	History: urinary obstruction; incontinence; menstruation	Consensus			III I II										II	III	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
30	Examination: general appearance; limbs; face; neck; chest; abdomen; pelvis; secondary sexual characteristics-male and female (photos)	Consensus			Consensus										III	II	
				3				4	5	6	7				YES	NO	
31	Orchidometer	II	III		I II I I										Consensus		
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES		
32	Prostate: examination	Consensus			I II I I										Consensus		
				3	1	2	3	4	5	6	7	8	9	10	YES		
33	Male genitalia (photos)	Consensus			Consensus										III	I	
				3				4	5	6	7				YES	NO	
34	Urethral catheterisation	Consensus			Consensus										Consensus		
				3				4	5	6	7					NO	
35	Female genitalia and vaginal examination (photos)	Consensus			Consensus										II	III	
				3				4	5	6	7				YES	NO	
36	Vaginal speculum examination	Consensus			Consensus										II	III	
				3				4	5	6	7				YES	NO	
37	Pap smear	Consensus			Consensus										II	III	
				3				4	5	6	7				YES	NO	
38	Insertion of IUD	I	III		I I I I										Consensus		
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES		
OBSTETRICS																	
39	Episiotomy	Consensus			Consensus										Consensus		
				3				4	5	6	7				YES		
HAEMATOLOGICAL SYSTEM																	
40	History: anaemia; fatigue; dizziness	Consensus			II III I										Consensus		
				3	1	2	3	4	5	6	7	8	9	10		NO	

	TOPIC	INAPPROPRIATE	USEFUL	ESSENTIAL	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
41	Examination: general appearance; hands and limbs; lymphatic glands; abdomen	Consensus			III I I	Consensus
				3	1 2 3 4 5 6 7 8 9 10	YES NO
42	Haemoglobin test	Consensus			Consensus	Consensus
				3	4 5 6 7	YES NO
43	Blood slide	II I		I	Consensus	III II
		1	2	3	4 5 6 7	YES NO
44	Bone marrow puncture (video)	II III		I II	I	Consensus
		1	2	3	1 2 3 4 5 6 7 8 9 10	YES
ENDOCRINOLOGICAL SYSTEM						
45	History: change in weight; bowel habits; sweating; hair distribution; skin pigmentation; potency; menstruation; urine	Consensus			Consensus	II III
				3	4 5 6 7	YES NO
DIABETES						
46	History	Consensus			Consensus	II III
				3	4 5 6 7	YES NO
47	Capillary blood glucose test	Consensus			Consensus	Consensus
				3	4 5 6 7	YES NO
THYROID						
48	Examination for hyper-hypothyroidism, nodules	Consensus			Consensus	Consensus
				3	4 5 6 7	YES NO
PARATHYROIDS						
49	Examination for hyper- and hypo-function	II III		I	III I	III I
		1	2	3	1 2 3 4 5 6 7 8 9 10	YES NO
50	SYNDROMES WITH SHORT STATURE: Turner; Down's; Rickets.	I III I		I	III I	III I
		1	2	3	1 2 3 4 5 6 7 8 9 10	YES NO
THE NERVOUS SYSTEM						
51	Neurological history: headache; facial pain; syncope; dizziness; visual disturbance; ataxia; sensation fall out and weakness of limbs; tremors and involuntary movements	Consensus			Consensus	Consensus
				3	4 5 6 7	YES

	TOPIC	INAPPROPRIATE	USEFUL	ESSENTIAL	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
52	Neurological examination: General signs; level of consciousness; neck stiffness; higher centres and speech	Consensus			II I III	Consensus
				3	1 2 3 4 5 6 7 8 9 10	NO
53	Parietal, temporal, frontal and occipital lobe function	III			Consensus	Consensus
		1	2	3	4 5 6 7	YES
54	Cranial nerves	Consensus			Consensus	I III
				3	4 5 6 7	YES NO
55	Limbs and body; general; motor- and sensory system; reflexes; proprioception; etc.	Consensus			Consensus	Consensus
				3	4 5 6 7	NO
56	Lumbar puncture	III			III I	III II
		1	2	3	1 2 3 4 5 6 7 8 9 10	YES NO
THE SKIN						
57	Dermatological definitions	I III			Consensus	Consensus
		1	2	3	4 5 6 7	YES
58	Wet slide microscopy	III I			Consensus	III I
		1	2	3	4 5 6 7	YES NO
59	Wood's lights	I III			II I	III
		1	2	3	1 2 3 4 5 6 7 8 9 10	YES NO
60	Biopsy techniques	II II II			Consensus	III
		1	2	3	8 9 10	YES NO
61	Benign and malignant lesions	Consensus			I I I I	Consensus
				3	1 2 3 4 5 6 7 8 9 10	YES
62	Ulcers; sinuses and fistulae	Consensus			Consensus	Consensus
				3	4 5 6 7	YES
MUSCULO-SKELETAL SYSTEM						
MUSCLES						
63	Examination	Consensus			Consensus	II III
				3	4 5 6 7	YES NO
TENDONS AND TENDON SHEATHS						
64	Examination for disruption/ ruptures	Consensus			Consensus	III
				3	4 5 6 7	YES NO
BONE						
65	Examination for abnormalities	Consensus			Consensus	III I
				3	4 5 6 7	YES NO

	TOPIC	INAPPROPRIATE			USEFUL			ESSENTIAL			WHERE IN THE COURSE										LECTURER SPECIFIC DISCIPLINE	
		1	2	3	1	2	3	1	2	3	1	2	3	4	5	6	7	8	9	10	III	II
66	JOINTS: Examination of individual joints, e.g. hip, knee, shoulder, ankle, wrist	Consensus			3			Consensus										III	II			
		3			4 5 6 7										YES	NO						
	HANDS	Consensus			3			Consensus										Consensus				
67	Examine: musculoskeletal; circulation; nerves - motor and sensory	Consensus			3			Consensus										YES				
	FEET	Consensus			3			Consensus										Consensus				
68	Deformities	Consensus			3			Consensus										YES				
	RHEUMATOLOGICAL SYSTEM	Consensus			3			Consensus										Consensus				
69	History: joint pains and swelling; back pain; limb pain; dry eyes and mouth; red eyes; systemic symptoms	Consensus			3			Consensus										YES				
70	Examination: observation - deformities; muscle atrophy; palpation; movement of joints; measurement	III			3			Consensus										Consensus				
		1	2	3	4 5 6 7										YES							
EAR-, NOSE- AND THROAT SYSTEM		Consensus			3			Consensus										Consensus				
71	History	Consensus			3			Consensus										YES				
72	Ear examination	Consensus			3			Consensus										III	II			
		3			4 5 6 7										YES	NO						
73	Nose and throat examination	Consensus			3			Consensus										III	I			
		3			4 5 6 7										YES	NO						
74	Cryothyroidotomy	II		III		3			I I II										Consensus			
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES							
OPHTHALMOLOGY		Consensus			3			Consensus										III I				
75	History	Consensus			3			Consensus										YES	NO			
		3			4 5 6 7																	
76	Examination: Snellen chart; Amsler chart, confrontation eye fields; red reflex, pupil reactions	Consensus			3			Consensus										III	II			
		3			4 5 6 7										YES	NO						
77	Ophthalmoscopy	Consensus			3			Consensus										III	II			
		3			4 5 6 7										YES	NO						
78	Ocular pressure (Schiotz tonometer)	Consensus			3			II I I II										III	II			
		1	2	3	4	5	6	7	8	9	10	YES	NO									

	TOPIC	INAPPROPRIATE	USEFUL	ESSENTIAL	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
ANAESTHESIA						
79	CPR	Consensus			II II I I	III II
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1 2 3 4 5 6 7 8 9 10	YES NO
80	Intubation	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	III II
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4 5 6 7	YES NO
81	Defibrillation/dysrhythmias	Consensus			I II II I	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1 2 3 4 5 6 7 8 9 10	YES
82	Infusions/cannula intravenously	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus NO
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4 5 6 7	NO
83	Central lines: placing	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	III I
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8 9 10	YES NO
84	Spinal injection simulator - spinals; epidurals; sacral block	II II I	Consensus			Consensus
		1 2 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8 9 10	
85	Ring block of fingers	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8 9 10	
PAEDIATRICS						
86	History taking	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4 5 6 7	
87	Technique of examination and systemic examination	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4 5 6 7	
88	Neonatal examination	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4 5 6 7	
89	Neurological examination	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4 5 6 7	
90	Child development	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4 5 6 7	
91	Intubation	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8 9 10	
92	Placement of IV lines (scalp veins; peripheral; tibia; umbilical)	Consensus			Consensus	
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	III II
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES NO
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8 9 10	
93	Arterial puncture	I II	Consensus			III I
		1 2 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Consensus
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES NO
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8 9 10	
94	Underwater drain	III			Consensus	
		1 2 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	II II
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	YES NO
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8 9 10	

	TOPIC	INAPPROPRIATE	USEFUL	ESSENTIAL	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE	
EMERGENCY CARE							
95	Primary evaluation and resuscitation of the trauma patient	Consensus			Consensus		III I
				3	4 5 6 7	YES NO	
96	Secondary evaluation - trauma patient	Consensus			Consensus		III I
				3	4 5 6 7	YES NO	
97	Use of the trauma board (spine board) and splints	Consensus			Consensus		Consensus
		1	2	3	4 5 6 7	YES	
98	Wound care and dressings and bandages	III			II I II		Consensus
		1	2	3	1 2 3 4 5 6 7 8 9 10	YES	
99	Shock	Consensus			CONSENSUS		Consensus
		1	2	3	4 5 6 7	YES	
ADDITIONAL TOPICS SUGGESTED BY PANEL MEMBERS							
100	TRACHEOSTOMY	Consensus			Consensus		Consensus
				3	8 9 10	YES	
101	HEIMLICH MANEUVRE	Consensus			I I III I		III II
				3	1 2 3 4 5 6 7 8 9 10	YES NO	
102	TENSION PNEUMOTHORAX	II III			I I I I		Consensus
		1	2	3	1 2 3 4 5 6 7 8 9 10	YES	
103	NASOGASTRIC INTUBATION	Consensus			Consensus		II III
				3	4 5 6 7	YES NO	
104	BASIC SUTURING TECHNIQUES	Consensus			Consensus		Consensus
				3	4 5 6 7	NO	
105	SPLINTING OF FRACTURES	Consensus			I I III I		III II
				3	1 2 3 4 5 6 7 8 9 10	YES NO	
106	EXAMINING OF THE PREGNANT ABDOMEN	Consensus			Consensus		Consensus
				3	4 5 6 7	YES	
107	NORMAL VAGINAL DELIVERY	Consensus			Consensus		III II
				3	4 5 6 7	YES NO	
108	EXAMINATION OF A RAPE VICTIM	Consensus			Consensus		Consensus
				3	8 9 10	YES	

	TOPIC	INAPPROPRIATE	USEFUL	ESSENTIAL	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
109	HAND WASHING AND GOWNING FOR THEATRE	Consensus			Consensus	II III YES NO
				3	4 5 6 7	
110	BLOOD CULTURE	I	I	III	II I I I	II III YES NO
		1	2	3	1 2 3 4 5 6 7 8 9 10	
111	INJECTIONS: INTRAMUSCULAR AND SUBCUTANEOUS	Consensus			II I II	Consensus YES NO
				3	1 2 3 4 5 6 7 8 9 10	
112	PLEURAL TAP	III		III	Consensus	II III YES NO
		1	2	3	8 9 10	
113	PLEURAL BIOPSY	I	III	II	Consensus	YES YES
		1	2	3	8 9 10	
114	ASCITIC FLUID TAP	III		III	Consensus	III I YES NO
		1	2	3	8 9 10	
115	COMPLETION AND INTERPRETATION OF ROAD TO HEALTH CHARTS	Consensus			I III I I	III III YES NO
				3	1 2 3 4 5 6 7 8 9 10	
116	STOCK EXCHANGE	II		II	II	II YES NO
		1	2	3	1 2 3 4 5 6 7 8 9 10	
117	SOAP SYSTEM - WRITING OF PATIENTS' NOTES	I	II	II	III I	Consensus YES NO
		1	2	3	1 2 3 4 5 6 7 8 9 10	
118	LANGUAGE	I	I	II	I I	I III YES NO
		1	2	3	1 2 3 4 5 6 7 8 9 10	
119	VISITS TO WARDS	I	III		I I I	II II YES NO
		1	2	3	1 2 3 4 5 6 7 8 9 10	
120	COMPLETION AND INTERPRETATION OF ANTENATAL CHARTS	Consensus			II I I I	Consensus YES
				3	1 2 3 4 5 6 7 8 9 10	
121	COMPLETION AND INTERPRETATION OF PARTOGRAM CHART	Consensus			I I I I I	Consensus YES
				3	1 2 3 4 5 6 7 8 9 10	
122	CERTIFICATION OF DEATH AND COMPLETION OF DEATH CERTIFICATE	Consensus			I II II	II III YES NO
				3	1 2 3 4 5 6 7 8 9 10	
123	BREAKING BAD NEWS	consensus			Consensus	Consensus YES NO
				3	4 5 6 7	
124	HIV TEST AND COUNSELLING	consensus			Consensus	III III YES NO
				3	4 5 6 7	

1st round Consensus ≥ 80%

2nd round Consensus ≥ 80%

Comments: The panel recommended 25 new topics after the first Delphi round. These topics were added to the questionnaire and are numbered from 100 to 124.

With regards to topics left over from the first round, 18 achieved consensus as essential for a skills laboratory in the second round (44% of the topics from the first round). There were now a total of 76 topics out of 99 (76.8%) indicated as essential. Of the additional new topics, 16 out of 24 were indicated as essential (66.6%).

The main categories of topics which were indicated as essential are analysed in Table 4.5.4.2/2

Table 4.5.4.2/2: Delphi second round: Analyses of consensus reached on the "Essential" category in the main topic groups

MAIN CATEGORIES OF TOPICS	Essential first round	essential second round	Number of topics	Percentage
Cardiovascular system	5	3	11	72.7%
Respiratory system	5	0	5	100%
Digestive system	5	2	8	87.5%

Continuation of Table 4.5.4.2/2

Uro-genital system	5	3	10	80%
Endocrine system	3	1	6	66.7%
Nervous system	4	2	6	100%
Haematological system	3	0	5	60%
Musculoskeletal	2	6	8	100%
Ear, nose and throat	3	0	4	75%
Ophthalmology	4	0	4	100%
Anaesthesia	5	1	7	85.8%
Paediatrics	7	2	9	100%
Emergency care	4	1	5	100%
Skin	0	3	6	50%

After the second round, the panel reached consensus on the time frame when topics should be taught for 51 out of 82 (62.2%) topics left from the first round. If the topics from the first round with consensus are added to those of the second round, it gives a total of 68 out 99 (68.6%). Consensus was reached in 12 of the new topics (50%). In total 80 topics out of 124 (64.5%) now has consensus for a time slot in the curriculum (cf. Figure 4.5.4.2/1) (Table 4.5.4.2/1).

The slots on the time frame were divided as follows: 10 topics in the first third of the curriculum, 57 topics in the middle third of the curriculum and 13 topics were identified for the last third of the curriculum as shown in Figure 4.5.4.2/1.

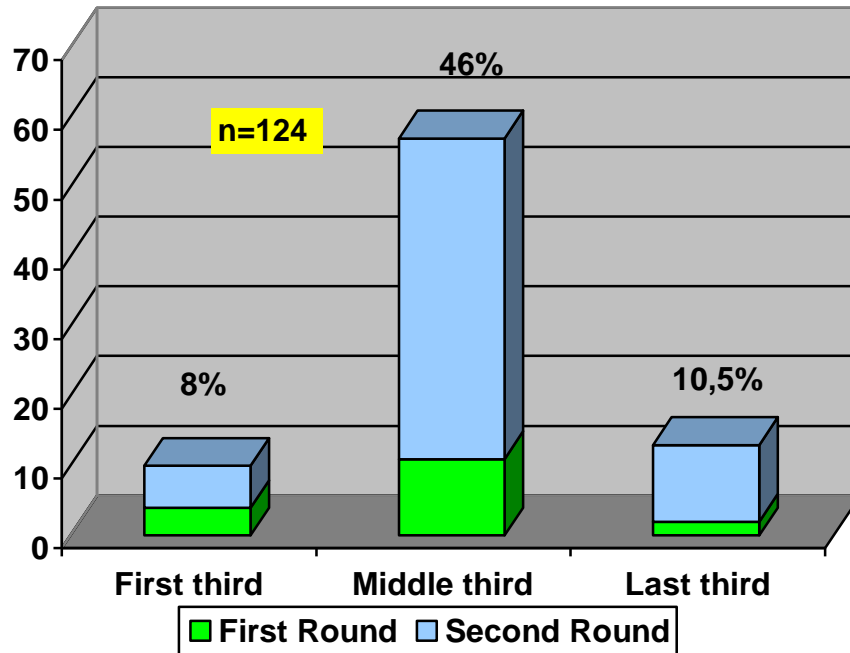


Figure 4.5.4.2/1: Consensus for the number of topics on time frame in the curriculum for the first and the second rounds.

With regard to who should do the teaching, consensus was reached for 32 topics left over from the first round and 11 of the new topics recommended by the panel. Further analysis of these figures indicated that 16 (37%) of the 32 topics were allocated for the specialist to be the lecturer. Seven of the 16 (43.8%) were from the new topics recommended by the panel after the first round (see Figure 4.5.4.2/2). In this second round consensus was reached in 27 (63%) topics which indicated the staff of the skills laboratory as the lecturers. Four (16%) were from the new topics (see Table 4.5.4.2/1). The consensus reached in the second round on the number of essential topics as well as the time is also depicted in Table 4.5.4.2/2.

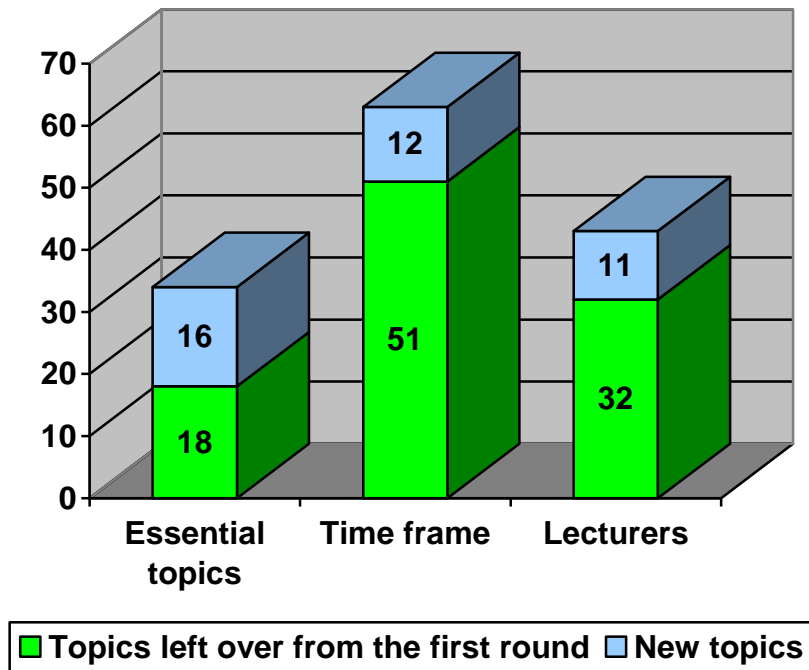


Figure 4.5.4.2/2: Delphi second-round consensus: Comparison between topics left over from the first round and new topics recommended by the panel.

The respondents did not mark all the topics. After conferring with the respondents, they indicated that they were sticking to their choices of the previous round. The information letter of the researcher for the second and the third rounds also stated: "If, however, you feel that you should stay with your choice even if it is not in agreement with the others, please feel free to keep to your previous opinion" (see Appendix G). These choices in the previous round were thus included in the analysis of this round.

4.5.4.3 Comments by the panel on the second round

The comments made in this second round were mostly related to the person who had to teach the topics. Where the staff of the skills laboratory were indicated, the

comment was that the facilitators had to be trained. With regard to the time frame in the curriculum, it was specified that some topics should be repeated in the last third of the curriculum and that the principles of the physical examination should be repeated and applied at the bedside (cf. 4.5.3.1). These topics, to be repeated later, are noted in Table 4.5.4.3/1:

Table 4.5.4.3/1: Topics identified during the second round recommended to be repeated during the clinical phase

NOS.	TOPIC	NOS.	TOPIC
13-17	Examination of the respiratory system	12	Examination of the lymphatic system
2-11	Cardiovascular examination	35	Examination of the female genitalia
8	Chest X-rays	34	Urethral catheterisation
9	ECG	27	Urine dipsticks and microscopy
81	Defibrillation and cardio-version	38	Insertion of an IUD
28	Abdominal X-rays	48	Examination of the thyroid
24	Hernias	52-55	Examination of the neurological system
25	Rectal examination	56	Lumbar puncture
32	Prostate examination	58	Wet slide microscopy in skin diseases

Comments: Some of the participants of the panel recommended that the above topics should be repeated in the clinical years. These recommendations will be addressed in Chapter 7.

4.5.4.4 Additional topics recommended by the panel in the Delphi second round

Five new topics were identified by the panel during round 2 of the Delphi process (cf. Table 4.5.4.4/1).

Table 4.5.4.4/1: Additional topics recommended by the Delphi panel after round two

NO.	topic
125	Ear toilet
126	Nose bleeding
127	Foreign object in the eye
128	Urine sampling in children
129	Suprapubic catheter

Comment: These topics were introduced in the questionnaire for the third round of the Delphi technique.

4.5.5 Third round of the Delphi technique

4.5.5.1 The questionnaire

The same topics as those for the questionnaire from the second round were used for the third round, in all 129 questions, with the addition of the five recommended by the panel (cf. Table 4.5.4.4/1). Again the topics where consensus had been reached were indicated by marking them in green for the first-round choices and blue for those which reached consensus in the second round. In addition to this, the previous votes were also indicated on the questionnaire so that, as in the second round the participants could reconsider their previous vote. The researcher sent out the questionnaires by e-mail, as well as hard copies by land mail. With those copies sent by land mail a post-paid envelope as well as an explanatory letter was included. The same letter was included in the e-mail too (see Appendix I).

Unfortunately one of the respondents dropped out. This respondent left the university where she was in charge of the skills laboratory and the questionnaire was not returned even after repeatedly reminding her by e-mail and by telephone. The Delphi process was thus left with five participants, although for the analysis of the questionnaire, the response of this participant in the second round was used.

4.5.5.2 Results and findings of the third round

The results were analysed by the researcher and topics and fields where consensus was reached are indicated by a red colour. The fields where 60% of the panel made the same choice are shaded in purple (cf. Table 4.5.5.2/1). The 60% vote was added to identify topics with a majority vote that did not reach 80% consensus. Some of these topics could later be included in the final framework.

Table 4.5.5.2/1: Third round Delphi questionnaire and analysis

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE										LECTURER SPECIFIC DISCIPLINE				
				1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
GENERAL APPROACH																		
1	Taking a history			Consensus			Consensus										Consensus	
			3	1	2	3												NO
CARDIOVASCULAR SYSTEM																		
2	Cardiovascular system: appropriate history			Consensus			III III										Consensus	
			3	1	2	3	4	5	6	7	8	9	10					NO
3	General principles of the physical examination of the healthy patient: Appearance (BMI, Anthropometry)			Consensus			Consensus										Consensus	
			3	1	2	3												NO
4	Vital signs; facies; hair; nails; gait			Consensus			Consensus										Consensus	
			3	1	2	3												NO
5	Pulses and blood pressure			Consensus			Consensus										Consensus	
			3	1	2	3												NO
6	Jugular venous pressure			Consensus			III II										Consensus	
			3	1	2	3	4	5	6	7	8	9	10					NO

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
7	Consensus	3	1 2 3	Consensus	Consensus
				NO	
8	Consensus	3	4 5 6 7	Consensus	Consensus
				NO	
9	Consensus	3	4 5 6 7	Consensus	Consensus
				YES	
10	Consensus	3	4 5 6 7	Consensus	Consensus
				NO	
11	Consensus	3	4 5 6 7	Consensus	Consensus
				NO	
12	Consensus	3	4 5 6 7	Consensus	Consensus
				NO	
RESPIRATORY SYSTEM					
13	Consensus	3	1 2 3	Consensus	Consensus
				NO	
Examination					
14	Consensus	3	1 2 3	Consensus	Consensus
				NO	
15	Consensus	3	1 2 3	Consensus	Consensus
				NO	
16	Consensus	3	1 2 3	Consensus	Consensus
				NO	
17	Consensus	3	1 2 3	Consensus	Consensus
				NO	
MAMMAE					
18	Consensus	3	4 5 6 7	Consensus	Consensus
				NO	
DIGESTIVE SYSTEM					
19	Consensus	3	1 2 3	Consensus	Consensus
				NO	

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
20	Consensus	3	1 2 3	III	Consensus
				NO	
21	Consensus	3	1 2 3	III	Consensus
				NO	
22	Consensus	3	1 2 3	Consensus	Consensus
				NO	
23	Consensus	3	1 2 3	III	Consensus
				NO	
24	Consensus	3	4 5 6 7	Consensus	Consensus
				YES	
25	Consensus	3	4 5 6 7	Consensus	III II
				YES NO	
26	Consensus	2	8 9 10	Consensus	Consensus
				YES	
27	Consensus	3	1 2 3 4 5 6 7 8 9 10	III	Consensus
				NO	
28	Consensus	3	4 5 6 7	Consensus	Consensus
				YES	
GENITO-URINARY SYSTEM					
29	Consensus	3	1 2 3	III II	Consensus
				NO	
30	Consensus	3	4 5 6 7	Consensus	Consensus
				YES	
31	Consensus	2	1 2 3 4 5 6 7 8 9 10	II II	Consensus
				YES	

TOPIC		Inappropriate	Useful	Essential	WHERE IN THE COURSE										LECTURER SPECIFIC DISCIPLINE	
32	Prostate: examination	Consensus			Consensus										Consensus	
			3			4	5	6	7							YES
33	Male genitalia (photos)	Consensus			Consensus										III	II
			3			4	5	6	7						YES	NO
34	Urethral catheterisation	Consensus			Consensus										Consensus	
			3			4	5	6	7							NO
35	Female genitalia and vaginal examination (photos)	Consensus			Consensus											
			3			4	5	6	7							NO
36	Vaginal speculum examination	Consensus			Consensus											
			3			4	5	6	7							NO
37	Pap smear	Consensus			Consensus										II	III
			3			4	5	6	7							NO
38	Insertion of IUD	Consensus							I	II			I	I	Consensus	
			3		1	2	3	4	5	6	7	8	9	10	YES	
OBSTETRICS																
39	Episiotomy	Consensus			Consensus										Consensus	
			3			4	5	6	7						YES	
HAEMATOLOGICAL SYSTEM																
40	History: anaemia; fatigue; dizziness	Consensus			Consensus										Consensus	
			3			4	5	6	7							NO
41	Examination: general appearance; hands and limbs; lymphatic glands; abdomen	Consensus			Consensus										Consensus	
			3		1	2	3									NO
42	Haemoglobin test	Consensus			Consensus										Consensus	
			3			4	5	6	7							NO
43	Blood slide	Consensus			Consensus										Consensus	
			2			4	5	6	7						YES	
44	Bone marrow puncture (video)	Consensus			Consensus										Consensus	
			2			4	5	6	7						YES	
ENDOCRINOLOGICAL SYSTEM																
45	History: change in weight; bowel habits; sweating; hair distribution; skin pigmentation; potency; menstruation; urine	Consensus			Consensus										Consensus	
			3			4	5	6	7							NO

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
DIABETES					
46	History	Consensus		Consensus	Consensus
		3		4 5 6 7	NO
47	Capillary blood glucose test	Consensus		Consensus	Consensus
		3		4 5 6 7	NO
	THYROID				
48	Examination for hyper-hypothyroidism, nodules	Consensus		Consensus	Consensus
		3		4 5 6 7	NO
	PARATHYROIDS				
49	Examination for hyper- and hypofunction		II III	Consensus	Consensus
		1 2 3		4 5 6 7	YES
50	SYNDROMES WITH SHORT STATURE: Turner; Down's; Rickets		IIII II	I IIII I	Consensus
		2		4 5 6 7	YES
THE NERVOUS SYSTEM					
51	Neurological history: headache; facial pain; syncope; dizziness; visual disturbance; ataxia; sensation fall out and weakness of limbs; tremors and involuntary movements	Consensus		Consensus	Consensus
		3		4 5 6 7	YES
	NEUROLOGICAL EXAMINATION				
52	General signs; level of consciousness; neck stiffness; higher centres and speech	Consensus		Consensus	Consensus
		3		4 5 6 7	NO
53	Parietal-, temporal-, frontal- and occipital lobe function	Consensus		Consensus	Consensus
		3		4 5 6 7	YES
54	Cranial nerves	Consensus		Consensus	Consensus
		3		4 5 6 7	NO
55	Limbs and body; general; motor and sensory system; reflexes; proprioception, etc.	Consensus		Consensus	Consensus
		3		4 5 6 7	NO
56	Lumbar puncture	Consensus		Consensus	IIII II
		3		4 5 6 7	YES NO

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE										
THE SKIN															
57	Dermatological definitions	Consensus			Consensus										Consensus
		1	2	3	4	5	6	7							
58	Wet slide microscopy	Consensus			Consensus										Consensus
				3	4	5	6	7							
59	Wood's lights	Consensus			I I III										Consensus
			2		1	2	3	4	5	6	7	8	9	10	
60	Biopsy techniques	I	II	II	Consensus										Consensus
		1	2	3								8	9	10	
61	Benign and malignant lesions	Consensus			IIII I I										Consensus
				3	4	5	6	7							
62	Ulcers; sinuses and fistulae	Consensus			Consensus										Consensus
				3	4	5	6	7							
MUSCULO-SKELETAL SYSTEM															
MUSCLES															
63	Examination	Consensus			Consensus										II III
				3	4	5	6	7							
TENDONS AND TENDON SHEATHS															
64	Examination for disruption/ruptures	Consensus			Consensus										Consensus
				3	4	5	6	7							
BONE															
65	Examination for abnormalities	Consensus			Consensus										Consensus
				3	4	5	6	7							
JOINTS															
66	Examination of individual joints, e.g. hip, knee, shoulder, ankle, wrist	Consensus			Consensus										Consensus
				3	4	5	6	7							
HANDS															
67	Examine: musculoskeletal; circulation; nerves – motor and sensory	Consensus			Consensus										Consensus
				3	4	5	6	7							
FEET															
68	Deformities	Consensus			Consensus										Consensus
				3	4	5	6	7							

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
RHEUMATOLOGICAL SYSTEM					
69	History: joint pains and swelling; back pain; limb pain; dry eyes and mouth; red eyes; systemic symptoms	Consensus		Consensus	Consensus
		3		4 5 6 7	YES
70	Examination: observation – deformities; muscle atrophy; palpation; movement of joints; measurement	Consensus		Consensus	Consensus
		3		4 5 6 7	YES
EAR-, NOSE- AND THROAT					
71	History	Consensus		Consensus	Consensus
		3		4 5 6 7	YES
72	Ear examination	Consensus		Consensus	II III
		3		4 5 6 7	NO
73	Nose and throat examination	Consensus		Consensus	III III
		3		4 5 6 7	YES NO
74	Cryothyroidotomy	Consensus		I I III I	Consensus
		3		8 9 10	YES
OPHTHALMOLOGY					
75	History	Consensus		Consensus	III III
		3		4 5 6 7	YES NO
76	Examination: Snellen chart; Amsler chart, confrontation eye fields; red reflex, pupil reactions	Consensus		Consensus	Consensus
		3		4 5 6 7	YES
77	Ophthalmoscopy	Consensus		Consensus	Consensus
		3		4 5 6 7	YES
78	Ocular pressure (Schiotz tonometer)	Consensus		I I III I	Consensus
		3		8 9 10	YES
ANAESTHESIA					
79	CPR	Consensus		I II I I I	III II
		3		4 5 6 7	YES
80	Intubation	Consensus		Consensus	Consensus
		3		4 5 6 7	YES
81	Defibrillation/dysrhythmias	Consensus		I I III I	Consensus
		3		8 9 10	YES
82	Infusions/cannula intravenously	Consensus		Consensus	Consensus
		3		4 5 6 7	NO

TOPIC	Inappropriate Useful Essential	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
83 Central lines: placing	Consensus	Consensus	Consensus
	3	8 9 10	YES
84 Spinal injection simulator – spinals; epidurals; sacral block	I IIII I	Consensus	Consensus
	2	8 9 10	YES
85 Ring block of fingers	Consensus	Consensus	Consensus
	3	8 9 10	YES
PAEDIATRICS			
86 History taking	Consensus	Consensus	Consensus
	3	4 5 6 7	YES
87 Technique of examination and systemic examination	Consensus	Consensus	Consensus
	3	4 5 6 7	YES
88 Neonatal examination	Consensus	Consensus	Consensus
	3	4 5 6 7	YES
89 Neurological examination	Consensus	Consensus	Consensus
	3	4 5 6 7	YES
90 Child development	Consensus	Consensus	Consensus
	3	4 5 6 7	YES
91 Intubation	Consensus	Consensus	Consensus
	3	8 9 10	YES
92 Placement of IV lines (scalp veins; peripheral; tibia; umbilical)	Consensus	Consensus	Consensus
	3	8 9 10	YES
93 Arterial puncture	Consensus	Consensus	IIII II
	3	8 9 10	YES
94 Underwater drain	Consensus	Consensus	III II
	3	8 9 10	YES NO
EMERGENCY CARE			
95 Primary evaluation and resuscitation of the trauma patient	Consensus	Consensus	Consensus
	3	4 5 6 7	YES
96 Secondary evaluation – trauma patient	Consensus	Consensus	Consensus
	3	4 5 6 7	YES
97 Use of the trauma board (spine board) and splints	Consensus	Consensus	Consensus
	3	4 5 6 7	YES

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE
98 Wound care and dressings and bandages	Consensus				Consensus
		3		4 5 6 7	YES
99 Shock	Consensus			Consensus	Consensus
		3		4 5 6 7	YES
ADDITIONAL TOPICS SUGGESTED BY PANEL MEMBERS					
100 Tracheostomy	Consensus			Consensus	Consensus
		3		8 9 10	YES
101 Heimlich manoeuvre	Consensus			Consensus	III II
		3		4 5 6 7	YES NO
102 Tension pneumothorax	Consensus			I I II I I	Consensus
		3		8 9 10	YES
103 Naso-gastric intubation	Consensus			Consensus	Consensus
		3		4 5 6 7	NO
104 Basic suturing techniques	Consensus			Consensus	Consensus
		3		4 5 6 7	NO
105 Splinting of fractures	Consensus			I III I I	Consensus
		3		4 5 6 7	YES
106 Examining of the pregnant abdomen	Consensus			Consensus	Consensus
		3		4 5 6 7	YES
107 Normal vaginal delivery	Consensus			Consensus	Consensus
		3		4 5 6 7	YES
108 Examination of a rape victim	Consensus			Consensus	Consensus
		3		8 9 10	YES
109 Handwashing and gowning for theatre	Consensus			Consensus	III III
		3		4 5 6 7	YES NO
110 Blood culture	Consensus			Consensus	III III
		3		4 5 6 7	YES NO
111 Injections: intramuscular and subcutaneous	Consensus			Consensus	Consensus
		3		4 5 6 7	NO

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE	LECTURER SPECIFIC DISCIPLINE	
					YES	NO
112	Pleural tap	Consensus		Consensus	III	II
		3		8 9 10	YES	NO
113	Pleural biopsy	III	II	Consensus	Consensus	
		1 2 3		8 9 10	YES	
114	Ascitic paracentesis	III	III	Consensus	Consensus	
		1 2 3		8 9 10	YES	
115	Completing and interpretation of road to health charts	Consensus		I III I I	Consensus	
		3		4 5 6 7	YES	
116	Stock exchange	III	II	I I	III	
		1 2 3		1 2 3 4 5 6 7 8 9 10	YES	
117	SOAP system – writing of patients' notes	Consensus		Consensus	Consensus	
		3		4 5 6 7		NO
118	Language	Consensus		III II	II	II
		3		1 2 3 4 5 6 7 8 9 10		NO
119	Visits to wards	Consensus		I I I I I	III	II
		3		1 2 3 4 5 6 7 8 9 10	YES	NO
120	Completing and interpretation of antenatal charts	Consensus		Consensus	Consensus	
		3		4 5 6 7	YES	
121	Completion and interpretation of partogram chart	Consensus		Consensus	Consensus	
		3		4 5 6 7	YES	
122	Certification of death and completion of death certificate	Consensus		Consensus	Consensus	
		3		8 9 10		NO
123	Breaking bad news	Consensus		Consensus	Consensus	
		3		4 5 6 7	YES	
124	HIV test and counselling	Consensus		Consensus	II	III
		3		4 5 6 7		NO
125	Ear toilet	Consensus		Consensus	Consensus	
		3		4 5 6 7	YES	
126	Nose bleed	Consensus		I I II	Consensus	
		3		1 2 3 4 5 6 7 8 9 10	YES	
127	Foreign object in eye	Consensus		I I III	Consensus	
		3		1 2 3 4 5 6 7 8 9 10	YES	

TOPIC	Inappropriate	Useful	Essential	WHERE IN THE COURSE										LECTURER SPECIFIC DISCIPLINE		
				1	2	3	4	5	6	7	8	9	10			
128	Urine sampling in children		II	III												Consensus
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	
129	Suprapubic catheter	Consensus			Consensus										Consensus	
				3									8	9	10	YES

1st round consensus ≥ 80%
 2nd round consensus ≥ 80%
 3rd round consensus ≥ 80%
 60% Agreement (cf. 4.5.5.2)

No new topics were suggested by the panel after round three.

In the third round consensus was reached on 15 topics as essential as indicated by the Delphi panel. In addition five topics were indicated as useful but not essential (cf. Table 4.5.5.2/1).

Table 4.5.5.2/2: Delphi third round: Analyses of consensus reached on “Essential” category in the main topic groups

MAIN CATEGORIES OF TOPICS	Essential first round	Essential second round	Essential third round	Number of topics	Percentage
Cardiovascular system	5	3	3	11	100%
Respiratory system	5	0	0	5	100%
Digestive system	5	2	1	8	100%
Uro-genital system	5	3	1	10	90%

Continuation of Table 4.5.5.2/2

MAIN CATEGORIES OF TOPICS	Essential first round	Essential second round	Essential third round	Number of topics	Percentage
Endocrine system	3	1	0	6	66.6%
Nervous system	4	2	0	6	100%
Haematological system	3	0	2	5	100%
Musculoskeletal	2	6	0	8	100%
Ear nose and throat	3	0	1	4	100%
Ophthalmology	4	0	0	4	100%
Anaesthesia	5	1	0	7	85.7%
Paediatrics	7	2	0	9	100%
Emergency care	4	1	0	5	100%
Skin	0	3	1	6	66.6%

Comments: As can be seen in Table 4.5.5.2/2, the majority of topics were indicated by the panel as essential, except the topics on the uro-genital system, the endocrinological system, anaesthesia, and the skin. This could imply that some topics from these groups are not important or practical to teach in a skills laboratory.

Five topics were indicated as useful but not essential. These topics are listed in Table 4.5.5.2/3.

Table 4.5.5.2/3: Topics indicated by the Delphi panel as useful and not essential

NO.	TOPIC
26	Proctoscopy and sigmoidoscopy
31	Orchidometer
43	Blood slide
44	Bone marrow aspiration (video)
59	Wood's light (dermatology)

Comments: Except for the topic on proctoscopy and sigmoidoscopy, the other topics were all topics suggested by the individual specialists in the questionnaire survey.

No topics were indicated as inappropriate, although in five topics no consensus was reached. These topics are indicated in Table 4.5.5.2/4:

Table 4.5.5.2/4: Topics on which consensus was not reached on importance by the Delphi panel.

NO.	TOPIC
49	Parathyroid examination: hyper- and hypofunction
60	Biopsy techniques
114	Ascites fluid paracentesis
116	Stock exchange
128	Urine sampling in children

Comment: The probable reason for not reaching consensus on these topics is that the respondents regard them as procedures that should be demonstrated in hospital wards. The topic on stock exchange is self-explanatory as it is not a clinical skill.

With reference to the time slot in the curriculum designated for presentation of specific topics, consensus was reached on 23 additional topics. Three were in the first third, 18 in the middle third and three in the last third of the curriculum. The tendency to teach the majority of topics in the middle third of the curriculum was again confirmed (cf. Figure 4.5.5.2/1).

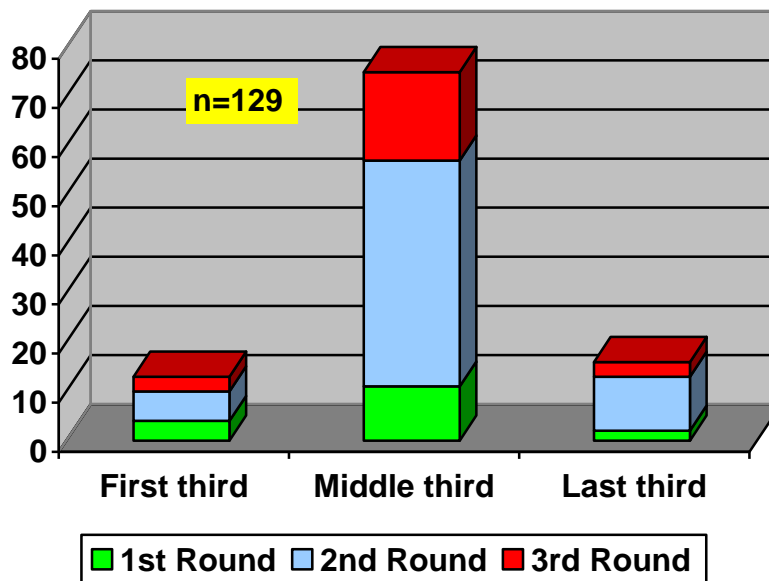


Figure 4.5.5.2/1: Consensus for the number of topics on the time frame in the curriculum for the first, second and third rounds

Where the lecturers had to be identified in the third round, consensus was reached for the specialist disciplines in 25 of the topics. The staff of the skills laboratory were indicated for 11 topics (Table 4.5.5.2/1).

Consensus reached on the three main categories, namely essential topics, the time frame and the lecturer, is indicated in Figure 4.5.5.2/2.

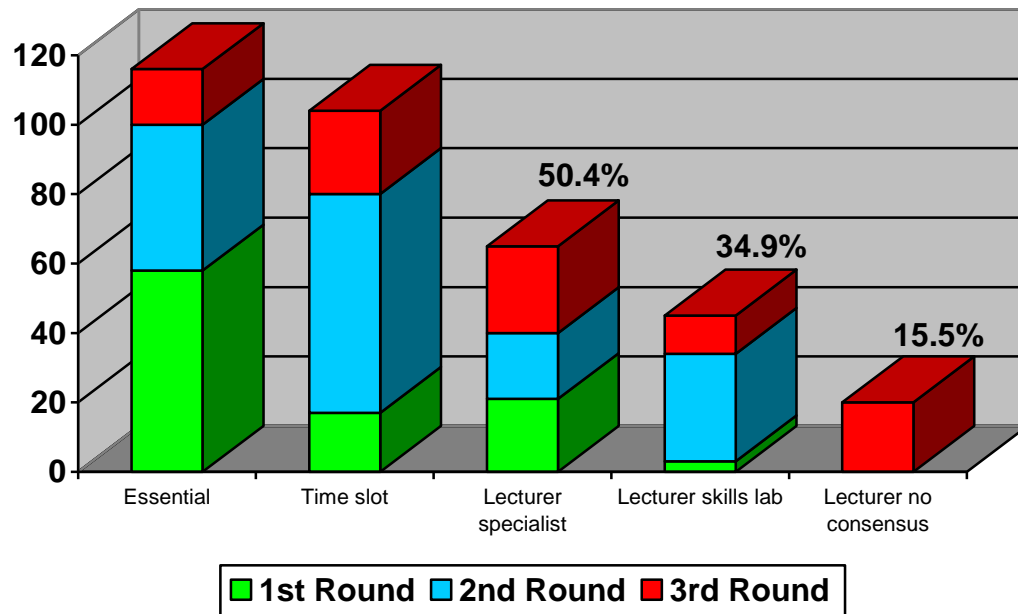


Figure: 4.5.5.2/2: Delphi final round: Consensus reached on the three main categories

The tendency here is that the specialists are indicated to be the lecturers in 50.4% of the topics; the skills unit lecturers in 34.9% of the topics; and no consensus in 15.5% (cf. Figure 4.5.5.2/2).

4.6 FINAL ANALYSIS OF THE DELPHI TECHNIQUE

116 topics were regarded as essential by the participants. Seven were indicated as useful, but not essential for a skills laboratory (cf. Table 4.6./1)

Table 4.6/1: Final Delphi analysis: Topics which by consensus were indicated as useful by the Delphi panel

NO.	TOPIC
113	Pleural biopsy
26	Proctoscopy and sigmoidoscopy
31	Orchidometer
43	Blood slide
44	Bone marrow puncture
59	Skin: Wood's light
84	Anaesthetics, spinal and epidural injections

No topics were indicated as inappropriate for the skills laboratory.

Where the topics in Table 4.6/2 are concerned, no consensus was reached, although some of these had an agreement rating of 60% and above (but not 80%) as indicated by an asterix. These are coloured in purple on analysis of the final Delphi questionnaire (Table 4.5.5.2/1).

Table 4.6/2: Final Delphi analysis: Topics on which consensus was not reached.

No.	TOPIC
49	Parathyroid examinations
50	Syndromes with short stature*
60	Skin: biopsy techniques
84	Spinal and epidural blocks*
114	Ascites fluid paracentesis
125	Urine sampling in children
116	Stock exchange
116	Visits to wards*

In the final analysis 89.9% (116) of all the topics were regarded as essential, 4% as useful and on 6.1% of the topics no consensus could be reached as depicted in Figure 4.6/1.

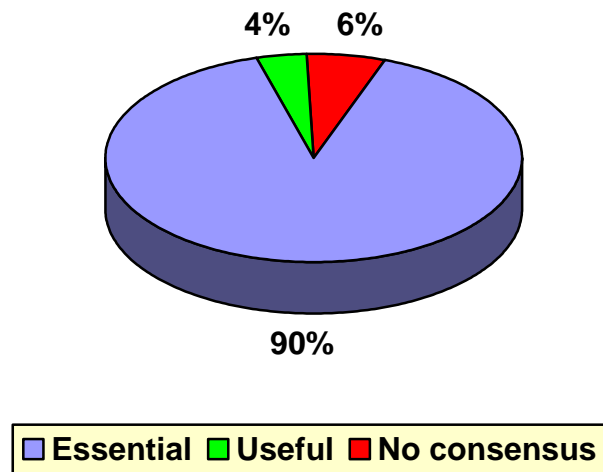


Figure 4.6/1: Delphi panel choice of importance of topics for the skills unit

4.6.1 Comments on the choice of topics

All the different systems such as the respiratory, the cardiovascular, the gastrointestinal, the genito-urinary and the nervous systems, include the taking of the history. As indicated in the literature study, the taking of a history and communication is an important skill to be mastered by the medical student (cf. 2.2; O'Neill *et al.* 1999:127). The skills unit is appropriately suited to teach communication in small groups with simulated patients. The skills laboratory is, however, not an essential requirement for the taking of the history of all systems, because - if the students have been taught to grasp the principles of communication - the history taking of the different systems can be taught in a lecture room.

The skills laboratory is not suited for all skills and, if the necessary equipment is not available, skills should initially be taught on patients while students observe, for example, clinical evaluation of the arterial and venous system, examination of the digestive system, and examination of the thyroid. For all these topics video tapes are also available or can be made available. Even though the skills laboratory is adequately suited for small group video teaching, this can also be done in a lecture hall with larger groups of students. The individual students can then later do revision by viewing the videos in the skills unit or in the medical library. Revision of material and skills in the skills unit is an important aspect and was also mentioned by the comments of the surgical disciplines (cf. 4.4.5.1).

Even though a large number of topics have been identified as essential for the skills unit, many of these topics need not be taught exclusively in the skills laboratory.

4.6.2 Consensus reached for topics to be taught in specific time slots of the curriculum

The skills which are suitable for the first third of the curriculum (13) are those related to history taking, examination of vital signs, the examination of the cardiovascular system, the respiratory system and the digestive system (cf. Table 4.5.5.2/1). For all these topics that were indicated for the first third of the curriculum the skills laboratory lecturers were indicated (cf. Table 4.6.2/1).

Table 4.6.2/1: Final Delphi analysis: Topics which by consensus were indicated as essential for the first third of the curriculum

No.	TOPIC
1	Taking a general history
3	Cardiovascular examination - general appearance
4	Vital signs

Continuation of Table 4.6.2/1

No.	TOPIC
5	Pulses and blood pressure
7	Praecordium inspection

No.	TOPIC
13	History of the respiratory system
14	Examination of the respiratory system: Inspection: sputum, hands, face, thorax
15	Palpation of the respiratory system
16	Percussion of the chest
17	Auscultation of the lungs
19	History taking of the digestive system
21	General examination of the digestive system
40	Haematological system general appearance and examination

Consensus was reached on 75 topics for the middle third of the curriculum and 16 topics were indicated by consensus for the last third of the curriculum. Only 10 of the 16 topics for the last third of the curriculum were indicated as essential, while the rest were either useful or no consensus could be reached. The 11 essential topics are depicted in Table 4.6.2/2.

Table 4.6.2/2: Final Delphi analysis: Topics which by consensus were indicated as essential for the last third of the curriculum

No.	TOPIC
83	Central lines placing
85	Ring block of the fingers

Continuation of Table 4.6.2/2

No.	TOPIC
-----	-------

No.	TOPIC
91	Paediatric intubation
92	Placement of IV lines in children
93	Arterial puncture in children
94	Underwater drain in children
100	Tracheostomy
108	Examination of the rape victim
112	Pleural tap
122	Certification of death and completion of the death certificate
129	Suprapubic catheter

These topics chosen for the last third of the curriculum are more complicated procedures, such as, the placing of central lines, arterial puncture and intubation in children, tracheostomy and the introduction of a suprapubic catheter (cf. Table 4.6.2/2).

For 25 of the topics no consensus on the time slot could be reached.

In 44 essential topics consensus was reached indicating that the skills laboratory personnel should teach the topic (cf. Table 4.5.5.2/1) and in 55 topics the specific specialist discipline was indicated to do the teaching (cf. Table 4.5.5.2/1).

The middle third of the curriculum was indicated as a time frame for the majority of topics and the probable explanations are depicted in Table 4.6.2/3.

Table 4.6.2/3: Delphi technique: Possible explanations why the middle third of the curriculum was chosen for the majority of topics.

<p>The pre-knowledge of anatomy and physiology would have been acquired by this time and students would have better insight into the work.</p>
<p>The majority of the skills should ideally already have been taught, practised and mastered in the skills unit on models by the time students start with their clinical years.</p>
<p>To start too early with the majority of skills would be a waste of time, as the students do not have the necessary knowledge of diseases and pathology to understand and apply their skills.</p>
<p>Students should be able to apply a skill, taught in the skills laboratory, on patients as soon as possible, preferably within the same month. This would be possible later in the curriculum.</p>

75 topics were indicated to be taught in the middle third of the curriculum, while only 13 were chosen for the first third and 16 for the last third of the undergraduate medical studies. These figures are indicated in Figure 4.6.2/1.

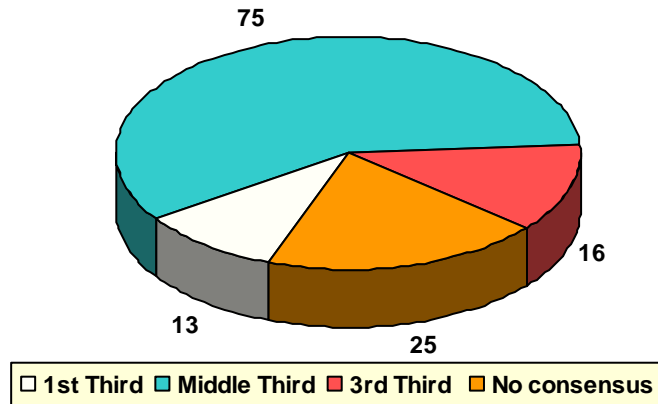


Figure 4.6.2/1: Time slots indicated in the curriculum

4.6.3 Delphi technique: Comments on the choice of the lecturer

When analysing all the topics, 55 were indicated for tuition by the specialist disciplines, while 44 were voted that the skills unit staff to be the instructors (cf. Figure 4.6.3/1). Consensus was not reached on 19 topics as to who the lecturer should be. The explanation for the number of non-consensus of who should teach the specific skill, depends on the experience and expertise of the skills laboratory personnel. As an example, one could mention that at one university the head of the skills unit is a trauma qualified registered nurse practitioner and this person is adequately trained to teach topics such as the splinting of fractures, the Heimlich manoeuvre to remove a foreign body from the pharynx, and treating a tension pneumothorax by introducing an intercostal drain. On the other hand, at another skills unit these procedures would probably not have such a high priority.

The analysis of the topics taught either by the specialists or the skills laboratory lecturers is depicted in Figure 4.6.3/1.

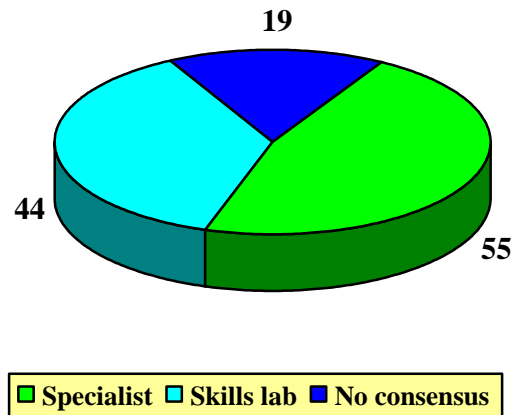


Figure. 4.6.3/1 Delphi: Topics indicated for specialist or staff of the skills laboratory

With the following 19 topics no consensus was reached as to who the lecturer of a specific topic should be (cf. Figure 5.3/6; Table 4.5.5.2/1).

Table 4.6.3/1: Final Delphi analysis: Topics on which consensus was not reached as to who the lecturer should be

NO.	TOPIC
25	Rectal examination
33	Examination of the male genitalia
37	Pap smear
45	Endocrinological system history
56	Lumbar puncture

Continuation of Table4.6.3/1

NO.	TOPIC
63	Examination of the musculoskeletal system
72	Ear examination
73	Nose and throat examination
76	Ophthalmologic history
79	Cardio-pulmonary resuscitation
93	Paediatrics – arterial puncture
94	Paediatrics – underwater drain
101	Heimlich manoeuvre
109	Handwashing and gowning in theatre
110	Blood culture
112	Pleural parcentesis
116	Stock exchange
118	Language
124	HIV testing and counselling

4.7 CONCLUDING REMARKS

The results of the questionnaire among the heads of the different specialist disciplines in the School of Medicine at the UFS, and the Delphi process among experts in the field of skills laboratories and medical education are presented. The comments and recommendations from the participants in the questionnaire survey are valuable and should be implemented in the planning of a skills laboratory curriculum.

Consensus was reached in the Delphi process on the importance of the majority (89.9%) of the topics in the questionnaire and only five topics (4%) were regarded as useful, but not essential for the skills laboratory. The participants did not reach a consensus for eight topics (6.1%). Some of them regarded these topics as inappropriate, while others were neutral about them.

On the whole, the process of initially implementing the questionnaire survey and afterwards the Delphi process, was successful. The essential topics should be seriously considered to be taught in the skills unit.

Some of the new topics were eliminated in the questionnaire survey, but again reintroduced by the Delphi panel. The grounds for eliminating the topics from the questionnaire survey can be ascribed to more than one reason. The respondents of the questionnaire survey are not used to work with small groups in a skills laboratory. They prefer large groups for formal

lectures and smaller groups for bedside tuition. This most probably is the reason too why they prefer that the skills laboratory staff do much of the teaching (34.9%). The fact that they are prepared to do the teaching in only 50.4% of topics is significant and corroborates some comments that they prefer to teach at the bedside.

One weak point in the questionnaire survey is that all the respondents did not complete all the questions, but only those related to their own speciality. As is clear from Table 4.4.2/1, the obstetric topics for example were all eliminated, because fewer than 10 respondents had voted these topics as essential. The respondent from the Department of Obstetrics and Gynaecology also did not regard these topics as essential for a skills unit, although when the votes were analysed, 11 had abstained, while eight had voted the topics to be essential. This is then more than 50% in favour of the obstetric and gynaecological topics. All these topics were later reintroduced by the Delphi panel. The reason for this is, most probably, that the Delphi panel consists of skills laboratory experts.

The Delphi panel of experts also made definite proposals towards the time schedule. It also seems that some topics should be taught later in the curriculum when the students are more senior and able to apply the skills to patients.

The next chapter will address the design for a proposed framework for a curriculum in the light of the results of the questionnaire survey and the Delphi study.

CHAPTER 5

DESIGNING A FRAMEWORK FOR A SKILLS LABORATORY CURRICULUM IN AN UNDERGRADUATE MEDICAL PROGRAMME IN SOUTH AFRICA

5.1 INTRODUCTION

The framework for a skills unit curriculum as identified by the Delphi technique will be presented in the following way, namely, first all the topics that are regarded as essential for the first third of the curriculum, including the indication of who the lecturer should be, a specialist or the skills laboratory personnel. In the second place will follow essential topics that did not reach consensus (80% majority) for the first third of the curriculum, but with a majority vote of at least 60%. Third will be the topics and lecturers for the middle third of the curriculum and then the topics with a majority vote of 60% for the middle third. The same applies to the last third of the

curriculum, namely essential topics with 80% consensus and then the essential topics that reached majority vote.

The essential topics with no majority vote on the time frame as well as the topics indicated as useful (not essential) and topics which did not reach any consensus or majority vote on importance for the skills unit, are tabulated.

In the last part of this chapter a comparison will be made between the results of the Delphi technique and the topics taught by four other universities as part of their clinical skills curricula. In this analysis it will be seen that in the Delphi research more topics are indicated as essential than usually taught in skills units. On the contrary, there are topics which are taught in some skills laboratories that were not addressed in the Delphi technique.

5.2 CURRICULUM FRAMEWORK AS SUGGESTED BY THE DELPHI PANEL

After three rounds the Delphi panel of experts reached consensus that 114 (89,9%) topics were essential for a skills laboratory (see Table 4.5.5.2/1). When these topics are arranged according to the time frame in the curriculum as indicated in the Delphi technique, the framework for the curriculum should be constructed as follows (cf. Table 5.2/1):

Table 5.2/1: Essential topics to be taught in a skills laboratory in the first third of the curriculum, including the choice of the lecturer

No.	ESSENTIAL TOPICS FIRST THIRD OF CURRICULUM	LECTURER	
		Specialist	Skills lab
1	History: Taking of the general history		X
	CARDIOVASCULAR SYSTEM		
3	General principles of the physical examination of the healthy patient		X
4	Vital signs: Facies, hair, nails, gait, etc.		X
5	Pulses and blood pressure		X
7	Praecordium: Inspection, palpation, percussion and auscultation		X
	RESPIRATORY SYSTEM		
13	Respiratory system: History		X
14	Examination: Inspection, sputum, face, hands, thorax		X

No.	ESSENTIAL TOPICS FIRST THIRD OF CURRICULUM	LECTURER	
		Specialist	Skills lab
15	Palpation: Trachea, thorax (expansion, apex, vocal fremitus)		X
16	Percussion		X
17	Auscultation		X
	DIGESTIVE SYSTEM		
20	History		X
22	General examination: Mass, skin, hands, nails, face, mouth, neck, chest		X
	HAEMATOLGICAL SYSTEM		
41	Examination: General appearance, hands+ limbs, lymphatic glands, abdomen		X
124	HIV counselling and testing		X

Comments: All the topics designated for the first third of the curriculum were mostly the general history of the different systems as well as the general physical examination. For reasons difficult to explain, the cardiovascular history was indicated by one half of the Delphi panel for the first third of the curriculum time frame while the other half of the panel chose the middle third. Another point is that the lecturers in all the instances were indicated as the staff of the skills unit. This implies that the specialists are designated to become involved in the skills laboratory training with the more senior medical students. Still another point which is implied, is that the head of the skills

unit is the person who should compile the roster for the first third of the curriculum.

The essential topics with no consensus on the time frame but with a majority vote of at least 60% for the first third of the curriculum are listed in Table 5.2/2.

Table 5.2/2: Essential topics with no consensus on the time frame in the curriculum but with a majority vote for the first third of the curriculum

No.	TOPIC	Vote %	LECTURER	
			Specialist	Skills unit
	CARDIOVASCULAR SYSTEM			
6	Jugular venous pressure	60%		X
	DIGESTIVE SYSTEM			
21	Examination of the abdomen	60%		X
	GENITO–URINARY TRACT			
27	Dipsticks and microscopy	69%		X
29	History: Urinary obstruction, incontinence, menstruation	60%		60 %
118	Language	60%	50%	50%

Comments: Even though no consensus could be reached on the time frame, the majority vote indicated the first third of the curriculum. These topics are very much in the same category as the previous group where consensus was

reached and should therefore be included as essential topics for the first third of the curriculum.

Language as a topic for the skills laboratory, which was suggested by a member of the Delphi panel, indicates that students are not fluent in the teaching language at the medical school. The opinion of the researcher is that this topic is not applicable to the skills laboratory and should be addressed before entrance to medical school. The learning of an indigenous language was mentioned by a task team of the South African Department of Health as a skill which interns and community service doctors should master when they work in rural areas (cf. Table 2.2/6; Claassen, Mannie & Mashapu. 2000:13).

The essential topics indicated to be taught in the middle third of the curriculum are listed in Table 5.2/3

Table 5.2/3: Essential topics to be taught in a skills laboratory in the middle third of the curriculum

No.	ESSENTIAL TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
		Specialist	Skills lab
	CARDIOVASCULAR SYSTEM		
9	ECG	X	
8	Chest X-rays: cardiac and lung conditions		X
10	Arterial circulation: examination		X
11	Venous circulation: examination		X
12	Lymphatic system: examination		X
	BREASTS		
18	Inspection, palpation, evaluation of lumps		X
	DIGESTIVE SYSTEM		
24	Hernias	X	
25	Rectal examination	60%	
26	Abdominal X-rays	X	
	GENITO-URINARY SYSTEM		
30	Examination: General appearance, limbs, face, neck, chest, abdomen, pelvis, secondary sexual characteristics - male and female (photos)	X	
32	Prostate examination	X	
33	Male genitalia	60%	
34	Urethral catheterisation		X
35	Female genitalia and vaginal examination		X
36	Vaginal speculum examination		X
37	Pap smear		60%
	OBSTETRICS		
39	Episiotomy	X	
106	Pregnant abdomen: examination	X	

No.	ESSENTIAL TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
		Specialist	Skills lab
107	Normal vaginal delivery	X	
120	Antenatal card	X	
121	Partogram	X	
	HAEMATOLOGICAL SYSTEM		
40	History: Anaemia, fatigue, dizziness		X
42	Haemoglobin test		X
110	Blood culture	50% vote	50% vote
	ENDOCRINOLOGICAL SYSTEM		
45	History: Change of mass, bowel habits, sweating, hair distribution, skin pigmentation, potency, menstruation, urine.		X
46	History: Diabetes		X
47	Capillary blood glucose test		X
48	Thyroid: examination for function and palpation		X
	THE NERVOUS SYSTEM		
51	History	X	
52	General examination: level of consciousness, neck stiffness, higher centres of speech		X
53	Parietal, temporal, frontal and occipital lobe function	X	
54	Cranial nerve function		X
55	Motor and sensory function and reflexes, proprioception, etc.		X
56	Lumbar puncture	60%	
	THE SKIN		
57	Dermatological definitions	X	

No.	ESSENTIAL TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
		Specialist	Skills lab
58	Wet slide microscopy		X
62	Ulcers, sinuses and fistulae	X	
104	Suturing techniques – basics		X
	MUSCULO-SKELETAL SYSTEM		
63	Examination		60%
64	Examination: tendons rupture	X	
65	Bone: examination for abnormalities	X	
66	Joints: examination of individual joints	60%	
67	Hands: examination	X	
68	Feet: deformities	X	
	RHEUMATOLOGICAL SYSTEM		
69	Back pain, limb pain, dry eyes and mouth, red eyes, systemic symptoms	X	
70	Examination: inspection – deformities, palpation, movement of joints	X	
	EAR, NOSE AND THROAT DISEASES		
71	History	X	
72	Ear examination		60%
73	Nose and throat examination	50%	50%
125	Ear toilet	X	
	OPHTHALMOLOGY		
75	History	50%	50%
76	Examination: Snellen chart, Amsler chart, confrontation eye fields, red reflex, pupillary reactions	X	
77	Ophthalmoscopy	X	
	ANAESTHESIA		
80	Intubation	X	

No.	ESSENTIAL TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
		Specialist	Skills lab
82	Infusions/intravenous cannula		X
	PAEDIATRICS		
86	History	X	
87	Technique of examination and systemic examination	X	
88	Neonatal examination	X	
89	Neurological examination	X	
90	Child development	X	
	EMERGENCY CARE		
95	Primary examination and resuscitation of the trauma patient	X	
96	Secondary evaluation of the trauma patient	X	
97	Use of spine board and splints	X	
98	Wound care and dressings and bandaging	X	
99	Shock	X	
101	Heimlich manoeuvre	60%	
103	Nasogastric intubation		X
	GENERAL PROCEDURES		
109	Handwashing and gowning for theatre	50%	50%
111	Injections intramuscular and subcutaneous		X
117	SOAP system for examination and notes		X
123	Breaking bad news	X	
124	HIV test and counselling		60%

Legend: 60% = 60% or more votes, but less than 80%.

50% = 50% of votes for the specific topic.

Comments: For the majority of topics (50,4%) the specialist discipline was indicated as the lecturer, although the skills unit personnel should also become involved in approximately 34,9% of the topics. With the rest of the topics, no consensus was reached on who the lecturer should be, although in 8,5% of the topics there was a 60% vote for the specialist to be the lecturer.

As indicated in Figure 5.2.3/1 the majority of the topics in the middle third of the curriculum should be presented by the specialist discipline. This percentage is increased to 57,7% if the 60% vote is added to the consensus vote.

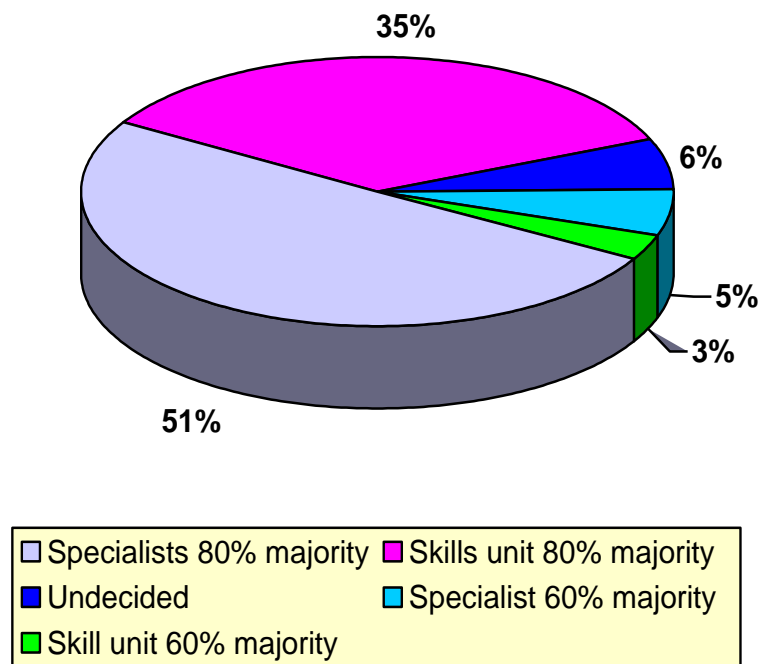


Figure 5.2/1: The choice of lecturers for the middle third of the curriculum

Some essential topics did not get consensus for a time frame although they received a majority vote of more than 50%. These topics with the percentage of votes they received are displayed in Table 5.2/4.

Table 5.2/4: Essential topics with no consensus on the time frame in the curriculum but with a majority vote for the middle third of the curriculum

No.	ESSENTIAL TOPICS – NO TIME FRAME (majority vote middle third)	Vote %	LECTURER	
			Specialist	Skills lab
	GYNAECOLOGY			
38	IUD insertion	60	X	
	PAEDIATRICS			
115	Road to health card: completion	60	75%	
	ANAESTHESIA			
79	CPR	60	60%	
	SKIN			
61	Benign and malignant lesions	60	X	
105	Splinting of fractures	60	X	
	GENERAL			
119	Visits to wards	60	60%	

Comments: The topics indicated in the Table 5.2/4 are all essential and all have a 60% vote for the middle third. Thus it is acceptable to assume that these topics should also be presented in the middle third of the curriculum.

Of the six essential topics, three had consensus for the specialist to be the lecturer, while the other three had a 60% vote for the specialists.

The essential topics indicated by the Delphi panel to be taught in the last third of the curriculum, are listed in Table 5.2/5.

Table 5.2/5: Essential topics to be taught in the last third of the curriculum in a skills laboratory

No.	ESSENTIAL TOPICS LAST THIRD OF CURRICULUM	LECTURER	
		Specialist	Skills unit
	RESPIRATORY SYSTEM		
112	Pleural paracentesis	75%	
	GENITO-URINARY SYSTEM		
129	Suprapubic catheter	X	
	OBSTETRICS AND GYNAECOLOGY		
108	Rape victim: examination	X	
	EAR, NOSE AND THROAT		
100	Tracheostomy	X	
	ANAESTHESIA		
83	Central line placing	X	
85	Ring block fingers	X	
	PAEDIATRICS		
91	Intubation	X	
92	Placement of IV lines (scalp veins, peripheral, tibia, umbilical)	X	

No.	ESSENTIAL TOPICS LAST THIRD OF CURRICULUM	LECTURER	
		Specialist	Skills unit
93	Arterial puncture	60%	
94	Intercostal drain	60%	
	ADMINISTRATIVE	Specialist	Skills unit
122	Death certificate – completion		60%

Comments: The topics indicated for the last third of the curriculum are more complicated or complex skills which should be taught to the more senior students. The only skill, which does not fall in this category, is the completion of the death certificate. This is understandable, since in the last third of the curriculum students come into contact with patients and death. It then is more appropriate to teach the responsibilities involved in filling out a death certificate.

Some of the essential topics did not achieve consensus on the time frame although they received a majority vote of 60% or more for the last third of the curriculum. These topics are depicted in Table 5.2/6.

Table 5.2/6: Essential topics with no consensus on the time frame in the curriculum but with a majority vote for the last third of the curriculum

No.	TOPIC	Vote %	LECTURER	
			Specialist	Skills unit
	OPHTHALMOLOGY			
78	Ocular pressure (Schiotz tonometer)	60	X	
	ANAESTHESIA			
81	Defibrillation / Dysrhythmias	57	X	
	EAR, NOSE AND THROAT SYSTEM			
74	Cricothyroidotomy	60	X	
	EMERGENCY CARE			
102	Tension pneumothorax	60	X	

Comments: The skills mentioned in this Table 5.2/6 are all indicated to be taught by a specialist and the same argument applies to these topics as those in the previous table where consensus had been obtained, namely that these are more intricate skills which should rather be taught to senior students by the time they have a good basic knowledge of anatomy, physiology and pathology.

Five essential topics did not achieve consensus or a majority vote for the time frame. These topics are listed in Table 5.2/7.

Table 5.2/7: Essential topics with no consensus on the time frame in the curriculum and no majority vote

No.	TOPIC	Middle 1/3	Last 1/3	LECTURER	
				Specialist	Skills unit
		Vote %	Vote %		
	CARDIOVASCULAR SYSTEM				
2	Appropriate history	50	50		X
	EAR, NOSE AND THROAT				
126	Nose bleed / Epistaxis	50	50	X 60%	
	OPHTHALMOLOGY				
127	Foreign object in eye	40	60	X	
	GENERAL TOPICS				
119	Visits to wards	60		60	40

Comments: The topic on the nosebleed did not achieve consensus for the specialist as lecturer but a majority vote of 60% was recorded. The other topics did not get a majority vote of 60% although they received four out of 5 votes. The majority of 60% is calculated out of six votes.

In Table 5.2/8 the topics that were voted as useful but not essential are depicted. The time frames as well as the lecturers are also indicated in Table 5.2/8

Table 5.2/8: Useful but not essential topics

No.	TOPICS: USEFUL NOT ESSENTIAL	Time frame	LECTURER	
			Specialist	Skills unit
	RESPIRATORY SYSTEM			
113	Pleural biopsy	last 1/3	X	
	DIGESTIVE SYSTEM			
26	Proctoscopy and sigmoidoscopy	last 1/3	X	
	UROLOGY			
31	Orchidometer	50% middle and 50% last 1/3	X	
	HAEMATOLOGICAL SYSTEM			
43	Blood slide	middle 1/3	X	
44	Bone marrow puncture (video)	middle 1/3	X	
	SYNDROMES OF SHORT STATURE			
50	Turner; Downs; Rickets	middle 1/3	X	
	THE SKIN			
59	Wood's light	75% for last 1/3	X	
	ANAESTHESIA			
84	Spinal injection simulator – spinals and epidurals; sacral block	last 1/3	X	

Comments: There is agreement that these topics are not essential, except the proctoscopy, which in the opinion of the researcher should be an essential examination in any patient with gastro-intestinal complaints. The probable reason for this topic not being considered essential is that unfortunately it was combined with the sigmoidoscopy, which falls in the non-essential category. The other useful topics can be taught in the clerkship or internal year rotation.

A number of topics did not achieve consensus or a 60% vote for their importance in the skills laboratory. In Table 5.2/9 these topics are listed as well as the lecturers.

Table 5.2/9: Topics with no consensus on importance for the skills unit

No.	TOPICS: NO CONSENSUS ON IMPORTANCE	LECTURER	
		Specialist	Skills lab
	PARATHRYOIDS		
49	Examination: Hyper- and hypofunction: 50% essential (consensus middle 1/3 of curriculum)	X	
	THE SKIN		
60	Biopsy techniques: 40% essential; 40% useful; 20% inappropriate (consensus last 1/3 of curriculum)		X

No.	TOPICS: NO CONSENSUS ON IMPORTANCE	LECTURER	
		Specialist	Skills lab
	DIGESTIVE SYSTEM		
114	Ascitic paracentesis: 50% essential; 50% useful (consensus last 1/3)	X	
	GENERAL		
116	Stock exchange: 60% inappropriate; (no significant indication on curriculum)	X	
	PAEDIATRICS		
128	Urine sampling in children: 50% essential; (60% middle 1/3)	X	

Comments: Two of the above topics have a 60% vote to be essential. One specific topic, the stock exchange had a 60% vote as inappropriate. Two topics did not receive a majority vote, namely, skin biopsy and the paracentesis of ascitic fluid.

SUMMARY

The main outcomes of the Delphi process are summarised in Figure 5.2.8/1.

The topics marked by an asterix are to be taught by the skills unit staff.

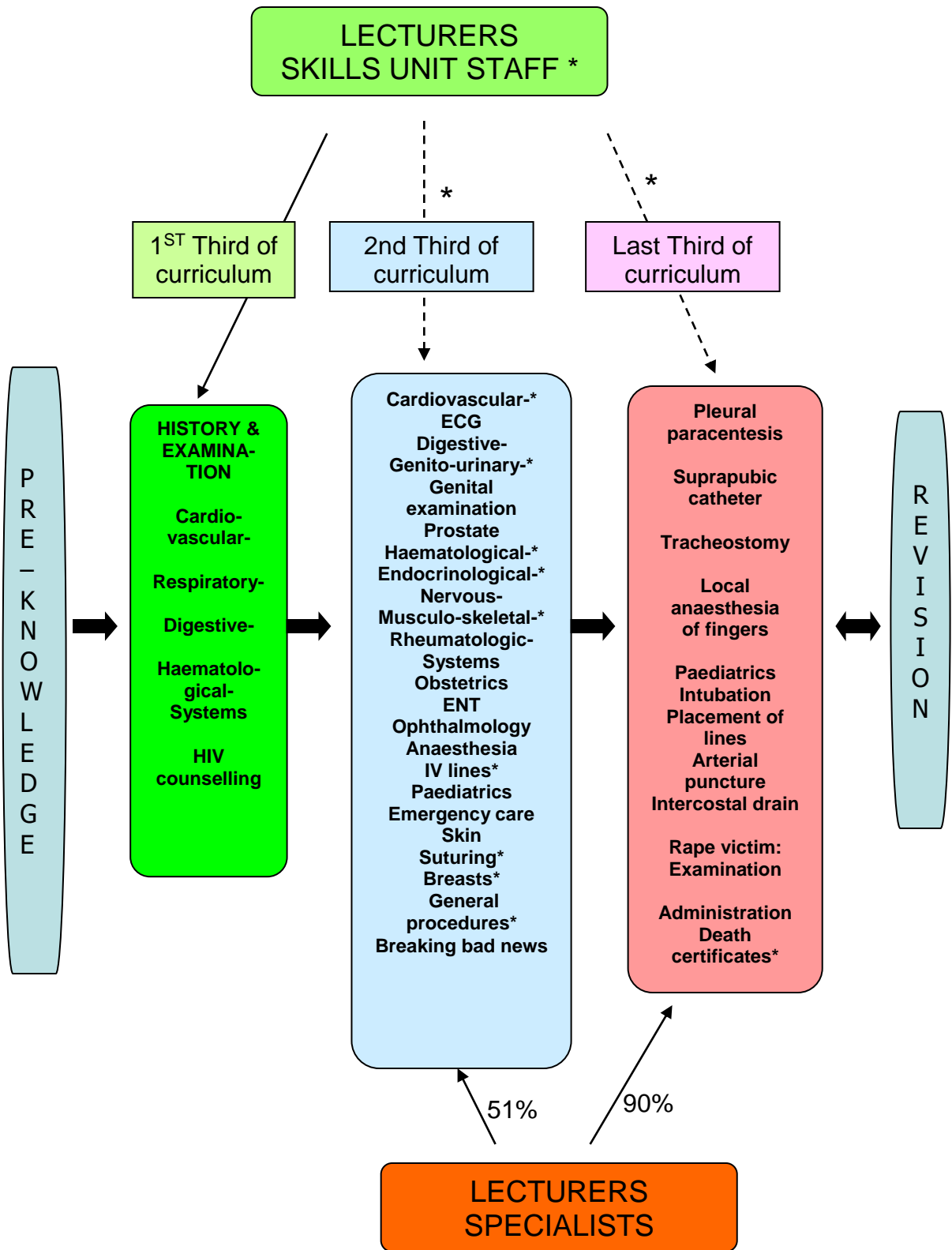


Figure 5.2.8/1: Summary of the main outcomes of the Delphi process

5.3 A COMPARISON BETWEEN THE SKILLS LABORATORY FRAMEWORK DEVELOPED BY THE DELPHI TECHNIQUE AND THE CURRICULA OF OTHER UNIVERSITIES

The topics taught by four other universities in its skills curricula are compared to those of the Delphi technique. The comparison is made to show to which extent there are similarities and also to indicate the topics in the research which are not taught by other universities. The reverse is also indicated, namely topics taught by other universities that do not feature in the framework of the Delphi research. The names of two of the universities are not disclosed as its access was subject to confidentiality.

The researcher was successful in obtaining the curricula of only two skills laboratories in South Africa. Two other South African Medical Schools promised their curricula, but did not send them. One of the universities was not prepared to let the researcher have its curriculum, even though anonymity was assured. Another university never answered the request of the researcher.

The following are comments on the universities offering a 5-year undergraduate medical curriculum whose clinical skills curricula were available:

University 1: This university makes use of the skills laboratory in all five years of their curriculum.

University 2: This university makes use of the skills laboratory only in years II and III of their five year curriculum.

University 3: The University of Leicester. The undergraduate curriculum of the University of the Free State was modelled on their five year curriculum.

University 4: The University of Manchester. Its skills laboratory curriculum stretches from year III to V.

The essential topics for the first third of the curriculum as indicated by the Delphi process are compared with the curricula of the three other universities in Table 5.3/1.

Table 5.3/1: A comparison of the essential Delphi topics in the first third of the curriculum with the curricula of different universities

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
	Year II	Semes- ters 3 and 4	1 st 2½ years	Year III
History: Taking of the general history	Yes	Yes	Yes	Yes
CARDIOVASCULAR SYSTEM				
General principles of the physical examination of the healthy patient	Yes	Yes	Yes	Yes
Vital signs: Facies, hair, nails, gait etc.	Yes	Yes	Yes	Yes
Pulses and blood pressure	Yes	Yes	Yes	Yes
Praecordium: Inspection, palpation, percussion and auscultation	Year III	Yes	Yes	Yes
RESPIRATORY SYSTEM				
Respiratory system: History	Year III	Yes and sem 5	Yes	Yes
Examination: Inspection, sputum, face, hands, thorax	Yes	Yes and sem 5	Yes	Yes
Palpation: Trachea, thorax (expansion, apex, vocal fremitus)	Year III	Yes and sem 5	Yes	Yes
Percussion	Year III	Yes and	Yes	Yes

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
	Year II	Semes- ters 3 and 4	1 st 2½ years	Year III
		sem 5		
Auscultation	Year III	Yes and sem 5	Yes	Yes
DIGESTIVE SYSTEM				
History		Yes and sem 5	Yes	No
General examination: Mass, skin, hands, nails, face, mouth, neck, chest	Yes	Yes and sem 5 and 6	Yes	No
HAEMATOLGICAL SYSTEM				
Examination: General appearance, hands and limbs, lymphatic glands, abdomen	Yes	Yes	Yes	No
HIV counselling and testing	Year V	No	No	No

The essential topics for the middle third of the curriculum as indicated by the Delphi process are compared with the curricula of the three other universities in Table 5.3/2.

Table 5.3/2: A comparison of the essential Delphi topics in the middle third of the curriculum with other universities

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
	Years III and IV	Semester 5 and 6	Years I to III	Year III
CARDIOVASCULAR SYSTEM				
ECG	Yes	Sem 4	No	Yes
Arterial circulation: examination	Yes	Sem 4	Yes	Yes
Venous circulation: examination	Yes	Sem 4	No	No
Lymphatic system: examination	Yes	Sem 4	Yes	
BREASTS				
Inspection, palpation, evaluation of lumps	Yes	Sem 5	No	Year IV
DIGESTIVE SYSTEM				
Hernias	No	Sem 5	No	Year IV
Rectal examination	Yes	Sem 4	No	Yes
Abdominal X-rays	No	No	No	Yes
GENITO-URINARY SYSTEM				
Examination: General appearance, limbs, face, neck, chest, abdomen, pelvis, secondary sexual characteristics male and female (photos)	No	Sem 4 and sem 5	Yes	Yes, year IV

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
Prostate examination	Yes	Sem 4,5	No	Yes
Male genitalia	Yes	No	No	Yes, year IV
Urethral catheterisation	Yes	Sem 4	No	Yes
Female genitalia and vaginal examination	Yes	Sem 5	No	Yes, year IV
Vaginal speculum examination	Yes	Sem 5	No	Yes, year IV
Pap smear	Yes	Sem 5	No	Yes, year IV
OBSTETRICS				
Episiotomy	No	No	No	No
Pregnant abdomen: examination	Yes	Yes	No	Yes, year IV
Normal vaginal delivery	Yes	Sem 5	No	Yes year IV
Antenatal card	Yes	Yes	No	No
Partogram	Yes	Yes	No	No
HAEMATOLOGICAL SYSTEM				
History: Anaemia, fatigue, dizziness	Yes	Yes	Yes	Yes
Haemoglobin test	Yes	Sem 4	Yes	No
Blood culture	Year II	No	No	No

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
ENDOCRINOLOGICAL SYSTEM				
History: Change of mass, bowel habits, sweating, hair distribution, menstruation, etc.	Year II	Sem 5	Yes	No
History: Diabetes	Year II	Sem 5	Yes	No
Capillary blood glucose test	Year II	Yes	Yes	Yes
Thyroid: examination for function and palpation	No	Sem 5	Yes	Yes
THE NERVOUS SYSTEM				
History	Yes	Sem 6	Yes	Yes, year IV
General examination: level of consciousness, neck stiffness, higher centres of speech	Yes	Sem 6	Yes	Yes, year IV
Parietal, temporal, frontal and occipital lobe function	Yes	Sem 6	No	Yes, year IV
Cranial nerve function	Yes	Sem 6	Yes	Yes, year IV
Motor and sensory function and reflexes, proprioception, etc.	Yes	Sem 3 and 6	Yes	Yes, year IV
Lumbar puncture	Yes	Sem 6	No	Yes, year IV
THE SKIN				
Dermatological definitions	No	Sem 3 and 5	No	No
Wet slide microscopy	No	No	No	No
Ulcers, sinuses and fistulae	No	No	No	No
Suturing techniques – basics	Yes	Sem 3	No	No

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
MUSCULO-SKELETAL SYSTEM				
Examination	Year II	Sem 3	Yes	Yes
Examination: tendons rupture	No	No	No	No
Bone: examination for abnormalities	Yes	Sem 3	Yes	Yes
Joints: examination of individual joints	Yes	Sem 3	Yes	Yes
Hands: examination	No	Yes	Yes	No
Feet: deformities	No	No	Yes	No
RHEUMATOLOGICAL SYSTEM				
Back pain, limb pain, dry eyes and mouth, red eyes, systemic symptoms	No	Yes	No	No
Examination: inspection – deformities, palpation, movement of joints.	No	Sem 3	Yes	No
EAR, NOSE AND THROAT DISEASES				
History	Yes	Sem 5	No	Yes
Ear examination	Yes	Sem 5	No	Yes
Nose and throat examination	Yes	Sem 5	No	Yes
Ear toilet	Yes	No	No	No
OPHTHALMOLOGY				
History	Yes	Sem 6	No	No

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
Examination: Snellen chart, Amsler chart, confrontation eye fields, red reflex, pupillary reactions	Yes vision	No	No	No
Ophthalmoscopy	Yes	Yes	No	Yes, year IV
ANAESTHESIA				
Intubation	Year V	Sem 5	No	Yes
Infusions/intravenous cannula	Year II	Sem 3 and 5	No	Yes
PAEDIATRICS				
History	No	Sem 3 and 6	No	Yes, year IV
Technique of examination + systemic examination	No	Sem 3	No	Yes, year IV
Neonatal examination	Yes	Sem 3	No	Yes, year IV
Neurological examination	No	Sem 3 and 6	No	Yes, year IV
Child development	Yes	Sem 3	No	Yes, year IV
EMERGENCY CARE				
Primary examination and resuscitation of the trauma patient	Year II	Yes	No	No
Secondary evaluation of the trauma patient	Year II	Yes	No	No
Use of spine board and splints	Year II	Yes	No	No

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
Wound care and dressings and bandaging	Year II	Yes	No	Yes
Shock	Yes	Yes	No	No
Heimlich manoeuvre	Yes	Yes	No	No
Nasogastric intubation	Yes	No	No	Yes
GENERAL PROCEDURES				
Handwashing and gowning for theatre	Yes	Sem 3 and 5	No	Yes
Injections intramuscular and subcutaneous	Year II	Sem 3	No	Yes
SOAP system for examination and notes	No	Sem 4 and 6	No	Yes

The essential topics for the last third of the curriculum as indicated by the Delphi process are compared with the curricula of the three other universities in Table 5.3/3.

Table 5.3/3: A comparison of the essential Delphi topics with other universities in the last third of the curriculum

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
RESPIRATORY SYSTEM				
Pleural tap	Yes	No	No	No
DIGESTIVE SYSTEM				
Proctoscopy and sigmoidoscopy	No	No	No	Yes, year III

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
GENITO-URINARY SYSTEM				
Suprapubic catheter	No	No	No	No
OBSTETRICS AND GYNAECOLOGY				
Rape victim: examination	No	No	No	No
EAR, NOSE AND THROAT				
Tracheostomy	No	No	No	No
ANAESTHESIA				
Ring block fingers	No	No	No	No
PAEDIATRICS				
Intubation	Year III	No	No	No
Placement of IV lines (scalp veins, peripheral, tibia, umbilical)	Yes	No	No	
Arterial puncture	Year III	No	No	Yes
Intercostal drain	Yes	Yes	No	No
ADMINISTRATIVE				
Death certificate - completion	No	No	No	Yes, Year V

The essential topics as indicated by the Delphi process but with no consensus on the time frame are compared with the curricula of the three other universities in Table 5.3/4.

Table 5.3/4: A comparison of the essential Delphi topics with no time frame consensus in the curriculum with other universities

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
CARDIOVASCULAR SYSTEM				
Appropriate history	No	Sem 3	Yes	Year III
DIGESTIVE SYSTEM				
Examination: Abdomen	Year III	Sem 4	Yes	Year III
GENITO-URINARY				
Dipsticks and microscopy	Year II	Sem 4	No	Yes, Year III
History: Urinary obstruction, incontinence, menstruation	No	Sem 5	No	No
GYNAECOLOGY				
IUD insertion	Year IV	Yes	No	No

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
OPHTHALMOLOGY				
Ocular pressure (Schiotz tonometer)	No	No	No	No
Foreign object in eye	No	No	No	No
ANAESTHESIA				
CPR	Year II	Sem 5	No	Yes, year III
Defibrillation/dysrhythms	Year II	Sem 5	No	Yes, year III
PAEDIATRICS				
Road to health card: completion	No	No	No	No
THE SKIN				
Benign and malignant lesions	No	No	No	No
EAR, NOSE AND THROAT SYSTEM				
Cryothyroidotomy	Year IV	Sem 5	No	No
Nose bleed	No	No	No	No
EMERGENCY CARE				
Tension pneumothorax	Year IV	Sem 5	No	No
Splinting of fractures	Year II	Sem 5	No	No
GENERAL				
Language	No	No	No	No
Visits to wards	No	Yes	No	No

The useful topics as indicated by the Delphi process are compared with the curricula of the three other universities in Table 5.3/5.

Table 5.3/5: A comparison of the useful but not essential Delphi topics with other universities

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
RESPIRATORY SYSTEM				
Pleural biopsy	No	No	No	No
DIGESTIVE SYSTEM				
Proctoscopy	No	No	No	Yes, year III
Sigmoidoscopy (last 1/3)	No	No	No	No
UROLOGY				
Orchidometer	No	No	No	No
HAEMATOLOGICAL SYSTEM				
Blood slide (middle 1/3)	No	Sem 4	No	No
Bone marrow puncture (video) (middle 1/3)	No	Yes	No	No
SYNDROMES OF SHORT STATURE				
Turner; Downs; Rickets (middle 1/3)	No	No	No	No

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
THE SKIN				
Wood's light (indication on curriculum)	No	No	No	No
ANAESTHESIA				
Spinal injection simulator – spinals and epidurals; sacral block (last 1/3)	No	No	No	No

The topics with no consensus on importance as indicated by the Delphi process are compared with the curricula of the three other universities in Table 5.3/6.

Table 5.3/6: A comparison of the topics with other universities with no consensus on importance for the skills unit

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
RESPIRATORY SYSTEM				
Chest X-rays (middle 1/3)	Year V	Sem 6	No	Yes, year III

DELPHI SELECTION	UNIV 1	UNIV 2	UNIV 3	UNIV 4
PARATHRYOIDS				
Examination: Hyper- and hypo-function (middle 1/3)	No	No	No	No
THE SKIN				
Biopsy techniques (last 1/3)	No	No	No	No
DIGESTIVE SYSTEM				
Ascitic fluid paracentesis (last 1/3)	No	No	No	No
GENERAL				
Stock exchange (indication on curriculum)	No	No	No	No
PAEDIATRICS				
Urine sampling in children (indication on curriculum)	No	No	No	No

The topics which were not included in the questionnaire for the Delphi process but taught by different universities in their undergraduate skills curriculum are depicted in Table 5.3/7.

Table 5.3/7: Topics not included in the Delphi but taught by different universities

TOPICS NOT IN THE DELPHI	UNIV 1	UNIV 2	UNIV 3	UNIV 4
	Year II	Year II		
Administering insulin	Yes	No	No	No
Blood sampling/Venesection	Yes	Yes	No	Yes
Burn wounds	No	Yes	No	No
Circumcision	No	Yes	No	No
Emergency delivery	Yes	No	No	No
Preparing hydration fluids	Yes	No	No	No
Purification of drinking water	Yes	No	No	No
X-rays back	No	Yes	No	Yes, year IV
X-rays limbs	No	Yes	No	Yes, year IV
	Year III			
Amnio-infusion	Yes	No	No	No
Dermatological history	No	Yes, year II	No	No
Dermatological examination	No	Yes, year II	No	No
Examination of the placenta	Yes	No	No	No
Gastric lavage	Yes	No	No	No
Immunisation Hepatitis B	No	Yes	No	No
Inhalation therapy	Yes	No	No	Yes, year III
Measuring of central venous pressure	Yes	No	No	No

TOPICS NOT IN THE DELPHI	UNIV 1	UNIV 2	UNIV 3	UNIV 4
Neonatology: APGAR scoring, Ballard assessment, intravenous infusion	Yes	Yes	No	No
Oxygen therapy	Yes	Yes	No	No
Pregnancy: RPR, pregnancy test, Rh, HIV, Ferning test*	Yes	No	No	No
Rinne and Weber test for deafness	No	Yes	No	No
Umbilical vein catheterisation, Phototherapy	Yes	No	No	No
	Year IV			
Bladder irrigation	Yes	No	No	No
Indirect laryngoscopy	Yes	Yes	No	No
LOCOMOTOR SYSTEM				
Aspiration of knee joint	Yes	No	No	Yes
Halter neck traction	Yes	No	No	No
Injection for lateral and medial epicondylitis	Yes	No	No	No
Subacromial bursa injection	Yes	No	No	No
	Year V			
TRAUMATOLOGY				
Assessment of head injuries	Yes	Yes	No	No
Casts	Yes	No	No	No
Cricothyroidotomy	Yes	Yes sem 5	No	No

TOPICS NOT IN THE DELPHI	UNIV 1	UNIV 2	UNIV 3	UNIV 4
Glasgow coma scale	Yes	Yes	No	Yes
Helmet removal	Yes	No	No	No
Interpret CT scan	Yes	No	No	No
Interpretation of chest X-rays for chest trauma	Yes	No	No	Yes
Monitor response to fluid		Yes	No	No
Monitor trends of vital signs: lactate, acid-base, CPK, myoglobin*	Yes	No	No	No
Oxygen monitoring – pulse oximeter	Yes	No	No	No
Venous cut down	Yes	No	No	No
Peak flow measurement	No	No	No	Yes
Nebuliser use	No	No	No	Yes
Substance abuse history	No	No	No	Yes
Psychiatric history	No	Yes	Yes	Yes
Sexual history	No	Yes	Yes	Yes
Mental state examination	No	No	Yes	Yes
Anxious or angry patient	No	Yes	Yes	Yes
Pleural aspiration	No	No	No	Yes
Terminal care – construct a management plan	No	No	No	Yes

These topics were not included in the Delphi technique, as the curricula of the other centres were not available when the questionnaires for the pilot study and the questionnaire survey were compiled.

5.4 CONCLUSION

The Delphi study indicated which topics should be taught and practised in the undergraduate curriculum for a skills laboratory. Some of the topics did not reach 80% consensus as essential, but those which reached a 60% agreement should also be considered to be included in the framework of the curriculum.

The taking of the history of the different systems is an important aspect of practical skills, although if the students have already been taught to take a general history in the skills laboratory and if they had the opportunity to practise it in the skills unit, then the history taking of the different systems can be done in a lecture hall.

The time frame in the curriculum where specific topics could be taught was also indicated by the Delphi study, as well as who the lecturer or lecturers should be.

In Chapter 6 a critical analysis of the whole Delphi technique will be made, while Chapter 6 will also contain the final recommendations on a framework for a skills laboratory.

CHAPTER 6

CONCLUSION, RECOMMENDATIONS AND FINAL FRAMEWORK

6.1 INTRODUCTION

The framework presented in Chapter 5 (cf. 5.2) was developed with the aim to provide a guideline for an undergraduate medical curriculum for skills laboratory teaching. The potential value, the limitations, recommendations, implementation, and practical application of this framework will be discussed in this chapter.

6.2 THE SIGNIFICANCE OF THE STUDY

6.2.1 The Delphi panel and process

A framework has now been established for an undergraduate skills laboratory curriculum applicable to South African conditions. This framework

may be regarded as adequate to achieve the desired outcomes in clinical methods teaching and learning, as a panel of South African experts from five different medical schools involved with the teaching of skills participated in the Delphi process.

The Delphi panel made valuable contributions concerning a comprehensive range of topics that may be taught in a skills laboratory. The recommendations of the panel on additional topics that were added, were invaluable. Anonymity was ensured and bias was limited, since the panel members did not know who the other members were or of which medical schools they were personnel to. The participants therefore could not influence one another. Anonymity also prevented social or emotional interaction (Clayton 1997:375).

When members of the Delphi panel are from different clinical disciplines, it may be difficult to reach consensus, but in this study all were interested and actively involved in the teaching of clinical skills to medical students. Only practising clinicians and/or heads of clinical skills laboratories were invited to establish the seven-member Delphi panel for this study. All but one of the panel members were actively involved in skills laboratories. Of the seven panel members, six were medical doctors and one a registered nurse practitioner. Five of the seven panel members were actively involved in running a skills laboratory. This is a strong point, as all panel members had

the same reference framework. In this way the limitations of background and experience were reduced to a minimum.

Researcher bias was limited due to the fact that the responses of the participants had to be noted on a template after each round and only the researcher analysed and collated the questionnaire results.

6.2.2 Value of the questionnaire survey

The heads of different disciplines at the Medical School of the UFS who had participated in the questionnaire survey individually made comments and recommendations not only on topics, but also on the way the skills course should be organised and presented (cf. Table 4.4.5.1/1; Table 4.4.5.2/1; Table 4.4.5.3/1). They suggested that the students should not only have a sound knowledge of the basic physiology, anatomy and pathology before they could be taught clinical examination skills and procedures, but they also had to have knowledge of the normal radiology when the chest examination was taught. The clinical examinations of the normal must be taught in the skills unit and that of the abnormal at the bedside or in outpatient departments. When intimate physical examinations and invasive procedures are taught, the skills laboratory should make use of models and photos before a limited number of students (not more than three students) examine

a patient in the hospital. Another recommendation was that the skills unit should be freely available and accessible to disciplines and students on an appointment basis so that the acquiring of skills can be a continuous process throughout the whole curriculum. These inputs, especially on the running of a skills laboratory, may also be used productively when planning the way a skills unit curriculum is presented (cf. 4.4.2).

Bias in the questionnaire survey was also limited, as the participants were anonymous and the questionnaire was analysed by the Department of Biostatistics.

6.3 THE LIMITATIONS OF THE STUDY

The following limitations can be attributed to the Delphi technique (cf. 3.2.6).

6.3.1 Time used to complete and return questionnaires

The time spent to consider, complete and return the questionnaires varied from one day to as long as six weeks. The participants who responded immediately, had to wait up to six weeks before the next questionnaire could be sent to them. The long period of waiting between questionnaires, could

have been demoralising to the respondents. This could also have influence on their subsequent responses that might be less accurate than with immediate feedback. The researcher reminded two participants who were slow in responding, by e-mail and per telephone, with subsequent response.

6.3.2 Feedback to the panel

The researcher gave feedback only on the response of the group as a whole and not on the answers of the individual respondents. If the participants did not retain copies of their own questionnaires for reference, it could happen that they changed some of their choices unknowingly. The advantage of sending the questionnaire by e-mail was that there was a copy of the previous round readily available. In the first and third rounds, all members of the panel received hard copies as well as e-mail copies of the questionnaire.

6.3.3 Diverse backgrounds of the panel members

The diverse background of each panel member may also have introduced some bias in evaluating each question, as some had already been working in a well-established skills laboratory for a number of years, while others only recently started working in a skills unit. The backgrounds differed in that one of the participants was a physician, another one was a registered trauma nurse, four were general practitioners, and one was a generalist who had

never worked in a general practice. It is conceivable that the backgrounds of the participants could play a role in their approach and ideas of topics that should be taught in a skills laboratory. This is not necessarily a disadvantage because all of them are involved in skill laboratory teaching.

6.3.4 Panel members who dropped out

The two panel members who dropped out of the Delphi technique, one after the first round and the other after the second round, decreased the reliability of the results, although the five who remained were regarded as adequate for the Delphi technique according to Delbecq (as quoted by Clayton 1997:377)

6.3.5 The significance of topics for the skills laboratory

Not all topics proposed were suitable for a skills laboratory. Some of the topics, when presented in a lecture hall, would be less time-consuming and not necessarily less effective than when taught in the skills laboratory, for example taking the histories of the different systems. The art of history-taking and communication skills are well suited to be demonstrated and developed in a skills laboratory by simulated patients. Some topics indicated as essential are not suited for and cannot be taught in a skills unit, such as palpating an enlarged liver or spleen, or examining an inguinal hernia. These

are best taught on patients. Although a patient may be taken to the skills unit for demonstration purposes, it is not feasible for a large number of students to examine a single patient. A skills laboratory can therefore not replace the bedside teaching of small groups of students.

The topics that are important and marked as essential but not suitable for a skills unit, should rather be presented in another venue, such as a lecture hall or during ward rounds. These topics are listed in Table 6.3.5/1.

Table 6.3.5/1: Topics to be taught in other venues

TOPIC	SUGGESTED VENUE
Pneumonia – clinical signs	Ward rounds or outpatients
Tension pneumothorax and pathological lung signs	Ward rounds or outpatients
Hepato-splenomegaly	Ward rounds
Skin ulcers and sinuses	Outpatients and ward rounds
Rheumatologic examination	Outpatients
Child development	Outpatients and ward rounds
Tracheostomy	Cadavers and animal models
Language teaching	Language laboratory
Visits to wards	Wards

Another weak point is that some of the questions addressed more than one topic and if one of the topics was regarded as inappropriate, the other was

also excluded. The following four topics could have been ambiguous for this reason. These topics are depicted in Table 6.3.5/2:

Table 6.3.5/2: Ambiguous topics

No.	TOPIC	COMMENTS
26	Proctoscopy and sigmoidoscopy	Proctoscopy could be essential unlike the sigmoidoscopy.
76	Ophthalmologic examination: Snellen chart, Amsler chart, confrontation eye fields, red reflex, pupil reactions	The Amsler chart could have been regarded as inappropriate.
84	Spinal injection simulator – spinals; epidurals; sacral block	Spinal injection may be regarded as important, while epidural injection could be regarded as a postgraduate skill.
92	Paediatric: Placement of IV lines (scalp vein line, peripheral, umbilical)	The different sites for line placement as separate topics would have been better.

6.3.6 Topics not included in the Delphi questionnaire but included by other medical schools in their clinical skills curricula

There are additional topics used by other medical schools that should be considered for skills laboratory training and which should be individually considered (cf. Table 5.3/7). This too is a weak point in the research. The researcher discovered many of these topics on the Internet after the Delphi process had already been running. Some of these were introduced on the Internet as late as in 2004 and 2005 for the first time (cf. 2.8.2; Mayo Clinic College of Medicine 2005; University of Newcastle upon Tyne 2004; Hasanuddin University Indonesia 2005; University of Louisville 2005; Indiana University School of Medicine 2004; City University London 2005). Because of their importance, these topics (cf. Table 5.3/7) were included in the final framework.

6.3.7 Topics identified by work groups which were not included in the Delphi questionnaire

In 2004 a work group of the Orthopaedic Association of South Africa made recommendations for a number of skills which should be mastered by medical students before qualifying (cf. 2.2; South African Orthopaedic Association 2004:38-44). Unfortunately this report was not available for the Delphi research, which was already taking place in 2004. Similarly, a work

group from the Department of Health published a report on skills needed by doctors working in rural areas. Although published in 2000, the researcher only came across this report after the Delphi technique had already been concluded. This is an "In House" report from the National Department of Health and it was brought to the attention of the researcher by a member of the Health Professions Board of South Africa (cf. Table 2.2/6; Claassen *et al.* 2000:13). Topics from both these reports were also included in the final framework.

6.4 FINAL FRAMEWORK AND RECOMMENDATIONS

For the final framework, the framework designed in Chapter 5 was adapted by inter alia the addition of useful topics included in the curricula from different medical schools. In this way a final framework is produced for a skills laboratory curriculum in an undergraduate medical programme in South Africa. This framework is indicated in Table 6.4.1/1, Table 6.4.1/2 and Table 6.4.1/3.

6.4.1 THE FINAL FRAMEWORK

The topics to be taught in the first third of the curriculum are listed in Table 6.4.1/1. Skills better suited for teaching in a skills laboratory are marked with an asterix (*).

Table 6.4.1/1: Final framework for a skills curriculum for the first third of the curriculum

TOPICS FIRST THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
History: Communication skills and the taking of the general history*		X
CARDIOVASCULAR SYSTEM		
Cardiovascular history		X
General principles of the physical examination of the healthy patient*		X
Vital signs: Facies, hair, nails, gait, temperature, etc.*		X
Pulses and blood pressure*		X
Precordium: Inspection, palpation, percussion and auscultation*		X
RESPIRATORY SYSTEM		
Respiratory system: History		X
Examination: Inspection, sputum, face, hands, thorax*		X
Jugular venous pressure*		X
Palpation: Trachea, thorax (expansion, apex, vocal fremitus)		X

TOPICS FIRST THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
Percussion		X
Auscultation		X
DIGESTIVE SYSTEM		
Digestive system: History		X
General examination: Mass, skin, hands, nails, face, mouth, neck, chest		X
Abdominal examination: Palpation, percussion and auscultation		X
GENITO-URINARY TRACT		
History: Infection		X
Urine dipsticks and microscopy*		X
GENERAL PROCEDURES		
Hepatitis B immunization*		X

Comments: All the topics designated for the first third of the curriculum are mostly the general history of the different systems as well as the general physical examination.

The essential topics indicated to be taught in the middle third of the curriculum are listed in Table 6.4.1/2.

Table 6.4.1/2: Topics to be taught in a skills laboratory in the middle third of the curriculum

TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
HAEMATOLOGICAL SYSTEM		
Haematological system: history	X	
Examination: general appearance of hands and limbs, lymphatic glands, abdomen		X
HIV counselling and testing*		X
CARDIOVASCULAR SYSTEM		
Cardiovascular: applied history	X	X
ECG: perform an ECG*		X
ECG: interpretation	X	
Chest X-rays: cardiac and lung conditions*	X	X
Arterial circulation: examination*		X
Venous system: examination		X
Lymphatic system: examination		X
Examination of the heart: auscultation – abnormal heart sounds	X	X
BREASTS		
Inspection, palpation, evaluation of lumps*		X

TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
DIGESTIVE SYSTEM		
Hernias: Examination	X	X
Abdominal X-rays*	X	X
Proctoscopy*		X
GENITO-URINARY SYSTEM		
Examination: General appearance, limbs, face, neck, chest, abdomen, pelvis, secondary sexual characteristics - male and female (photos)*	X	
Prostate examination*	X	X
Male genitalia: History	X	
Testicular examination*	X	X
Rectal examination*	X	X
Urethral catheterisation*		X
Female genitalia: History	X	
Female genitalia and vaginal examination*		X
Vaginal speculum examination*		X
Pap smear*		X
IUD insertion*		X
OBSTETRICS		
Pregnancy test, Ferning test*		X
Antenatal card*		X

TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
Partogram*	X	X
Pregnant abdomen: examination *	X	X
Normal vaginal delivery*	X	X
Episiotomy	X	X
HAEMATOLOGICAL SYSTEM		
History: Anaemia, fatigue, dizziness		X
Haemoglobin test*		X
Blood group and Rh rapid tests*		X
Blood culture		X
ENDOCRINOLOGICAL SYSTEM		
History: Change of mass, bowel habits, sweating, hair distribution, skin pigmentation, potency, menstruation, urine.		X
History: Diabetes		X
Capillary blood glucose test		X
Thyroid: examination for function and palpation		X
THE NERVOUS SYSTEM		
History	X	
General examination: level of consciousness, neck stiffness, higher centres of speech		X
Parietal, temporal, frontal and occipital lobe function*	X	
Cranial nerve function*	X	

TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
Motor and sensory function and reflexes, proprioception, etc.*	X	
Lumbar puncture	X	X
THE SKIN		
Dermatological definitions	X	
Wet slide microscopy	X	
Ulcers, sinuses and fistulae	X	
Suturing techniques – basics*		X
The safety measures for sharp instruments*		X
Benign and malignant lesions	X	
MUSCULO-SKELETAL SYSTEM		
Examination*	X	X
Examination: tendons rupture	X	
Bone: examination for abnormalities	X	
Joints: examination of individual joints	X	X
Hands: examination	X	X
Feet: deformities	X	
RHEUMATOLOGICAL SYSTEM		
History	X	
Back pain, limb pain, dry eyes and mouth, red eyes, systemic symptoms	X	
Examination: inspection – deformities, palpation, movement of joints	X	

TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
EAR, NOSE AND THROAT DISEASES		
History	X	
Ear examination*		X
Nose and throat examination*		X
Ear toilet	X	
Test for deafness: Include Rinne and Weber tests*	X	
Nose bleed: Epistaxis - evaluation and management *	X	X
OPHTHALMOLOGY		
History	X	
Examination: Snellen chart, Amsler chart, confrontation eye fields, red reflex, pupillary reactions*	X	X
Pinhole test*	X	X
Ophthalmoscopy*	X	X
ANAESTHESIA		
Intubation*	X	X
Infusions/intravenous cannula*		X
PAEDIATRICS		
Road to health card: completion*		X
History	X	
Technique of examination and systemic examination *	X	
Neonatal examination*	X	
Neurological examination*	X	
Child development*	X	

TOPICS MIDDLE THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
Intubation*	X	X
Phototherapy		X
Paediatric basic life support*	X	X
EMERGENCY CARE		
CPR*	X	X
Adult basic and advanced life support*	X	
Primary examination and resuscitation of the trauma patient *	X	
Secondary evaluation of the trauma patient*	X	
Use of spine board and splints and immobilisation before transport*	X	
Wound care and dressings and bandaging*		X
Shock	X	
Heimlich manoeuvre*		X
Nasogastric intubation*		X
Gastric lavage		X
Splinting of fractures*	X	
GENERAL PROCEDURES		
Hand washing and gowning for theatre*		X
Injections intramuscular and subcutaneous*		X
Venesection and i.v. infusions*		X
SOAP system for examination and notes*		X
	X	
HIV test and counselling*		X

Legend: Where X is indicated for both the specialist as well the skill laboratory teacher, it implies that the latter can also teach the skill if experienced and skilled.

Topics which are identified to be taught in the last third of the curriculum are listed in Table 6.4.1/3

Table 6.4.1/3: Essential topics to be taught in the last third of the curriculum in a skills laboratory

ESSENTIAL TOPICS LAST THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
RESPIRATORY SYSTEM		
Tension pneumothorax: diagnosis and treatment	X	X
Pleural paracentesis	X	X
GENITO-URINARY SYSTEM		
Suprapubic catheter	X	
OBSTETRICS AND GYNAECOLOGY		
Rape victim: examination	X	
GASTRO-INTESTINAL SYSTEM		
Paracentesis of ascites fluid	X	

ESSENTIAL TOPICS LAST THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
ANAESTHESIA		
Tracheostomy	X	
Cricothyroidotomy*	X	X
Central venous line placing and measurement of central venous pressure*	X	
Ring block of fingers and local anaesthetic procedures*		X
Dysrhythms and defibrillation*	X	
GASTRO-INTESTINAL SYSTEM		
Paracentesis of Ascites fluid	X	X
PAEDIATRICS		
Intubation*	X	X
Placement of IV lines (scalp veins, peripheral, tibia, umbilical)*	X	
Arterial puncture	X	
Intercostal drain	X	
Urine sampling in children*	X	X
OPHTHALMOLOGY		
Ocular pressure (Schiotz tonometer)*	X	

ESSENTIAL TOPICS LAST THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
Foreign object in the eye*	X	
DERMATOLOGY		
Wood's light	X	
Biopsy techniques	X	
GENERAL PROCEDURES		
Breaking bad news*		X
Handling the terminal patient *	X	
Handling an aggressive patient*		X
Administering Insulin*		X
RADIOLOGY		
X-rays of the spine*	X	X
X-rays of the limbs*	X	X
ADMINISTRATIVE PROCEDURES		
Death certificate – completion*		X
Notification of infectious disease*		X
Certification of psychiatric patients*	X	

ESSENTIAL TOPICS LAST THIRD OF CURRICULUM	LECTURER	
	Specialist	Skills lab
Sickness certification*		X
TRAUMA AND EMERGENCIES		
Assessment of head injuries + Glasgow coma scale*	X	
Applying of casts for fractures*		X
Treatment of the shocked patient and the monitoring of fluid replacement	X	
Oxygen monitoring – the pulse oximeter*		X
The emergency treatment of muscle, tendon and nerve injuries	X	

Comments: The topics indicated for the last third of the curriculum are more complicated or complex skills which should be taught to the more senior students who have the opportunity to come into contact with actual patients.

This framework provides a clear guide of the topics which should be taught in a skills laboratory in South Africa, the most suitable time slot in the undergraduate medical curriculum as well as who the lecturer should be. This framework should empower lecturers to compile a curriculum for a skills laboratory.

In medical schools having a shortage of staff, the specialist discipline can initially introduce the topic to the whole class and then skills laboratory personnel can continue with small groups in the unit.

Skills, such as some operations - for example appendicectomies, caesarean sections, ectopic pregnancies, and general and local anaesthetics - that are often required to be done by recently qualified medical practitioners, are problematic and require sophisticated equipment to be taught in a skills laboratory. These procedures should rather be taught in the clinical years and during the internship (clerkship). In South Africa, where the doctors have to do community service, many of them are required to do these procedures without supervision. It is therefore imperative that the students should know the relevant anatomy and pathology as well as the protocols used in operation theatres. The skills laboratory can be of assistance in making sure that students are well trained in basic procedures such as resuscitation skills, the use of instruments and sterility.

Resuscitation and life support skills are an integral part of a number of curricula, while a certification in basic and advanced life support is a recommendation (cf. Sanders *et al.* 2004:875; Louisiana State University Health Sciences Center New Orleans 2002:1).

The skills laboratory ideally has to be equipped with appropriate information technology (IT) links and it has to have a large area with a number of cubicles where students can do assessment on computer questionnaires and revision of individual skills or procedures of which they feel uncertain. (Freeth, De Santiago, & Chaput 2000:396). This facility is not available in all skills units. As an example, the skills unit of the School of Medicine at the UFS does not have computers for students in the unit, but there are 70 computers in a venue in the same building which should be used for revision and self-assessment by the students. For developing countries (South Africa included) where financial constraints are a hurdle, it is not necessary to fit the skills laboratory with a simulated emergency room, ICU unit or a simulated ward as mentioned in Chapter 2 (cf. 2.3; Dent 2001:484; Wilson & Jennet 1997:45), as the students will have ample time in their clinical rotations to do ward visits and work in emergency departments.

As stated by Bradley (1999:216), retention of information and skills by students is a problem, especially when the skills are introduced too early in the curriculum. The training later in the curriculum and skills training in the clinical years should overcome the problem of retention. It must be emphasised that skills laboratory training is an ongoing process and should continue into the clinical years of the undergraduate medical student. It should actually be seen as an essential component of Continued Medical Education (CME).

Skills training should also run parallel with system-modules. This implies careful coordination with all disciplines.

The manikins available in most skills units also have a limited shelf life, such as the arms for venesection that are punctured so often that artificial skin has to be replaced regularly. On the other hand, improvising models for venesection is not expensive and can be used to give the arms a longer life. So, when the expensive manikins cannot be afforded, improvisation up to a certain extent can be utilised and the training in the skills laboratory should then be limited to basic training. The more specialised training such as resuscitation of specific conditions, for example myocardial infarction or a life threatening asthma, have to be done during rotations in the emergency departments.

6.4.2 Recommendations on the implementation of the skills curriculum framework

The head of the skills unit should initially confer with the heads of departments by first presenting the framework and giving an overview of the possibilities for teaching as well as the facilities in the skills unit. There should then be an agreement on which topics they would prefer to teach in

the skills laboratory and which topics the skills unit personnel should teach as well as the appropriate timing of the sessions.

When planning a skills unit, it is important to first decide which skills are going to be taught and if/and when patients are going to be brought to the unit or not. The ideal is, as Ledingham and Dent (2001:90) state, that it should be accessible to all major users as well as to patients.

6.5 POTENTIAL PROBLEMS FOR IMPLEMENTATION

To implement all the topics included in the Delphi process, adequate numbers of dedicated lecturers in the skills laboratory and the full commitment of the clinical disciplines are mandatory.

One of the problems experienced locally, is resistance from clinicians to buy into a skills unit (Personal experience from meetings with clinicians in 2005). Clinicians prefer to teach students at the bedside rather than in a skills unit. This may be because they are not aware of all the advantages of the skills unit or they do not know which equipment in the form of manikins, videos and other training materials are available (Du Boulay & Medway 1999:188).

A skills laboratory should have enough personnel such as mentioned by Bradley and Postlethwaite (cf. 2.4; Bradley & Postlethwaite 2003:10), for

example a manager/an administrator, and a patient/simulated patient coordinator, who is responsible for maintaining a database of real patients and simulated patients who will be used in teaching and assessment of clinical skills. Receptionists/secretaries and a technician, to maintain and ensure availability of models, manikins, clinical and diagnostic and also therapeutic equipment, are necessary (Bradley & Postlethwaite 2003:10). If the laboratory does not have enough personnel, then some topics will have to be excluded and only the more important skills should receive attention, such as those proposed by the British General Medical Council (GMC 1993:13) and Ledingham and Dent (2001:87,88), namely communication and history-taking, as well as skills for which manikins and teaching material are available.

Financial constraints are always a problem to implement a full curriculum, even though there are numerous ways to improvise. This should not be a deterrent to perform as many skills as possible in the skills laboratory.

6.6 CONCLUDING REMARKS

A framework for undergraduate medical teaching in a skills laboratory in South Africa has been developed mainly by means of the Delphi technique. This should not be regarded as the only or the best framework. This framework should not be seen as a final product, but rather as the beginning of a process to produce an undergraduate clinical skills curriculum that may eventually be embraced by most medical schools in South Africa.

The fulfilment of this ideal may be aptly summarised in the following quotation:

"Medical practice is not knitting and weaving and the labour of the hands, but it must be inspired with soul and filled with understanding and equipped with the gift of keen observation; these together with accurate scientific knowledge are the indispensable requisites for proficient medical practice (Moses ben Maimon) as quoted by Murtagh 1999:3)."

Soli Gloria Deo

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QUESTIONNAIRE FOR THE PILOT STUDY

TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
	1	2	3	3	4	5			6	YES		
GENERAL APPROACH												<input type="checkbox"/> <input type="checkbox"/> 1-2
1 History taking of all systems	1	2	3	3	4	5	6		YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 3 - 6
CARDIOVASCULAR SYSTEM												
2 General principles of the physical examination of the healthy patient: appearance (BMI, Anthropometry); vital signs; facies; hair; nails, etc. hair; hands; nails, etc.												<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 7-10
3 Pulses and blood pressure	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 11-14
4 Cardiovascular system: appropriate history; pulses; blood pressure; carotid arteries; jugular venous pressure.								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 15-18
5 Precordium: inspection; palpation; percussion; auscultation								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 19-22
6 Abnormal heart sounds and murmurs	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 23-26
7 Chest X-rays: cardiac and lung conditions								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 27-30
8 ECG	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 31-34
ARTERIES VEINS AND LYMPHATICS												
9 Clinical evaluation of arterial circulation of a limb	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 35-38
10 Clinical evaluation of the venous circulation of the lower limb	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 39-42
11 Examination of the lymphatic system	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 43-46

QUESTIONNAIRE FOR THE PILOT STUDY

	TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
		1	2	3	3	4	5			6	Where:		
	RESPIRATORY SYSTEM												
12	History								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 47-50
13	Inspection; sputum; hands; face; thorax								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 51-54
14	Palpation: trachea; thorax; (expansion; apex; vocal fremitus)								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 55-59
15	Percussion								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 59-62
16	Auscultation								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 62-65
17	Lung functions								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 66-69
	MAMMAE												
18	Inspection; palpation; evaluation of lumps								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 70-73
	DIGESTIVE SYSTEM												
19	History								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 74-77
20	Appropriate history: pain; weight loss; nausea and vomiting; diarrhoea; etc.								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 78-81
21	Examination: inspection; palpation; percussion; auscultation								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1-4
22	General: mass; skin; hands; nails; face; mouth; neck; chest								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5-8
23	Abdomen; inspection; palpation; percussion; auscultation (techniques)								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

QUESTIONNAIRE FOR THE PILOT STUDY

	TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
		1	2	3	4	5	6			Where:	YES		
24	Hernias: history and examination	1	2	3	3	4	5	6	Where:	YES	NO		
25	Rectal examination	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 9-12
26	Proctoscopy and sigmoidoscopy												
		1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 13-16
27	Urine Examination Dipsticks and microscopy												
		1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 17-20
28	Abdominal X-rays	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 21-24
GENITO-URINARY SYSTEM													
29	History: urinary obstruction; incontinence; menstruation												
		1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 25-28
30	Examination: general appearance; limbs; face; neck; chest; abdomen; pelvis												
		1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 29-32
31	Prostate: examination												
		1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 33-36
32	Male genitalia	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 37-40
33	Urethral catheterisation	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 41-44
34	Female genitalia and vaginal examination	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 45-48
35	Vaginal speculum examination												
		1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 49-52
OBSTETRICS													
36	Ante- and post natal visit	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 53-56
37	Examination of pregnant abdomen	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 57-60

QUESTIONNAIRE FOR THE PILOT STUDY

	TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
		1	2	3	3	4	5			6	Where:		
38	Vaginal deliveries								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 61-64
39	Episiotomy								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 65-68
40	Breastfeeding								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 69-72
HAEMATOLOGICAL SYSTEM													
41	History: anaemia; fatigue; dizziness								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 73-76
42	Examination: general appearance; hands and limbs; lymphatic glands; abdomen								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1-4
43	Haemoglobin test								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5-8
44	Blood group and Rh determination								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 9-12
45	Blood slide								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 13-16
46	Bone marrow puncture								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 17-20
ENDOCRINOLOGICAL SYSTEM													
47	History: change in weight; bowel habits; sweating; hair distribution; energy; skin pigmentation; potency; menstruation; urine.								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 21-24
THYROID													
48	Examination for hyper- hypothyroidism, nodules								Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

QUESTIONNAIRE FOR THE PILOT STUDY

	TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
		1	2	3	3	4	5			6	Where:		
49	Observation, palpation, auscultation	1	2	3	3	4	5	6	Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 25-28
	PITUITARY GLAND												
50	Examination for hypofunction or Acromegaly	1	2	3	3	4	5	6	Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 29-32
	ADRENAL GLANDS												
51	Examination for Cushing's; Addison's								Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 33-36
52	PARATHYROIDS Hyper- and hypofunction	1	2	3	3	4	5	6	Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 37-40
53	SYNDROMES WITH SHORT STATURE: Turner, Down's, Rickets								Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 41-44
54	DIABETES Examination for complications	1	2	3	3	4	5	6	Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 45-48
	NERVOUS SYSTEM												
55	Neurologic history: headache; facial pain; syncope; dizziness; visual disturbance; ataxia; sensation fall out and weakness of limbs; tremors and involuntary movements								Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 49-52
	NEUROLOGICAL EXAMINATION												
56	General signs; level of consciousness; neck stiffness; higher centres and speech.	1	2	3	3	4	5	6	Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 53-56
57	Parietal-, temporal-, frontal- and occipital lobe function.	1	2	3	3	4	5	6	Where:	YES	NO		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 57-60

QUESTIONNAIRE FOR THE PILOT STUDY

	TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
		1	2	3	3	4	5			6	Where:		
58	Cranial nerves	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 61-64
59	Limbs and body; general; motor- and sensory system; reflexes; proprioception etc.	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 65-68
60	Lumbar puncture	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 69-72
NEUROSURGERY													
61	Evaluation of comatose patient and Glasgow coma scale	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 73-76
62	Craniotomy	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1-4
SKIN													
63	Benign and malignant lesions	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5-8
64	Ulcers; sinuses and fistulae	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 9-12
65	Suturing techniques	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 13-16
SUBCUTANEOUS TISSUES													
66	Benign and malignant lesions; sebaceous cysts; dermoid cysts; ganglions; bursa etc.	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 17-20
MUSCLES													
67	Examination	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 21-24
TENDONS AND TENDON SHEATHS													
68	Examination for disruption/ ruptures	1	2	3	3	4	5	6	Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 25-28

QUESTIONNAIRE FOR THE PILOT STUDY

TOPIC	UNNECESSARY USEFUL ESSENTIAL	SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
				YES	NO		
BONE							
69	Examination for abnormalities	1 2 3 3 4 5 6	Where:				29-32
JOINTS							
70	Examination of individual joints e.g. hip, knee, shoulder, ankle, wrist	1 2 3 3 4 5 6	Where:				33-36
HANDS							
71	Examine: musculoskeletal; circulation; nerves - motor and sensory	1 2 3 3 4 5 6	Where:				37-40
FEET							
72	Deformities	1 2 3 3 4 5 6	Where:				41-44
RHEUMATOLOGIC SYSTEM							
73	History: joint pains and swelling; back pain; limb pain; dry eyes and mouth; red eyes; systemic symptoms	1 2 3 3 4 5 6	Where:				45-48
74	Examination: observation - deformities; muscle atrophy; palpation; movement of joints; measurement	1 2 3 3 4 5 6	Where:				49-52
ENT							
75	History	1 2 3 3 4 5 6	Where:				53-56
76	Ear examination	1 2 3 3 4 5 6	Where:				57-60
77	Nose and throat examination	1 2 3 3 4 5 6	Where:				61-64
78	Cryothyroidotomy	1 2 3 3 4 5 6	Where:				65-68

QUESTIONNAIRE FOR THE PILOT STUDY

TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
	1	2	3	3	4	5			6	Where:		
OPHTHALMOLOGY												
79	History						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 69-72
80	Examination: Snellen chart; Amsler chart, confrontation eye fields; red reflex, pupil reactions						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 73-76
81	Ophthalmoscopy						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1-4
82	Eye pressure (Schiotz tonometer)						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5-8
ANAESTHESIA												
83	CPR						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 9-12
84	Intubation						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 13-16
85	Cricothyroidotomy						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 17-20
86	Defibrillation/Dysrhythms						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 21-24
87	Infusions/cannula intravenously						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 25-28
88	Central lines: placing						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 29-32
89	Spinal injection simulator- spinals; epidurals; sacral block.						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 33-36
PAEDIATRICS												
90	History taking						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 37-40
91	Technique of examination and systemic examination						1 2 3 3 4 5 6	Where:				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 41-44

QUESTIONNAIRE FOR THE PILOT STUDY

	TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
		1	2	3	3	4	5			6			
													<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
92	Neonatal examination												<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 45-48
93	Neurological examination								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 49-52
94	Intubation								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 53-56
95	Placement of IV lines (scalp veins; peripheral; tibia; umbilical)								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 57-60
96	Arterial puncture								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 61-64
97	Under water drain (thoracic)								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 65-68
	EMERGENCY CARE												
98	Primary evaluation and resuscitation of the trauma patient								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 69-72
99	Secondary evaluation - trauma patient								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 73-76
100	Use of the traumaboard and splints								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1-4
101	Wound care and dressings and bandages									YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5-8
102	Extrication equipment: use								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 9-12
103	Shock								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 13-16
104	Fracture and dislocations								Where:	YES	NO		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 17-20

QUESTIONNAIRE FOR THE PILOT STUDY

	TOPIC	UNNECESSARY USEFUL ESSENTIAL						SEMESTER	COMMENTS	LECTURER DISCIPLINE		PRE-KNOWLEDGE	FOR OFFICE USE ONLY
		1	2	3	3	4	5			6	Where:		
105	Thoracic injuries and under water drain.												<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 21-24
	ADDITIONAL TOPICS												<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 25-28

Dept of Family Medicine
Room 46
De Wet Building
University of the Free State
16 May 2002

Prof/dr.
Department of
School of Medicine
University of the Free State

Dear Colleague,

QUESTIONNAIRE ON: "A FRAMEWORK FOR A SKILLS LABORATORY CURRICULUM IN AN UNDERGRADUTATE MEDICAL PROGRAMME IN SOUTH AFRICA"

I shall appreciate it if you would be prepared to complete the included questionnaire.

The aim of my research is to compile a framework for a curriculum for a skills laboratory for undergraduate M.B.,Ch.B. students. This curriculum has to comply with South African needs.

Please indicate the following:

1. Indicate the necessity for each topic to be taught in a skills laboratory, either **unnecessary**, **useful**, or **essential**. Indicate with a cross in the designated square.
2. Indicate in which **semester** of the five year curriculum the topic should be taught (the present medical curriculum is included for your information).

3. **Where?** In case you feel the topic should not be presented in a skills laboratory, please indicate where the topic should be addressed, for example a lecture hall, or at the bedside of the patient.
4. Indicate which **pre-knowledge** is necessary (knowledge the student should already have acquired before the specific topic is addressed). Please add any additional pre-knowledge you recommend.
5. Indicate who should teach specific topics, lecturers from the specific disciplines or the skills laboratory personnel.
7. Please add any additional topics or recommendations.

In a skills laboratory, skills can be taught by using models, videos, CD-ROMS or fellow students.

To complete this form should not take more than 40 minutes and it could have important implications for the future.

Thank you for your cooperation.

Yours truly,

Prof MVJ van Vuuren.

DIAGRAM OF THE OVERALL STRUCTURE OF THE M.B., Ch. B. PROGRAMME OF THE SCHOOL OF MEDICINE OF THE UNIVERSITY OF THE FREE STATE

PHASE I		PHASE II						PHASE III		
YEAR 1		YEAR 2		YEAR 3		YEAR 4	YEAR 5			
SEMESTER 1	SEMESTER 2	SEMESTER 3	SEMESTER 4	SEMESTER 5	SEMESTER 6	Sem 7 and 8	Sem 9 and 10			
General skills	Health Psychology	Health policy and service provision	Metabolism	Special study module	Mechanisms of disease	Gastrointestinal system	Human diversity	Compulsory elective at an approved General Practitioner	Internal Medicine	
	The doctor and the environment	Epidemiology and Biostatistics	Membranes and receptors		Immunology and Haematology	Exocrine and endocrine glands	Human life cycle		General Surgery	General Surgery
	Concepts of health and disease	Molecules of the body			Infections	Respiratory system	Nervous system		Obstetrics	Trauma Orthopaedics
	Tissues of the body	Development of the body	Principles of therapy and imaging		Cardiovascular system	Health and disease in populations	Reproduction		Psychiatry	Paediatrics
	Structure of the body	Electrical systems of the body	Musculo-skeletal system		Urinary system	Genital system	Ethical and legal aspects of medicine		Cardiology	Gynaecology
Clinical Skills Module							Neurology		Family Medicine	Dermatology
							Oncotherapy		Geriatrics	Anaesthesiology
							Forensic Medicine		Urology	
							Ophthalmology			
							ENT			

Dept. of Family Medicine
University of the Free State
Room 46
De Wet Building (G19)
PO Box 339
Bloemfontein 9300
15 March 2004

Dr

.....

Dear Dr. ,

REQUEST TO PARTICIPATE IN A Ph.D. STUDY ENTITLED: "A FRAMEWORK FOR A SKILLS LABORATORY CURRICULUM IN AN UNDERGRADUTATE MEDICAL PROGRAMME IN SOUTH AFRICA"

Thank you that you are prepared to participate in this study by completing the questionnaire as part of the Delphi technique.

I am currently occupying the position of Principal Family Physician (Associate Professor) in the Department of Family Medicine in the School of Medicine at the University of the Free State. I am presently chairperson for the advisory committee on the skills unit and also module leader for the teaching of Emergency Medicine in the Skills Laboratory. In the National District Hospital in Bloemfontein, I am involved in clinical medicine and teaching final year medical students.

As conveyed to you by e-mail, I hope to write my thesis on the above mentioned topic. My supervisors are, Prof. WF Mollentze, head of the Department of Internal Medicine and Prof MM Nel, who is head of the Division of Educational Development in the Faculty of Health Sciences.

I chose this specific topic, since my interest lies in teaching skills and also because there is a need for such a curriculum. As the skills laboratory is a new project in our medical school, the heads of the different clinical departments do not always appreciate the valuable role the skills unit can play in the training of medical students.

The method I used was in the first place to compile a list of skills, which could be taught in a skills unit. This list was compiled based on a literature study, personal discussions with clinicians and on personal experience. I circulated this list to all the heads of departments in our medical school so that they could indicate which topics they deemed necessary for a skills lab. They also made suggestions for additional topics. This information was computerised and the final list produced.

The next step is to subject this list to a Delphi survey and a final set of topics will be obtained around which to design a skills curriculum.

The Delphi technique can be described as a method, which is used to obtain the most reliable consensus of opinion of a group through a series of questionnaires. The Delphi technique will entail gaining the opinions of academics who head Skills units in South Africa, as well as one academic who has a degree in medical education.

As participant you are asked to indicate on a rating scale which topics are essential or useful in the skills laboratory. Skills which are necessary, but not appropriate for a skills unit, can also be indicated.

You will also be asked to indicate where in the curriculum you think the topic should be taught. For this there is a scale from 1 to 10, where 1 is in the beginning of the medical school curriculum and 10 is the final part. (This is much the same as a pain scale.)

Would you please also indicate who should teach the topic – either the specific discipline or the personnel of the skills unit.

Your choice can be indicated by an "x".

It is envisaged that approximately three rounds Delphi will be required to reach consensus. The process is anonymous in that only the researcher will have access to the

individuals responses. The findings of each round will be processed and the propositions will be edited accordingly, whereafter the questionnaire will be sent to the respondents once again for comments and rating. The aim is to get 80% consensus for the different topics.

Where we achieve only 60% consensus, these topics will also be included, but with a motivation.

The final result, as well as relevant suggestions for implementation, will be submitted to all the Delphi experts.

Having given this explanation, I sincerely trust that you will still be prepared to spend some of your time on this project. The completion of the questionnaire should take approximately 40 minutes.

I shall send the questionnaire by e-mail as well as by land mail, so that you have the choice to fill it in on the computer or on a hard copy. A pre-paid envelope will be included.

To comply with examining regulations there is also a consent form which you must please complete and sign as a Delphi participant.

Thank you very much for your kind attention and I hope that this process will be fruitful to you too.

Yours sincerely,

Prof MVJ van Vuuren
(Student no: 2001110256)
(Ethics approval no: ETOVS 16/02)

FORM OF CONSENT

Date:

Hereby I, the undersigned, consent to participate in the Delphi process which is scheduled to take place **from 1 March 2004 to 30 April 2004**. My full particulars are as follows:

Title:.....

Surname:.....

Full names:.....

Postal address:.....

.....

.....

E-mail address:.....

Telephone number:.....

Cellular number:.....

Signature:.....

Please return this form **on or before 10 March 2004**. My full particulars are as follows:

Postal address: Prof Martin van Vuuren

Dept of Family Medicine

School of Medicine

University of the Free State (G19)

PO Box 339,

Bloemfontein 9300

E-mail address: gnhkmvv.md@mail.uovs.ac.za

Telephone number: 051 4013310

Cellular number:0828006491

Thank you in advance for your kind co-operation.

Yours faithfully

PROF. Martin van Vuuren

	ONDERWERP	NIE MERK	ONNO NEUT NODIG			SEMESTER										AANBIEDE		
						1	2	3	4	5	6	7	8	9				
		0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6	4,5,6	GEEN	JA	NEE	
	ALGEMENE BENADERING																	
1	Die neem van geskiedenis:	8	1	0	13	1	0	5	1	1	2	0	1	1	0	6	4	
	KARDIO-VASKULÊRE SISTEEM																	
2	Algemene beginsels van die fisieke ondersoek van 'n gesonde pasiënt : Voorkoms, Vitale tekens Facies; Hare; Hande; Naels	9	2	0	11	1	0	2	2	1	1	0	1	1	0	4	5	
3	Polse en Bloeddruk	9	1	0	12	1	0	3	3	0	1	0	0	2	0	1	12	
4	Kardiovaskulêre sisteem: Toepaslike geskiedenis; arteriële polse; bloeddruk; karotis arteries; Jugulêre veneuse druk;	9	1	0	12	1	0	1	5	0	1	1	0	1	0	4	5	
5	Prekordium: Besigtiging; betasting; Beklopping; Beluistering.	9	2	0	11	1	0	1	5	0	1	1	0	0	0	3	5	
6	Abnormale hartklanke en geruise	9	5	0	8	0	0	1	1	0	2	3	0	0	0	4	2	
7	Borskas X-fotos: hart en longtoestande	8	1	0	13	0	0	2	3	0	2	1	1	0	0	4	6	
8	EKG	9	1	0	12	1	1	1	3	1	1	0	0	1	0	3	3	
9	Kliniese evaluasie van arteriële sirkulasie van 'n ledemaat	10	1	0	13	0	0	2	4	1	2	0	1	1	0	4	5	
10	Kliniese evaluasie van veneuse sirkulasie van onderste ledemaat	9	1	0	12	0	0	2	4	1	2	0	1	0	0	4	5	
11	Ondersoek van limfatiese sisteem	8	1	2	11	0	0	1	3	0	2	1	0	1	0	4	4	

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG			SEMESTER									AANBIEDE		
						1	2	3	4	5	6	7	8	9	GEEN	JA	NEE
		0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6	4,5,6			
RESPIRATORIESE SISTEEM																	
12	GESKIEDENIS	10	0	0	12	1	0	2	1	4	1	1	0	0	0	6	3
13	Besigtiging; Sputum; hande; gesig; borskas.	10	2	0	10	1	0	3	1	2	1	0	0	0	0	1	3
14	Betasting: Tragea; Borskas (Uitsetting, Apeks, Vokale fremitus,	10	2	0	10	1	0	2	1	3	1	0	0	0	0	4	3
15	Beklopping:	10	2	0	10	0	0	2	0	4	1	1	0	0	0	4	3
16	Beluistering	10	2	0	10	1	0	2	0	4	1	0	0	0	0	5	2
17	longfunksies	10	3	2	7	0	0	0	1	1	3	0	0	0	0	1	3
MAMMAE																	
18	Inspeksie, betasting, evaluasie van massas.	11	1	0	10	0	0	1	1	1	3	0	1	0	0	4	3
SPYSVERTERINGSISTEEM																	
19	GESKIEDENIS	9	0	0	13	1	0	1	2	4	2	1	0	0	0	6	4
20	Toepaslike geskiedenis: pyn; massa verlies; naarheid+braking; diarree ens.	10	1	0	11	1	0	1	1	4	1	1	0	0	0	4	4
21	Ondersoek: Besigtiging, betasting, beklopping, beluistering.	10	2	0	10	0	0	1	1	3	2	0	1	0	0	4	3
22	Algemeen; massa; vel; hande; naels; gesig; mond; nek&borskas;	10	1	0	11	1	0	2	1	1	4	0	0	0	0	3	5
23	Abdomen: Besigtiging; betasting; beklopping; beluistering (tegnieke)	10	1	0	11	1	0	1	1	3	3	0	0	0	0	5	3

Prioriteit: Groen: 10 en meer as 10

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Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG			SEMESTER									AANBIEDE				
						1	2	3	4	5	6	7	8	9	GEEN	JA	NEE		
			0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6	4,5,6				
24	BREUKE (hernias)	10	4	0	8	0	0	1	0	1	3	0	1	0	0	0	3	2	INT
25	Onderzoek	13	2	0	7	0	0	1	0	1	2	1	0	0	0	0	3	1	
26	Rektale ondersoek	10	2	0	10	0	0	0	1	2	6	1	0	0	0	0	4	3	
27	Proktoskopie en sigmoidoskopie	10	7	1	4	0	0	0	0	0	1	0	0	0	0	0	1	1	INT
URIENE ONDERSOEK																			
28	Doopstokkies en interpretasie; mikroskopie	9	0	0	13	1	0	1	4	1	2	0	0	1	0	4	6		
29	Buik x-fotos	8	3	3	8	0	0	0	0	2	6	0	1	0	0	3	2	INT	
GENITO-URINêRE SISTEEM																			
30	Geskiedenis: Voorkoms v urien; urien obstruksie; inkontinensie; menstruasie	10	0	0	12	0	0	1	2	2	2	1	0	1	0	2	6		
ONDERSOEK:																			
31	Alg. Voorkoms; ledemate; gesig; nek; borskas; buik; bekken.	11	2	0	9	0	0	1	1	1	2	1	0	0	0	2	4		INT
32	Prostaat ondersoek	10	2	0	10	0	0	0	2	1	3	1	0	0	0	5	2		INT
33	Manlike genitalië	10	3	0	9	0	0	1	2	1	2	1	0	0	0	2	4		INT
34	Uretrale kateterisasie	10	2	0	10	0	0	0	2	2	2	1	0	0	0	2	5		INT/GO
35	Vroulike genitalië en vaginale ondersoek	10	1	0	11	0	0	1	2	1	2	2	0	0	0	3	4		
36	Vaginale spekulum: ondersoek	10	2	0	10	0	0	0	1	3	2	1	0	0	0	4	3		INT/GO
OBSTETRIE																			
37	Die Voor- en nageboorte besoek	13	2	0	7	0	0	1	0	1	2	1	0	0	0	4	1		
38	Swangerbuik ondersoek	13	2	0	7	0	0	0	1	0	3	1	0	0	0	3	2		

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG			SEMESTER									AANBIEDE		
						1	2	3	4	5	6	7	8	9	GEEN	JA	NEE
		0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6	4,5,6			
39	Vaginale verlossings	13	1	0	8	0	0	0	0	1	3	1	0	0	0	4	2
40	Episiotomie	13	2	0	7	0	0	0	0	1	2	1	0	0	0	3	2
41	Borsvoeding	13	1	0	8	0	0	0	1	0	3	0	1	0	0	1	5
HEMATOLOGIESE SISTEEM																	
42	Geskiedenis: anemie, moegheid; duiselig.	10	0	0	12	1	0	0	5	1	2	0	0	1	0	3	6
43	Onderzoek: Alg voorkoms; hande en ledemate; limfkliere; buik	10	1	0	11	1	0	1	5	0	1	1	0	0	0	3	5
44	Hemoglobienbepaling	10	0	0	12	1	0	1	6	0	1	0	0	1	0	1	8
45	Bloedgroep en Rh bepaling	10	3	1	8	0	0	2	3	0	1	0	0	0	0	2	4
46	Bloedsmeer;	10	3	2	7	1	0	1	3	0	0	0	0	0	0	1	4
47	Beenmurgpunksie	10	6	1	5	0	0	0	1	1	0	1	0	0	0	1	2
ENDOKRIENE SISTEEM																	
48	Geskiedenis: Veradering in gewig, derm gewoonte, sweet, haar distribusie, energie, vel, pigmentasie, potensie, menstrusie, uriene.	10	1	0	11	1	0	1	1	5	1	1	0	0	0	4	4
TIROIED																	
49	Onderzoek vir - hiper-, hipotireose, knobbels	11	2	0	9	0	0	1	1	3	2	1	0	0	0	3	2
50	Besigtiging; betasting; beklopping; beluistering.	13	2	0	7	0	0	1	1	1	2	0	1	0	0	1	2

GO/VIDEO

INT

INT/VIDEO

INT/GO

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG	SEMESTER									AANBIEDE				
				1	2	3	4	5	6	7	8	9	GEEN	JA	NEE		
		0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6			
	PITUITÊRE KLIER																
51	Ondersoek vir hipofunksie; akromegalie	11	4	1	6	0	0	0	0	3	1	0	1	0	0	1	2
	BYNIERE																
52	Ondersoek vir Cushing's; Addison's	11	4	0	7	0	0	0	0	3	2	0	1	0	0	2	2
	PARATIROIEDE																
53	Ondersoek vir hiper- en hipofunksie	11	5	1	5	0	0	1	0	1	2	0	0	0	0	1	1
54	SINDROME MET KORT STATUUR Turner, Down's, Ragitis	11	5	1	5	0	0	1	0	0	3	0	0	0	0	2	0
	DIABETES MELLITUS																
55	Ondersoek vir komplikasies: vel; spieratrofie; neuropatie; vasculêre inkorting; fundi ens.	11	5	0	6	0	0	0	0	2	3	0	0	0	0	2	1
	DIE SENUWEESISTEEM																
56	Neurologiese geskiedenis: Hoopyn; gesigspyn; Sinkopie; Duiseligheid; Visuele steurnis; Ataksie; Sensasieuitval+swakheid van ledemate; tremore en onwillekeurige bewegings.	11	2	0	9	1	0	0	0	1	6	0	0	0	0	5	1
	NEUROLOGIESE ONDERSOEK																
57	Algemene tekens: bewussynsvlak; nekstyfheid; hoëre sentrums en spraak.	10	2	0	10	0	0	1	0	0	8	0	0	0	0	4	2

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG	SEMESTER											AANBIEDE		
				1	2	3	4	5	6	7	8	9	GEEN	J A	NEE		
		0	1 2 3	3+4	4+5	3	4	5	6	5+6	3,4,5,6	4,5,6					
58	Pariëtale-, Temporale- Frontale- en Oksipitalelob funksie	10	2 1 9	1	0	1	0	0	5	0	0	0	0	0	3	2	NEUROL
59	Kraniale senuwees	10	2 0 10	1	0	2	1	0	4	0	0	0	0	0	4	2	
60	Ledemate en lyf: Algemeen; motoriese sisteem; sensories; reflekse; proprioepsie ens	10	1 0 11	1	0	2	1	0	4	1	0	0	0	0	6	1	
61	Lumbaalpunksie	11	2 0 9	0	0	0	0	0	6	1	0	0	0	0	6	1	NEUROL
NEUROCHIRURGIE																	
62	Evaluasie komateuse pasiënt en Glasgow skaal.	13	2 0 7	0	0	0	0	1	4	0	1	0	0	0	4	0	
63	Kraniotomie	13	6 1 2	0	0	0	0	0	1	0	0	0	0	0	1	0	
DIE VEL																	
64	Benigne + maligne letsels	9	6 0 7	0	0	0	2	0	3	0	0	1	0	0	2	1	INT/CHIR(plast-)
65	Ulsera; sinusse en fistulas.	10	5 2 5	0	0	1	1	0	2	0	0	0	0	0	3	0	CHIR
66	Hegtings: Tegnieke	11	2 1 8	1	0	1	2	1	0	0	0	0	0	0	3	2	
DIE SUBKUTANE WEEFSELS																	
67	Benige tumore soos lipome, talgkiestes, dermoiede kiestes, ganglion, bursae, neurofibromatoses ens.	11	7 0 4	0	0	0	2	0	1	0	0	0	0	0	1	1	

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG	SEMESTER											AANBIEDE		
				1	2	3	4	5	6	7	8	9	GEEN	JA	NEE		
		0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6	4,5,6			
	MUSKULO-SKELETALE SISTEEM																
	SPIERE																
68	Ondersoek	11	0	0	11	0	0	5	0	1	2	0	1	1	0	6	2
	PESE, EN PEESKEDES																
69	Ondersoek vir skeure	13	4	0	5	0	0	3	0	0	0	0	0	0	0	1	1
	BEEN																
70	Ondersoek vir afwykings: deformiteite en tumore	13	5	0	4	0	0	3	0	0	0	0	0	0	0	2	0
	GEWRIGTE																
71	Ondersoek van individuele gewrigte bv. Heup, knie, skouer, enkel, pols.	11	0	0	11	0	0	5	2	0	1	1	1	0	0	5	3
	HANDE																
72	Ondersoek: muskulo-skeletaal, sirkulasie, senuwees motories en sensories.	11	0	0	11	0	0	5	2	0	1	1	1	0	0	2	4
	VOETE																
73	Deformiteite	12	3	0	7	0	0	3	1	0	1	1	0	0	0	1	2
	RUMATOLOGIESE SISTEEM																
74	Geskiedenis: Gewrigspyne en swelsel; rugpyn; ledmaatpyn; droë oë+mond; rooi oë; sistemiese simptome.	10	2	0	10	1	0	4	0	1	2	0	0	1	0	5	1
75	Ondersoek: Besigtiging - defromiteite; spieratrofie; Betas; beweeg gewrigte; meet																

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG				SEMESTER									AANBIEDE		
			1	2	3	4	5	6	7	8	9	GEEN	JA	NEE				
		0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6	4,5,6	0	4	1	
		10	2	0	10	1	0	3	0	1	2	0	0	1	0	4	1	
	ONK																	
76	Geskiedenis	13	0	0	9	0	0	1	1	4	1	0	1	0	0	4	3	ONK
77	Oor ondersoek	13	0	0	9	0	0	1	1	4	1	0	1	0	0	4	3	ONK
78	Neus en Keel ondersoek	12	0	0	10	0	0	1	1	4	2	0	1	0	0	4	3	
79	Krikotirodotomie	13	1	2	6	0	0	0	0	2	3	0	0	0	0	2	2	ONK/DISSEK
	OFTALMOLOGIE																	
80	Geskiedenis	13	1	0	8	0	0	2	1	1	2	0	1	0	0	3	3	OFT
81	Ondersoek: Snellenkaart	13	1	0	8	1	0	2	1	1	2	0	0	0	0	3	3	OFT
82	Oftalmoskopie	10	0	0	11	0	0	1	0	2	6	0	1	0	0	4	3	
83	Oogdruk (Schiotz tonometer)	12	5	1	4	0	0	0	0	2	1	0	0	0	0	2	0	OFT
	NARKOSE																	
84	KPR	13	3	0	6	1	0	0	0	2	3	0	0	0	0	4	1	NARK
85	Intubasie	13	1	0	8	0	1	0	0	2	4	0	1	0	0	5	1	NARK
86	Krikotirodotomie	13	4	2	3	0	1	0	0	2	0	0	0	0	0	2	0	NARK
87	Defibrillasie/ disritmieë	13	4	0	5	0	0	0	1	3	0	0	1	0	0	2	2	NARK
88	Infuus/ kanule binne-aars	13	0	0	9	0	0	3	4	1	0	0	1	0	0	3	5	NARK
89	Sentrale lyn plasings	13	2	3	4	0	0	0	1	1	2	0	0	0	0	2	1	NARK

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG			SEMESTER									AANBIEDE				
						1	2	3	4	5	6	7	8	9	GEEN	JA	NEE		
		0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6	4,5,6					
90	Spinale inspuiting simuleerder - spinale, epidurale, sakkrale blok.																		NARK
		13	3	1	5	1	0	0	1	0	0	0	0	0	0	0	1	1	
PEDIATRIE																			
91	Neem van geskiedenis	14	0	0	8	1	0	3	0	0	5	0	0	0	0	0	4	1	PED
92	Tegniek van ondersoek + sistemies ondersoek																		PED
		14	0	0	8	1	0	1	0	0	4	0	0	0	0	0	5	0	
93	Neonatale ondersoek	14	3	0	5	0	0	1	0	0	3	0	0	0	0	0	3	0	PED
94	Neurologiese ondersoek	14	2	0	6	0	0	0	1	0	4	0	0	0	0	0	4	0	PED
95	Intubasie	14	2	1	5	0	0	0	0	0	3	0	0	0	0	0	5	0	PED
96	Plaas van binne-aarse lyne (kopvel, perifeer, tibiaal, umbilikaal)																		PED
		14	3	0	5	0	0	0	0	1	2	0	0	0	0	0	2	1	
97	Arteriële punksie	14	4	2	2	0	0	0	0	0	0	0	0	0	0	0	2	0	
98	Onderwater drein (pediatrics)	14	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
NOODSORG																			
99	Primêre evaluasie en resussitasie van die trauma pasiënt																		HAK
		13	3	0	6	0	0	0	4	3	1	0	0	0	0	0	2	2	HAK
100	Sekondêre evaluasie trauma pasiënt																		HAK
		13	3	2	4	0	0	0	1	2	0	0	0	0	0	0	1	1	
101	Gebruik van traumabord en spalke																		HAK/ORT/CHIR
		16	2	0	4	1	0	0	1	3	1	0	0	0	0	0	2	2	
102	Wondversorging en Verbande	13	1	1	7	0	0	1	3	0	2	0	0	0	0	0	1	3	HAK/CHIR

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG	SEMESTER											AANBIEDE								
				1	2	3	4	5	6	7	8	9	3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6	GEEN	JA
				0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6							
103	Bevrydingtoerusting- gebruik van	12	2	3	5	0	0	0	0	2	2	0	0	0	0	0	0	3	0				
104	Skok	12	1	0	9	0	0	0	2	2	3	0	1	0	0	0	0	4	2	HAK.CHIR/ORT			
105	Frakture + Ontwrigtings	13	4	0	5	0	0	1	1	1	1	0	0	0	0	0	0	1	2				
106	Toraksbeserings en Onderwater drein	14	3	0	5	0	0	0	0	2	2	0	0	0	0	0	0	1	2				

Prioriteit: Groen: 10 en meer as 10

Prioriteit: Strepies: Deur betrokke dept aangedui

Semester van keuse: Ligblou waar 5 en meer.

	ONDERWERP	NIE MERK	ONNO NEUT NODIG			SEMESTER								
						1	2	3	4	5	6	7	8	9
		0	1	2	3	3+4	4+5	3	4	5	6	5+6	3,4,5,6,	4,5,6
	ALGEMENE BENADERING													
1	Die neem van geskiedenis:	8	1	0	13	1	0	5	1	1	2	0	1	1
	KARDIO-VASKULÊRE SISTEEM													
2	Algemene beginsels van die fisieke ondersoek van 'n gesonde pasiënt : Voorkoms, Vitale tekens Facies; Hare; Hande; Naels	9	2	0	11	1	0	2	2	1	1	0	1	1
3	Polse en Bloeddruk	9	1	0	12	1	0	3	3	0	1	0	0	2
4	Kardiovaskulêre sisteem: Toepaslike geskiedenis; arteriële polse; bloeddruk; karotis arteries; Jugulêre veneuse druk;	9	1	0	12	1	0	1	5	0	1	1	0	1
5	Prekordium: Besigtiging; betasting; Beklopping; Beluistering.	9	2	0	11	1	0	1	5	0	1	1	0	0
		9	5	0	8	0	0	1	1	0	2	3	0	0
7	Borskas X-fotos: hart en longtoestande	8	1	0	13	0	0	2	3	0	2	1	1	0
8	EKG	9	1	0	12	1	1	1	3	1	1	0	0	1
9	Kliniese evaluasie van arteriële sirkulasie van 'n ledemaat	10	1	0	13	0	0	2	4	1	2	0	1	1
10	Kliniese evaluasie van veneuse sirkulasie van onderste ledemaat	9	1	0	12	0	0	2	4	1	2	0	1	0
11	Ondersoek van limfatiese sisteem	8	1	2	11	0	0	1	3	0	2	1	0	1
	RESPIRATORIESE SISTEEM													
12	GESKIEDENIS	10	0	0	12	1	0	2	1	4	1	1	0	0
13	Besigtiging; Sputum; hande; gesig; borskas.	10	2	0	10	1	0	3	1	2	1	0	0	0
14	Betasting: Tragea; Borskas (Uitsetting, Apeks, Vokale fremitus,	10	2	0	10	1	0	2	1	3	1	0	0	0
15	Beklopping:	10	2	0	10	0	0	2	0	4	1	1	0	0
16	Beluistering	10	2	0	10	1	0	2	0	4	1	0	0	0
	MAMMAE													
18	Inspeksie, betasting, evaluasie van massas.	11	1	0	10	0	0	1	1	1	3	0	1	0
	SPYSVERTERINGSISTEEM													
19	GESKIEDENIS	9	0	0	13	1	0	1	2	4	2	1	0	0
20	Toepaslike geskiedenis: pyn; massa verlies; naarheid+braking; diarree ens.	10	1	0	11	1	0	1	1	4	1	1	0	0

48	Geskiedenis: Veradering in gewig, derm gewoonte, sweet, haar distribusie, energie, vel, pigmentasie, potensie, menstrusie, uriene.													
		10	1	0	11	1	0	1	1	5	1	1	0	0
	TIROIED													
49	Ondersoek vir - hiper-, hipotireose, knobbels	11	2	0	9	0	0	1	1	3	2	1	0	0
		11	4	0	7	0	0	0	0	3	2	0	1	0
	PARATIOEIDE													
53	Ondersoek vir hiper- en hipofunksie	11	5	1	5	0	0	1	0	1	2	0	0	0
54	SINDROME MET KORT STATUUR Turner, Down's, Ragitis	11	5	1	5	0	0	1	0	0	3	0	0	0
	DIE SENUWEESISTEEM													
56	Neurologiese geskiedenis: Hoopyn; gesigspyn; Sinkopie; Duiseligheid; Visuele steurnis; Ataksie; Sensasieuitval+swakheid van ledemate; tremore en onwillekeurige bewegings.	11	2	0	9	1	0	0	0	1	6	0	0	0
	NEUROLOGIESE ONDERSOEK													
57	Algemene tekens: bewussynsvlak; nekstyfheid; hoëre sentrums en spraak.	10	2	0	10	0	0	1	0	0	8	0	0	0
58	Pariëtale-, Temporale- Frontale- en Oksipitalelob funksie	10	2	1	9	1	0	1	0	0	5	0	0	0
59	Kraniale senuwees	10	2	0	10	1	0	2	1	0	4	0	0	0
60	Ledemate en lyf: Algemeen; motoriese sisteem; sensories; reflekse; proprioepsie ens	10	1	0	11	1	0	2	1	0	4	1	0	0
61	Lumbaalpunksie	11	2	0	9	0	0	0	0	0	6	1	0	0
	NEUROCHIRURGIE													
	DIE VEL													
64	Benigne + maligne letsels	9	6	0	7	0	0	0	2	0	3	0	0	1
65	Ulsera; sinusse en fistulas.	10	5	2	5	0	0	1	1	0	2	0	0	0
	MUSKULO-SKELETALE SISTEEM													
	SPIERE													
68	Ondersoek	11	0	0	11	0	0	5	0	1	2	0	1	1

	PESE, EN PEESKEDES																
69	Onderzoek vir skeure	13	4	0	5	0	0	3	0	0	0	0	0	0	0	0	0
	BEEN																
70	Onderzoek vir afwykings: deformiteite en tumore	13	5	0	4	0	0	3	0	0	0	0	0	0	0	0	0
	GEWRIGTE																
71	Onderzoek van individuele gewrigte bv. Heup, knie, skouer, enkel, pols.	11	0	0	11	0	0	5	2	0	1	1	1	1	0	0	0
	HANDE																
72	Onderzoek: muskulo-skeletaal, sirkulasie, senuwees motories en sensories.	11	0	0	11	0	0	5	2	0	1	1	1	1	0	0	0
	VOETE																
73	Deformiteite	12	3	0	7	0	0	3	1	0	1	1	0	0	0	0	0
	RUMATOLOGIESE SISTEEM																
74	Geskiedenis: Gewrigspyne en swelsel; rugpyn; ledmaatpyn; droë oë+mond; rooi oë; sistemiese simptome.	10	2	0	10	1	0	4	0	1	2	0	0	0	1	0	0
75	Onderzoek: Besigtiging - defromiteite; spieratrofie; Betas; beweeg gewrigte; meet	10	2	0	10	1	0	3	0	1	2	0	0	0	1	0	0
	ONK																
76	Geskiedenis	13	0	0	9	0	0	1	1	4	1	0	1	0	0	0	0
77	Oor ondersoek	13	0	0	9	0	0	1	1	4	1	0	1	0	0	0	0
78	Neus en Keel ondersoek	12	0	0	10	0	0	1	1	4	2	0	1	0	0	0	0
79	Krikotirodotomie	13	1	2	6	0	0	0	0	2	3	0	0	0	0	0	0
	OFTALMOLOGIE																
80	Geskiedenis	13	1	0	8	0	0	2	1	1	2	0	1	0	0	0	0
81	Onderzoek: Snellenkaart	13	1	0	8	1	0	2	1	1	2	0	0	0	0	0	0
82	Oftalmoskopie	10	0	0	11	0	0	1	0	2	6	0	1	0	0	0	0
83	Oogdruk (Schiotz tonometer)	12	5	1	4	0	0	0	0	2	1	0	0	0	0	0	0
	NARKOSE																
84	KPR	13	3	0	6	1	0	0	0	2	3	0	0	0	0	0	0
85	Intubasie	13	1	0	8	0	1	0	0	2	4	0	1	0	0	0	0
86	Krikotirodotomie	13	4	2	3	0	1	0	0	2	0	0	0	0	0	0	0
87	Defibrillasie/ disritmieë	13	4	0	5	0	0	0	1	3	0	0	1	0	0	0	0

QUESTIONNAIRE FOR DELPHI FIRST ROUND

TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
GENERAL APPROACH																
1 Taking a history																
CARDIOVASCULAR SYSTEM																
2 Cardiovascular system: appropriate history																
3 General principles of the physical examination of the healthy patient :appearance (BMI,Anthropometry.);																
4 Vital signs; facies; hair; nails; gait.																
5 Pulses and blood pressure																
6 Jugular venous pressure.																
7 Precordium: inspection; palpation; percussion; auscultation																
8 Chest X-rays: cardiac and lung conditions																
9 ECG																
10 Clinical evaluation of the arterial circulation of a limb																
11 Clinical evaluation of the venous circulation of the lower limb																
12 Examination of the lymphatic system																
RESPIRATORY SYSTEM																
13 HISTORY																
14 Inspection; sputum; hands; face; thorax																
15 Palpation: trachea; thorax; (expansion; apex; vocal fremitus)																
16 Percussion																
17 Auscultation																

QUESTIONNAIRE FOR DELPHI FIRST ROUND

TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
MAMMAE																
18 Inspection; palpation; evaluation of lumps																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
DIGESTIVE SYSTEM																
19 HISTORY																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
20 Appropriate history: pain; weight loss; nausea and vomiting; diarrhoea; etc.																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
21 Examination: inspection; palpation; percussion; auscultation																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
22 General: mass; skin; hands; nails; face; mouth; neck; chest																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
23 Abdomen; inspection; palpation; percussion; auscultation (techniques)																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
24 Hernias: history and examination																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
25 Rectal examination																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
26 Proctoscopy and sigmoidoscopy																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
URINE EXAMINATION																
27 Dipsticks and microscopy																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
28 Abdominal X-rays																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
GENITO-URINARY SYSTEM																
29 History: urinary obstruction; incontinence; menstruation																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
30 EXAMINATION General appearance; limbs; face; neck; chest; abdomen; pelvis; secondary sexual characteristics- male and female (photos)																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
31 Orchidometer																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
32 Prostate: examination																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
33 Male genitalia (photos)																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	

QUESTIONNAIRE FOR DELPHI FIRST ROUND

TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
34 Urethral catheterization																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
35 Female genitalia and vaginal examination (photos)																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
36 Vaginal speculum examination																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
37 Pap smear																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
38 Insertion of IUD																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
OBSTETRICS																
39 Episiotomy																
	1	2	3				4	5	6	7				YES	NO	
HAEMATOLOGICAL SYSTEM																
40 History: anaemia; fatigue; dizziness																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
41 Examination: general appearance; hands and limbs; lymphatic glands; abdomen																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
42 Haemoglobin test																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
43 Blood slide																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
44 Bone marrow puncture (video)																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
ENDOCRINOLOGICAL SYSTEM																
45 History: change in weight; bowel habits; sweating; hair distribution; skin pigmentation; potency; menstruation; urine																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
DIABETES																
46 History																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
47 Capillary blood glucose test																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
THYROID																
48 Examination for hyper-hypothyroidism, nodules																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
PARATHYROIDS																
49 Examination for hyper- and hypofunction																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
SYNDROMES WITH SHORT STATURE: Turner; Down's; Rickets																
50 Rickets																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	

QUESTIONNAIRE FOR DELPHI FIRST ROUND

TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
THE NERVOUS SYSTEM																
51 Neurological history: headache; facial pain; syncope; dizziness; visual disturbance; ataxia; sensation fall out and weakness of limbs; tremors and involuntary movements																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
NEUROLOGICAL EXAMINATION																
52 General signs; level of consciousness; neck stiffness; higher centres and speech																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
53 Parietal-, temporal-, frontal- and occipital lobe function																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
54 Cranial nerves																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
55 Limbs and body; general; motor- and sensory system; reflexes; proprioception; etc.																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
56 Lumbar puncture																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
THE SKIN																
57 Dermatological definitions																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
58 Wet slide microscopy																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
59 Wood's lights																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
60 Biopsy techniques																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
61 Benign and malignant lesions																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
62 Ulcers; sinuses and fistulae																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
MUSCULO-SKELETAL SYSTEM																
MUSCLES																
63 Examination																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
TENDONS AND TENDON SHEATHS																
64 Examination for disruption/ ruptures																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
BONE																
65 Examination for abnormalities																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	

QUESTIONNAIRE FOR DELPHI FIRST ROUND

	TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE	COMMENTS	
		1	2	3	1	2	3	4	5	6	7	8	9	10			YES
	JOINTS																
66	Examination of individual joints, e.g. hip, knee, shoulder, ankle, wrist																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
	HANDS																
67	Examine: musculo-skeletal; circulation; nerves - motor and sensory																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
	FEET																
68	Deformities																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
	RHEUMATOLOGIC SYSTEM																
69	History: joint pains and swelling; back pain; limb pain; dry eyes and mouth; red eyes; systemic symptoms																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
70	Examination: observation - deformities; muscle atrophy; palpation; movement of joints; measurement																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
	EAR-, NOSE- AND THROAT																
71	History																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
72	Ear examination																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
73	Nose and throat examination																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
74	Cryothyroidotomy																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES		
	OPHTHALMOLOGY																
75	History																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
76	Examination: Snellen chart; Amsler chart, confrontation eye fields; red reflex, pupil reactions																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
77	Ophthalmoscopy																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
78	Ocular pressure (Schiotz tonometer)																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
	ANAESTHESIA																
79	CPR																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
80	Intubation																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
81	Defibrillation/ Dysrhythms																
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	

QUESTIONNAIRE FOR DELPHI FIRST ROUND

TOPIC	INAPPROPRIATE USEFUL ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		COMMENTS
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
82 Infusions/cannula intravenously																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
83 Central lines: placing																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
84 Spinal injection simulator; spinals; epidurals; sacral block																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
85 Ring block of fingers																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
PAEDIATRICS																
86 History taking																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
87 Technique of examination and systemic examination																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
88 Neonatal examination																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
89 Neurologic examination																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
90 Child development																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
91 Intubation																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
92 Placement of IV lines (scalp veins; peripheral; tibia; umbilical)																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
93 Arterial puncture																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
94 Underwater drain																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
EMERGENCY CARE																
95 Primary evaluation and resuscitation of the trauma patient																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
96 Secondary evaluation - trauma patient																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
97 Use of the trauma board (spine board) and splints																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
98 Wound care and dressings and bandages																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
99 Shock																
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO	
ADDITIONAL TOPICS SUGGESTED BY PANEL MEMBERS																

	MAMMAE	
17	Inspection; palpation; evaluation of lumps	
		1 2 3
	DIGESTIVE SYSTEM	
18	HISTORY	1 2 3
19	Appropriate history: pain; weight loss; nausea+vomiting; diarrhea; etc.	
		1 2 3
20	Examination: Inspection; palpation; percussion; auscultation	
		1 2 3
21	General: Mass; skin; hands; nails; face; mouth; neck; chest	
		1 2 3
22	Abdomen; Inspection; palpation; percussion; auscultation (techniques)	
		1 2 3
23	HERNIAS	
24	Rectal examination	
		1 2 3
25	Proctoscopy and sigmoidoscopy	
		1 2 3
	URINE EXAMINATION	
26	Dipsticks and microscopy	
		1 2 3
27	Abdominal X-rays	
		1 2 3
	GENITO-URINARY SYSTEM	
28	History:Urinary obstruction; incontinence; menstruation	
		1 2 3
	EXAMINATION	
29	General appearance; limbs; face; neck; chest; abdomen; pelvis; secondary sexual characteristics-male+female	
		1 2 3
30	Prostate: examination	
		1 2 3
31	Male genitalia (photos)	
		1 2 3
32	Urethral catheterization	
		1 2 3

45	Neurologic history: Headache; facial pain; Syncope; Dizziness; Visual disturbance; Ataxia; Sensation fall out + weakness of limbs; tremors + involuntary movements																
		1	2	3													
NEUROLOGICAL EXAMINATION																	
46	General signs; level of consciousness; neck stiffness; higher centers and speech.																
		1	2	3													
47	Parietal-, Temporal-, Frontal- and occipital lobe function.																
		1	2	3													
48	Cranial nerves																
		1	2	3													
49	Limbs and body; General; motor- + sensory system; reflexes; proprioception etc.																
		1	2	3													
50	Lumbar puncture																
		1	2	3													
THE SKIN																	
Dermatological definitions																	
		1	2	3													
Wet slide microscopy		1	2	3													
Wood's lights																	
		1	2	3													
Biopsy techniques																	
		1	2	3													
51	Benign and malignant lesions																
		1	2	3													
52	Ulcers; sinuses and fistulae																
		1	2	3													
MUSCULO-SKELETAL SYSTEM																	
MUSCLES																	
53	Examination																
		1	2	3													
TENDONS+TENDON SHEATHS																	
54	Examination for disruption/ ruptures																
		1	2	3													
BONE																	
55	Examination for abnormalities																
		1	2	3													
JOINTS																	
56	Examination of individual joints e.g.. hip, knee, shoulder, ankle, wrist.																
		1	2	3													
HANDS																	

COMMENTS	FOR OFFICE USE ONLY										
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Dept. of Family Medicine
Room 46
De Wet Building
University of the Free State
PO Box 339
Bloemfontein 9300
8 May 2002

Dr

.....

Dear dr,

**SECOND ROUND OF THE DELPHI RESEARCH ON: "A FRAMEWORK FOR
A SKILLS LABORATORY CURRICULUM IN AN UNDERGRADUTATE
MEDICAL PROGRAMME IN SOUTH AFRICA"**

Thank you for completion of the first round of this study.

This questionnaire includes the answers of the first round of all the participants.
The parts coloured in green and marked "consensus" do not have to be filled in
again, as more than 80% of you have chosen them.

You must please fill in the parts not coloured, bearing in mind that you are
allowed to change your first round opinion so that we can reach consensus
where possible. If, however, you feel that you should stay with your choice even
if it is not in agreement with those of the others, please feel free to stick to your
previous opinion.

Where we achieve only 60% consensus, these topics will also be included, but with a motivation.

To remind you regarding the first part, those topics which are necessary in the curriculum but not suitable for a skills unit, should be marked "inappropriate".

Regarding the time scale (the middle part) or phase in the medical curriculum where you feel the topic should be taught, I divided this into thirds in order to be able to reach consensus. The divisions are 1-3; 4-7; and 8-10 so that if your choice falls in one of these thirds, is easier to reach consensus. The last part is to indicate if you prefer that a specific discipline must teach the topic, for example if surgery should teach hernias = YES. If you prefer that the personnel of the skills unit should teach hernias, then = NO.

Added to this questionnaire are the suggestions of new topics by some of the Delphi participants. If you wish to add more topics, you are welcome.

I am sending this letter by e-mail as well as a hard copy by land mail.

Thank you very much for your kind attention and I trust that this second round will go much quicker and that you will find it interesting.

Yours sincerely

Prof MVJ van Vuuren

Cell phone: 0829006491

e-mail: gnhkmvv.md@mail.uovs.ac.za

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE	
	1	2	3	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
GENERAL APPROACH																		
1 Taking a history	Consensus			Consensus													IIIIII	
			3	1	2	3												NO
CARDIOVASCULAR SYSTEM																		
2 Cardiovascular system: appropriate history	Consensus			III III													I III	
			3	1	2	3												NO
3 General principles of the physical examination of the healthy patient :appearance (BMI,Anthropometry.)	Consensus			Consensus													IIIIII	
			3	1	2	3												NO
4 Vital signs; facies; hair; nails; gait	Consensus			Consensus													IIIIII	
			3	1	2	3												NO
5 Pulses and blood pressure	Consensus			Consensus													IIIIII	
			3	1	2	3												NO
6 Jugular venous pressure	I	III		II III													Consensus	
	1	2	3	1	2	3												NO
7 Precordium: inspection; palpation; percussion; auscultation	Consensus			III I I													I III	
			3	1	2	3												NO
8 Chest X-rays: cardiac and lung conditions	III			IIII I I													IIII	
	1	2	3	1	2	3												NO
9 ECG	IIII			I III I													III I	
	1	2	3	1	2	3												NO
10 Clinical evaluation of the arterial circulation of a limb	IIII			I III I													I II	
	1	2	3	1	2	3												NO
11 Clinical evaluation of the venous circulation of the lower limb	IIII			II I													I II	
	1	2	3	1	2	3												NO
12 Examination of the lymphatic system	II III			I II I													II III	
	1	2	3	1	2	3												NO
RESPIRATORY SYSTEM																		
13 History	Consensus			IIII I I													I IIIII	
			3	1	2	3												NO
14 Inspection; sputum; hands; face; thorax	Consensus			IIIIII													IIIIII	
			3	1	2	3												NO

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL	WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
15 Palpation: trachea; thorax; (expansion; apex; vocal fremitus)	Consensus				IIIIII										IIIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
16 Percussion	Consensus				IIIIII										IIIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
17 Auscultation	Consensus				IIIIII										IIIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
MAMMAE																
18 Inspection; palpation; evaluation of lumps	Consensus				II I III										I IIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
DIGESTIVE SYSTEM																
19 History	Consensus				IIII I										I IIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
20 Appropriate history: pain; weight loss; nausea and vomiting; diarrhoea; etc.	Consensus				III II I										I IIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
21 Examination: inspection; palpation; percussion; auscultation	Consensus				IIII I I										IIIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
22 General: mass; skin; hands; nails; face; mouth; neck; chest	Consensus				IIII I										IIIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
23 Abdomen; Inspection; palpation; percussion; auscultation (techniques)	Consensus				IIII II										I IIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
24 Hernias: Examination	IIIIII				I III I I										Consensus	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
25 Rectal examination	IIIIII				II III										III II	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
26 Proctoscopy and sigmoidoscopy	IIII I				I I I II										IIIIII	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
27 Urine examination: Dipsticks and microscopy	Consensus				IIII I I										IIIIII	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
28 Abdominal X-rays	IIIIII				III II										III I	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE	
	1	2	3	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
GENITO-URINARY SYSTEM																		
29 History: urinary obstruction; incontinence; menstruation	Consensus			III I II													II	III
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
30 Examination: General appearance; limbs; face; neck; chest; abdomen; pelvis; secondary sexual characteristics - male and female (photos)	Consensus			I II II I													III	II
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
31 Orchidometer	II	III		I			II			I	I						Consensus	
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
32 Prostate: examination	IIII			I			II			I	I						Consensus	
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
33 Male genitalia (photos)	IIII			I			III			I						III	I	
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
34 Urethral catheterisation	Consensus			IIII													IIII	
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
35 Female genitalia and vaginal examination (photos)	IIII			I			III								II	III		
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
36 Vaginal speculum examination	Consensus			I			III			I	I						II	III
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
37 Pap smear	Consensus			I			III			I	I						II	III
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
38 Insertion of IUD	I	III		I			I			I	I						Consensus	
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
OBSTETRICS																		
39 Episiotomy	IIII			Consensus													Consensus	
	1	2	3	4	5	6	7	8	9	10	YES	NO						
HAEMATOLOGICAL SYSTEM																		
40 History: anaemia; fatigue; dizziness	Consensus			II			III			I						I	III	
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
41 Examination: general appearance; hands and limbs; lymphatic glands; abdomen	Consensus			III			I			I						IIII		
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			
42 Haemoglobin test	Consensus			I			III			II						IIII		
	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO			

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL			WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE	
	1	2	3	1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
43 Blood slide	II	I					IIII	I									III	II
	1	2	3	1	2	3	4	5	6	7	8	9	10				YES	NO
44 Bone marrow puncture (video)	II	III					I	II									Consensus	
	1	2	3	1	2	3	4	5	6	7	8	9	10				YES	NO
ENDOCRINOLOGICAL SYSTEM																		
45 History: change in weight; bowel habits; sweating; hair distribution; skin pigmentation; potency; menstruation; urine							I	I	IIII								II	III
			Consensus				1	2	3	4	5	6	7	8	9	10	YES	NO
DIABETES																		
46 History							I	I	IIII								II	III
			Consensus				1	2	3	4	5	6	7	8	9	10	YES	NO
47 Capillary blood glucose test							I	III	II									IIII
			Consensus				1	2	3	4	5	6	7	8	9	10	YES	NO
THYROID																		
48 Examination for hyper-hypothyroidism, nodules							I	I	III								I	IIII
	1	2	3	1	2	3	4	5	6	7	8	9	10				YES	NO
PARATHYROIDS																		
49 Examination for hyper- and hypofunction		II	III						III				I				III	I
	1	2	3	1	2	3	4	5	6	7	8	9	10				YES	NO
50 SYNDROMES WITH SHORT STATURE: Turner; Down's; Rickets	I	III	I						IIII		I						III	I
	1	2	3	1	2	3	4	5	6	7	8	9	10				YES	NO
THE NERVOUS SYSTEM																		
51 Neurologic history: headache; facial pain; syncope; dizziness; visual disturbance; ataxia; sensation fall out and weakness of limbs; tremors and involuntary movements							I	II	I	II							Consensus	
			Consensus				1	2	3	4	5	6	7	8	9	10	YES	NO
NEUROLOGICAL EXAMINATION																		
52 General signs; level of consciousness; neck stiffness; higher centres and speech							II	I	III								I	IIII
			Consensus				1	2	3	4	5	6	7	8	9	10	YES	NO
53 Parietal-, temporal-, frontal- and occipital lobe function			III				I	IIII									Consensus	
	1	2	3	1	2	3	4	5	6	7	8	9	10				YES	NO

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL	WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
54 Cranial nerves	Consensus				IIII II										I	IIII
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
55 Limbs and body; general; motor- and sensory system; reflexes; proprioception, etc.	Consensus				I III II										Consensus	
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
56 Lumbar puncture	IIII				III I										III	II
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
THE SKIN																
57 Dermatological definitions	I	III			Consensus										Consensus	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
58 Wet slide microscopy	IIII I				IIII I										IIII	I
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
59 Wood's lights	I	III			II I										III	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
60 Biopsy techniques	II	II	II		Consensus										IIII	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
61 Benign and malignant lesions	IIII				I I I I										Consensus	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
62 Ulcers; sinuses and fistulae	I	IIII			Consensus										Consensus	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
MUSCULO-SKELETAL SYSTEM																
MUSCLES																
63 Examination	Consensus				IIII II										II	III
			3		1	2	3	4	5	6	7	8	9	10	YES	NO
TENDONS AND TENDON SHEATHS																
64 Examination for disruption/ ruptures	I	IIII			Consensus										IIII	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
BONE																
65 Examination for abnormalities	IIIIII				Consensus										III	I
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
JOINTS																
66 Examination of individual joints e.g. hip, knee, shoulder, ankle, wrist	Consensus				Consensus										III	II
			3		1	2	3	4	5	6	7	8	9	10	YES	NO

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL	WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE	
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO
HANDS																
67	Examine: musculo-skeletal; circulation; nerves - motor and sensory	IIIIII			III III										IIII	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
FEET																
68	Deformities	IIIIII			I IIII I										IIII	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
RHEUMATOLOGIC SYSTEM																
69	History: Joint pains and swelling; back pain; limb pain; dry eyes and mouth; red eyes; systemic symptoms	IIIIII			III I										Consensus	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
70	Examination: observation - deformities; muscle atrophy; Palpation; movement of joints; measurement	IIII			III I										IIII	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
EAR-, NOSE- AND THROAT																
71	History	Consensus			I IIIII										IIII I	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
72	Ear examination	Consensus			II IIII										III II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
73	Nose and throat examination	Consensus			II IIII										III I	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
74	Cryothyroidotomy	II III			I I II I										Consensus	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
OPHTHALMOLOGY																
75	History	Consensus			II III I										III I	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
76	Examination: Snellen chart; Amsler chart, confrontation eye fields; red reflex, pupil reactions	Consensus			I IIII I										III II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
77	Ophthalmoscopy	Consensus			I IIII I										III II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
78	Ocular pressure (Schiotz tonometer)	Consensus			II I I II										III II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
ANAESTHESIA																
79	CPR	Consensus			II II I I										III II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO
80	Intubation	Consensus			I II II I										III II	
		1	2	3	1	2	3	4	5	6	7	8	9	10	YES	NO

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL	WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		
	1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO	
81 Defibrillation/Dysrhythms	Consensus				I II II I										IIII		
82 Infusions/cannula intravenously	Consensus				IIII II										Consensus		
83 Central lines: placing	Consensus				Consensus										IIII I		
84 Spinal injection simulator - spinals; epidurals; sacral block	II	II	I		I III										Consensus		
	1	2	3														
85 Ring block of fingers	IIII				I II II										Consensus		
	1	2	3														
PAEDIATRICS																	
86 History-taking	Consensus				II III										IIII I		
87 Technique of examination and systemic examination	Consensus				I I III										Consensus		
88 Neonatal examination	Consensus				Consensus										Consensus		
89 Neurological examination	Consensus				Consensus										Consensus		
90 Child development	Consensus				Consensus										Consensus		
91 Intubation	Consensus				I III I										IIII I		
92 Placement of IV lines (scalp veins; peripheral; tibia; umbilical)	Consensus				I III I										IIII II		
93 Arterial puncture	I	II			II III										IIII I		
	1	2	3														
94 Underwater drain	III				I I III										II II		
	1	2	3														
EMERGENCY CARE																	
95 Primary evaluation and resuscitation of the trauma patient	Consensus				I IIIII										IIII I		
96 Secondary evaluation - trauma patient	Consensus				Consensus										IIII I		

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

	TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL	WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE			
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
97	Use of the trauma board (spine board) and splints	Consensus				I	I	IIII										Consensus	
				3		1	2	3	4	5	6	7	8	9	10	YES			
98	Wound care and dressings and bandages	IIII				II	I	II										Consensus	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES			
99	Shock	Consensus				Consensus										IIII			
				3					4	5	6	7				YES	NO		
ADDITIONAL TOPICS SUGGESTED BY PANEL MEMBERS																			
100	TRACHEOSTOMY	I	IIII			I			I	II	II						IIII		
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
101	HEIMLICH MANOEUVRE	IIII				I		III				I					III	II	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
102	TENSION PNEUMOTHORAX	II	IIII						I		I	I	I				IIII		
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
103	NASOGASTRIC INTUBATION	IIIIII				II	III		I								II	IIII	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
104	BASIC SUTURING TECHNIQUES	IIIIII				I	II	I	II								I	IIII	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
105	SPLINTING OF FRACTURES	IIIIII				I	I	III				I					IIII	II	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
106	EXAMINING OF THE PREGNANT ABDOMEN	IIIIII				II	II	I	I								IIII	I	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
107	NORMAL VAGINAL DELIVERY	I	IIIIII			III	I	I	I								IIII	II	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
108	EXAMINATION OF A RAPE VICTIM	I	IIII			I			I			IIII					IIII		
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
109	HAND WASHING AND GOWNING FOR THEATRE	I	IIII			II	III		I								II	IIII	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
110	BLOOD CULTURE	I	I	IIII		II	I		I	I							II	III	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
111	INJECTIONS: INTRAMUSCULAR AND SUBCUTANEOUS	I	IIII			II	I		II								I	IIII	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
112	PLEURAL TAP	III	III						I		II	III					II	IIII	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
113	PLEURAL BIOPSY	I	III	II					II	II	II						IIII	I	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		
114	ASCITIC FLUID TAP	III	III						II	II	I						IIII	I	
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO		

DELPHI QUESTIONNAIRE SECOND ROUND ANALYSIS

	TOPIC	INAPPROPRIATE USEFUL			ESSENTIAL	WHERE IN THE COURSE										LECTURER: SPECIFIC DISCIPLINE		
		1	2	3		1	2	3	4	5	6	7	8	9	10	YES	NO	
115	COMPLETION AND INTERPRETATION OF ROAD TO HEALTH CHARTS	I	IIII			I		III	I		I						III	III
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
116	STOCK EXCHANGE	II	II								II						II	
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
117	SOAP SYSTEM - WRITING OF PATIENTS' NOTES	I	II	II				III			I							IIII
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
118	LANGUAGE	I	I	II		I	I		I								I	III
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
119	VISITS TO WARDS			III				I	I	I							II	II
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
120	COMPLETING AND INTERPRETATION OF ANTENATAL CHARTS		I	IIII				II	I	I	I						IIII	I
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
121	COMPLETION AND INTERPRETATION OF PARTOGRAM CHART		I	IIII				I	I	I	I	I					IIII	I
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
122	CERTIFICATION OF DEATH AND COMPLETION OF DEATH CERTIFICATE			IIII						I	II	II					II	III
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
123	BREAKING BAD NEWS	I	IIII					III	I	I	I						I	IIII
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
124	HIV TEST AND COUNSELLING		IIII					III	I	II							III	III
		1	2	3		1	2	3	4	5	6	7	8	9	10		YES	NO
	PLEASE ADD TOPICS IF YOU THINK OF SOME.																	
	EAR TOILET																	
	NOSE BLEED																	
	FOREIGN OBJECT IN EYE																	
	URINE SAMPLING IN CHILDREN																	
	SUPRAPUBIC CATHETER																	

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5 July 2004

Dr
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Dear Dr.,

THIRD ROUND OF THE DELPHI RESEARCH ON: "A FRAMEWORK FOR A SKILLS LABORATORY CURRICULUM IN AN UNDERGRADUATE MEDICAL PROGRAMME IN SOUTH AFRICA"

Thank you for completion of the first two rounds of this study.

This questionnaire includes the answers of the second round of all the participants.

The parts coloured in green and marked "consensus" do not have to be filled in again, as more than 80% of you have chosen them. The blue colour indicates consensus reached in the second round.

You must please fill in the parts not coloured, bearing in mind that you are allowed to change your first round opinion so that we can reach consensus where possible. If, however, you feel that you should stay with your choice even if it is not in agreement with those of the others, please feel free to stick to your previous opinion and fill it in once again.

Where we achieve only 60% consensus, these topics will also be included, but with a motivation.

To remind you regarding the first column, those topics which are necessary in the curriculum but not suitable for a skills unit, should be marked "inappropriate".

Regarding the time scale (the middle columns) or phase in the medical curriculum where you feel the topic should be taught, I divided this into thirds in order to be able to reach consensus. The divisions are 1-3; 4-7; and 8-10 so that if your choice falls in one of these thirds, it should be easier to reach consensus. The last part is to indicate if you prefer that a specific discipline must teach the topic, for example, surgery should teach hernias = YES. If you prefer that the personnel of the skills unit should teach hernias, then = NO.

Added to this questionnaire are the suggestions of six additional topics by some of the Delphi participants.

I am sending a copy by e-mail as well as by land mail. You are free to fill in the one you find most convenient.

Thank you very much for your kind attention and I trust that this third and hopefully last round will go much quicker than the previous two rounds.

Yours sincerely

Prof MVJ van Vuuren

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UNIVERSITY OF THE FREE STATE



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24th January 2002

PROF MVJ VAN VUUREN
DEPARTMENT OF FAMILY MEDICINE
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UNIVERSITY OF THE FREE STATE

St. Nr. 200110259

Dear Prof van Vuuren

ETOVS NR 16/02

RESEARCHER: PROF MVJ VAN VUUREN

**PROJECT TITLE: A FRAMEWORK FOR A SKILLS LABORATORY CURRICULUM
AND PROGRESS TEST IN AN UNDERGRADUATE MEDICAL PROGRAM IN SOUTH
AFRICA.**

You are hereby informed that the abovementioned project was approved by the Ethics Committee during their meeting held on the 22nd January 2002.

Prof van Vuuren who is a member of the Ethics Committee, did not take part in the final evaluation of this project.

Your attention is kindly drawn to the following:

- a) A progress report be presented not later than one year after approval of the project
- b) That all extensions, amendments, serious adverse events, termination of a study etc have to be reported to the Ethics Committee

Will you please quote the Etovs number as indicated above in subsequent correspondence, reports and enquiries.

Yours faithfully

For DIRECTOR: MEDICINE ADMINISTRATION