Introducing problem-based learning into a traditional medical school : student and staff perceptions of the United Arab Emirates University's innovation

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Student and staff perceptions of the
United Arab Emirates University's innovation

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PROEFSCHRIFT

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Deborah Jean Sihle Mpofu

geboren te Chipinge, Zimbabwe, in 1956

Promotor:

Prof.dr. H.G. Schmidt

Beoordelingscommissie:

Prof. dr. C.P.M. van der Vleuten (voorzitter)

Prof. dr. J.J.C.B. Bremer

Dr. D.H.J.M. Dolmans

Prof. dr. G.J. Kok

Dr. M.W.J. van de Wiel

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PREFACE

The studies described in this thesis were conducted at the Faculty of Medicine and Health Sciences (FMHS), United Arab Emirates (UAE) University.

In a fairly new medical school only a decade old, a major question was whether innovation in the form of Problem-Based Learning (PBL) was really necessary? Negative attitude by faculty staff to the idea of introducing PBL was highlighted in a study undertaken in 1991. On the other hand, policy makers had an idealistic perception of what medical education and training at the FMHS could be like. PBL and the promotion of self and active learning were some of the key curriculum principles identified. In 1994 the FMHS decided to cautiously introduce change in the form of PBL into the Introduction to Medicine Module (ITMM) during the preparatory year (the first year) of the medical curriculum.

In June 1994, together with Dr Mandira Das, the ITMM coordinator, I attended a PBL training workshop and PBL conference at McMaster University. Following the McMaster experience, work on introducing PBL to the ITMM and work on this thesis began. In 1996, I attended a further PBL workshop at the University of Maastricht, the Netherlands. The final product of this thesis is the result of a team effort around the globe.

My promotor prof.dr.Henk Schmidt, used all forms of modern technology to keep me focused, and communicate fine details about the micro and macro aspects of the study. I am most thankful for your belief in me. Dr Mandira Das was a key support, her suggestions, ideas and leadership provided tremendous strength especially during difficult times. Dr Joel Lanphear, my co-promoter, was facilitative in addressing not only the bureaucratic issues, but practical matters too. Professor Earl V. Dunn, I consulted about matters pertaining to data collection and more importantly the statistical aspects of the project. To Doctors Tom Stewart, Harith Swadi, Mohammed Hassan, your support and enthusiasm about the project was an important driving force.

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Finally I would like to thank my husband Chris, my three wonderful sons Sabe, Dumiso and Vukile. Your patience and love are a blessing. Last but not least I dedicate this thesis to my father, MacDonald Major, you always believed in me.

Deborah Major-Mpofu

Introduction and Overview of the Thesis

The study reported in this thesis aims to illustrate the wealth of information educators can obtain about aspects of the curriculum, especially the students, using innovative Problem-Based Learning (PBL). Historically, not only established medical schools but even fairly new medical schools, like the Faculty of Medicine and Health Sciences (FMHS), United Arab Emirates (UAE) University lean more towards traditional forms of education. Faculty are more comfortable with tradition. Maintaining the status quo is easier than accommodating the new “alien” ideas. For the students in many medical schools, progressing through the medical curriculum means survival of the fittest. Paying attention to an institution’s unique curricula concerns and not treating medical education as the same the world over, is crucial. Innovation starts to highlight the unique curricula problems. These could vary from the recruitment process, the medium of instruction, faculty related issues to issues such as the institutional environmental aspects. PBL offers an opportunity to review aspects of the curriculum from a variety of perspectives, using qualitative methodologies. It is hoped that by providing the results of specific curricula related investigations into the system, needed growth and development will be promoted.

The Thesis

This thesis reports the investigations around the introduction of innovative practice into a medical curriculum. It focuses on feedback on aspects of PBL, from PBL students, PBL tutors and observers on a variety of issues pertinent to the innovation. In this instance PBL is an innovative educational mode being introduced as a small segment into a strongly teacher centred curriculum.

Setting the scene

For the study, in introducing PBL, it is not only the student group functioning with a facilitator that is important but the setting, the learning milieu, plays a crucial role. It is a Saturday morning at 9 a.m. the beginning of the working week, the temperatures range from 30-45 degrees Celsius. Often the desert wind brings with it heavy sand storms. During the cooler December to January months, maybe for two weeks out of the entire year a little rain falls teasingly around. A Canadian female professor in Family Medicine and a clinician, a male Lebanese Anaesthetist head to the male teaching rooms to take one of the Preparatory Year male groups of eight students for a PBL session. At 2 p.m. the two PBL tutors repeat the same PBL session with a group of nine female students, this time in the female teaching rooms. The students laugh and joke in Arabic as they are heading to the PBL rooms, and switch to English once the session begins.

students, complimented by the distinctive Arabic head dress. The male students and the male anaesthetist rub noses as a form of traditional greeting. On the other hand, the clicking of fashion shoes and the silky black "abayas" remind you that you are in the female teaching area. Students and tutors greet one another traditionally, "Salam Alekum" "Walekum Salam". Both tutors and students have received orientation on PBL. Orientation covers the principles of PBL, the PBL steps, the roles of group members, the tutorial sessions, group interaction, information management skills, assessment and evaluation. This is part of the Introduction to Medicine Module (ITMM), a module that runs for the whole academic year, in the first year of medical education and training.

All students of the FMHS are UAE nationals who enter medical school after completing secondary school education and a one year Basic University Education Program. English is the medium of instruction in the FMHS. For all students, English is a second language. It is identified that for almost all the medical schools in the Arab world, English has been adopted as the language of instruction. The majority of pre-college schooling is in a different language and therefore students experience related language problems during the course of medical schooling, (Swadi, 1997).

Each year 35-40 students enter medical school at FMHS, in general approximately two-thirds of the entrants are female. For cultural and religious reasons males and females are taught separately.

The United Arab Emirates: A Brief Sketch

Although the investigations were carried out in relation to medical education, it is important to understand the sociopolitical environment of the medical school.

The UAE was established as a loose confederation of seven separate states, called emirates in 1971. The discovery and exploitation of oil has provided for an incredible modernization over the past three decades. The nation was transformed from desert land, dependent on fishing, pearling, trading and "wadi" agriculture to a very complex consumer economy supported by modern transportation and communication systems, with a GDP comparable to any country in the developed world, (Gallagher 1993).

The "oil boom" has attracted a vast expatriate workforce, where expatriates presently outnumber citizens. In 1968, the combined population of the seven emirates was about 180,000 36% of whom were non-nationals. By 1980, the population had grown to 2.5 million and the percentage of non-nationals had increased to 73% (Gardner 1995). The expatriate population carries out many vital functions from unskilled construction work, to skilled work in architecture, teaching, banking, petroleum geology, patient care and a variety of other professional and non-professional work, (Gallagher 1993). Gardner 1995, indicates that the twin dominance of both the workforce and the total population by non-nationals has caused anxiety among the nation's leaders because too much of the nation's future is in the hands of a foreign population. Thus, the UAE leadership encourages large families amongst its national population. Further, although illiteracy was common among the over fifty year old males and almost universal amongst females, virtually all children today receive at

least primary school education. Education of nationals including medical education is well supported by the government. In relation to health care delivery, the leadership aims at not only producing its own UAE physicians, but physicians who are comparable to the best in the world. It is identified that health care is an important vector of modernity in two senses: directly, for its powerful practical effects in curing or alleviating illness; and symbolically for its representation of a society's capacity to mobilize the agents and institutional structures that can implement biomedical science to human benefits. With physicians leading the charge, so to speak, against illness, medical education is a particularly strategic component of a society's health effort and index of its modernization, Gallagher (1993). Islam is the state religion of the UAE. Arabic is the official language, although languages like English, Hindi, Tagalog to name a few, are spoken widely. Within the research context, male students versus female students' differences in various aspects of the research studies are of particular interest as: a) UAE women have traditionally played a dominant role in domestic and family affairs where, their public role was very limited; b) although women are slowly entering the workforce into business, management and secretarial positions the majority are still mainly in the occupations of teacher, social worker and a limited number of physicians. There is still greater encouragement for females to work in areas in which they deal more with female clients.

The Wider Historical Background of Importance to the FMHS, UAE University

Around 1910, Flexner introduced the biomedical approach into medical education. The emphasis of his approach was on producing high-quality physicians by increasing the scientific knowledge and emphasizing medical practice (Magzoub 1994). Flexner's model was adopted by medical schools in both developed and developing countries. This meant the amount of knowledge medical students had to acquire and the number of specialists who had to teach this knowledge increased tremendously. However, in the seventies calls for education reform using problem-solving rather than rote-memory, stressing active rather than passive learning and emphasizing student-centred rather than teacher-centred education followed. These ideas were voiced by the Association of American Medical Colleges (AAMC) 1984 panel on the General Professional Education of the Physician (GPEP) in a report entitled "Physicians for the twenty-first century". In addition, in 1978, following the Alma Ata declaration on primary health care, worldwide awareness of the importance of primary health care and equity in service delivery was realized. The Alma Ata conference confirmed the need for a new look at health profession education. The worldwide awareness of the global problems in conjunction with the promotion of health for all by the year 2000 brought with it major concerns. One growing concern was the necessity to adjust health manpower development to the real health needs and demands of the population, namely the "health manpower development concept" Fulop (1985).

The question of relevance of medical education to the health needs of the nation has received world-wide attention. The Edinburgh declaration (World Federation on Medical Education, 1989) which stemmed from a conference organized in response to the GPEP report received world-wide support. A delegation from the United Arab

Emirates University, Faculty of Medicine and Health Sciences participated in this conference. The FMHS thus, was interested in promoting knowledgeable, high quality physicians, comparable to any other physicians the world over. Simultaneously, the UAE wanted to produce its own physicians responsive to the health needs of the country.

The History of the FMHS UAE University, and identified curricula gaps

At the time of the establishment of the FMHS at UAE University in 1986, a number of key curriculum principles were defined. Two of these principles were: 1) The curriculum will promote and facilitate: a) self-directed learning by students, b) active rather than passive learning; 2) A variety of teaching / learning methods will be used with an emphasis on problem-based learning (Lanphear, 1991).

In theory, the FMHS supported the above principles. However, there was no real implementation of them in everyday practice. In a study undertaken in 1991, there was lack of understanding of what the principles were, and there was a general reluctance and resistance to the idea of PBL (Abdulrazaq & Qayed, 1991). Simultaneously, at the FMHS, UAE University in 1990/1991 due to a number of factors working together, an environment was created for curriculum revision. These factors were:

- Rapidly expanding faculty members experienced in FMHS teaching and eager to contribute;
- Growing experience in teaching UAE medical students;
- Better understanding of health care needs in the UAE;
- Concern especially with pre-medical teaching entirely in Arabic, whereas the integrated medical curriculum emphasized problem-solving and was in English;
- An interest in aligning the curriculum with the curriculum principles identified from the outset. However, the faculty had not resolved the question of the extent to which the curriculum would be problem-based or problem-oriented and there was a clear need to better address the community aspects of health care, including non-hospital medicine;
- International developments in Medical Education. - The Edinburgh Declaration called for attention to active learning by students. It also called for institutions to reward good teaching and asked faculty to teach prevention as well as management of disease. Finally, it called for integration of education in service and practice and for fostering problem-solving in clinical and community settings;
- Curricular changes in the United Arab Emirates.

Lanphear (1991) pp 217-219.

In 1991, the FMHS medical curriculum which had only been in existence since 1986 was therefore revised. Major gaps still existed as indicated above in the areas of PBL, self directed learning and increased community involvement. The major breakthrough, however, in the system was the course module integrated system. Therefore, from here on the FMHS introduced an integrated curriculum where the modules were functional units. The seven year curriculum included a one year internship. The first year, namely the Preparatory Course comprised of the following modules: Physical sciences;

Biological sciences; Communication and Study Skills and Introduction to Medicine. In the second year the Integrated Biology and Medical Sciences (IBMS) Course was offered. IBMS comprised of four modules, namely: Basic Medical Sciences; Human Sciences; Developmental Sciences and Biological Sciences. These two years therefore provide the background for entering years three and four in the Organ Systems Course. This was then followed by two years of Clinical Clerkships, where students rotated through the clinical specialties.

The real dilemma at the FMHS was a philosophy that was supported by the government, the advisory groups and the administration, but not the power players within the traditional academic departments - the chairmen. However, attendance at the World Summit on Medical Education in Edinburgh in 1993, left some key faculty keen to investigate aspects like PBL further. Experts from McMaster University were invited to conduct an intensive workshop on PBL. The attending Dean, Associate Deans, Course Directors, Module Coordinators and Faculty staff agreed to proceed to work towards implementation of the earlier identified key curriculum principles. A PBL program was therefore designed and implemented in the Introduction to Medicine Module (ITMM) of the Preparatory course from 1994/1995.

The ITMM covered six PBL thematic units, namely: Health Care System, Environment and Health, Alternative and Islamic Medicine, Family Health Issues, Infectious Diseases, Prevention and Health Promotion. These six PBL themes were later reduced to five themes for a variety of reasons. The aims of the ITMM were to provide the medical students an insight into the:

1. Health care system of the United Arab Emirates
2. Socio-cultural, psychological, and environmental factors which affect health of the individual, family and community.
3. The approach to alternative therapies in UAE, disease prevention and health promotion.
4. Methods of clinical examination.

One of the themes in the ITMM which ran for four weeks was called *Environment and Health*. The objectives for this theme were as follows:

- to identify environmental factors related to health and disease;
- begin to identify measures for preventing diseases due to environmental factors

Simultaneously students were introduced to:

- the principles of First Aid
- common First Aid measures

The PBL trigger used was based on local issues, concerns and identified problems that are common in UAE, and in keeping with the theme title.

Environment and Health PBL trigger

Problem Title - *Sayed Ahmed and his environment*

Sayed Ahmed, complaining of difficulty breathing and sore eyes, was brought to the local hospital's Emergency Department. Sayed is anxious as he inhaled all sorts of fumes from a fire. Would this lead to tuberculosis he keeps asking? Sayed has worked

as a laborer in the construction sites in Abu-Dhabi Emirate for the past fifteen years. A building in his neighbourhood caught fire. Sayed joined the fire-fighters in evacuating people and putting out the fire in the multi-storied building.

Following clarification of the meaning of words, students identified learning issues and divided them into the following categories; biological, community, educational, ethical and critical appraisal. The first year students discussed the issues arising from the problem trigger. The students using their prior knowledge, explained to each other their understanding of the issues related to the PBL trigger. Each PBL category was then summarized into a major and a minor objective. For example, the major biological learning objective was; the anatomy and physiology of the upper and lower respiratory tract. Minor objective were; 1) the effects of inhaling fire fumes on the respiratory tract, 2) the effects of tuberculosis on the respiratory tract. Some Community objectives were the incidence of fire accidents in the UAE, and the incidence and prevalence of tuberculosis amongst nationals and expatriates in UAE. For critical appraisal the local reports on fire accidents and tuberculosis would be compared with those of other countries etc. etc. On an ongoing basis students generally referred to the facilitators for confirmation as to whether they were on the right track or not. Now and again students consulted the dictionary for clarification of the meaning of words. Illustrations on the board accompanied much of the discussions. The students used their prior knowledge in the analysis of aspects related to the trigger. In some cases they had difficulty trying to verbalize the appropriate English terminology. Some students struggled on in English, at times consulting the tutor. Other students reverted to using Arabic at this point and returned to English when they were satisfied with the Arabic explanations given. Following possible analyses of the problem, learning objectives were clarified. Then, identification of appropriate learning resources was undertaken. The learning resources included library materials, computer search, First Aid and other exercises in the skills laboratory. Some students would consult public health, hospital emergency and other facilities. Still others would seek out FMHS faculty, senior colleagues and views of the public on ethical issues. Informal evaluation of self, peers and tutor(s) concluded each PBL classroom experience. In this case the presence of experts on the subject under discussion is evaluated very positively by the students at the end of this session. Each PBL session was followed by self-directed study periods. The report back phase was undertaken a week later before progressing to the next PBL trigger (Table 2). Multiple choice questions, Modified essay questions, a related project and objective structured clinical exam would be the methods of assessment used at the end of each semester. This assessment would cover two or sometimes three thematic units of study.

Why was the innovation necessary?

In a new medical school only a decade old, why would change be necessary? Why move from traditional practices to PBL? The innovation was necessary for several reasons. Firstly, the FMHS aspires to be a medical school comparable to other medical schools around the world. Therefore, there was a need to respond to international

recommendations like the Edinburgh Declaration, which called for active learning, integration in service and practice, problem- solving etc. Secondly, during the 1990/91 curriculum revision a need was identified to align the medical curriculum with the FMHS curriculum principles identified at the inception of the FMHS in 1986. This would involve introducing problem-based learning, self-directed learning, and demonstrating a greater degree of community orientation within the curriculum. Further here, from a local perspective the FMHS Chancellor had made recommendations to move towards active learning where, PBL is the prime method of active learning. Finally, the previously mentioned curriculum revision highlighted concern in relation to the integrated medical curriculum being in English, when pre-medical teaching was entirely in Arabic. These collective issues pointed towards a move to more student centred problem-based learning, granted, with appropriate monitoring, review and feedback.

It is important to note that in 1991, an investigation at the UAE University, FMHS reported little understanding of what Problem Based Learning (PBL) was about amongst faculty members. The same investigation identified open hostility by some faculty towards the idea of introducing PBL (Abulrazzaqi & Qayed, 1991). Three years later a study published in 1994 using the 'SPICES Continuum' showed that the FMHS faculty believed then, that the use of a student-centred, problem-based, integrated and community oriented curriculum with electives would be more appropriate than the defined traditional practices (Das, Lanphear & Ja'afar, 1994). From the above, therefore, it was timely to introduce problem-based learning and some degree of community oriented learning into the medical curriculum, with appropriate monitoring and review. It was also important to examine the PBL user's perspectives, both staff and students, on the innovation, and feed these back into the system. From the students perspective there was a need to investigate several areas within the innovative structure. Firstly, to investigate whether the FMHS students were able to not only use PBL, but also to work in small groups. Secondly, the move from pre-university education in Arabic to medical education in English had been identified as problematic; could the innovation help to define the problem more concisely? Finally, to determine overall any positive as well as negative aspects of the innovation. For the study therefore, following some of the recommendations by Kantrowitz, Kaufman, Mennin, Fulop & Guilbert, (1987), a limited segment of the medical curriculum was selected to introduce and monitor the innovation, for the following reasons:

1. Minimization of threat to traditional faculty

Selecting a small segment of the curriculum allows a small group of committed faculty and students to try out new types of curriculum without initially forcing the rest of the faculty either to change what and how they teach, or to participate in the innovation. Study 2, (Chapter 3) entitled *A Review of PBL over five themes: perceptions of students and tutors at the UAE University*, uses a questionnaire adopted from Majoer, Schmidt, Snellen-Ballendog, Moust, Stalen hoef-Halling (1990) to identify the merits of PBL. There is an attempt to scrutinize the PBL process adopted and to highlight both positive and negative aspects related to the innovation. In this instance the

innovation was only introduced to the Introduction to Medicine Module (ITMM) and used volunteer tutors only.

2. Bypassing of departmental power bases

The innovation brought together educators from different departments who place students education needs above departmental concerns. The goal of offering an integrated curriculum can be undermined by traditional departmental control of curriculum evaluation. Study 2, referred to above, used tutors/ facilitators from eight different departments in the review of PBL. This was supported overall by the new curriculum model.

3. Providing a protected environment

Innovative practice like ours, allows room for ideas to be tested and modified until it is clear which ideas work and which ones do not. Innovation needs time and space to develop and modify new approaches. One major concern at the FMHS was whether students could comprehensively address necessary learning material in PBL. Study 1, (Chapter 2) entitled *Effectiveness of problems used in problem-based learning* used the degree of congruence between staff objectives and student generated learning issues to assess effectiveness of PBL triggers used over five thematic study units. Previous studies by Coulson and Osborne (1984) and later by Dolmans (1994) demonstrated students to identify approximately 60% of the learning issues intended by staff. The need was felt to replicate the study in a Middle-East location, using objectives and PBL problems designed locally.

Further, here, introducing students to self and peer appraisal was identified as a professional skill essential for the success of every doctor in maintaining professional competence. How would our FMHS students handle self-evaluation? Could self-evaluation be introduced into the summative or formative assessment systems for the respective years? Study 4 (Chapter 5) entitled *Self and Tutor evaluations in problem-based learning tutorials: is there a relationship?* sought to review the role of self evaluation by first year students as opposed to tutors during PBL sessions over two academic years. The study used a fifteen item questionnaire adopted from Rangachari & Crankshaw (1992). The fifteen items represented five subscores; responsibility, information processing, communication, critical analysis and self awareness. These five subscores were rated on a scale from 1 to 5, from disagree to agree. An overall rating was also required at the end of the form, and a space for comments about self-evaluation, was provided.

Identifying how useful or otherwise self-evaluation would be, was seen as a worthwhile exercise in encouraging student identification of areas for self development and encouraging the students greater responsibility for their own learning.

4. Offering an innovative approach to learning

This study gave students an opportunity to not only use a novel approach to learning but also the facility to stand back and reflect on positive and negative aspects of learning in small groups. Study 4, (Chapter 5) entitled *Perception of group dynamics in PBL learning sessions: a time to reflect on group issues*, offers students and tutors not

just the use of PBL approach to learning but opportunity to review positive and negative aspects of group functioning. The majority of the FMHS first year medical students had no previous experience of learning in groups. Using a survey form adapted from Tipping, Freeman & Rachlis, (1995) medical students and PBL tutors reviewed the following categories of group behaviour over four thematic study units; physical climate, emotional climate, involvement, interaction, cohesion, productivity, the student as group leader, and finally, the tutor as facilitator.

The experience of working in small groups would hopefully identify general as well as specific group dynamics issues, important in adapting PBL as a mode of learning.

5. Confirming or refuting rumours of importance to students education

It is crucial and extremely important to undertake research that confirms or refutes anecdotal reports. Not only with the FMHS, but with other schools as well, it is not uncommon to see faculty vote against introducing a new approach to student learning because anecdotal evidence suggests students may not cope with the innovation. It is important to provide research evidence which forms the bases for suggested recommendations. At the FMHS, English Language, communication in English, interaction using English were repeatedly highlighted as some areas of concern for the students (Das, Murdoch, Mpofu & Benner 1996; Harrison, Glasgow, Townsend 1996; Swadi 1997; Mpofu, Das, Stewart, Dunn & Schmidt 1998; Mpofu, Schmidt, Das, Lanphear & Dunn 1998.) Study 5, (Chapter 6) entitled *Facility with the English language and Problem-Based Learning Group Interaction: Findings from an Arabic Setting*, focuses on the issues of student proficiency with English as measured by the Test of English as a Foreign Language (TOEFL), student background factors and interaction in Problem-Based Learning groups. Using a modification of Bales Interaction Process Analysis (IPA), four PBL groups were observed over four thematic study units, to measure the degree of student interaction within PBL groups and to compare this to individual TOEFL scores and key background variables.

This final study would highlight more clearly and more specifically the problem the students were experiencing with the use of the English language, as identified in PBL small group situations.

The collective findings from the above five studies are viewed as tools to promote curricula dialogue and a promotion of curricula modifications.

The issues the thesis addresses, both directly and indirectly therefore are as follows:

- Could PBL be an appropriate learning method for UAE Arabic students?
- Could students use PBL as intended ?
- What were the merits of introducing a new PBL programme at FMHS?
- Was PBL acceptable to tutors, and students as an approach to learning?
- How did the students perceive working as a group in PBL, when they had no experience of group learning?
- PBL uses post session evaluation by participants, how useful was self-evaluation to students and how was self-evaluation perceived by both students and tutors?
- Did proficiency with English affect students interaction in PBL groups?

Chapters 2-6 of the thesis are articles published in various journals, these chapters report the investigations carried out in relation to the above reported questions. Some issues are over explained for clarity to the reader of the individual journals the articles were prepared for. The relationship between the chapters is therefore presented graphically in Figure 1.

The introductory chapter of this thesis describes the educational context in which the innovation was conducted. There is also an attempt to briefly highlight the sociopolitical context of the country where the study was based. In chapter 2, the learning environment and the PBL process is described as adapted at the FMHS, in order to give the reader an understanding of the prevailing educational conditions. The identification of relevant learning issues as a measure of student learning has been used in several studies (Dolmans 1994, Coulson & Osborne 1984). In chapter 2, an investigation was undertaken to measure problem effectiveness. During PBL, the extent to which the students identify relevant learning issues when exposed to prepared problem triggers is indicated as demonstrating how effectively the problems were constructed from faculty objectives. At the FMHS it was necessary to repeat the study from a local perspective, and second, to demonstrate the following: that FMHS students could not only effectively utilize PBL to learn, but also illustrate the effectiveness of PBL in covering related content. One assumed that this would help to alleviate FMHS faculty anxieties and doubts about this approach to teaching and learning. Chapter 3 then reviews benefits and areas needing further development related to PBL from the users' perspective. It attempts to highlight the worth of PBL in the respective context. Data were collected, using a questionnaire in English and Arabic to study perspectives on PBL from both the faculty and students involved. This was done to inform any interested parties especially skeptical faculty, on the users' views regarding PBL. It also highlights how PBL can contribute to improving the quality of learning for the students by identifying deficiencies in every day practice. Chapter 4 addresses the question whether evaluation by students is comparable to evaluation by tutors. Further, how self-evaluation, compares with students' respective test results. During the undergraduate medical curriculum, how useful would self-evaluation be to the students' own progress and development? Self-evaluation which helps students in general appraisal is viewed as essential competence skills for every medical doctor, in their professional career. Chapter 5, focuses on an analysis of group dynamics dimensions. PBL requires co-operative group learning. How would UAE, FMHS students who had no previous experience of working in groups, view and cope with learning in small groups? Implementation of PBL resulted in an opportunity to investigate the identified areas further. Curricula concerns with the students moving from pre-university education in Arabic to medical education and training in English were highlighted in the FMHS curricular revision of 1991. Various concerns with English language, and the UAE, FMHS students were further highlighted in studies identified earlier. In chapter 6, using well respected qualitative methodologies developed in the 1950s, an analysis of students' facility with the English language and PBL group interaction was undertaken. This would hopefully highlight more clearly the type of problem(s) students experienced in relation to the second language, during

PBL interactions. The summary and conclusion discuss the main findings overall, and demonstrate the issues and lessons learnt from a cautious introduction. Based on the study findings, recommendations are made in relation to possible areas for curricula revision. Implications for education are highlighted and suggestions are made regarding areas for future investigations.

Table 1
In the (ITMM), The Title of the Problems, Themes and the Areas Emphasized

<i>Problem</i>	<i>Theme</i>	<i>Areas Emphasized</i>
1. Suhail and his Health Care	Health Care System	<ul style="list-style-type: none"> • Organization and function of health care delivery system • Principles of “Health for all” • Roles of different health professionals • Presentation of health problems to the physician
2. Sayed Ahmed and his environment	Environment and Health	<ul style="list-style-type: none"> • Environmental factors in relation to Health • Prevention of disease due to environmental factors
3. Rashida’s dilemma	Alternative and Islamic Medicine	<ul style="list-style-type: none"> • Traditional medicinal practices in the UAE • Advantages and Disadvantages of alternative medicine • Medical Ethics and Islamic Shariah in practice of Medicine
4. Health check up of Hamad	Family Health	<ul style="list-style-type: none"> • Regular health check up • Effect of chronic illness on individuals and members of the family.
5. Vaccination for Ayesha	Infectious Diseases	<ul style="list-style-type: none"> • Transmission of Infectious diseases • Prevention of transmission of infectious diseases
6. Health problems in Berashi	Prevention and Health Promotion	<ul style="list-style-type: none"> • Principles of health promotion which encompass health education • Prevention and health protection.

Table 2

Steps involved in the PBL tutorial process at FMHS, UAE University

1. Clarify terms in the problem description which are unclear
2. Identify the issues to be discussed categorising them into biological, behavioural, population, ethical, critical appraisal or any other identified heading acceptable to the group
3. Analyze these issues using prior knowledge
4. Formulate learning goals
5. Attempt to fill in the gaps in knowledge through individual study. Collect information from varied resources.
6. Share findings with the group, and try to integrate the knowledge acquired.
7. Evaluate self, peers and tutors, informally after each session, and formally on the last session per theme.
8. Evaluate the PBL tutorial process and the theme as in 7 above.

Figure 1
Medical education areas the thesis addresses at the United Arab Emirates University

Research Question or Issues	Related Study Area	Aspect of the Innovation dealt with
Background to the Study	Presentation of Information leading to the overall investigation.	Preliminary Discussion
Q 1- Given a problem could the students comprehensively identify learning issues related to the theme objectives identified by faculty? Q 2- What were unexpected learning issues the students identified?	Study 1. (Chapter 2) <i>Effectiveness of problems used in PBL.</i>	Providing a protected environment, in which to test ideas.
Q- In view of skepticism expressed by faculty staff regarding PBL, what were the perceptions of tutors and students involved in the PBL programme?	Study 2. (Chapter 3) <i>A review of PBL over five themes: perceptions of students and tutors at the UAE University.</i>	Minimization of threat and By-passing departmental power bases.
Q 1- What were the differences between self- and tutor evaluations of student performance during PBL tutorials? Q 2- How did students perceive the process self-assessment and how did self-evaluation compare with test results?	Study 3. (Chapter 4) <i>Self and tutor evaluations in problem-based learning tutorials: is there a relationship?</i>	Providing a protected environment, in which to test ideas.
Q 1- What were the most important and least important sub-elements of group dynamics perceived by tutors and students in PBL groups? Q 2- What were the differing perceptions of group dynamics a) by students from one theme to another b) between male and female students regarding perceptions of group dynamics within PBL groups?	Study 4. (Chapter 5) <i>Perceptions of group dynamics in PBL learning sessions: a time to reflect on group issues.</i>	Offering an innovative approach to learning
Q 1- How do Arabic students of differing English language proficiency levels interact in PBL groups? Q 2- What factors influence English language proficiency (TOEFL results) and do the same factors influence PBL group contributions?	Study 5. (Chapter 6) <i>Facility with the English Language and PBL group interactions: Findings from an Arabic Setting.</i>	Confirming or refuting rumours of importance to student education
Overall results of investigations.	Summary and Conclusion	Study findings, lessons learnt, recommendations and areas for future investigations.

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Effectiveness of problems used in problem-based learning

D J S Mpofu¹, M Das², J C Murdoch¹ & J H Lanphear²

Departments of ¹Family Medicine and ²Medical Education, Faculty of Medicine and Health Sciences, United Arab Emirates University, Al-Ain, Abu-Dhabi, United Arab Emirates

SUMMARY

Where problem-based learning (PBL) is the main method used in medical curricula, the literature suggests that it is crucial that the problems used are effective in facilitating students to identify relevant learning issues. These learning issues guide the students' studying. The present investigation explores the extent to which students identify relevant issues following exposure to prepared paper problems. In the preparatory year, in an Introduction to Medicine module, four groups of students were exposed to six themes (Health Care System, Environment and Health, Alternative and Islamic Medicine, Chronic Illness, Infectious Diseases, and Prevention and Health Promotion). Each group had two facilitators per theme. Having discussed the prepared problems, the students identified learning issues which were collected for the purpose of the study. Two content experts, using a Likert scale, analysed learning issues for their concordance to staff objectives per theme. Kappa coefficients were computed for the six PBL themes in order to assess inter-rater agreement. Learning issues identified as having no relationship to theme objectives were further analysed for their relevance to theme objectives. No objective was totally omitted by any student group. There was a 100% concordance of objectives to learning issues demonstrated over four themes. The relationship of learning issues to theme objectives ranged from 55–85% in the theme on health care system, and 73–94% in the theme on environment and health. Irrelevant learning issues were identified in the first two PBL themes addressed. Kappa coefficients over the six PBL themes varied from 0.49 to 0.82.

Keywords

*Education, medical, undergraduate; learning; *problem-based learning; students medical, *psychology; United Arab Emirates

The United Arab Emirates (UAE) University medical curriculum is a 7 year programme, the preparatory year is the first year of education and training. Problem-Based learning (PBL) is used as the teaching and learning strategy in the Introduction to Medicine module of the First (preparatory) course, which runs throughout the academic year.

The kind of problem that medical students use in the problem-based approach in the Preparatory Year can be illustrated by this example

Five children aged 7–8 years of age from Al-Shaza school were seen on Saturday at 2 pm playing with material from a rubbish heap. Some appeared to be eating their sandwiches after playing on the rubbish dump. The heap of rubbish was full of dirty cans, bottles, old food, all sorts of paper and some flies.

Ali cut his foot with a dirty metal wire and was immediately rushed to Emergency department of the hospital. Ali had his wound cleaned and dressed and received a tetanus injection.

The next morning Mohammed and Jamal (Ali's friends) reported at the Emergency department with vomiting and diarrhoea. They were kept in for 24–48 hours under observation.

A major concern of medical teachers considering PBL is that students will not comprehensively address essential learning material (Coulson & Osborne 1984; Waterman & Cooley 1985). Several reports have indicated that problem cases should lead students toward the learning objectives determined by staff members (Shahabudin 1987; Blumberg *et al.* 1990; Majoor *et al.* 1990; Dolmans *et al.* 1993). Studies by Coulson & Osborne (1984) and later by Dolmans (1994) indicate that students identify approximately 60% of the learning intended by staff.

AIMS OF THE STUDY

The purpose of the study was twofold. First, to identify whether, given a problem, the students could comprehensively identify learning issues related to the theme

objectives identified by staff. This was assessed by the degree of congruence between staff objectives and student generated learning issues. Second, to review unexpected learning issues raised by the students and attempt to categorize them.

Problem-based learning – the process

In PBL as organized at the UAE University, eight to 10 students formed a tutorial group. Each group had two group facilitators who remained with the same group for each theme. Following discussion of each problem trigger, students identified learning issues which were written on a flip chart. The group categorized the learning issues into the following parameters: biological issues; behavioural/educational issues; population issues; ethical issues; and critical appraisal issues. The group, with the aid of the facilitator, divided the task of obtaining the information amongst themselves. Identification of appropriate learning resources followed and included: library materials; computer searching; video materials; experiences in skills laboratory; hospitals and clinics; and use of faculty experts to gain a variety of information. Evaluation concluded the group sessions where the facilitator not only encouraged self-evaluation by each group member, but also encouraged peer and student evaluation of the tutor by all pupils involved.

The Introduction to Medicine module themes were: Health Care System (HCS); Environment and Health (EVH); Alternative and Islamic Medicine (AIM); Chronic Illness (CHI); Infectious Diseases (IND); and Prevention and Health Promotion (PHP).

An example of a problem trigger from the theme HCS. *Ahmed Hassan visited the local health centre with his 7-year-old son Suhail. Suhail had a common cold, fever and runny nose, and possessed no health card. The clinic receptionist refused to register Suhail without the health card.*

The HCS objective was that students should be able to describe and start to understand the organization of the health care delivery system in the United Arab Emirates.

An example of a student group's learning goal derived from learning issues identified following exposure to the above HCS trigger. What is the importance, purpose and function of health cards in the UAE?

- (a) to individuals;
- (b) to a health centre organization; and
- (c) to the Ministry of Health.

The problem triggers were prepared to be as real as possible and were intended to reflect local style, tradition, culture and everyday experiences. The problem triggers relating to the theme on health care system were prepared from five theme objectives.

METHOD

Each theme had a set of related problem triggers which students worked on over a 4 week period of 16 hours duration. Students were offered the problem trigger for the first time during a PBL group session. Learning issues generated from each session were collected from all groups. The experts were briefed about the theme, the faculty objectives and the process of evaluation. At the end of each theme the faculty objectives, learning issues identified by the students and evaluation forms were sent to the respective experts. For each theme experts consisted of a clinician who was a specialist in the field related to the theme and one senior staff member. Twelve experts participated in this study all of whom independently reviewed learning issues generated by students in each theme. For example, in the theme on infectious diseases, a clinical specialist in the field of infectious diseases and a professor in Community Medicine analysed the material. The experts were not involved as facilitators in the module teaching and they used a three-point Likert scale to assess the extent to which the learning issues raised in each theme strongly related to the theme objective(s); had a moderate relationship to theme objective(s); or had only a slight relationship to theme objective(s). Experts also indicated learning issues which had no relationship to the theme objectives. These learning issues were further assessed on a three-point Likert scale as to whether they were totally irrelevant; neutral; or relevant to the theme objective(s). This was done by simply comparing learning issues to theme objectives.

STATISTICAL ANALYSIS

The data were coded and processed on an IBM PC-compatible computer using the Statistical Packages for Social Sciences (Norusis 1992). Each expert's responses were entered into the computer and percentages of learning issues identified as related to faculty objectives per theme were calculated. Percentage of learning issues unrelated to objectives and learning issues totally irrelevant to individual themes were also calculated. Kappa coefficients were computed and comparisons made of responses by each pair of experts.

RESULTS

The total number of learning issues generated for each theme by all four student groups were as follows: HCS = 232; EVH = 149; AIM = 122; CHI = 93; IND = 159; PHP = 130. There was 100% concordance of student generated learning issues to theme objectives in relation to the themes AIM, CHI, IND and PHP. These four themes had objectives ranging from one to four per theme. In the theme on health care system, 12.5% of those learning issues identified as having no relationship to theme objectives by experts were further judged as totally irrelevant to the theme objectives. These learning issues related to diagnosis, investigations and treatment; biological issues; and areas related to sociological/psychological perspectives of health.

In the theme EVH, learning issues identified as having a relationship to theme objectives ranged from 73–94% among different student groups. Of those learning issues identified as having no relationship to theme objectives, 3% were further judged as totally irrelevant to the faculty objectives related to the theme on environment and health. These related to investigations and treatment; biological issues; and areas relating to students' own experiences and interest with environment and health issues. No objective was judged as totally missed out by any student group, although within the themes HCS and EVH certain objectives received superficial attention.

The level of inter-rater agreement for each pair of raters in the various themes ranged from 73.9% to 98.3%. Since these percentages may have over-estimated the true inter-rater agreement due to agreement based on chance alone, Kappa coefficients were computed for the six themes, for each pair of raters in order to assess inter-rater reliability (Table 1). Here Kappa coefficients take into account the expected proportion of agreement due to chance alone (Landis & Koch 1977) and the Kappa coefficients varied from 0.49 to 0.82.

DISCUSSION

This study investigates the extent to which students are able to identify relevant learning issues during exposure to paper-based problems prepared by staff in a problem-based curriculum. It is important to note the limitations of the study before discussing the results. One of the inherent limitations of such qualitative educational research is the influence of subjectivity. Efforts were made to make the nature of evaluation by experts as objective as possible and two experts were involved for evaluation of each theme to minimize subjectivity. Furthermore, Kappa coefficients which assess the agreement or reliability of experts were computed. This in effect measured the proportion of learning issues experts classified into the same category using the defined Likert scale. The resultant range from 0.49 to 0.82 indicated a moderate to substantial level of agreement between the two experts in each theme (Everitt 1994).

The degree of concordance between learning issues and theme objectives varied from 55% to 100% (average 91.4%) in different themes and among the four student groups. The percentage of overlap between student learning issues and staff objectives for HCS was 55% to 85% (average 76.25%). For the theme EVH there was a 73 to 94% (average 87.25%) overlap. The last four themes were more effectively covered, with 100% concordance of learning issues to staff objectives. Dolmans (1994) found the degree of overlap in her study to vary from 27.7% to 100%, with an average of 64.4%. Furthermore, on average the tutorial groups failed to identify 7.4% of the objectives (15% of the course objectives). In our study, although no objective was completely omitted by any student group, the theme HCS had learning issues which were assessed as having little relationship to two objectives by both experts. One of the reasons for the superficial address of an objective by FMHS students may have been lack of experience of learning using PBL at the beginning of the medical curriculum. On the other hand, the quality

Table 1 Kappa coefficients for the pairs of raters per student group per theme

	Health care system	Environment and health	Alternative and Islamic medicine	Chronic illness	Infectious diseases	Prevention and health promotion
Group 1	0.79	0.72	0.75	0.66	0.61	0.56
Group 2	0.79	0.66	0.76	0.49	0.66	0.70
Group 3	0.82	0.68	0.78	0.74	0.69	0.66
Group 4	0.65	0.78	0.72	0.62	0.64	0.78

of the problems used may have simply failed to address particular learning objectives.

As the academic year progressed the students' PBL group discussions became more focused. Feedback from the facilitators both about their (students) contribution and the process of learning by discussion in PBL sessions could have further contributed to the changes noted in identification of learning issues for later PBL themes. For the majority of the facilitators this was the first experience of conducting PBL tutorials. A regular facilitator development programme was conducted after the implementation of PBL and a detailed tutor guide was prepared by the planners which identified objectives to be covered and gave guidance or learning areas to be focused on by the students. Discussion sessions were held by facilitators and planners before and after PBL sessions for each theme. The discussion sessions were very useful in facilitating the PBL tutorials and could have contributed directly to the ability of the facilitators in guiding the students to identify learning issues. It has been reported that facilitators may have a major role to play in facilitating aspects of the PBL learning process. However, there are debates about the most beneficial role of the tutor (Moust *et al.* 1990; Davis *et al.* 1992). On the other hand, other reports indicate the importance of a combination of factors to facilitate learning during PBL. These are indicated as activation of students' prior knowledge; good quality problems; show of interest in the students by the tutor; a meaningful context; a well-structured student guide book; and suitable group functioning (Gijssels & Schmidt 1990).

The suggestion is, therefore, that investigations carried out in realistic settings such as our study are prone to multiple variables influencing the outcome. The results of this study suggest that the problems used were better structured for the last four PBL themes. Problem triggers used in AIM, CHI, IND, PHP led students towards learning objectives determined by the faculty. Studying overlapping of faculty objectives to the student-generated learning issues was a useful way of determining effectiveness of problem triggers in stimulating the students to identify learning issues (Dolmans *et al.* 1993; Shahabudin 1987).

The quality of problems used could have well contributed to identification of irrelevant learning issues which occurred with the themes HCS and EVH, especially considering that the theme on HCS had five theme objectives, some of which were very broad. An example of one objective within HCS which received weak coverage was "Understand the importance and economics of health planning". Majoor *et al.* (1990) suggests that there is an art to develop effective

problems for PBL which requires team effort, dedicated time and rigour.

A number of student-generated issues were identified as unrelated to the faculty-determined objectives. This is not surprising as the process of PBL allows students to brainstorm and identify issues they need to learn. However, many such issues were further judged as actually related to aspects of the theme at hand, and these extra issues were relevant in highlighting students' thoughts at the beginning of the medical curriculum. It appears that students hope to find concrete factual answers to all medical queries. Thus they raise questions like "what exactly is the correct treatment for a common cold?" or "is it always clear how to diagnose illness in a patient?". A few of the learning issues identified by the students were very useful for stimulating major debate among students. This was particularly true in identifying behavioural, population and ethical issues. For example, students using prior knowledge questioned the usefulness of consulting a doctor for a common cold. Not only did they share experiences here, but they inquired at local health centres about the frequency of attendance by various age groups for "the common cold" and discussed the following: possible causes of the common cold; signs and symptoms related to the condition; the common remedies used at home; probable medical treatment; the local population's knowledge about aspects of the common cold; patients' rights to health care, and so on. Most of the staff of the FMHS are expatriates from various parts of the world and probably missed the significance of some of the population, behavioural and ethical issues raised by the students. Thus, although experts identified few student-generated learning issues as unrelated to faculty objectives, the experience has proved to be an eye-opener for staff and module planners. Comments from group facilitators indicated that students' discussions during follow-on group sessions demonstrated increased assertiveness, self-directedness, and a degree of reflection on experiences not consciously intended by module planners.

The study identifies that by using well-structured paper-based problems students could identify learning issues related to faculty generated objectives. There is an implication that very broad faculty objectives, combined with group and facilitator inexperience could lead to problem triggers that were unable to direct the students to the intended learning goals. Therefore, in order to reduce concern that students may fail to address essential learning material in the PBL curriculum, not only should curriculum planners pay close attention to the construction of problem triggers from the defined objectives, but they should also encourage continuous

support and monitoring of the facilitators and the PBL process.

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A Review of Problem-based Learning: Perceptions of Students and Tutors at the United Arab Emirates University

D. J. S. MPOFU¹, H. G. SCHMIDT², M. DAS³, J. LANPHEAR³
& E. DUNN¹

¹*Department of Family Medicine, United Arab Emirates University, Al-Ain, United Arab Emirates,* ²*Department of Psychology, Maastricht University, The Netherlands and* ³*Department of Medical Education, United Arab Emirates University, Al-Ain, United Arab Emirates*

ABSTRACT *Problem-based Learning (PBL) is being adopted by medical schools the world over. Some PBL schools have unique cultural and student-tutor characteristics. These programmes need appropriate feedback on PBL. The present study focuses on perceptions of students and tutors involved in a new PBL programme. Data were collected in English and Arabic. Gender differences in students' behaviour within groups were highlighted with significant differences between males and females in two areas. Students' concerns about PBL were related to communication in English and that certain aspects of the PBL themes were inadequately covered. The only significant difference between the students' and the tutors' perceptions was in the first PBL theme. From the tutors' perspective, students understood the various PBL elements except the critical appraisal aspect. The review has demonstrated the merits of the PBL programme. An evaluation exercise would be a logical progression from the present exercise.*

Introduction

At the Faculty of Medicine and Health Sciences (FMHS) in the United Arab Emirates (UAE) University, the preparatory year (the first year of medical education) uses problem-based learning (PBL) as one of the approaches to teaching and learning. PBL is used in the Introduction to Medicine Module (ITMM) which is to provide students with insight into the health care system of

the UAE, the socio-cultural, psychological and environmental factors which affect health, disease prevention and health promotion. This module includes the Health Care System, Alternative and Islamic Medicine, Family Study, Infectious Diseases, and Prevention and Health Promotion. Each theme constituted a complete unit of study with clearly defined objectives.

The Medical Faculty was established in 1986. Its curriculum uses a variety of teaching and learning methods. Problem-based learning, originally identified as one of the key principles, was not introduced until 1994. In 1991, a study revealed that only seven out of eighteen academics interviewed understood PBL, and a further five colleagues were openly hostile to this approach (Abdulrazzaq & Qayed, 1991).

Following active participation by the FMHS in the World Summit on Medical Education in Edinburgh in 1993, two academics from McMaster University were invited to the Medical School to hold an intensive workshop on PBL. During the following year curriculum planning included training of library and support staff, staff development, and development of student orientation measures. These aspects of PBL were reviewed and developed annually by the Medical Education Department. In reviewing the various PBL models the Maastricht model (Schmidt, 1993) was favoured and introduced with slight modifications (Das *et al.*, 1995).

Student Orientation and Tutor Training

Twelve hours were devoted to acquainting students with some of the key elements of the PBL programme. The principles, the seven steps, the tutorial sessions, group interaction, information management skills, assessment and evaluation of PBL group sessions were dealt with during this period. Use of videos, role play and practice of the PBL process were part of the orientation (Das *et al.*, 1995). Following library orientation, the students practised their newly acquired library skills as part of the induction process. Fifteen tutors were involved in the Introduction to Medicine Module. Each tutor participated in at least two, sometimes three PBL themes. The tutors were from eight different specialties: Family Medicine, Community Medicine, Pharmacology, Anatomy, Psychiatry, Internal Medicine, Anaesthesia and Medical Education. Only five of the fifteen tutors had any previous experience of PBL. The tutors' workshops covered similar ground to that in the students' orientation. The role of the group tutor to facilitate and not to lecture was emphasized, as well as the goals of PBL. Tutors practised acting as PBL tutor, scribe and group member. Mini information sharing meetings, of one to two hours were held before and after each PBL theme with module coordinators and those tutors who were involved in a particular theme. Informal feedback sessions by each group were scheduled after each PBL session. Formal sessions for self, peer and tutor evaluation were held at the end of each PBL theme (Das *et al.*, 1996).

Problem-based Learning at UAE University

Six to ten students formed a tutorial group. Each group had either one or two tutors, who remained with the same group for a specific theme. It is important to note that for cultural and religious reasons, male and female students were separated for all teaching and learning purposes. In the present study there were three groups of six to seven female students and one group of seven male students. Following discussion of each problem trigger, students identified learning issues which were written on a flip chart. The groups categorized the learning issues as biological; behavioural; community; ethical; and critical appraisal issues. With the aid of their tutor the students divided the task of obtaining the requisite information amongst themselves. Identification of appropriate learning resources followed, including library materials, computer search, video materials, exercises in the skills laboratory, experiences in hospitals and clinics, and the use of experts to gain a variety of information. Follow-on PBL sessions commenced with a review and discussion of areas researched during self study. This report-back phase was undertaken before progressing to the next PBL thematic trigger. One hundred and forty hours were dedicated to the ITMM over one academic year. Just under 50% of the module time was dedicated to PBL tutorials which were always followed by self-directed study. Twenty per cent of the module time was dedicated to lectures, 20% to clinical and field work sessions, and 10% of the time was reserved for project work (Das *et al.*, 1995).

Assessment

The ITMM module used the assessment system of the FMHS: Modified Essay Questions, Multiple Choice Questions and Objective Structured Clinical Examinations.

Aims of the Study

Anecdotal evidence suggested scepticism amongst faculty staff regarding the benefits of PBL. In view of the earlier expressions of hostility towards PBL and the novelty of the PBL programme, this study sought to identify tutors' and students' perceptions of PBL.

Method

In June 1995 a pilot questionnaire, adapted from Majoor *et al.* (1990), was tested on a group of six students who had completed a year of PBL. At the FMHS, students, whose first language is Arabic, use English as the language of

instruction. Comments by the student pilot group indicated that the investigators might receive a more honest response from First Year students if the questions were in Arabic. The students' questionnaire (Table 1) was, therefore, translated into Arabic and later back into English, in order to check for accuracy.

All PBL tutors were asked to complete a tutor questionnaire in relation to each theme. The questionnaire had also been used with three tutors. Although various comments were made, it was agreed that the questionnaire was suitable for completion by tutors (Table 1).

At the end of each of five themes, the students completed the Arabic questionnaire, focusing on the theme they had just completed. This resulted in 35 questionnaires from the seven male students and 100 questionnaires from the 20 female students (Table 3). The questionnaire consisted of Likert-type items. For each item they were asked to indicate (1) full agreement, (2) agreement, (3) neutrality, (4) disagreement, (5) full disagreement. Space was provided for comments. For the initial three PBL themes each group had two group tutors, an expert in the topic of the theme and another academic. For the last two themes each group had only one tutor.

The data were entered into ACCESS and then imported into the Statistical Packages for Social Sciences (SPSS) for analysis (Norusis, 1992). The mean ratings and standard deviations of items over the five themes were calculated. The total scores were calculated by adding up individual item scores. It is important to note that for comparison of tutor versus student scores only items appearing in both the student and tutor questionnaire were included (Table 2). Only the following items were used: Q1, Q4, Q5, Q6, Q7, Q8, Q9, Q10 and Q11 (Table 1). Correlation coefficients were calculated, and differences between tutor and student responses were tested using a two-tailed significance test. The *t*-test was used in analysing student versus tutor responses and male versus female student responses.

Results

At the beginning of the academic year 1995/96 there were 32 students in the preparatory course. However, two male and three female students dropped out during the course of the year. Therefore, the student group for analysis consisted of 27 students. Over the five PBL themes 135 student responses were collected. All the tutors, except one member who left the FMHS during the academic year, completed the questionnaires, a total of 31 tutor forms.

Tutors' and Students' Views

From PBL Theme One to Theme Five there was growing consensus amongst tutors about aspects of PBL as the year progressed. Student responses, however, varied from theme to theme. The greatest consensus was for the theme on Health

Table 1. Study questionnaire

	1	2	3	4	5
Questionnaire items common to tutors and students					
Q1. Working with the group was pleasant					
Q4. Format was too structured					
Q5. Problems were suitable for systematic approach by small groups					
Q6. Understanding of biological perspectives of the theme					
Q7. Understanding of behavioural/social perspectives of the theme					
Q8. Understanding of community/population perspectives of the theme					
Q9. Understanding of ethical perspectives of the theme					
Q10. Understanding of critical appraisal perspectives of the theme					
Q11. Concern that certain aspects of the theme were not adequately covered					
Any comments					
Additional questionnaire items only in the student questionnaire					
Q2s. As a whole it was interesting	1	2	3	4	5
Q3s. Problems and tasks were clearly interrelated					
Additional questionnaire items only in the tutor questionnaire					
Q1t. Students worked with enthusiasm	1	2	3	4	5
Q2ta. Students were free to select their own learning objectives, and the problem triggers guided their study activities					
Q2tb. In my opinion students in general sought out reading material related to this theme					
Q3ta. In general students identified learning issues remote from this theme					
Q3tb. In my opinion prep year students studied relevant aspects of this theme to an adequate level					

Key: 1 = full agreement, 2 = agreement, 3 = neutral, 4 = disagreement, 5 = full disagreement. This questionnaire was adapted with permission from Majoor *et al.* (1990).

Table 2. Tutors' and students' aggregate responses across the five PBL themes

Theme title	Number		Mean (SD)	
	Tutors	Students	Tutors	Students
Health Care System	8	27	19.75 (6.78) ^a	15.66 (3.40) ^a
Alternative and Islamic Medicine	7	27	16.33 (4.37)	14.40 (6.29)
Family Study	8	27	15.57 (3.80)	15.22 (5.53)
Infectious Diseases	4	27	15.50 (2.28)	15.18 (4.17)
Prevention and Health Promotion	4	27	14.00 (1.29)	15.88 (5.61)

^a $t = 3.15$, $df = 33$, $p < 0.003$.

All other differences were not significant.

Care System and the least consensus for the Alternative and Islamic Medicine as shown by standard deviations (Table 2).

The only significant difference between tutors' and students' responses related to Health Care System ($p < 0.003$). From the 31 tutor responses over the five PBL themes, 90.3% of the tutors perceived that the students had worked with enthusiasm. Eighty-seven per cent of the tutors felt that the students' learning issues matched the objectives for the themes. However, 34.8% of tutors indicated that the students identified further learning issues not directly related to the themes. Only 54.8% of tutors felt that the students had sought out relevant reading material. Tutors' comments echoed the students' open-ended comments, suggesting that English was a contributory factor. At least 50% of the tutors also indicated that English appeared to limit some students' participation in group activities.

Male Versus Female Perspectives of PBL

For all the items, except for items 5, 10 and 11, male students recorded lower mean values than their female counterparts, thus demonstrating higher agreement with the questionnaire items (Table 3). In Item 2s (PBL being interesting) and Item 8 (recognition of the importance of covering community perspectives in the themes) there was a significant difference between male and female scores (Table 3). When comparing responses by groups, the female groups were more positive to having two tutors than a single tutor. There was no difference of preference within the male group.

Discussion

The instrument used for the review proved to be valuable for gathering general information on the merits of a new PBL programme. Question Q2ta (Table 1)

Table 3. Male students' versus female students' views of PBL across all five module themes

Variable	Total male questionnaires ($n = 35$) Mean (SD)	Total female questionnaires ($n = 100$) Mean (SD)
Q1	1.40 (0.50)	1.63 (0.77)
Q2s ^a	1.40 (0.50)	1.85 (0.80)
Q3s	1.83 (0.71)	2.06 (0.83)
Q4	2.14 (0.81)	2.18 (0.83)
Q5	1.69 (0.80)	1.55 (0.77)
Q6	1.86 (0.69)	1.99 (0.88)
Q7	1.63 (0.60)	1.84 (0.84)
Q8 ^b	1.49 (0.56)	1.84 (0.91)
Q9	1.54 (0.66)	1.68 (0.91)
Q10	2.00 (0.80)	2.00 (0.96)
Q11	2.91 (1.12)	2.85 (1.06)

1 = Full agreement, 5 = Full disagreement.

All differences were not significant, except

Q2s^a 'As a whole it was interesting' $t = 3.13$, $df = 133$, $p < 0.002$

Q8^b 'I recognized the importance of covering community/population perspectives within the theme': $t = 2.17$, $df = 133$, $p < 0.008$.

had to be withdrawn from the discussion as it did not permit precise interpretation. Open comments provided the 'icing on the cake' to perceptions and some have been used in the present discussion.

Students' Versus Tutors' Views

The students recorded a varied response to PBL. They enjoyed working in groups and found PBL interesting. The tutors also enjoyed PBL. However, tutors and students demonstrated statistically significant differences in their perceptions of the very first theme: Health Care System. Anecdotal evidence suggested that the students had only experienced didactic teaching methods up to this stage and had rarely engaged in group activities. A two-week orientation may have been insufficient as an introduction to PBL. The benefits of a well planned period of familiarization have been highlighted by Engel (1992). As for the students' concern that some aspects of the curriculum may not have been covered in all the five PBL themes, other studies have confirmed that an inability to identify knowledge deficiencies is a phenomenon that PBL students elsewhere have also found uncomfortable (Woodward & Ferrier, 1982). Perhaps at this early stage of their studies it might have been very difficult for the students to judge the adequacy of their learning. The students were not yet very sophisticated in

comparing their interpretation of the content with the Faculty's objectives, as they were still learning how to learn with this educational approach. One instrument that will measure adequacy of content will be the module test, and this is an area for review within the PBL programme. In the present study, all questionnaires were completed soon after each PBL theme and before the students had experienced the related formative or summative assessment. Their concern and uncertainty was, therefore, quite reasonable. Some PBL schools, e.g. Maastricht University, include self-assessment tests as part of the students' guide document (Dolmans, 1994).

Level of Understanding of PBL Categories

There was agreement by tutors on the students' level of understanding and the students' perception of the importance of community, social and ethical issues. However, seven out of 31 tutors commented that critical appraisal would call for greater attention. '*Students just do not understand what critical appraisal means*', '*Facilitators and students all need to review whether we use the term critical appraisal to mean the same thing*'.

The students did not comment specifically on critical appraisal. However, their responses from Theme One, Health Care System, to the Theme on Prevention and Health Promotion demonstrated a steady progression from a high to a low mean value. During an informal review of this aspect with the male and a female student group, the students related critical appraisal to reviewing material from triggers in the light of mainly locally based research. As there was little local research available on most topics, they had difficulty in learning how to undertake critical appraisal. The concept appeared difficult to grasp, not only for the students but also for some tutors. It was not entirely clear how critical appraisal was dealt with by the tutors. Critical appraisal was reviewed during the PBL staff development and tutor training sessions, and tutors were encouraged to approach this as evidence-based medicine. Tutors were expected to help students in deciding whether information in the literature was valid and whether it was important (Sackett *et al.*, 1997). The concept of evidence-based medicine would appear to require more dedicated time for review, discussion and better understanding by the tutors. However, introducing First Year medical students to thinking deeper about issues, reflecting, critiquing and evaluating information should be of benefit to the students for handling health and medical issues and debates in the future.

Tutors' Perceptions

Tutors were generally positive about PBL, 90% felt that students worked with enthusiasm. Just under 25% were uncertain whether the students had studied some aspects of the themes to an adequate depth. Future assessment results would indicate whether such concerns were justified.

The theme on Alternative and Islamic Medicine demonstrated low consensus for several questionnaire items as indicated by high standard deviations. This theme dealt with debates related to the History of Islamic Medicine, Sharia Law and Alternative Medicinal Practices, which were woven into PBL triggers on 'abortion' and 'drug abuse'. From a Faculty perspective these subjects did not lend themselves to open and easy discussion by students from a relatively conservative Moslem background. Some tutors felt that group interaction may have been inhibited by cultural/religious experiences and expectations. Interestingly, students demonstrated more positive scores in handling aspects of community, behaviour and ethics of this Theme than in the other four Themes. As most of the tutors were expatriates, their assumptions and views may have been clouded by preconceived ideas on how these students might handle certain problem triggers. Gallagher (1993) alluded to the existence of a faculty-student gap in relation to cultural understanding. This will be an important issue to address, but it is beyond the scope of this report.

English Language and Communication

English as a communication barrier in group situations was highlighted by half the tutors and at least 30% of the students in their free responses. This echoed findings in an Australian study where students, whose first language was not English, reported that language was an impediment to effective participation in PBL groups (O'Hanlon *et al.*, 1995). In a local study Harrison *et al.* (1996) demonstrated the benefits of introducing UAE students to communication training early in their medical education. The importance of proficiency in English and how it affects classroom interaction, clinical communication and assessment outcome will require in-depth investigation in the context of local conditions.

Gender and Cultural Issues

The study indicated that male students were more positive towards PBL than female students who exhibited a degree of competitiveness that was not evident among the males. *'Working in groups is difficult because each female student wants to be the best; in PBL you have to share, sometimes we do not want to do so'*. Some students found it difficult to work in groups. One female student indicated that they ought to have a choice to opt out of PBL sessions and have lectures only instead. Cox and Cooper (1977) identified that behaviours demonstrated in group sessions are very much a reflection of the cultural norms of a society. The UAE is a traditional and conservative society. Within the UAE masculine culture female competitiveness is 'valued' and 'legitimate' outside the family (Hofstede, 1986).

Conclusion

The study raised more questions than it answered. It emphasized the need for close attention to planning and introduction of PBL for the benefit of both tutors and students. On the one hand, the study demonstrated the ability of PBL to highlight educational concerns related to communication, language, gender and culture that might go unnoticed in a more traditional education system. On the other hand, the study echoed weaknesses of PBL, such as students' concerns whether PBL theme objectives were adequately covered (Woodward & Ferrier, 1982). This study also identified how PBL can be complementary to other approaches to teaching and learning. Finally, programme review can be seen as paving the way for a holistic and in-depth evaluation of a PBL curriculum.

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Self and Tutor Evaluations in Problem-Based Learning Tutorials: Is there a Relationship?

*Mandira Das,¹ D. Mpofu,² E. Dunn,² & J.H. Lanphear¹ **

1 Department of Medical Education and

2 Family Medicine, Faculty of Medicine & Health Science, UAE University, Al-Ain, United Arab Emirates

SUMMARY

It is now recognized that acquiring specific skills in self-evaluation helps students in a more general appraisal of their overall performance. Self- and peer-evaluation skills are essential prerequisites for the success of every doctor in maintaining professional competence. In the Faculty of Medicine and Health Sciences (FMHS) of the United Arab Emirates, problem-based learning (PBL) is instructed in the first year. Self-evaluation by students and tutor rating of students' performances are an integral part of the PBL tutorials. This has provided the opportunity to conduct a systematic study of the role of self-evaluation by students as distinct from the tutor evaluation of students in the PBL tutorials for five themes. The study sample included all preparatory year (first-year) students who joined the FMHS in 1994 and 1995. A total number of 64 students participated, of whom 17 (26%) were male and 47 (74%) female. Mean self-evaluation scores were high throughout the module and did not follow any trend from theme one to theme five. While self and tutor scores were similar, male student self-evaluation scores were higher than for female students in overall scores. The sharing of assessment reports between students and tutors has been perceived to be a useful tool for the students' development of the skills of analysis, differentiation and critical appraisal.

Keywords

Education, measurement; education, medical undergraduate, *methods; *problem-based learning; self concept; self-evaluation programs

INTRODUCTION

It is now recognized that acquiring skills in self-evaluation is a prerequisite for the continuing learning of every doctor. Helping students to develop these skills also helps in facilitating appraisal of their performance on an ongoing basis (Cowan 1988; Small *et al.* 1993; Stefani 1994). Only a few medical schools have made efforts to develop these skills while programming undergraduate and postgraduate curricula (Rezler 1989; Rawnsley *et al.* 1994; Das *et al.* 1996). In their review of self-evaluation studies, Boud & Falchikov (1989) reported that high-achieving students tend to underestimate their performance while low-achieving students overestimate. Some studies report that self-ratings by students could be different from those done by tutors (Stuart *et al.* 1980;

Cochran & Spears 1980; Sciabassi & Woelfel 1984). Students find discussion about discrepancies of scores among self, peer and tutor useful as it helps to improve analytical habits, better understanding of the objectives of the curriculum and better communication with peers and tutors. In general, while reservations have been expressed about using self-evaluation for summative assessment, it has been accepted as a useful tool for formative assessment (Abrams & Kelley 1974; Henbest & Fehrsen 1985; Das *et al.* 1996)

Reported self-evaluation studies in the medical setting have primarily dealt with the ability to self-assess the performance of clinical skills. Reports on experiences related to self-evaluation in problem-based learning (PBL) curricula are scanty in the literature. This is in spite of the fact that evaluation of self, peer, tutor and the tutorial process forms an integral part of the PBL tutorial in many institutions and time is usually set apart for such evaluations. Rezler (1989) has reported that self-evaluation by students was not different from the tutor ratings during Unit 1 of the University of New Mexico's problem-based primary care curriculum. However, students' self-ratings were higher and did not correlate with those of tutors towards the end of the curriculum (Unit 6). Student self-ratings did not correlate with achievement in the National Board of Medical Examiners (NBME), but tutor ratings did. Rawnsley *et al.* (1994) have also reported the usefulness of self-evaluation as an integral component of PBL tutorial in Pharmacology and Physiology courses in McMaster University.

In the Faculty of Medicine and Health Sciences (FMHS) of the United Arab Emirates (UAE) PBL is instituted in the first year and self-evaluation by students and tutor rating of students' performances is an integral part of the PBL tutorials. This has provided the opportunity to conduct a systematic study of the role of self-evaluation by students as distinct from the tutor evaluation of students in the PBL tutorials. We have particularly addressed the questions of differences between self- and tutor evaluations of student performance during PBL tutorials and how students and tutors perceive the process of self-evaluation. Since the evaluations were done repeatedly as the students progressed from theme 1 to theme 5, we have also tried to find out if the self-evaluations change as the students progress over a period of time and whether these evaluations relate to achievement at the end of the year. Finally, we have tried to analyze any gender differences that may bias the process of self-evaluation.

METHODS

The study sample included 64 first-year medical students who joined the FMHS in 1994 and 1995. The total number of students in 1994 were 27 and in 1995 37, of which 17 (26%) were male and 47 (74%) were female. The preparatory course offered to the first-year students follows an integrated curricular approach similar to subsequent years. *Introduction to Medicine* is one of the four modules that students complete during this year. The module has been designed to provide students with insight into the health care system of the UAE and the socio-cultural, psychological and environmental factors that affect health and disease prevention and health promotion. The main goals of the module are to impart knowledge by analyzing medical problems; inculcate specific skills such as responsibility, the ability to process information, communicate, accomplish critical analysis and to increase student awareness of their own strengths and weaknesses.

To implement the PBL programme, carefully constructed problems were presented to small groups of students. Each problem was associated with one theme and each problem had three triggers. One trigger was discussed in each PBL tutorial, which lasted for 2 hours. The students started tutorial sessions trying to clarify meaning of any words, terms or concepts. Next they raised issues from the problem which needed explanation, analysis and reasoning. A series of learning objectives were derived from the issues raised and these provided the framework for seeking information. The information gained by individual students was discussed in a subsequent tutorial session. In the last PBL tutorial session, time was set apart for evaluation of self, peer, tutors and the tutorial process. A total of five themes were identified in the module.

For the PBL tutorial sessions each year the female students were divided into three groups. In 1994 the groups consisted of 6-7 students while in 1995 there were 9-10 students each. The male student (8 in 1994 and 9 in 1995) remained in one group. Each tutorial group undertook the same activities during the course of the module. Each group was assigned with one or two tutors. The tutors, most of whom were male, rotated among the groups for different themes. There was no gender bias in rotations. At the end of the last PBL tutorial in each theme, students evaluated themselves using an evaluation form and the tutor completed a similar form. Where there were two tutors, an average score was submitted. The tutor marks were used as part of the internal assessment whereas student self-evaluation marks were used for formative assessment. Students and tutors discussed congruence between self- and tutor evaluation at the end of the evaluation process. The module coordinator met the students at the end of each theme to further discuss issues that may have arisen from self- or tutor evaluations.

The self- and tutor evaluation form

The form used for self- and tutor evaluation of students was adapted from Rangachari & Crankshaw (1992), who developed the self-evaluation form to provide a format for students in a problem-based curriculum to use to acquire the skills needed for self-evaluation. Following a pilot study with 4 female and 3 male students of the second-year curriculum and after consultation with PBL tutors, minor modifications were made to the original form.

There are 15 items in the form representing five subscores: responsibility, information processing, communication, critical analysis and self-awareness. Ratings were distributed on a scale of 1-5 from disagree to agree. An overall rating was asked for at the end of the form, which was scored as below average (1), average (2), or outstanding (3). Each form also had space for comments. The format of the self-evaluation form is reproduced in Fig. 1. The tutor evaluation form was similar to the self-evaluation form, with appropriate changes as necessary. Students and tutors were encouraged to give their views along with reasoning on the usefulness or otherwise of self-evaluation in PBL systems, for which space was provided as "comments" on the forms. These items were also collated to gauge the respective perceptions of the students and tutors. The organizers of the module met the students and the tutors for feedback about the self-evaluation process at the end of all the themes.

Name of the Student:
PBL session:

Name of the tutor:
Date:

Indicate the strength of your agreement/disagreement on the five point scale given with each statement, 1 representing disagreement and 5 agreement.

A. Responsibility	1	2	3	4	5
1. I completed all assigned tasks to the level appropriate for the tutorial	☐	☐	☐	☐	☐
2. I participated actively in the tutorial	☐	☐	☐	☐	☐
3. My behavior did not impede the tutorial process	☐	☐	☐	☐	☐
4. My behavior facilitated learning of others	☐	☐	☐	☐	☐
5. I was punctual in each PBL session	☐	☐	☐	☐	☐
B. Information processing					
1. I brought in new information	☐	☐	☐	☐	☐
2. The information I brought in was relevant to the discussion	☐	☐	☐	☐	☐
3. I used a variety of sources to obtain information (texts, review Articles, video, talking to patients and peers, etc.)	☐	☐	☐	☐	☐
C. Communication					
1. I was able to communicate the ideas clearly	☐	☐	☐	☐	☐
2. My comments did not confuse other students	☐	☐	☐	☐	☐
D. Critical analysis					
1. I justified the comments made	☐	☐	☐	☐	☐
2. My comments promoted understanding of the subject by the group	☐	☐	☐	☐	☐
3. I am interested in the problem-based learning approach ☐	☐	☐	☐	☐	
E. Self-awareness					
1 I assessed my own strengths and weaknesses	☐	☐	☐	☐	☐
2 I am able to accept and respond to criticism gracefully	☐	☐	☐	☐	☐

Based on the above my tutorial performance was:

Below Average

☐

Average

☐

Outstanding

☐

Figure 1 Tutorial self-evaluation form. Adapted from Rangachari & Crankshaw (1992).

At the end of the year students were assessed in a written examination where two modified essay questions (MEQs) of 2 hours each were used as an instrument for assessing knowledge, reasoning and critical analysis skills. High- and low-achievers were identified from this test to find out whether self-evaluation and tutor evaluations relate to achievement at the end of the year.

Statistical methods

The self-evaluation form included five categories with 2-5 items under each category. The categories were responsibility, information processing, communication, critical analysis and self-awareness. A subscore for each of the five categories was created for both self- and tutor evaluation by averaging across items for each of them. Mean ratings were calculated for each of the five sub-scores. Comparisons between self- and tutor evaluations were made using Chi-square and paired *t*-test. Correlation coefficients were obtained to study congruence between self- and tutor evaluations. Sex differences were tested using Student's *t*-test.

RESULTS

A total of 316 (98.7%) self-evaluation forms were completed by the students and the same number of tutor evaluation forms were collected in the 2 years of sampling.

Are there differences between self- and tutor evaluation of students performances in PBL tutorials?

The comparisons of self- and tutor evaluations during the 2 years are shown in Table 1, which gives the respective mean rating, standard deviation and *P* value for each subscore. Statistically significant differences were present only for the categories of responsibility in 1994 and self-awareness in 1995.

Table 2 displays the correlation coefficient for self- and tutor subscore ratings and for the overall score. In only two instances were the correlation coefficients significant. The self- and tutor overall scores had a small but negative correlation coefficient (not significant).

The cumulative data over 2 years showed that the students' overall ratings of their performance were significantly correlated to all of the subscores ($P < 0.001$). The tutors' overall ratings of students was not correlated with the students' overall ratings ($P = 0.609$) or with any of the subscores except responsibility ($P < 0.001$).

How did the students and the tutors, respectively, perceive self-evaluation in the PBL tutorials?

Eighty percent of students and 70% of tutors expressed the view that the exercise of scoring self and comparing self-evaluation with tutor evaluation was beneficial to them. Some reasons given by the students were "it has clarified the objectives of PBL tutorials", "I know what teachers want me to do during the PBL tutorials", "I know how tutors mark", "We know how peers are assessed by tutors" and "I became aware of my role". The tutors felt that it provided an opportunity to "help the students who are not confident or who are over confident", "discuss objectives of PBL tutorials" and "inform about the expectations of the tutors and the organizers in a PBL curriculum". Both the students and tutors reported that discussion about student performances and tutor evaluations at the end of PBL tutorials help to create closer relationships between students and tutors. However, both students and tutors found that this method of self-

evaluation took too much time during the tutorials and was too frequent during the year. Both students and tutors expressed views that the form was too long to complete at the end of each theme and that it should be done only once in each semester. Students, however, were strongly opposed to the use of self-evaluation in summative assessment and said that the teachers know better about assessment and that it should be the teachers who assess them. Seventy-five percent of the students believed that self-evaluation should be used for formative assessment but not in summative assessment. Eighty-three percent of the tutors had similar opinions. Students felt that some tutors were more strict than others and this was why some groups obtained lower marks than others.

Table 1. A comparison of self and tutor evaluation responses.

Subscores	Self (1994) Mean $\pm$ SD	Tutor (1994) Mean $\pm$ SD	Self (1995) <i>P</i> ^a	Tutor (1995) Mean $\pm$ SD	Mean $\pm$ SD	<i>P</i> ^a
Responsibility	4.34 $\pm$ 0.51	4.46 $\pm$ 0.53	0.015	4.56 $\pm$ 0.44	4.55 $\pm$ 0.50	0.869
Information processing	4.28 $\pm$ 1.60	4.23 $\pm$ 0.56	0.724	4.39 $\pm$ 0.57	4.33 $\pm$ 0.54	0.282
Communication	4.37 $\pm$ 0.59	4.48 $\pm$ 0.52	0.070	4.56 $\pm$ 0.66	4.54 $\pm$ 0.49	0.846
Critical analysis	4.23 $\pm$ 0.55	4.32 $\pm$ 0.56	0.097	4.53 $\pm$ 0.64	4.42 $\pm$ 0.55	0.131
Self-awareness	4.35 $\pm$ 0.52	4.29 $\pm$ 0.53	0.336	4.56 $\pm$ 0.62	4.40 $\pm$ 0.64	0.520
Overall (Scale 1-3)	2.39 $\pm$ 0.52	2.49 $\pm$ 0.50	0.052	2.50 $\pm$ 0.55	2.54 $\pm$ 0.50	0.520

^a Paired *t*-test was used. SD, standard deviation.

Table 2. Correlation between self and tutor scores over five themes in both the years.

Subscores	<i>Students</i>					
	R	I	C	CA	SA	O
<i>Tutors</i>						
Responsibility	0.2037***					
Information processing		0.0547				
Communication			0.0796			
Critical analysis				0.1324*		
Self-awareness					0.533	
Overall						-0.0288

*** *P* < 0.001; **P* < 0.05.

Table 3. (a) Mean value of self-evaluation for each subscore over the five themes in 1994 ($n = 27$) and 1995 ($n = 37$). (b) Mean value of tutor evaluation for each subscore over the five themes in 1994 ($n = 27$) and 1995 ($n = 37$).

Themes Subscores	1994					1995				
	1	2	3	4	5	1	2	3	4	5
(a)										
Responsibility	4.09 ± 0.51	4.27 ± 0.60	4.27 ± 0.45	4.56 ± 0.43	4.50 ± 0.42	4.36 ± 0.33	4.60 ± 0.37	4.49 ± 0.41	4.72 ± 0.36	4.61 ± 0.61
Information	4.55 ± 3.44	3.99 ± 0.71	4.06 ± 0.59	4.52 ± 0.50	4.27 ± 0.70	4.20 ± 0.66	4.43 ± 0.55	4.38 ± 0.50	4.53 ± 0.46	4.54 ± 0.64
Processing										
Communication	4.16 ± 0.60	4.28 ± 0.69	4.46 ± 0.64	4.50 ± 0.46	4.47 ± 0.51	4.61 ± 0.47	4.52 ± 0.48	4.48 ± 0.66	4.75 ± 0.36	4.43 ± 1.07
Critical analysis	4.07 ± 0.58	4.21 ± 0.61	4.11 ± 0.53	4.43 ± 0.44	4.42 ± 0.53	4.32 ± 0.74	4.58 ± 0.33	4.57 ± 0.38	4.78 ± 0.32	4.38 ± 1.03
Self-awareness	4.31 ± 0.57	4.32 ± 0.51	4.28 ± 0.54	4.32 ± 0.47	4.50 ± 0.51	4.46 ± 0.46	4.48 ± 0.52	4.61 ± 0.56	4.74 ± 0.38	4.51 ± 0.99
Overall (Scale 1-3)	2.24 ± 0.49	2.33 ± 0.59	2.39 ± 0.49	2.44 ± 0.50	2.54 ± 0.51	2.48 ± 0.51	2.33 ± 0.47	2.51 ± 0.49	2.67 ± 0.48	2.50 ± 0.75
(b)										
Responsibility	4.29 ± 0.55	4.18 ± 0.57	4.52 ± 0.52	4.81 ± 0.30	4.56 ± 0.50	4.21 ± 0.59	4.35 ± 0.48	4.71 ± 0.37	4.74 ± 0.39	4.72 ± 0.41
Information	4.10 ± 0.51	3.86 ± 0.49	4.20 ± 0.58	4.56 ± 0.42	4.47 ± 0.51	4.05 ± 0.55	4.10 ± 0.52	4.41 ± 0.49	4.52 ± 0.45	4.58 ± 0.50
Processing										
Communication	4.39 ± 0.49	4.23 ± 0.52	4.50 ± 0.53	4.81 ± 0.36	4.49 ± 0.52	4.35 ± 0.53	4.25 ± 0.44	4.74 ± 0.35	4.76 ± 0.45	4.61 ± 0.45
Critical analysis	4.15 ± 0.46	3.96 ± 0.49	4.48 ± 0.56	4.61 ± 0.41	4.41 ± 0.60	4.15 ± 0.52	4.09 ± 0.49	4.78 ± 0.28	4.67 ± 0.43	4.41 ± 0.62
Self-awareness	4.16 ± 0.43	3.92 ± 0.54	4.38 ± 0.75	4.69 ± 0.50	4.30 ± 0.69	4.13 ± 0.42	4.02 ± 0.69	4.72 ± 0.42	4.60 ± 0.51	4.52 ± 0.78
Overall (Scale 1-3)	2.41 ± 0.50	2.32 ± 0.47	2.59 ± 0.51	2.72 ± 0.45	2.54 ± 0.51	2.33 ± 0.48	2.46 ± 0.51	2.56 ± 0.51	2.59 ± 0.50	2.74 ± 0.45

Do self- and tutor evaluations change with progress of students in PBL tutorials?

Mean self-evaluation scores were high throughout the module (Table 3), ranging from 3.99 for information processing in theme 2 (1994) to 4.78 for critical analysis in theme 4 (1995). The minimum individual score was 1 and the maximum individual score was 5. The subscores did not show any significant difference over time for any themes except for responsibility, where students consistently gave higher self-evaluation scores as they progress to theme 5 ($P < 0.001$) during 1994. Mean tutor rating scores were also high throughout the module, ranging from 3.86 for information processing in theme 2 (1994) to 4.81 in theme 4 (1994). The subscores did not show any significant trend as student progressed from theme 1 to theme 5.

Do self- and tutor evaluations relate to achievement at the end of the year?

The student scores in the end of the year written examination ranged from 70% to 93.3%. The students were categorized into high- (> 90%), middle- (>80% and <90%) and low- (<80%) achievers. These categories were not correlated to any of the subscores except that high-achievers were less likely to give themselves a high rating than low-achievers. Students of all three categories scored themselves as either average or outstanding. The tutors also scored approximately half of the students of each category as average or outstanding. None was ranked as below average. There was no significant correlation between student achievement scores and self- or tutor evaluation scores for all subscores and for overall scores.

Is there any difference in self-evaluation between male and female students?

Table 4 gives the respective mean self-evaluation scores for each subscore. There were no significant differences between male and female in these subscores. This is in contrast with the fact that the female students gave themselves an "overall" score, which was much lower than male students gave themselves. This difference was highly significant ($P < 0.0001$).

DISCUSSION

This study investigated the evaluation of medical students by self and tutors about their participation and attitude in PBL tutorials. PBL emphasizes self-learning, where students are expected to take responsibility, be good communicators, be able to process and critically analyze information. Students are expected to be aware of their own strengths and weaknesses as a way to improve their performance. In this study, self-evaluation scores during learning in the PBL tutorials corresponded reasonably well to the tutor evaluation, with mean values for both evaluations in the high range. This congruence was present with respect to all the subscores. This factor probably reflects a positive attitude of the students and tutors towards a curriculum that was new to them and allowed the students to evaluate their own performances. This congruence also provides positive feedback to the module organizers that the understanding of the students and the tutors about the goals of the PBL tutorials and responsibility of the students in a self-learning curriculum were clear. This is important because differences in student and

Table 4. A comparison of self-evaluation between male and female students.

Subscores	Male (<i>n</i> = 17) Mean $\pm$ SD	Female (<i>n</i> = 47) Mean $\pm$ SD	<i>P</i> -value ^a
Responsibility	4.44 $\pm$ 0.46	4.43 $\pm$ 0.50	0.847
Information processing	4.45 $\pm$ 1.42	4.28 $\pm$ 1.26	0.009
Communication	4.43 $\pm$ 0.68	4.46 $\pm$ 0.61	0.729
Critical analysis	4.25 $\pm$ 0.73	4.39 $\pm$ 0.55	0.054
Self-awareness	4.37 $\pm$ 0.71	4.46 $\pm$ 0.51	0.240
Overall (Scale 1-3)	2.73 $\pm$ 0.51	2.32 $\pm$ 0.50	0.000

^a Student's *t*-test was used. SD, standard deviation

tutor ratings could occur in a PBL tutorial performance evaluation if the aims and objectives of PBL tutorials are interpreted differently by them and if their roles and responsibilities are not clear. Discrepancies between student and tutor scores found by Stefani (1994) was thought to be due to lack of experience of students in self-evaluation and to possible differences in interpretation of criteria for scoring.

Rezler (1989) observed that the self-evaluation scores tended to be high as the students progressed over a period of time. Woolliscroft *et al.* (1993) also showed a significant increase in the initial self-assessment as the year progressed and students gained more experience. The continuing self-evaluation of all subscores as the students progressed from theme 1 to theme 5 in the present study revealed no such pattern and the fluctuations of self-evaluation scores from theme 1 to theme 5 showed no statistical significance. The students showed self-confidence throughout the module and scored themselves in the high range from the beginning. High scoring by the students at the beginning of the course probably shows self-confidence of students as they join a prestigious institution after tough competition (Rezler 1989). High scoring by self and tutor in both years could also be the reflection of the high pass mark (75%) expected from the students of the FMHS.

In Rezler's (1989) study, tutor ratings and not student ratings correlated with NBME scores. He concluded that the students may have rated themselves according to the goals of the tutorials, while faculty rated them on different criteria. Boud & Falchikov (1989) reported that the high-achieving students tend to underestimate their performance and low-achieving students overestimate. Woolliscroft *et al.* (1993) also made similar observations in their studies on the predictive value of self-evaluation in clinical performance of students. Our results showed that high-achievers did not identify themselves and self-evaluations of high- and low-achievers were similar. Although the MEQs were structured to assess reasoning and critical analytic abilities, they probably required skills other than those required to perform well in problem-based tutorial

sessions. To achieve a high score in written examinations, students need to have a good command of language. English is a second language for many Preparatory Course students and they may have relatively poor comprehension and writing abilities. A good participant in a PBL tutorial may not necessarily be able to comprehend and express him/herself in a written form. This sends an important message to the organizers of PBL to consider modifications of the assessment format of the PBL curriculum.

Subjective perceptions of both students and tutors had a reasonable amount of concordance on self-evaluation skills and their role in learning. In spite of this, the majority of students wanted its role to be limited to only formative assessment. They were against its inclusion as a summative assessment. The FMHS students have shown in other studies that they place considerable trust in faculty decisions about curriculum design and assessment (Das *et al.* 1995; Das *et al.* 1996).

An observation that is unique to this study is the perceived gender difference in self-evaluation. The evaluation of subscores in our study is highly objective due to the structured format and clearly stated items; however, the overall score at the end of the self-evaluation form may be a subjective expression of self. The female students had similar self-evaluation scores as the male students in all the subscores. In spite of this, the overall self-evaluation by the female students was quite low and this difference was statistically highly significant ($P < 0.0001$). The female students were also more critical about self and peers during the feedback sessions following self- and tutor evaluation. Self-evaluation is a reflection of how a society views its members. The reason for this gender difference finding could be related to culture and the beliefs in a society. Arab countries, like those studied by Hofstede (1986) have been identified as collectivist societies, where women accept inequality. On the other hand, such gender differences may be more universal. Roberts (1991) has reviewed the pertinent literature and argues that men and women do indeed have different approaches to evaluative achievement situations. Males are more likely to adopt a self-confident approach that leads them to deny the informational value of other's evaluations. Females may be particularly likely to approach such situations as opportunities to gain information about their abilities.

CONCLUSION

Studies such as this one that seek to ascertain the impact of new methodologies on students whose traditional educational models are authoritarian teacher-centred and rely on external motivation raise more questions than they answer. Nevertheless, they are clinically important to medical schools attempting to inculcate a sense of lifelong learning, introspection as well as self- and peer appraisal, which is so important to the long-term profession of doctors. Clearly, the students in this study were able to assess their abilities in concordance with tutors, although there were significant gender differences. Further study over time will perhaps tell us whether or not female perceptions change as the society becomes more egalitarian and as the large member of current female students enter practices.

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Perceptions of group dynamics in problem-based learning sessions: a time to reflect on group issues

D. J. S. MPOFU¹, M. DAS², T. STEWART³, E. DUNN¹ & H. SCHMIDT⁴

¹Department of Family Medicine, United Arab Emirates University, UAE; ²Department of Medical Education, United Arab Emirates University, UAE; ³Department of Psychiatry, United Arab Emirates University, UAE; ⁴Department of Psychology, University of Limburg, Maastricht

SUMMARY *Problem-based learning (PBL) educational settings are design studios for reflection on group dynamics perceptions. Most PBL studies report aspects related to cognitive skills and very little attention has been given to the development of group-related skills. This study reports on students' and faculty perceptions of group dynamics. A questionnaire was used to collect data from students following completion of each of four PBL themes. Data from tutors was collected using a more open-ended format. Feedback and discussions post-PBL themes offered reflective opportunities for groups. Differences were noted in what students and tutors perceived as important, demonstrating a faculty-student gap. The female students stated important aspects to be areas which facilitated their learning and exam success, whereas for the males, of importance was an environment conducive to participation by all. Further, gender differences were demonstrated in interpretation of over 50% of items, with highly significant differences between males and females ($p < 0.001$), in just under 25% of items.*

Introduction

Very little research has been undertaken on facilitating group dynamics skills during the education and training period of medical students. In problem-based learning (PBL) tutorials the group process relies heavily on several factors one of which is indicated as group dynamics (Kaufman 1985; Schmidt 1993; Tipping *et al.*, 1995). Earlier the importance of group dynamics skills in experiential learning situations was highlighted by Bollag *et al.*, (1982). Research has identified the tremendous growth in medical and other health-related schools adapting PBL as a mode of teaching and learning (Albanese & Mitchell, 1993). What is lacking is studies on actual practicalities related to developing and dealing with appropriate PBL group behaviors (Tipping *et al.*, 1995). The importance of facilitating practitioners to think about what they are doing while they are doing it has been defined as reflective practice (Schon 1991). Schon (1991) p8, further identifies the relevance dilemma indicating that "what aspiring professionals need most to learn, professional schools seem least

able to teach". It is essential, therefore, that future physicians develop, review and refine group dynamic skills as part of their undergraduate medical curriculum.

At the Faculty of Medicine and Health Sciences (FMHS), United Arab Emirates (UAE) University all the medical students are UAE nationals and more than 90% of faculty staff are expatriates. Sexual segregation of students is practiced throughout the seven years of training. PBL used in the preparatory year, the first year of medical education and training, is identified as one of the key educational principles of the FMHS. Curriculum planners developed certain objectives in relation to PBL tutorial groups. These are:

- development and refinement of communication and interpersonal skills;
- stimulation and encouragement of self-directed learning;
- facilitation of information management skills which cover clinical reasoning and problem management;
- fostering student growth in responsibility in relation to self, peers, educational establishment and future profession;
- development of effective professional behavior;
- identification, utilization and refinement of self and peer-evaluation strategies;
- capability to offer one another support emotionally and socially in order to foster personal growth.

These objectives are in keeping with the goals of tutorial groups as identified by Lucero *et al.*, (1985). From a local perspective, module planners also want to develop leadership skills and reflective praxis in our medical students. Anecdotal evidence suggests that student-centered learning in the form of PBL is an entirely new phenomenon to the majority if not to all the FMHS new medical students. What, therefore, are the important issues to consider in encouraging medical students and their tutors to not only think of but experience and review aspects that contribute to harmonious group functioning?

The study

This study reports the perceptions of group dynamics gathered following four out of five PBL themes encountered by students in one academic year. The issues addressed were twofold. First, what were the most important and least important sub-elements of group dynamics perceived by tutors and students in PBL groups. Second, what were the differing perceptions of group dynamics by: (a) the students from one PBL theme to another, (b) between male and female students regarding perceptions of group dynamics within PBL groups.

Methodology

In the preparatory year, the first year of medical education and training, 140 hours are dedicated to the Introduction to Medicine Module (ITMM). This module accounts for five hours weekly. Two hours per week are used for PBL and the rest of the time is used for practical skills sessions, fieldwork activities, one to two lectures per theme and self-study.

In September 1996, 49 students entered the preparatory year. During the course of the year three students left the program, resulting in 16 males and 30 females, making up two male and four female PBL groups. For cultural and religious reasons males and females are taught in separate groups. Students were assigned randomly to groups and not allowed to change groups for the duration of the ITMM. Students received a two-week PBL orientation program, where in small groups they were introduced to the principles of group learning, and reviewed the roles of group members, group rules and effective group functioning. Students were introduced to practice PBL triggers, and worked through the steps encountered during problem-based learning situations. The introduction to the library was related to their information search following exposure to the practice trigger. Consultation with experts and/or relevant organizations and the use of the skills laboratory facility were encouraged. Report back and evaluation, followed by discussion of assessment methods, concluded the training. The role of student group leader and that of scribe rotated among the group members. During the course of the year each student had an opportunity to practice the role of student leader and that of scribe. In tackling the problem triggers, groups were introduced to a modified form of the components of the PBL process, as described by Schmidt (1993) and later by Dolmans (1994). The PBL process adopted at UAE University is described fully in Das *et al.*, (1995).

The PBL themes covered were Health Care System (HCS), Alternative and Islamic Medicine (AIM), Family Health (FAM), and Infectious Diseases (INFED). On completion of each theme the students individually completed a group dynamics survey form. Tutors completed a similar open ended questionnaire, however, where there were two tutors they discussed their perception of group dynamics and submitted a joint form. Tutors' comment sheets distinguished between very important group dynamics issues and those of lesser importance. A total of 184 (100%) group perception forms by students and 22 (91.6%) tutor perception forms were completed following the PBL themes.

The group dynamics survey form

The survey form used was adapted from Tipping *et al.*, (1995). To provide concepts and a description of effective group behavior Tipping *et al.*, (1995) adapted a framework from behavioral sciences (Dimock, 1993). Using the sub-elements utilized by Tipping *et al.*, (1995), a pilot study was undertaken on six male and six female students at the end of the 1995-96 academic year. Necessary modifications were made to the form. There were 41 items on the form representing eight categories of group dynamics. These categories, given in Table 1, were: physical climate, emotional climate, involvement, interaction, cohesion, productivity, the student as group leader and the tutors as facilitators. Ratings were distributed on a scale from not important (0) to very important (10). Each form had a space for comments. The tutors' group dynamics form listed the same categories as above; however, tutors were required to only make open-ended comments under each category in relation to the various items per category. There was an opportunity at the end of each theme for students, PBL tutors and module planners to review and reflect on group dynamics issues pertinent to the theme just completed.

Statistical analysis

The data were entered into ACCESS and then imported into the Statistical Packages for Social Sciences (SPSS) for analysis (Frankfort-Nachmias & Nachmias, 1996). Sub-scores for each of the eight group perception categories were created for individual students, by averaging across individual items. Mean ratings were calculated for each of the eight categories. Comparisons between groups and by themes were made. The *t*-test was used in analyzing differences between male and female students.

Results

Perception of group dynamics by PBL tutors

Of those tutors who participated in the study, 77.2% of them commented on physical climate and involvement issues as very important. On the other hand students identified aspects relating to physical climate, such as: lighting, air conditioning, room size, sitting arrangement, distractions, as of least importance in group dynamics. Tutors identified large rooms, unsuitable room lighting, air conditioning that made the rooms sometimes too cold, as very important. Tutors identified that sitting arrangement in lecture rooms, where seats needed rearranging into semi-circles prior to each PBL session, was more a nuisance, and regarded this as of lesser importance. Further issues such as students arriving late to sessions, or disturbances from students in other years, was, although regarded as of lesser importance, highly irritating to 45.5% of faculty staff.

The tutors highlighted some discomfort and insecurity with the role of PBL tutor, in five out of the 22 tutor perception forms completed. The other group dynamics categories received minimal comments by the tutors.

Perception of group dynamics by students

The most important areas in relation to group dynamics for

Table 1. Results of t-test for independent samples of gender differences in perceptions of group dynamics over four PBL themes (total male responses = 64, total female responses = 120).

Group dynamics categories	<i>p</i> values
(1) <i>Physical climate</i>	
Lighting	0.061
Use of flip charts	0.079
Sitting arrangement	0.553
Air conditioning	0.593
Distractions	0.274
(2) <i>Emotional climate</i>	
Cooperativeness in the group	0.017*
Support for student leader	0.001**
Having formal tutor support	0.000***
Accepting and not judging others	0.032*
Pride in the group	0.341
(3) <i>Involvement</i>	
Knowing PBL objectives	0.320
Knowing the goals of PBL	0.234
Interest in the group	0.012*
Curiosity about problems to be discussed	0.000***
Attentiveness	0.266
Commitment to the group	0.006**
Lateness and absenteeism	0.003**
(4) <i>Interaction</i>	
Listening to each and every one	0.137
Communication with all	0.077
Participation by all	0.013*
Balance of tasks	0.042*
Subgroups having power	0.210
Individuals having power	0.010*
(5) <i>Cohesion</i>	
Degree of how well group works together	0.006**
Accepting majority decisions	0.129
Adhering to group rules	0.000***
(6) <i>Productivity</i>	
Understanding the goals for the theme	0.198
Having clear goals for the theme	0.135
Having all follow the plan	0.000***
Making plans for the next session	0.000***
Having a flexible plan for reaching the goals	0.050*
Having all contribute	0.016*
Having decisions from last session carried out	0.000***
Making plans for the next session	0.055
Evaluating group effectiveness regularly	0.054
(7) <i>The student as group leader</i>	
The effect of the student leader on the group	0.000***
The style used by the student leader affecting group functioning	0.000***
The effect of student leadership on group participation	0.000***
(8) <i>The tutor(s) as facilitators</i>	
The tutors' style as facilitator (s) affecting group functioning	0.001**
The effect of the tutor(s) facilitation on the group	0.001**
The effect of tutor(s) facilitation on group participation	0.000***
(9) <i>Comments</i>	

Note: * = *p* value ≤ 0.05 , ** = *p* value < 0.01 , *** *p* value < 0.001 ; female student scores were higher than the scores of the male students.

Table 2. Students' perceptions of most important and least important group dynamics items by themes

<i>Sequence of themes</i>	<i>Theme title</i>	<i>Most important items</i>	<i>Least important items</i>
First theme	Health Care System	<p>Communication with all</p> <p>Participation by all</p> <p>Having all follow the plan</p> <p>Interest in group</p> <p>Listening to each other</p> <p>Knowing PBL objectives</p> <p>Support for student leader</p> <p>Knowing the goals of PBL</p> <p>Understanding goals of this theme</p> <p>Listening to each other</p> <p>Having clear goals for the theme</p> <p>Understanding goals of this theme</p> <p>Knowing PBL objectives</p> <p>Communication with all</p> <p>Listening to each other</p> <p>Knowing PBL objectives</p> <p>Knowing the goals of PBL</p> <p>Understanding goals of this theme</p> <p>Having clear goals for the theme</p> <p>Communication with all</p>	<p>Accepting and not judging others</p> <p>Air conditioning</p> <p>Subgroups having power</p> <p>Individuals having power</p> <p>Distractions</p> <p>Accepting and not judging others</p> <p>Distractions</p> <p>Pride in the group</p> <p>Subgroups having power</p> <p>Individuals having power</p> <p>Use of flip charts or appropriate boards</p> <p>Style used by the student leader affecting the group</p> <p>Effect of student leadership on group participation</p> <p>Subgroups having power</p> <p>Individuals having power</p> <p>Sitting arrangement</p> <p>Air conditioning</p> <p>Effect of tutor's facilitation on the group</p> <p>Subgroups having power</p> <p>Individuals having power</p>
Second theme	Alternative and Islamic Medicine		
Third theme	Family Health		
Fourth theme	Infectious Diseases		

the six PBL groups were identified as those areas given a mean score of nine or more, and fell into the following categories: involvement, interaction, productivity, and tutor(s) as facilitators. The particular items were: knowing PBL objectives, knowing the goals of PBL, understanding the goals of PBL, having clear goals per theme, interest in the group, listening to each and every one, communication with all, having all follow the plan, making plans for the next session and the style used by the tutor(s) as facilitators affecting group functioning. The range of the mean scores for these items was 9.00–9.63 (standard deviation 1.25–1.82).

The areas that were identified as of less importance were areas with a mean score of less than the value eight. These areas were: *physical climate*—sitting arrangement, air conditioning, distractions; *emotional climate*—pride in the group; *interaction*—subgroups having power, individuals having power.

The students' views on group dynamics were examined by themes: with the first theme, HCS, areas identified as most important were aspects related to communication, listening, participation, interest in the group and having all follow the plan. Communication and listening aspects remained very important issues for the groups for the succeeding themes. However, with subsequent themes there was identification of a need for knowing and being clear about PBL objectives and also understanding the goals of each PBL theme. Requiring support for the student leader was identified as highly important in the second theme, AIM. However, by the third theme the style and effect of student leadership on group participation was regarded as less important (Table 2).

Of least importance to the students in all four themes was whether subgroups or individuals had power within the groups. Furthermore, items relating to physical environment, accepting and not judging others were identified as of minimal importance. By the fourth theme students even perceived the tutors' facilitation as of little importance (Table 2).

Reviewing group-dynamics perceptions by gender, there were significant to highly significant differences between male and female students' perceptions of over 50% of items. The females demonstrated a general tendency to evaluate most aspects of group dynamics as more important than did the males. In Table 1, the areas where very highly significant differences were identified were primarily the categories relating to the student acting as group leader and facilitation by the tutor(s). Further items were also identified as highly significant and these were: having formal tutor support, curiosity about problems to be discussed, adhering to group rules, having all members follow the plan, making plans for the next session and having decisions from the last session carried out (see Table 1).

Discussion

The study sought to identify students' and tutors' perceptions about group dynamics, and further to highlight what issues they considered as most and least important. The results highlighted some distinct issues about group dynamics in a PBL program.

Least important items of group dynamics

In all four PBL themes, of least importance were aspects to do with individuals having power or subgroups having power (Table 2). Surprisingly, without consulting one another, the majority of students in completing the group dynamics questionnaire indicated that having a powerful individual within a group was not important. Inequality exists in all cultures; however, the degree of it that is tolerated varies from one culture to another. Hofstede (1986) identifies the UAE as a country with large power distance. This means that it is a culture where the less powerful persons accept inequality in power and consider it as normal. What was illuminating here was the tutors' and observers' comments on non-verbal group communication, as a very strong weapon amongst members. Where a student did not do his/her homework between PBL sessions, or where a student was repeatedly late for sessions, or where a student or group of one or two students dominated the group, group members did not and would not openly confront their colleague(s). This occurred even when tutors raised these issues during group evaluation and reflection discussions. Students preferred to ignore the deviant member(s) and proceed with other group issues, thus maintaining group harmony. Some expatriate tutors found this reluctance to actually confront what they perceived as important group functional issues difficult to accept. This demonstrates a possible attitude difference that might be culturally related, echoing a 'faculty student gap' as identified by Gallagher (1993).

In many situations such as group dynamics, faculty have their own preconceived ideas about what is really important, and the students may have a totally different view as indicated in the results. It is, therefore, important to clarify from the outset how to deal with, for example, lateness to and absenteeism from PBL sessions and, further, to clarify whether there is an obligation on the students' side to be present at all PBL sessions and explain why this is so. In a traditional school students opt out of lecture sessions with little penalty, except the necessity to pass the related assessments. Experiential learning in PBL takes on a new meaning. PBL goals are far broader than those of lectures and far superior in preparing students for community orientation in the form of team skills. Aspects such as punctuality, relationship with staff and peers take on a new dimension (Das *et al.*, 1996). On the other hand, having rooms dedicated to small-group teaching where everyone is made aware of the need to reduce disturbances to a minimum reduces distractions. At McMaster University, 'home bases' are used for tutorial group sessions, and can also be used for study, discussions and for reviewing various resources. The home bases are identified as helpful for students to have a place to call their own, and to create a sense of community (Hamilton, 1976). The lesson here appears to suggest a strong need to identify and not assume to know what factors are important for particular students in creating an effective climate for group functioning.

Most important aspects of group dynamics

Examining most important perspectives on group dynam-

ics by themes, it was not surprising that at the beginning of the ITMM, in the first theme on HCS students identified items related to: communication, listening to each other, participation, interest in the group and having all follow the plan as most important (Table 2). At this stage students did not know each other well enough, and they were new to PBL and group work.

At the beginning of PBL themes certain individuals' communication contributions may be hindered by unfamiliarity not only with tutors, but with group members and group tasks (Anderson, 1993). For succeeding themes interaction aspects such as communication and listening remained very important issues for the groups, demonstrating that students themselves identified a need, perhaps, for more facilitation with aspects of communication echoing findings by Harrison *et al.*, (1996). These study findings highlight the need to address group communication and group functioning issues in a non-PBL setting. If students are to get maximal benefit from PBL, addressing communication and social skills issues separately would benefit the PBL groups themselves. Medical students at the University of Limburg in Maastricht experience communication and social skills training parallel to the PBL program throughout their medical curriculum (Van Dalen *et al.*, 1989).

Knowing, being clear, understanding the goals of PBL and the objectives of themes were items identified as most important by PBL groups in subsequent themes (Table 2). Low standard deviation (1.25–1.82) demonstrated that there was a high consensus amongst groups as to the importance of productivity items. Students' written comments elaborated on why certain items were important; students felt a need to have aspects related to the PBL framework and the various theme objectives explained in language they could digest more easily. In the study by Tipping *et al.*, (1995), students similarly commented more frequently on productivity areas after the study intervention than before.

In the second PBL theme on AIM, students identified the importance of support for the student leader. Several comments by students, especially the females, as well as PBL tutors pointed to the need to clearly define the role, offer more practice opportunities for students as leaders, increase the student leader's responsibility, and review the tutor's role in relationship to that of the student leader. Skepticism expressed by some tutors during tutor training as to the ability of students to take on this role points to the need to investigate this area further. The importance of the effect of tutor's facilitation on the groups as a whole diminished in importance from the first to the fourth PBL theme echoing findings by Tipping *et al.*, (1995). However, in comparing males and females, the importance of the tutor's role remained fairly high as judged by the females.

Gender differences in students' perceptions of PBL group dynamics

The questionnaire used for this study required students to indicate the degree of importance of items in eight categories (Table 1). On interviewing a group of male and a group of female students to identify their interpretation of

how they judged an item to be important, the females indicated the following:

... what is important is what needs to be present, what is necessary in order to help our learning, understanding and exam success.

On the other hand, a group of male students interpreted an important item to be:

... an environment that provides opportunities for each student to participate.

From the outset males and females appeared to focus on slightly different aspects of groups: the females were homing in on 'learning and outcomes' whereas the males identified 'a suitable environment and participation by all'. Comparing male and female group dynamics perceptions, several areas were identified as highly significant ($p < 0.001$; see (Table 1). Female students desired the facilitation of expert tutors, who would fill in any of their knowledge gaps. For the female students the group plans, having been identified, needed to be executed by all according to group rules. It was important to the female students to undertake and experience the role of student group leader. Informal discussions with the tutors indicated that, unlike the males, weeks in advance the females would highlight to tutors who would act as leader and scribe in subsequent PBL sessions. Gallagher (1993) identified that UAE female students, more so than the male students, were very concerned with proving themselves academically. Not unlike other societies, UAE women have traditionally played more dominant roles in domestic and family affairs rather than as employees outside the household. They have a desire, therefore, to develop those cognitive skills and to work hard towards the medical qualification that will enable them to function outside the home in a more competitive environment. In the PBL group situation gaining factual knowledge was of prime importance to the female as this would lead to passing theoretical exams, a step towards that physician qualification. The males, on the other hand, desired 'individual air time'. Gender differences demonstrated in our group dynamics study echoed similar findings by Gallagher (1993).

Our study provides an illumination of differing perceptions of pertinent issues regarding group dynamics in PBL groups. It raises important further questions concerning the differing views on group issues: of male students and female students, of students as they become more familiar with PBL, and of faculty-student differences. These issues are important to investigate and feed back into one's local PBL system. PBL implementation, the participants in PBL programs and also the educational environment vary from one school to another. The need to develop PBL program plans that take account of local issues in areas like group dynamics cannot be over-emphasized. Such research of a highly descriptive nature, in the words of Schon (1991), is rich in forcing the world of education to stand back and think about what it is doing as it is doing it.

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Notes on contributors

DEBORAH MPOFU was, at the time of writing, a teacher and researcher at the Faculty of Medicine and Health Sciences (FMHS) United Arab Emirates (UAE) University. She is now completing PhD studies in Saskatchewan, Canada.

MANDIRA DAS is an Assistant Professor in Medical Education at the FMHS, UAE University. She is the Coordinator of the Clinical Skills Laboratory, and a module coordinator for the Introduction to Medicine Module.

TOM STEWART is an Associate Professor in the Department of Psychiatry at the FMHS, UAE University.

EARL V. DUNN is a Professor and the Chairman of the Department of Family Medicine FMHS, UAE University.

HENK G. SCHMIDT is a Professor in Psychology at the University of Limburg, Maastricht, The Netherlands.

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Facility with the English Language and problem-based learning group interaction: findings from an Arabic setting

D J S Mpofu¹, J Lanphear², T Stewart³, M Das², P Ridding⁴ & E Dunn¹

¹Department of Family Medicine, United Arab Emirates University, Al-Ain, Abu-Dhabi, UAE;

²Department of Medical Education, United Arab Emirates University, UAE;

³Department of Psychiatry, United Arab Emirates University, UAE; and

⁴CMSS Unit, Medical Education, United Arab Emirates University, UAE

SUMMARY

The Faculty of Medicine and Health Sciences (FMHS), United Arab Emirates (UAE) University is in a unique position to explore issues related to English language proficiency and medical student performance. All students entering the FMHS have English as a second language. This study focused on the issues of students' proficiency in English as measured by the TOEFL test, student background factors and interaction in problem-based learning (PBL) groups. Using a modification of Bales Interaction Process Analysis, four problem-based learning groups were observed over four thematic units, to measure the degree of student interaction within PBL groups and to compare this to individual TOEFL scores and key background variables. The students' contributions correlated highly with TOEFL test results in the giving of information (range $r = 0.67-0.74$). The female students adhered to interacting in English during group sessions, whereas the male students were more likely to revert to using Arabic in elaborating unclear phenomena ($p < 0.01$). The educational level of the student's mother was highly predictive of TOEFL scores for the male students, but not for female students. Multivariate analysis was undertaken to analyse the relative contribution of the TOEFL, parental education and years of studying in English. The best predictor of students' contributions in PBL groups was identified as TOEFL scores. The study demonstrates the importance of facilitating a locally acceptable level of English proficiency prior to admission to the FMHS. However, it also highlights the importance of not focusing only on English proficiency but paying attention to additional factors in facilitating medical students in maximizing benefits from interactions in PBL settings.

Keywords

*Communication barriers; *language; *problem-based learning; *students, medical

INTRODUCTION

English is accepted today as a major international language of medical communication (Maher 1986). Most of the best contributions in science and medicine are today published in English in international reviews. It is not surprising therefore that the English language was adopted as the medium of instruction at the United Arab Emirates University (UAE), Faculty of Medicine and Health Sciences (FMHS) when it opened in 1986. For all FMHS students at UAE University, however, English is a second language. Historically in 1991, FMHS students' protested at having formal English language instruction continued during their medical education and training. These students would on average have had 7-12 years of English instruction in their pre-university education, and a year with English, Mathematics, Computing and Arabic at basic university education level. The Test of English as a Foreign Language (TOEFL) was therefore introduced in order to give students whose TOEFL scores were above 500 (later changed to 550) the opportunity to opt out of the English modules at the FMHS. The test also provided a baseline, indicating to the FMHS the level of English proficiency of the students who were commencing the study of medicine. It appeared timely to examine aspects of oral proficiency in PBL groups and to compare these to students' English language proficiency as measured by the TOEFL test.

A REVIEW OF THE LITERATURE AND A CASE FOR THE PROPOSED STUDY

The literature identifies that in many instances English language proficiency cut-off points have been established for admission to medical schools, and one of the common tests utilized is the TOEFL test (Graham 1987). Literature on the usage of the TOEFL test is

complex and unclear. There have been questions about the value of using multiple choice professional tests like the TOEFL test for predicting the ability to use the English language (Dulay *et al.* 1982, Graham 1987). The TOEFL test measures listening comprehension, written expression, vocabulary and reading. Why therefore should researchers choose to use this test to examine oral proficiency in English? The relationship of indirect measures like the TOEFL test to active speaking skills is well documented. Powers and Stansfield (1983), identify that throughout the past century multiple-choice tests have been the primary mode of assessing proficiency in English as a second language. Multiple choice tests measuring similar components to the TOEFL test are the Michigan Test of English Language Proficiency (MTELP), the Comprehensive English Language Test (CELT), and the American Language Institute of Georgetown University (ALIGU) test (Powers and Stansfield 1983). None of these tests measure oral proficiency, however, research suggests that the relationship between multiple-choice indirect measures and direct measures of active speaking skills is moderately high. Clark and Swinton (1980), Clark (1979), and Pike (1979) have demonstrated moderate correlations between scores on indirect paper and pencil measures of language proficiency and performance on tests of active speaking skills. The method of exposure to English is indicated as determining the resultant skills acquired. Other factors that will also affect the profile of language skills are indicated as age, acculturation, purpose for learning the language and cognitive style (Johnson and Newport 1989).

One of the major gaps identified in the literature is that most studies that are published were undertaken in western countries where the study group were foreign students, or refugees, or immigrants, or permanent residents in a country other than their country of origin. In these environments English would be widely spoken. An interesting feature of our context is that our study was undertaken in an English medium medical school, where all students are Arabic and study English as a second language. Their future patients, like the population of the country, will be very mixed, with Arabic being the major language of communication with patients, followed by languages such as English and Hindi. This situation is unique, as in most studies the identified medical students, using English as a second language are studying in an English environment, where they are expected to use English language in communicating with patients and in socializing. In an Australian study, O'Hanlon *et al.* (1995) commented on 57.1% of students with English as a second language, indicating that language skills hindered their

participation in a pain module in PBL. Further students were identified as feeling inferior to others, having difficulties communicating in a lecture theatre, difficulty with aspects of self study, etc. (O'Hanlon *et al.* 1995). In our study anecdotal evidence suggested English language problems, and this was highlighted in PBL groups and general communication skills training situations (Das *et al.* 1995; Harrison *et al.* 1995), respectively. Gallagher (1993), in a UAE-based study, highlights how it is not only language but other cultural and environmental issues that complicate the UAE medical students' education and training process. Important research questions to be addressed in this study are therefore:

1. how do Arabic students of differing English proficiency levels interact in PBL groups?
2. what factors influence English language proficiency (TOEFL results) and do the same factors influence PBL group contributions?

PROBLEM-BASED LEARNING

In our setting a group of six to nine students form a tutorial group. Each group is facilitated by one or two tutors, and encounters a variety of PBL paper problems. For cultural and religious reasons, male students form separate groups to their female counterparts. The problem triggers used relate to real-life scenarios and are organized in specific themes. For the Introduction to Medicine Module, the themes addressed are as follows: Health Care System; Alternative and Islamic Medicine; Family Health; Infectious Diseases and Prevention and Health Promotion. For each PBL session a different student directs the group discussion facilitated as necessary by the Faculty tutor(s), and the role of scribe also rotates every session. The description of the problem provokes the group members to think; activate their prior knowledge; question underlying phenomena; formulate hypotheses; motivate research around the identified learning objectives; report back to the group and repeat the cycle with exposure to new information or further triggers (Schmidt 1993). Using the students' prior knowledge and researched evidence, the problem analysis that occurs requires processing material in English. Students walk around the education campus communicating in Arabic and switch to English when the group sessions commence. The English and medical dictionary are a regular accompaniment to the PBL tutorial room. Students also correct each other's spelling and grammar. In addressing the various PBL steps, members ask questions of other members. This is identified as having a positive

effect on the learning process to both the one asking and the one giving the answer (Peterson and Swing 1985; Webb 1989). This is especially the case when open-ended questions are used that require an elaborated response.

METHOD

In September 1996 during the FMHS orientation week for the 49 newly admitted Preparatory Year medical students the following items were administered:

- the TOEFL test;
- a questionnaire used for the survey of new medical entrants.

For the Introduction to Medicine Module, students were randomly allocated to four female and two male PBL groups, which remained the same for the whole of the academic year. Using an Interaction Process Analysis (IPA) the study groups were observed during PBL sessions over four out of five themes. Each theme consisted of three or four PBL sessions, of 2 h duration. Group observation data were correlated with TOEFL test results to identify participation patterns in relation to English language proficiency. Background survey data were also correlated to TOEFL test results and compared with group observation results.

The data were entered into ACCESS and then imported into the Statistical Packages for Social Sciences (SPSS) for analysis (Frankfort-Nachmias & Nachmias 1996). Interaction Process Analysis data were collected from tutor(s), the student leader, the scribe and group members for the categories: 'Asks'; 'Gives'; 'Elaborates English'; 'Seeks clarification of English'; 'Arabic' and 'Total', for the three or four PBL sessions per theme. Four observers received a training programme appropriate to the observational situation. Necessary modifications were made to the IPA data-collecting instrument in response to comments received from practise applications of the instrument (Frankfort-Nachmias & Nachmias 1996). TOEFL scores were correlated with interaction results. Mean ratings and standard deviations were calculated over the various observation categories. The *t*-test was used in analysing the following: male versus female results; student leader versus group members; student leader versus group tutor(s). Finally information from the background survey data were correlated with TOEFL test results and observation results. For the study, the levels of significance were identified as follows: significant < 0.05, highly significant < 0.01 and very highly significant < 0.001.

SUBJECTS

In September 1996 49 students (18 males and 31 females), all UAE citizens, were admitted to the FMHS. During the course of the year one female and two male students dropped out of the medical education and training programme.

INSTRUMENTS

Interaction Process Analysis

Analysis of communication within health care and medical settings has been one of the most productive areas of research in the 1980s and 1990s. A by-product of the growth of studies of patient-doctor communication and other communication studies has been the production, testing and validation of a number of basic methodologies for the analysis of interpersonal interaction in doctor's offices, clinics, hospitals and other settings. These instruments and tools can be easily adapted to educational group settings. The study group decided to adapt one classical scheme for group analysis, Bales Interaction Process Analysis (IPA), developed in the 1950s.

IPA evolved as a result of an attempt by Bales and others to develop empirical generalizations about group processes at a time when the understanding of groups was just emerging (Bales 1950). The focus was upon the basic elements of group interaction and in time IPA was applied to analyses of classroom interaction, psychotherapy sessions, patient-doctor interactions and other social encounters. The code categories and scoring systems emphasized the basic units of interaction (statements versus questions; agreement versus disagreement, etc.) to allow researchers to identify patterns of the most general forms. It was this emphasis upon basic elements that appealed to us in choosing IPA as a method to analyse the PBL process. Another factor that favours the use of IPA is the long history of application of very clear code categories, which is an advantage when multiple team members are to serve as score-observers. The code categories were easily learned and lent themselves to congruence in behavioural observation.

The TOEFL test

The Test of English as a Foreign Language (TOEFL) is a test to measure the level of English proficiency of non-native speakers of English. It is generally required by English language colleges and Universities, particularly in North America. The TOEFL test was developed for use starting in 1963-64, through the co-operative effort

of more than 30 organizations, both private and public (Educational Testing Service 1993). A co-operative arrangement for the operation of the TOEFL programme was entered into by the Educational Testing Service, the College Board and the Graduate Record Examinations Board in 1973. The Education Testing Service is therefore responsible for administering the TOEFL programme according to the policies determined by a 15-member Policy Council. The TOEFL test takes approximately 2 h to complete and has three sections: listening comprehension; structure and written expression; and vocabulary and reading comprehension. The three sections contain multiple-choice questions. Listening comprehension tests the candidate's ability to understand spoken English, by listening to a tape and responding to various types of questions. Structure and written expression assesses a candidate's ability to recognize grammatically correct English. Vocabulary and reading comprehension demonstrates one's ability to understand written English by answering vocabulary and comprehension questions to given passages.

Use of the TOEFL test with candidates from the Middle East region has been mainly in relation to students seeking admission to institutions in the USA and Canada (Educational Testing Service 1993).

RESULTS

Students' TOEFL scores

The mean TOEFL scores for the two female groups were markedly higher than the mean scores for the male groups. The four student groups had a wide range of TOEFL scores with the males ranging from less than 400 in both groups to just over 600 in one group. The mean total TOEFL score for the females was 468.20 (SD 42.37) and for the males was 439.96 (SD 69.02). Using the *t*-test this was not significant, $P = 0.281$. The mean TOEFL scores of the study population are very similar to those identified in a study undertaken from 1989 to 1991 of students seeking admission to the United States or Canada from different parts of the

world. The total TOEFL mean score from 1849 UAE candidates was identified as 470 (Educational Testing Service 1993).

Male versus female participation in PBL groups

Comparison was made of each student's TOEFL results and their participation in PBL groups.

With the female students, the lower the TOEFL scores, the less likely they were to ask or give information. This was not so for the male students; TOEFL 2 score and total TOEFL scores correlated to asking for information ($P < 0.035$ and $P = 0.000$, respectively). For both male and female students the giving of information was highly correlated to their total TOEFL score (range of $r = 0.67-0.74$). Female students were more likely to explain to each other using English. In other words they used English in discussing unclear words and concepts, until they came to some understanding. On the other hand the males reverted to Arabic to clarify terms. They were also five times as likely to use Arabic during PBL sessions and this was highly significant, $P < 0.001$ (Table 1). Possible influences here will be addressed later.

Background student information and factors that were predictive of TOEFL scores

Survey data were collected during the first week of medical education from the first year students. The students' years of English study ranged from 7 to 13 years, where 75% had received 9-10 years of studying in English. Years of studying in English was not correlated to TOEFL scores. Thirty-four students (70.8%) had mothers whose educational level was primary school or less, and only four students (8.4%) had mothers who had a university degree. Twenty-one students (43.8%) had fathers who had primary school education or less, and 13 students (27.1%) had fathers who had a university degree or more. The mother's education level was predictive of TOEFL scores and highly significant ($P < 0.01$) for the male students. The mother's education level correlated highly to male

Table 1 Contributions in the various categories: Male versus female students

Students	Number of student observations	Asks mean (SD)	Gives mean (SD)	Elaboration mean (SD)	English mean (SD)	Arabic mean (SD)	Total mean (SD)
Female	123	5.68 (8.77)	17.64 (14.59)	0.52 (1.45)	0.89 (2.17)*	0.56 (1.08)**	25.34 (23.56)
Male	151	4.41 (5.82)	18.03 (16.10)	0.49 (1.17)	0.55 (1.42)*	2.60 (3.05)**	26.14 (21.11)

* $P < 0.05$ and ** $P < 0.001$.

student's TOEFL scores but not to the female student's scores ($r = 0.71$ and $r = 0.25$, respectively). The father's education level was not predictive of TOEFL scores, and was not correlated to TOEFL scores of the male or female students ($r = 0.47$ and $r = 0.25$, respectively). Furthermore, where the mother's education was low, students were more likely to identify that they had been discouraged from entering medical school by the family, and this was highly significant ($P < 0.001$). Comparing students from Dubai Emirate to those from all the other more conservative Emirates, the Dubai students had a mean TOEFL score that was significantly higher than that of students from other UAE Emirates ($P < 0.05$), with a mean difference of 53.3. A further observation was that students with higher TOEFL scores tended to indicate that they were 'worried' or 'very worried' about their ability to graduate from medical school, as related to their English ability, and indicated that they needed more facilitation with English. The reverse was true of students with lower TOEFL scores.

PBL group contributions versus students' background data

In correlating group contributions with the students' background data, the mother's educational level was more predictive of students' asking and giving information than was the father's level of education. Regression analysis was undertaken to identify the best predictor of interactions within the student groups. TOEFL scores were identified as the best predictor of PBL group contributions. Finally here 31 students (64.6%) were interested in going to the United Kingdom, the United States of America and Canada for postgraduate studies.

DISCUSSION

This study identifies several aspects about English language proficiency and interaction in PBL groups. The giving of information was correlated with TOEFL scores for both male and female students. Unlike the female students, the male students demonstrated less inhibition in asking for information, regardless of their TOEFL scores. In PBL, active student participation is identified as helpful for students to mobilize their prior knowledge. Later, following related research, discussions facilitate elaboration and restructuring of knowledge (Schmidt 1993). In our study, however, the female students with lower TOEFL scores demonstrated some inhibitions in coming forward to ask questions related to the PBL trigger at hand. Perhaps

they did not want to show group members and a strange tutor their lack of knowledge. Informal discussions with the student groups identified two concerns. Firstly, some students identified difficulty with spoken English, which they perceived as their 'private problem' and, with tutors they were unfamiliar with, were much less vocal. Secondly, students indicated not being familiar with one another at the beginning of the module, and this made them less free to interact. Culturally in UAE, neither the teacher nor the student should ever be made to lose face (Hofstede 1986, p. 312). In spite of Hofstede's comment it is important to highlight that reluctance to expose difficulties that one is experiencing in a tutorial group is encountered in group situations the world over. Charles Anderson, in a study undertaken in the Faculty of Social Sciences in Edinburgh, highlights similar problems in their tutorial groups. Anderson identified how students openly admitted lack of willingness 'to lose face with peers' by admitting they lacked understanding of concepts being discussed in group situations. Further students were identified as 'guarded' in identifying their lack of understanding in aspects of the discussions, because of the false belief that they were the only ones who may be experiencing a difficulty with the topic (Anderson 1993). Although the low proficiency in English affects group contributions, reluctance to identify oneself as unclear with issues under discussion also played a part in hindering the students' contributions in our PBL groups.

Further in this study the female students were more likely to adhere to 'rules of the game', speaking and practising using English during PBL sessions. The male students, on the other hand, used more Arabic in clarification of unclear concepts and this was highly significant. The male students appeared to have experienced socially more freedom of speech and thus contributed more easily in PBL groups. However, their mean total TOEFL score was 439.96 with a wide variation demonstrated by the standard deviation of 69.02. Hofstede (1986) identifies UAE as a masculine society, where men are expected to be assertive, ambitious and competitive. Comments from observers suggested that the males not only used Arabic more, but were less likely than the females to correct one another's spelling and grammar. Thus they were more accepting of the material offered, as it was. If practising using English improves linguistic skills, do UAE female students improve their English proficiency more than their male counterparts over a defined period of time? Data collected by the English language teachers, over the past 2 years strongly suggests this is the case, however, a systematic investigation in this area is strongly recommended.

Years of studying in English prior to University education was not predictive of TOEFL scores, and this was not a predictor of PBL group interaction. The quality of instruction, interaction, and activities encouraged in relation to English programmes that students are exposed to in private and public schools in UAE varies tremendously. Exposure to English is generally restricted to the classroom situation, as students revert to Arabic between sessions and socially with families and friends. However, our results suggest that certain factors about living in the more cosmopolitan Dubai Emirate generally helps to improve one's English. This suggests that certain environmental factors contribute positively towards one's English proficiency. Finally here, multivariate analysis identified TOEFL scores (therefore English proficiency) as the best predictor of PBL group interaction. This appears to suggest a very strong need for maximizing facilitation of the acquisition of English at an early age for maximal benefit in future educational processes such as PBL. This would support the studies that identify children as having an advantage over adults in acquiring a second language (Oyama 1978; Johnson & Newport 1989).

In our study 34 students (70.8%) had mothers whose educational level was primary school or less. Seventeen (35.4%) actually had mothers who were illiterate and 14 (29.2%) had fathers who were illiterate. However, it is important to realize that UAE is near the top of a list of countries with the highest per capita incomes in the world (Gallagher 1993). Unlike most countries with high illiteracy rates UAE does not experience poverty but is adjusting rapidly to progress and development. The students therefore come from financially well-off families, but for the majority their parents and most of the people in their communities are much less educated than they are. Literature identifies the advantages that a mother's schooling confers on her children's health, as relates to pre-natal care, nutrition, obtaining information on health issues, and generally in empowering women on family and other matters (World Development Report 1993). In our study the mother's education level correlated highly to male students TOEFL scores (0.71) and not to those of the female students. Further, here, where the mother's education was low, students were more likely to identify that they had been discouraged from entering medical school although we cannot identify a causal relationship. The evidence strongly suggests that the more educated the mother is, the more likely will be the support towards schooling of offspring, which later indirectly reflects on the child's proficiency in English. Further, the more proficient the student is in English, the better would be the interaction in PBL groups, especially in giving information. Exactly

why the female students appeared less affected by this situation is not clear.

Finally, 31 students (64.6%) indicated a desire to undertake postgraduate studies in the UK, USA, or Canada. Access to postgraduate studies in these countries generally requires a TOEFL score of at least 550 and is therefore also heavily dependent on a higher level of English language proficiency than our average student attains. The message from our study therefore asks educators to reflect on the medium of instruction in medical education and training. Where English is a second language, strategies like PBL help to identify students with a variety of English proficiency problems early in the medical curriculum. Appropriate measures need to be locally investigated for providing counsel, not only to the students in training but also to recruitment policies and pre-university educational establishments. Our study reinforces the need to not forget the crucial role indirectly played by family and the social setting in facilitating language development, in our case development of English language within the UAE Arabic environment.

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SUMMARY AND CONCLUSION

At the United Arab Emirates (UAE) University, Faculty of Medicine and Health Sciences (FMHS), a new medical school only a decade old, a major question was why it was necessary to introduce change into the medical curriculum? The defined change would be in the form of Problem-based learning (PBL). Within the study PBL is both a tool for change and a tool to help identify curricula concerns against maintaining the status quo. PBL is offered not as a substitute for traditional education but complimentary to it.

From the grass roots there were suggestions in the FMHS, that PBL had worked and would work in Canada, the USA, Australia, the Netherlands but not in the Middle East, (Das, Murdoch, & Mpofu, 1995). Anecdotal evidence suggested that faculty staff felt students at the FMHS were not ready to be given the responsibility for their own learning. The climate was thick with doubt as to the ability of the FMHS students to use PBL. Doubts existed as to whether PBL as a teaching and learning method was worth considering. On the other hand the policy makers had an idealistic perception of what medical education at the FMHS could be like. In theory only, the FMHS identified PBL, the promotion of self and active learning as some of its key curriculum principles. Given this background, it was necessary to cautiously introduce change. Therefore, at the FMHS, UAE University PBL was first introduced into the first year medical curriculum in the Introduction to Medicine Module (ITMM).

The studies conducted focused on the monitoring of, review of, and continued dialogue created by the innovation. The issues addressed in the studies, were as follows:

1. Could PBL be an appropriate learning method for UAE Arabic students?
2. Were students able to use PBL as intended ?
3. What were the merits of introducing a new PBL programme at FMHS?
4. Were PBL concepts comprehensible to tutors, and students ?
5. How did the students perceive working as a group in PBL, when they had no experience of group learning?
6. PBL uses post session evaluation by participants, how useful was self-evaluation to students and how was self-evaluation perceived by both students and tutors?
7. Did proficiency with English affect students interaction in groups?

Chapter 2, dealt with item two and starts to throw some light on item one. Chapter 3 dealt with items three and four. Chapter 4 dealt with item six. Chapter 5 dealt with item three and five. Finally chapter 6 dealt with items seven, and provided more information in relation to items one and three. First year medical students during the Introduction to Medicine Module (ITMM) were randomly assigned to groups and not allowed to change PBL groups for the duration of the ITMM, which was one academic year. Male students and female students were taught separately for cultural and religious reasons.

Problem effectiveness, and appropriateness of PBL as a learning method

The focus in chapter 2 therefore, was demonstrating that, given a locally oriented problem, UAE students could comprehensively identify learning issues related to the theme objectives. Demonstrating that our FMHS students could use PBL to direct themselves towards learning issues that would possibly guide their self-study, was a fundamental necessity. This would be assessed by the degree of congruence between staff objectives and student-generated learning activities. Over one academic year in the ITMM, learning issues were collected from each of six PBL themes. Each theme had four PBL sessions. Learning issues were categorised into the following five headings; biological, behavioural, population, ethical, and critical appraisal. Having five headings to be addressed created room for a large number of learning issues to be identified. Following analysis of learning issues per category students narrowed it down to main objectives/ learning goals in each respective category. However, experts were offered the initial collection of learning issues identified.

Experts to judge the degree of congruence between staff objectives and student-generated learning issues were chosen from well respected senior clinicians and faculty staff. These experts worked independently, and were not involved in any way in the module teaching. In order to reduce subjectivity, in the assessment of congruence of student-generated learning issues to staff objectives by experts, the study had two experts undertake the exercise independently. Kappa coefficients assessed the reliability of the responses by experts, the resultant range of 0.49 to 0.82 indicated a moderate to substantial level of agreement.

There was 100% concordance of learning issues to theme objectives for four out of six PBL themes. For all the groups the degree of concordance between learning issues and theme objectives varied from 55% to 100% (average 91.4%). For the remaining two themes, which were also the first two themes students were exposed to, the percentage of overlap in the theme Health Care System (HCS) ranged from 55% to 85% (average 76.25%) and for the theme Environmental and Health (EVH) the percentage of overlap was judged to be 73% to 94% (average 87.25%). No objective was judged as totally missed out by any student group, although within HCS and EVH certain objectives received superficial attention. The results demonstrated that our UAE, FMHS students were able to identify learning issues that related to faculty objectives.

As 100% concordance of staff objectives to student generated learning issues was evident only in the last four PBL themes. It was concluded that the possible superficiality in the addressing of the objectives at the beginning of the PBL experience was a sign of students' and tutors' in-experience with PBL. Alternatively the problem triggers may have been of poor quality.

Certain concerns were highlighted in relation to the study: 1) Eight of the twelve experts felt there were too many learning issues being identified especially in the biological and population categories. Fewer learning issues were identified in the other three PBL categories. 2) For the theme on HCS, 12.5% of the learning issues identified as having no relationship to theme objectives by experts were further judged as totally irrelevant to the theme objectives. The same was true of 3% of the learning issues in EVH. The question here was why were students identifying so many learning

issues? Was this related to the quality of problems presented which were in turn constructed from given faculty objectives? Staff development exercises were initiated by the Medical Education Department, in response to the identified concerns relating to the quality of theme objectives and the quality of problem triggers used. The quality and effectiveness of the Introduction to Medicine module objectives was under question. If theme objectives affected problem triggers constructed from them, therefore the quality of problem triggers used in the ITMM would also need attention.

On the other hand, the FMHS students, had a tendency to identify more learning issues related to the biological /physiological, and population aspects of the problem triggers and less learning issues on the behavioural, ethical and critical appraisal issues. This echoed findings by Dolmans (1994), where medical students were identified as more interested in issues related to biological and patho/physiological issues, than social and psychological issues. In other words our UAE, FMHS students were demonstrating similar behaviours to medical students in other countries. On the other hand, some tutors suggested that FMHS students may not have understood the meaning of these PBL categories well enough? This suggestion required further investigation. Chapter 3, reviews understanding of the various PBL dimensions by PBL tutors and students.

The study described in chapter two had demonstrated that FMHS students were perfectly able to identify relevant learning issues in PBL. They were able to use PBL as intended by module planners. As far as identifying learning objectives, PBL was a suitable learning method. However, whether learning issues once identified would lead to appropriate learning and exam success would need further investigation.

Comprehensibility of PBL dimensions and the merits of PBL

In chapter 3, the investigators sought to identify the merits of a PBL programme. Further, to review the comprehension of PBL aspects to both students and tutors. Such an investigation was necessary in the light of earlier identified hostility and skepticism regarding PBL at the FMHS. In chapter 2 doubt was expressed as to whether students understood the various PBL dimensions.

A questionnaire published by Majoor, Schmidt, Snellen-Ballendog, Moust, Stalenhoef-Halling, (1990) was adapted for the exercise. The questionnaire used a five point Likert scale ranging from full agreement to full disagreement. The questionnaire dealt with; a) how well PBL dimensions were understood by students, from the perspectives of both students and tutors, b) tutors opinions on students and PBL were offered as additional questions, c) other additional questions on students and PBL were offered to the students. Eleven questions on the questionnaire were common to both PBL tutors and PBL students.

Tutor responses, progressed from least consensus in the first PBL theme to the greatest consensus in the final PBL theme. Student responses on the other hand, were more varied from one theme to another. The greatest consensus with the students was in the very first PBL theme, Health Care system (standard deviation 3.40). The least consensus was with the second theme Alternative and Islamic medicine, (standard deviation 6.29). In respect of the various PBL dimensions to the astonishment of the tutors, the students' conservative Moslem background did not inhibit their handling of

ethical and other perspectives of issues on “drug abuse” or “abortion”, pertaining to the theme Alternative and Islamic Medicine. The PBL area students had problems understanding was the concept of “critical appraisal”. Some tutors, themselves, lacked current supportive research knowledge on aspects related to the theme under study and also to the concept of critical appraisal itself. The exercise highlighted to the students a gap in locally-based research on a variety of topics, simultaneously exposing some tutors’ lack of current research knowledge in specific areas. From the students perspective, the major concern identified in the study was that in all the five PBL themes some aspects of the curriculum may not have been covered. Our study had identified concerns reported in other studies, other studies reported that an inability to identify knowledge deficiencies is a phenomenon that PBL students elsewhere have also found uncomfortable (Woodward & Ferrier 1982). Further, in our study students’ commented about their unfamiliarity to working in groups. The study results indicated significant differences in responses to the questionnaire between tutors and students only in the first theme, Health Care System ($p < 0.003$).

Half of the tutors concern was that students had not searched for relevant reading material, this was suggested for some students as related to low English proficiency. Open ended comments by students themselves echoed concerns about English as a communication barrier in group situations. English language proficiency and participation in PBL groups was therefore subjected to a more in depth investigation, discussed in Chapter 6.

The study demonstrated that the students sufficiently understood PBL dimensions except for critical appraisal. The concern with knowledge deficiencies was not unique to UAE, FMHS students only. The issue of “critical appraisal” was an issue to be addressed for the benefit of both tutors and students. Concern by tutors with aspects of English was an area for future investigation and is addressed in Chapter six. The students identified a lack of current and local research material on a variety of areas. This was and is a very important issue, requiring commitment, support and direction for UAE based medical and health related research, from not only the FMHS, but also the UAE business world, private agencies and the UAE government itself.

Self and tutor evaluations in PBL tutorials

Self, peer and tutor evaluations are an integral part of the PBL tutorial process. Anecdotal evidence at the FMHS identified this as an area of high anxiety amongst the PBL participants, both tutors and students. Reports on experiences related to self-evaluation in PBL are scanty in the literature. Considering the regularity and importance of self evaluation in PBL this was a very important area to investigate. The aim of this study was to identify differences between self and tutor evaluation of students’ performances during PBL tutorials. Further, to highlight students’ views on self-evaluation and compare evaluation results to achievement at the end of the year.

The study used a form adopted from Rangachari and Crankshaw (1992). Fifteen items on the form represented five subscores, namely: responsibility, information processing, communication, critical analysis, self awareness. Each item was rated from 1 to 5, from disagree to agree. Each form further required highlighting of an overall

score and comments on usefulness or otherwise of self evaluation in PBL. Data was collected over 5 PBL themes for two academic years.

The results showed that over the two years, comparing self and tutor evaluations, statistically significant differences were present only for the categories of responsibility in 1994 and self-awareness in 1995. The identified reasonable congruence in self evaluation scores between students and tutors, highlighted awareness by students of their strengths and weaknesses. Further, this demonstrated that in most areas students' self evaluation in PBL was as stringent as that by tutors. The students overall ratings of their performance significantly correlated to all of the subscores ($p < 0.001$). Tutors overall ratings of students was not correlated with the students overall ratings except for responsibility.

Eighty per cent of students and 70% of tutors felt the exercise of scoring self and comparing self-evaluation with tutor evaluation was beneficial, as it not only clarified PBL objectives, but, helped to clarify PBL assessment aspects, and the role of the student. However, the process of form filling was indicated as too time consuming and students were opposed to using self evaluation for summative purposes. In our study, students' self-evaluation scores were fairly high from the beginning, demonstrating a high degree of self confidence. Other studies like Rezler (1989) and Wooliscroft, TenHaken & Calhoun (1993) found that self-evaluation scores increased as the students progressed over a period of time. Further, in our study, overall evaluation were significantly high for male students than for female students ($p < 0.0001$), this was interpreted as due to different gender approaches to evaluative achievement situations. As for written exams at the end of the year using Modified Essay Questions (MEQs), there was no significant correlation between student achievement scores and self or tutor evaluation scores, for all subscores and for overall scores. MEQs were viewed as requiring other skills like a good command of English language. The relationship between English language and participation in PBL groups would be investigated in more depth in chapter 6. In our study, high achievers did not identify themselves, and self-evaluation of high and low achievers were similar. This was in contrast to findings by Boud and Falchikov (1989), who found that high-achieving students tend to underestimate their performance and low-achieving students overestimate.

The study had clearly showed that the students were not only able to demonstrate responsibility in adopting to self-evaluation as part of PBL, but were able to assess their abilities in concordance with the tutors. The sharing of assessment reports was identified as helpful in developing the students' skills of self-analysis and critical appraisal, important for their future professions as doctors. For the tutors, the exercise facilitated their opportunity to identify and help students with low confidence and those who were over confident. Although students had previously only experienced traditional educational models which were authoritarian and teacher centred, new approaches to learning like PBL, were facilitating development of a sense of life-long learning, self- and peer appraisal, which were so important to the long-term profession of doctors. Future investigations were indicated in the areas of PBL and English, also in the areas of self-evaluation and critical appraisal following graduation from medical school.

Perceptions of Group functioning in Problem-Based Learning

PBL takes place in small groups, of 6-8 students. Studies dedicated to the development of group-related skills are needed as most published studies limit themselves to the development of cognitive skills. In situations like our UAE, FMHS experience, where previous exposure to working in groups is limited, for the first year medical students, investigating group dynamics is important. In study 2 (Chapter 3) the findings suggested a need for reviewing group functioning within PBL small groups.

The aim of this particular study was to investigate views of students and tutors on group dynamics, during PBL group sessions. The issues addressed were as follows: what were the most important and least important dimensions of group dynamics by students and tutors in PBL groups? Further, what were the differing perceptions of group dynamics by students from the first to the last PBL theme, and how did male students and female students differ in their views on group functioning?

Students received PBL orientation, were introduced to the principles of group learning, reviewed the roles of group members, group rules and effective group functioning. They then worked through the various PBL triggers from one theme to another by using the PBL process adopted at UAE University as described in Das, Murdoch & Mpofu, (1995). On completion of each theme students completed a group dynamics survey form. Tutors completed a similar open ended questionnaire. The survey form used was adapted from Tipping, Freeman, & Rachlis, (1995). The eight major categories for review were; physical climate, emotional climate, involvement, interaction, cohesion, productivity, the student as group leader, and the tutor as facilitator.

The results demonstrated that aspects related to physical climate, were of least importance to the students, yet more than 70% of tutors considered physical climate as very important. Too large rooms, unsuitable room lighting, unsuitable air conditioning were very important issues for tutors. Tutors were also less tolerant to seats needing re-arranging prior to sessions, students arriving late for PBL sessions and other disturbances caused by students.

Reviewing group dynamics perceptions, the PBL students preferred to ignore deviance within groups rather than confront a colleague for: not doing their homework, or dominating the group, or repeatedly being late for sessions. Having a powerful individual or subgroups being powerful in a group was highlighted as of no consequence to the group members. By contrast expatriate tutors found students' reluctance to confront deviance within groups, difficult to accept. A faculty-student difference in how to handle these behaviours was indicated. Faculty had their own preconceived ideas as to what was important for harmonious group functioning, while the students had totally differing opinions. The findings highlighted a need to clarify from the outset issues related to: being late to sessions and absenteeism. This is important as in the UAE, arriving half an hour late for an arranged appointment is culturally acceptable.

Not only during the first theme HCS, but for succeeding themes too, group interaction aspects such as communication and listening remained as very important issues for students. The possible reasons for difficulties in aspects related to

communication are complex. Communicating easily in a second language, English, which is only experienced in classroom settings has its difficulties. Where the culture promotes female interaction mainly with females only, and on commencement of medical education and training, being expected to contribute freely in a group where the tutors may not only be expatriates but also male, requires some complex personal adjustment, for the female students. Developing skills in "turn taking" and "listening" to each others contributions was identified as important, but not always practiced by group members. Communication concerns identified in our study, echoed findings by Harrison, Glasgow & Townsend, (1996), Swadi (1997), suggesting a need perhaps for a communication and social skills training course parallel to PBL and running through out the seven year medical curriculum. In the Skills laboratory at Maastricht Medical school, a communication skills training programme is run from years one to year six, with a gradual increase of complexity in skills the students are exposed to and a gradual increase of complexity in practice situations, Van Dalen, Zuidweg & Collet, (1989).

Finally, in the present study, concerns relating to the role of student leader versus teacher's role as tutor in PBL groups was identified. This area would require in depth investigation in the future. In over 50% of questionnaire items gender differences were evident ($p < 0.0001$). Female students were focusing on learning and outcomes, whereas the male students desired opportunity to individually participate within their groups. These differences were indicated as culturally related echoing previous reports by Gallagher (1993).

The study demonstrates the polarity in faculty versus student interpretation of important issues around group dynamics. It echoes previous findings on the importance of developing the areas of communication skills for the students. It is entirely intended to be descriptive and succeeds in demonstrating how attitudes and previous experiences can influence PBL group functioning. From the students perspective the study suggests that perception of how a group functions can be influenced by cultural experiences and expectations. Innovative educational methodologies like PBL, unlike traditional education, help to highlight the expectations of not only the students but the tutors too. Where PBL tutors and students differ in cultural backgrounds it is not only the students who are 'learning to learn' in small PBL groups, but PBL tutors benefit from the experience by learning more about their very own male and female students.

Facility with the English Language and PBL group interaction

This study described in chapter 6 aimed at addressing the issue of English language proficiency and interaction within PBL groups. Further, it attempted to review factors that influence English language proficiency and identified whether these factors also influence PBL group contributions. In previous chapters 3,4 and 5 a variety of issues were highlighted that pointed to concerns from medical students and/or faculty staff at deficiencies in English language being a barrier to student participation, interaction, general communication in PBL. It was important to try and investigate the area of English language proficiency more extensively, and try to demonstrate whether PBL was a suitable learning method for UAE Arabic students.

A major gap identified in literature in relation to proficiency in English of persons whose primary language is different, was that most studies published were undertaken in western countries, where the study group were foreign students or immigrants, resident in a country other than their country of origin. The present study was undertaken in an English medium medical school, where all students are Arabic who studied English as a second language in their own country. The findings would therefore have tremendous importance both locally and internationally.

At the commencement of the Preparatory year, newly recruited medical students were given the Test of English as a Foreign Language (TOEFL), and a questionnaire used for surveying of new medical students. The TOEFL test measures listening comprehension, structure and written expression, vocabulary and grammar. Using an Interaction Process Analysis, the study groups were observed during PBL sessions. The Interaction Process Analysis was based on Bales Interaction Process Analysis (IPA) developed in the 1950s (Bales 1950). The code categories and scoring systems emphasized basic units of interaction. Adapted IPA data was collected from tutor(s), student leader, scribe and group members for the categories: "Asks"; "Gives"; "Elaborates English"; "Seeks clarification of English", "Arabic" and "Total" over four out of five PBL themes.

The mean Total TOEFL scores for the female groups were markedly higher ($x = 468.20$; $SD\ 42.37$) than for the male groups ($x = 439.96$; $SD\ 69.20$). However, the difference was not significant. The results demonstrated that for female students the lower their TOEFL scores the less likely they were to ask or give information. In the male groups this was not the case. For both males and females giving of information was highly correlated with their TOEFL score (range of $r = 0.67$ to 0.74). Thus 'giving information' was mainly explaining phenomena, clarifying issues. Male students were less inhibited at asking questions regardless of their TOEFL scores. Female students with lower TOEFL scores, asked fewer questions. Perhaps they perceived their lower English language ability as their private problem not to be exposed in group sessions. *Being restricted by the English language in PBL groups therefore, meant that participation was limited for those respective students.*

Female students were further identified as speaking and practicing using English during PBL sessions. The males reverted to Arabic to clarify terms. The males students were five times more likely to use Arabic and this was highly significant, $p < 0.001$. Male students were also noted as less likely to correct others English spelling and grammar. An interesting future question might be, whether English proficiency as measured by the TOEFL test improves for male students and female students over the undergraduate education and training period?

Years of studying in English were not predictive of TOEFL scores due to the great variation in English instruction from one school to another. Mother's educational level was predictive of TOEFL scores and highly significant for the male students ($p < 0.01$). Father's education level was not predictive nor correlated to male or female students' TOEFL scores. Where mother's education was low, students were more likely to identify that they had been discouraged from entering medical school. Multivariate analysis identified TOEFL scores (therefore English proficiency) as the best predictor of PBL group interaction.

In our study, English proficiency was therefore demonstrated as affecting students in giving of information in PBL groups. An important and follow-on question might be, what is the effect of English proficiency on examination success? PBL in this study was therefore highlighted as a learning method which helped to identify concerns in students ability with the second language, the main medium of instruction. These students would therefore be directed for appropriate counsel early in their medical education and training. From this perspective, PBL had demonstrated its worth and facilitation in highlighting where help was urgently necessary with English Language aspects for respective first year medical students. Yet again this final study highlights how new approaches to learning like PBL, were facilitating clearer identification of gaps within the authoritarian and more teacher centred educational system, simultaneously, highlighting the need for further investigations around PBL.

Conclusion and Recommendations

The studies identified in chapters 2 to 6, answer all the questions and issues raised about the innovation. There is identification of how appropriate, worthwhile and ready not only the students but the FMHS is to embrace 'learning to learn' using PBL. In addressing the questions highlighted, a lot of other issues are identified.

From the perspective of the faculty staff, PBL initiated big staff development exercises relating to clearer module objectives and later construction of more effective problems. In working towards an effective PBL programme, the greatest work from faculty appears to be in well thought out and structured ground work. It appears there has to be a vision of the whole picture by cohesive teams bringing in expertise from their respective disciplines, before breaking it down into smaller pieces of the puzzle. Lack of understanding and lack of current knowledge by faculty staff on areas related to "evidence based medicine" were highlighted. Stereotyped beliefs by FMHS PBL tutors of their students were questioned. PBL staff did not think Moslem students could handle PBL triggers on "abortion" and "drug abuse". Perception of faculty staff versus students views on what was important in group functioning, identified some big differences. These differences it appears were influenced by previous experiences and expectations. In using self-assessment in PBL, students were demonstrated as stringent as tutors, and positively developing professionally oriented skills towards self-analysis. Proficiency in English was identified as restricting students in giving of information in PBL groups. PBL created and continues to create tremendous educational dialogue locally and internationally.

In addressing whether PBL was an appropriate learning method, and whether learning in groups was positively accepted, certain issues were highlighted. The study demonstrated how PBL facilitated students in verbalizing their difficulties with the subject matter which seemed to remain hidden and dormant in the lecture driven curriculum. Communication problems, problems with understanding the language used in explaining the PBL process, English, were identified. Problems with PBL concepts such as critical appraisal were also identified. In general, a greater awareness of students' difficulties was made possible. Some of these issues point to the problems with basic English language. Would raising the level of TOEFL related to FMHS medical student entry be an answer? More importantly raising the standards of English

language instruction and education from primary school level might be of better long term benefits. On the other hand, would introduction of a communication and social interaction module running throughout the medical curriculum be of benefit to those medical students already involved in the FMHS seven year medical education and training curriculum? Repeatedly male versus female differences were identified in a variety of situations, indicated as a reflection of the UAE culture. Paying due respect to the countries culture and religion, what would be the results of mixing the male and female students during the undergraduate education and training period?

This thesis is an attempt to highlight the challenges to students and staff, in the delivery of medical education and training adopting PBL. The major limitation of the study is its broad base. However, in attempting to address issues related to change, this was inevitable. Other limitations are the small number of students who formed the study group, in many respects the study used a convenient sample of participants. On retrospect, data collected over a longer period of time might have been more meaningful. Finally, instruments used for data collection were restrictive in that they were generally modified from other studies. Nevertheless, important findings around student issues, staff issues and communication and English language resulted directly and indirectly from the exercise.

The thesis demonstrates that the process of introducing an innovative approach like PBL in medical education in an institution can never be a carbon copy of another institution's experience. Undertaking research such as this thesis helps create an institutions very own data base.

The thesis in addressing whether PBL was necessary, highlights several fundamental issues that are crucial to the education and training of UAE medical students. The major area highlighted being the use of a second language, English, as the medium of instruction where the students primary language is Arabic. What might be the outcomes of running a comparative programme of PBL in English versus one in Arabic? In other schools where English is a second language for all or nearly all, the medical student cohort, what is the relationship between participation/ interaction in PBL groups and English language proficiency? At the FMHS, what is the relationship between participation in PBL groups, English proficiency and achievement? Does proficiency in English improve over the undergraduate years? Further questions here might be, what effect do PBL tutors have on small group interaction? Do PBL tutors have a positive or negative effect on student outcomes? What effect does having two tutors have per PBL group as opposed to having one tutor?

Finally in working towards the millennium it might be an opportune time to evaluate PBL the FMHS and the present status, from the perspective of firstly the graduate students who experienced PBL; secondly, the faculty staff who act and have acted as PBL tutors, finally the supportive network. Some of the studies already published could be expounded on, where data was collected over a longer period of time to boost the sample size.

Results from the various studies making up the thesis have been fed back into the FMHS educational system, and the various publications continue to stimulate dialogue and influence developmental modifications. PBL, since its inception in 1994, has been slowly introduced into other modules other than the Introduction to Medicine

Module. These modules are: the Behavioural Sciences Module, the Respiratory Module, Clinical Anatomy, Family Medicine clerkship and in 1999 PBL is to be introduced into the Human Sciences Module. Although introduction of the innovation was and still continues to be in segments, as an investigative tool, PBL has unearthed curricula issues that cannot be reburied and forgotten. The thesis has demonstrated the merits of the innovation in exposing concerns that require further research and in the long term further curricula modifications for the benefit of FMHS future physicians. To the FMHS curriculum committee, it would appear that PBL is an educational mode for serious consideration, through out the medical curriculum. This thesis demonstrates the ability of PBL to expose not only students' strengths and weaknesses, but those of the faculty and the educational system. In order for students to gain the best of both worlds, it would appear that the presently more dominant authoritarian and teacher centred curriculum, could be more heavily revised and reduced. With the necessary attention to resources and manpower, the result would be a curriculum that had a strong PBL base, complimented by an appropriate lecture component.

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SAMENVATTING

De Faculteit Geneeskunde en Gezondheidswetenschappen (FGG) van de Universiteit van de Verenigde Arabische Emiraten (V.A.E.), een nieuwe opleiding geneeskunde die pas tien jaar bestaat, werd geconfronteerd met de belangrijke vraag waarom het nodig was om veranderingen door te voeren in het curriculum voor geneeskunde. De omschreven veranderingen betroffen de invoering van Probleemgestuurd Onderwijs (PGO). Binnen het onderzoek is PGO zowel een hulpmiddel bij veranderingen, als een hulpmiddel bij het identificeren van curriculum-problemen bij handhaving van de status quo. PGO wordt niet aangeboden als een vervanging van traditioneel onderwijs, maar als een aanvulling.

Meteen vanaf het begin werd er binnen de FGG geopperd dat PGO wel in Canada, de Verenigde Staten, Australië en Nederland kon functioneren, maar niet in het Midden-Oosten (Das, Murdoch & Mpofu, 1995). Anekdotisch bewijs wees erop dat de faculteitsmedewerkers vonden dat de studenten van de FGG nog niet zo ver waren dat ze zelf de verantwoordelijkheid voor hun eigen onderwijs konden dragen. Er bestond grote twijfel over de vraag of de studenten van de FGG in staat waren om met PGO om te gaan. Men vroeg zich af of het wel zin had om PGO als onderwijs- en leermethode te overwegen. Aan de andere kant hadden de beleidsmakers een idealistisch beeld van hoe het medisch onderwijs aan de FGG zou kunnen zijn. De FGG beschouwde PGO - de bevordering van zelfstudie en actief leren - alleen in theorie als een van de grondbeginselen van het curriculum. Gezien deze achtergrond was het nodig om veranderingen omzichtig door te voeren. Daarom werd aan de FGG van de Universiteit van de V.A.E. PGO voor het eerst geïntroduceerd in het eerste jaar van het curriculum geneeskunde in de Module Inleiding in de Geneeskunde (MIG).

Het gedane onderzoek richtte zich op het bestuderen en bespreken van de vernieuwingen, en op de continue dialoog die door de vernieuwingen op gang was gebracht. De vragen die in het onderzoek werden belicht, waren de volgende:

1. Zou PGO een geschikte leermethode kunnen zijn voor Arabische studenten in de V.A.E.?
2. Waren studenten in staat om PGO op de juiste wijze toe te passen?
3. Wat waren de verdiensten van de introductie van een nieuw PGO-programma aan de FGG?
4. Was het concept PGO gemakkelijk te begrijpen voor zowel de tutors als de studenten?
5. Hoe ervoeren de studenten het werken in een groep in PGO zonder enige ervaring te hebben met het leren in groepen?
6. PGO maakt gebruik van evaluatie van de bijeenkomst door de deelnemers. Hoe nuttig was zelfevaluatie voor studenten en hoe ervoeren de studenten zowel als de tutors de zelfevaluatie?
7. Had de mate waarin de studenten het Engels beheersten invloed op de interactie in de groepen?

Hoofdstuk 2 gaat over punt twee en werpt licht op punt één. Hoofdstuk 3 behandelt de punten drie en vier. In hoofdstuk 4 wordt punt zes besproken. Hoofdstuk 5 gaat over punt drie en punt vijf. Het laatste hoofdstuk - hoofdstuk 6 - belicht punt zeven en bevat aanvullende informatie over punt één en drie.

Eerstejaarsstudenten geneeskunde werden tijdens de Module Inleiding tot de Geneeskunde (MIG) willekeurig in groepen verdeeld. De samenstelling van de groepen moest voor de hele duur van de MIG (het hele academische jaar) ongewijzigd blijven. Mannelijk en vrouwelijk studenten kregen om culturele en religieuze redenen gescheiden onderwijs.

Effectiviteit van de taken en geschiktheid van PGO als leermethode

In hoofdstuk 2 poogden de onderzoekers aan te tonen dat, gegeven een herkenbaar probleem, studenten in de V.A.E. leerdoelen gerelateerd aan de themadoelstellingen

ruimschoots konden identificeren. Het was een fundamentele noodzaak om te bewijzen dat de studenten van de FGG zich met behulp van PGO konden wijden aan leerdoelen die mogelijk richting zouden geven aan hun zelfstudie. Dit zou beoordeeld worden aan de hand van de mate van overeenstemming tussen de doelstellingen van de tutores en de door de studenten ontwikkelde leeractiviteiten. Gedurende één studiejaar werden er tijdens de MIG leerdoelen verzameld uit elk van de zes PGO-thema's. Elk thema besloeg vier PGO-bijeenkomsten. Leerdoelen werden ingedeeld bij een van de volgende vijf categorieën; biologie, gedrag, bevolking, ethiek en kritische evaluatie. Het feit dat er vijf categorieën aangesproken konden worden, gaf ruimte aan het identificeren van een groot aantal leerdoelen. Na een analyse van de leerdoelen per categorie beperkten de studenten zich tot de voornaamste doelstellingen/leerdoelen van elk van de vijf categorieën. Deskundigen kregen echter de beschikking over de in eerste instantie verzamelde gegevens omtrent de geïdentificeerde leerdoelen.

De deskundigen die de mate van overeenstemming tussen de doelstellingen van de tutores en de door de studenten ontwikkelde leerdoelen moesten beoordelen, waren gerespecteerde en ervaren kliniekartsen en faculteitsmedewerkers. Deze deskundigen werkten zelfstandig en waren op geen enkele wijze betrokken bij het onderwijs. Om de subjectiviteit bij het vaststellen van bovengenoemde overeenstemming door de deskundigen te beperken, werd tijdens het onderzoek de toetsing ook door twee onafhankelijke deskundigen uitgevoerd. Met behulp van Kappa-coëfficiënten werd de mate van overeenstemming tussen de antwoorden van de deskundigen bepaald. De resulterende verdeling van 0,49 tot 0,82 wijst op een gemiddeld tot substantieel niveau van overeenstemming.

Voor vier van de zes PGO-thema's was er een overeenstemming van 100% tussen de leerdoelen en de themadoelstellingen. Bij alle groepen varieerde de mate van overeenstemming tussen leerdoelen en themadoelstellingen van 55% tot 100% (91,4% gemiddeld). Voor de overige twee thema's, welke ook de twee thema's waren waarmee de studenten als eerste kennismakten, varieerde het overlappingspercentage bij het thema Gezondheidszorgsysteem van 55% tot 85% (76,25% gemiddeld) en bij het thema Omgeving en Gezondheid was het overlappingspercentage volgens de beoordeling 73% tot 94% (87,25% gemiddeld). Er waren geen doelstellingen die volgens de groepen totaal niet aan bod waren gekomen, hoewel aan sommige doelstellingen binnen Gezondheidszorgsysteem en Omgeving en Gezondheid slechts oppervlakkig aandacht was besteed. De resultaten toonden aan dat de studenten van de FGG van de Universiteit van de V.A.E. in staat waren om leerdoelen te identificeren die betrekking hadden op de doelstellingen van de faculteit.

Alleen bij de laatste vier PGO-thema's was er 100% overeenstemming tussen de doelstellingen van de tutores en de door de studenten ontwikkelde leerdoelen. Daaruit werd geconcludeerd dat de mogelijke oppervlakkigheid bij het behandelen van de doelstellingen aan het begin van de PGO-ervaring het gevolg was van het feit dat de studenten en tutores geen ervaring hadden met PGO. Aan de andere kant zou het kunnen dat de taken van matige kwaliteit waren.

Een aantal aandachtspunten werd naar aanleiding van het onderzoek naar voren gebracht.

- 1) Acht van de twaalf deskundigen vonden dat er te veel leerdoelen geïdentificeerd werden, vooral in de categorieën biologie en bevolking. In de overige drie PGO-categorieën werden minder leerdoelen geïdentificeerd.
- 2) Bij het thema Gezondheidszorgsysteem werd 12,5% van de leerdoelen die volgens de deskundigen geen verband hielden met de themadoelstellingen, gezien als totaal irrelevant voor de themadoelstellingen.

Hetzelfde gold voor 3% van de leerdoelen in Omgeving en Gezondheid. De vraag was waarom de studenten zo veel leerdoelen identificeerden. Hield dit verband met de kwaliteit van de taken, hoewel deze waren samengesteld op basis van de doelstellingen van de faculteit? De afdeling Medisch Onderwijs startte ontwikkelingstrainingen voor de faculteitsmedewerkers naar aanleiding van de genoemde twijfels omtrent de kwaliteit van de themadoelstellingen en de kwaliteit van de taken. Er werden vraagekens gezet bij de kwaliteit en de effectiviteit van de doelstellingen van de Module Inleiding tot de

Geneeskunde. Als themadoelstellingen invloed hadden op de taken die op die doelstellingen waren gebaseerd, dan zou de kwaliteit van de taken die in MIG werden gebruikt ook nader bekeken moeten worden.

Aan de andere kant hadden de studenten van de FGG de neiging om meer leerdoelen te identificeren die verband hielden met de biologische/fysiologische kant en de bevolkingsaspecten van de taken, en minder leerdoelen die verband hielden met ethische en gedragsmatige kwesties en kritische evaluatie. Dit weerspiegelde bevindingen van Dolmans (1994), waaruit bleek dat geneeskundestudenten meer geïnteresseerd waren in biologische en pathofysiologische leerdoelen, dan in sociale en psychologische doelen. Met andere woorden, de studenten van de FGG van de Universiteit van de V.A.E. vertoonden gelijksoortig gedrag als studenten geneeskunde in andere landen. Aan de andere kant waren er tutoren die opmerkten dat studenten van de FGG de betekenis van deze PGO-categorieën wellicht niet voldoende hadden begrepen. Deze mogelijkheid moest verder onderzocht worden. In hoofdstuk 3 wordt het inzicht van tutoren en studenten in de diverse PGO-dimensies besproken.

Het onderzoek dat in hoofdstuk 2 wordt beschreven had aangetoond dat studenten van de FGG heel goed in staat waren om de relevante leerdoelen te identificeren. Ze waren in staat om PGO op de door de moduleplanningsgroep bedoelde wijze toe te passen. Wat het identificeren van leerdoelen betreft, was PGO een geschikte leermethode. Maar of leerdoelen na identificatie tot het juiste leer- en examensucces zouden leiden, zou nader onderzocht moeten worden.

Begrijpelijkheid van PGO-dimensies en de verdienste van PGO

In hoofdstuk 3 probeerden de onderzoekers de verdiensten van een PGO-programma te identificeren. Verder werd bekeken in hoeverre de diverse aspecten van PGO door zowel studenten als tutoren begrepen werden. Een dergelijk onderzoek was nodig gezien de eerder vastgestelde tegenstand en scepsis omtrent PGO aan de FGG. In hoofdstuk 2 werd twijfel geuit over de vraag in hoeverre studenten de diverse PGO-dimensies begrepen.

Een vragenlijst die was opgezet door Majoor, Schmidt, Snellen-Balendong, Moust, Stalenhoef-Halling (1990) werd aangepast voor het onderzoek. De vragenlijst maakte gebruik van een vijfpunts-Likert-schaal verlopend van volledig mee eens tot volledig mee oneens. De vragenlijst behandelde het volgende; de mate waarin PGO-dimensies door studenten werden begrepen, vanuit het gezichtspunt van zowel studenten als tutoren, de meningen van de tutoren over studenten en PGO (in aanvullende vragen voor tutoren), vragen over studenten en PGO (aanvullende vragen voor studenten). Elf vragen van de vragenlijst werden zowel aan de PGO-tutoren als aan de PGO-studenten gesteld.

De antwoorden van de tutoren liepen op van nauwelijks enige consensus in het eerste PGO-thema tot de grootste mogelijke consensus in het laatste PGO-thema. De antwoorden van de studenten, daarentegen, varieerden meer per thema. De grootste consensus bij de studenten was in het eerste PGO-thema, Gezondheidszorgsysteem (standaarddeviatie 3,40). De minste consensus was er in het tweede thema Alternatieve en Islamitische Geneeskunde (standaarddeviatie 6,29). Wat de diverse PGO-dimensies betrof, waren de tutoren verbaasd dat de conservatieve Islamitische achtergrond van de studenten geen belemmering was voor het behandelen van ethische en andere perspectieven van leerdoelen op het gebied van drugsmisbruik of abortus, die betrekking hadden op het thema Alternatieve en Islamitische Geneeskunde. Het PGO-gebied dat studenten moeilijk vonden om te begrijpen, was het concept kritische evaluatie. Sommige tutoren ontbrak het aan recente ondersteunende onderzoekskennis over aspecten van het te bestuderen thema, en ook over het concept kritische evaluatie zelf. Het onderzoek wees de studenten op een leemte in plaatselijk onderzoek op een groot aantal gebieden, en vestigde tegelijkertijd de aandacht op het feit dat het sommige tutoren ontbrak aan recente onderzoekskennis op specifieke gebieden. Het meest verontrustende - vanuit het gezichtspunt van de studenten - dat uit het onderzoek naar voren kwam, was dat binnen elk van de vijf PGO-thema's enkele aspecten van het curriculum wellicht niet waren behandeld. Ons onderzoek had bezwaren

geïdentificeerd die in andere onderzoeken waren gerapporteerd. Ander onderzoeken gaven aan dat het onvermogen om leemten in kennis aan te wijzen een verschijnsel is dat PGO-studenten in andere delen van de wereld eveneens verontrustend vonden (Woodward & Ferrier, 1982). Verder lieten studenten in ons onderzoek blijken dat ze geen ervaring hadden met het werken in groepen. De onderzoeksresultaten gaven alleen in het eerste thema - Gezondheidszorgsysteem - significante verschillen aan tussen de antwoorden van de tutoren en de studenten ($p < 0,003$).

De helft van de tutoren betwijfelden of de studenten wel naar relevante literatuur hadden gezocht. Er werd aangegeven dat dit bij sommige studenten verband hield met hun beperkte beheersing van het Engels. Opmerkingen van de studenten in antwoord op open vragen weerspiegelden hun vrees dat het Engels een belemmering zou zijn bij communicatie in groepssituaties. De beheersing van het Engels in combinatie met actief bijdragen aan PGO-groepen werd daarom aan nader onderzoek onderworpen. Dit wordt besproken in hoofdstuk 6.

Het onderzoek toonde aan dat de studenten de PGO-dimensies voldoende begrepen, met uitzondering van de categorie kritische evaluatie. De bezorgdheid om leemten in de kennis was niet iets wat alleen bij studenten van de FGG van de Universiteit van de V.A.E. voorkwam. De kritische evaluatie was een kwestie die aangepakt moest worden ten behoeve van zowel tutoren als studenten. De bezorgdheid bij de tutoren over bepaalde aspecten van het gebruik van de Engelse taal was een kwestie die nader onderzoek verdiende en dit komt in hoofdstuk 6 aan bod. De studenten gaven aan dat er een gebrek was aan recent en plaatselijk onderzoeksmateriaal op een groot aantal gebieden. Dit was en is een belangrijk vraagstuk. Het vereist de betrokkenheid bij en steun voor onderzoek in de V.A.E. op het gebied van geneeskunde en gezondheidszorg, niet alleen van de FGG, maar ook van het bedrijfsleven, van particuliere instellingen en van de overheid van de V.A.E. zelf.

Zelfevaluaties en tutorevaluaties bij onderwijsgroepsbijeenkomsten in PGO

Zelfevaluaties en tutorevaluaties zijn een integraal deel van de onderwijsgroepsbijeenkomsten binnen het PGO-proces. Anekdotisch bewijs aan de FGG gaf aan dat dit een gebied is dat veel spanningen teweegbrengt bij de deelnemers aan het PGO, zowel bij tutoren als bij studenten. In de literatuur zijn gegevens over ervaringen met zelfevaluatie in PGO schaars. Aangezien zelfevaluatie in PGO een belangrijke en regelmatig voorkomende gebeurtenis is, was dit een belangrijk gebied om nader te onderzoeken. Het doel van dit onderzoek was het vaststellen van verschillen tussen zelf- en tutorevaluatie van de studieresultaten tijdens onderwijsgroepsbijeenkomsten binnen PGO. Verder werden de meningen van de studenten over zelfevaluatie belicht, en werden de resultaten van de evaluatie vergeleken met de studieresultaten aan het eind van het jaar.

Tijdens het onderzoek werd gebruik gemaakt van een formulier dat van Rangachari en Crankshaw (1992) was overgenomen. Vijftien punten op het formulier vertegenwoordigden één van de vijf volgende categorieën: verantwoordelijkheid, informatieverwerking, communicatie, kritische analyse en zelfbewustzijn. Aan elk punt moest een score van 1 tot 5 gegeven worden, van mee oneens tot mee eens. Verder werd er gevraagd om op het formulier aan te geven wat de totaalbeoordeling was en om te reageren op het nut van zelfevaluatie in PGO. De gegevens werden verzameld tijdens vijf PGO-thema's gedurende twee studiejaar.

De resultaten toonden aan dat er in de twee jaar bij het vergelijken van de zelf- en tutorevaluaties alleen statistisch significante verschillen gevonden werden bij de categorie verantwoordelijkheid in 1994, en bij de categorie zelfbewustzijn in 1995. De zelfevaluatiescores van studenten en die van tutoren vertoonden een redelijke mate van congruentie, wat bewees dat de studenten zich bewust waren van hun sterke en zwakke punten. Verder toonde dit aan dat op de meeste gebieden in PGO de zelfevaluatie van de studenten net zo streng was als die door de tutoren. De totaalscore die de studenten voor hun studieresultaten gaven, had een significant hoge correlatie met alle categorieën ($p < 0,001$). De totaalscore die de tutoren aan hun studenten gaven, vertoonde geen

correlatie met de totaalscore van de studenten, met uitzondering van de categorie verantwoordelijkheid.

Tachtig procent van de studenten en 70% van de tutors vond het uitvoeren van een zelfbeoordeling en een vergelijking van de zelfevaluatie met de tutorevaluatie bevorderlijk, aangezien het niet alleen de PGO-doelstellingen duidelijk maakte, maar ook bepaalde aspecten van de PGO-evaluatie en de rol van de student hielp verduidelijken. Desondanks werd het invullen van formulieren als te tijdrovend ervaren en waren studenten erop tegen dat zelfevaluaties voor summatieve doeleinden werden gebruikt. Tijdens ons onderzoek waren de zelfevaluatiescores van de studenten vanaf het begin tamelijk hoog, wat wees op een hoge mate van zelfvertrouwen. Uit ander onderzoek, zoals dat van Rezler (1989) en Wooliscroft, TenHaken & Calhoun (1993), bleek dat de zelfevaluatiescores toenamen naarmate de studenten zich over een bepaalde periode ontwikkelden. Verder bleek uit ons onderzoek dat de totaalbeoordeling bij mannelijke studenten significant hoger lag dan bij vrouwelijke studenten ($p < 0,0001$). Dit werd geïnterpreteerd als een gevolg van de verschillen tussen de manier waarop mannen en vrouwen situaties omtrent het evalueren van prestaties benaderen. Met betrekking tot de schriftelijke examens in de vorm van Aangepaste Essayvragen (AEV) aan het eind van het jaar was er geen significante correlatie tussen de prestatiescores van de studenten en zelf- of tutorevaluatiescores voor alle categorieën en voor de totaalbeoordeling. Er werd gevonden dat voor de AEV's andere vaardigheden nodig waren, zoals een goede beheersing van het Engels. De relatie tussen de Engelse taal en het actief bijdragen aan PGO-groepen wordt in hoofdstuk 6 nader onderzocht. In ons onderzoek kwamen *high achievers* niet naar voren; de zelfevaluaties van *high* en *low achievers* waren vergelijkbaar. Dit was in tegenspraak met de bevindingen van Boud en Falchikov (1989), die constateerden dat studenten die goed presteerden de neiging hebben om hun prestatie te onderschatten en dat studenten die slecht presteren hun prestatie overschatten.

Het onderzoek had duidelijk aangetoond dat studenten niet alleen in staat waren om verantwoordelijkheid te tonen door het aanvaarden van zelfevaluatie als onderdeel van PGO, maar ook dat ze in staat waren om hun vaardigheden vast te stellen in overeenstemming met hun tutors. Het uitwisselen van evaluatierapporten werd gezien als een hulp bij het ontwikkelen van vaardigheden zoals zelfanalyse en kritische evaluatie bij studenten - belangrijke vaardigheden voor het beroep van arts. Voor tutors was het een kans om vast te stellen welke studenten weinig en welke te veel zelfvertrouwen hadden en om daarop in te spelen. Hoewel de studenten voorheen alleen ervaring hadden met traditionele onderwijsmodellen, die autoritair waren en waarbij de docent centraal stond, vergemakkelijkten nieuwe onderwijsbenaderingen zoals PGO de ontwikkeling van een gevoel van "leren voor het leven," zelfevaluatie en evaluatie door medestudenten, wat op de lange termijn zo belangrijk is voor het beroep van arts. Verder onderzoek op het gebied van PGO en Engels werd gewenst geacht, alsmede op het gebied van zelfevaluatie en kritische evaluatie na het afstuderen.

Inzicht in het functioneren in een groep bij PGO

PGO vindt plaats in kleine groepen van 6-8 studenten. Onderzoek dat gewijd is aan het ontwikkelen van vaardigheden omtrent het functioneren in een groep is noodzakelijk, aangezien de meeste gepubliceerde onderzoeken zich beperken tot de ontwikkeling van cognitieve vaardigheden. In gevallen waarin eerdere ervaring met het werken in groepen beperkt is - zoals aan onze FGG van de Universiteit van de V.A.E. - is het belangrijk voor de eerstejaarsstudenten geneeskunde dat groepsdynamiek wordt bestudeerd. In onderzoek 2 (hoofdstuk 3) gaven de bevindingen aan dat er behoefte was aan het bestuderen van het groepsfunctioneren in kleine onderwijsgroepen.

Het doel van dit tweede onderzoek was het onderzoeken van de meningen van studenten en tutors over de groepsdynamiek tijdens onderwijsgroepsbijeenkomsten. De volgende vraagstukken werden behandeld: wat waren de belangrijkste en wat waren de minst belangrijke dimensies van groepsdynamiek volgens studenten en tutors in onderwijsgroepen? En, wat waren de verschillende visies van studenten op groepsdynamiek van het eerste tot en met het laatste PGO-thema, en op welke manier verschilden de

meningen van de vrouwelijke en de mannelijke studenten met betrekking tot het functioneren van de groep?

De studenten kregen PGO-oriëntatie en maakten kennis met de principes van het leren in groepen, bestudeerden de rollen van groepsleden, groepsregels en het effectief functioneren in groepen. Vervolgens doorliepen ze de "triggers" van de opeenvolgende thema's met behulp van het PGO-proces zoals beschreven in Das, Murdoch & Mpofu (1995) en toegepast aan de Universiteit van de V.A.E. Na afsluiting van elk thema vulden de studenten een vragenformulier met betrekking tot groepsdynamiek in. De tutores vulden een soortgelijk formulier met open vragen in. Het vragenformulier was in aangepaste vorm overgenomen van Tipping, Freeman & Rachlis (1995). De acht voornaamste categorieën die aan bod kwamen waren; fysiek klimaat, emotioneel klimaat, betrokkenheid, interactie, cohesie, productiviteit, de student als groepsleider en de tutor als procesbegeleider.

De resultaten toonden aan dat aspecten die verband hielden met het fysieke klimaat door de studenten het minst belangrijk werden gevonden, maar meer dan 70% van de tutores beschouwde het fysieke klimaat wel als erg belangrijk. Te grote lesruimtes, ondeugdelijke verlichting van die ruimtes en ondeugdelijke airconditioning waren problemen die voor de tutores zwaar wogen. De tutores waren ook minder tolerant ten opzichte van het moeten verplaatsen van meubilair voor aanvang van de bijeenkomst, studenten die te laat op de onderwijsgroepsbijeenkomsten verschenen en ander oponthoud dat door studenten werd veroorzaakt.

Bij het bespreken van de visies op de groepsdynamiek gaven de PGO-studenten er de voorkeur aan om afwijkend gedrag binnen de groepen te negeren, in plaats van hun medestudenten aan te spreken op: het niet doen van hun huiswerk, het domineren van de groep of het herhaaldelijk te laat zijn voor bijeenkomsten. De aanwezigheid in een groep van een overheersend persoon of een dominante subgroep vonden de groepsleden niet bezwaarlijk. De buitenlandse tutores, daarentegen, vonden de onwilligheid van de studenten om afwijkend gedrag binnen de groep aan de kaak te stellen moeilijk te accepteren. Uit het onderzoek bleek dat faculteitsmedewerkers en studenten op verschillende manieren met dergelijk gedrag omgingen. De faculteitsmedewerkers hadden hun eigen vooropgezette ideeën over wat belangrijk was voor het harmonieus functioneren van de groep, maar de studenten hadden daar totaal andere meningen over. De bevindingen wezen op de behoefte om vanaf het begin duidelijkheid te verschaffen over de volgende zaken: te laat komen op bijeenkomsten en afwezigheid. Dit is belangrijk, aangezien het volgens de cultuur van de V.A.E. acceptabel is om een half uur later dan afgesproken op een afspraak te verschijnen.

Niet alleen tijdens het eerste thema, Gezondheidszorgsysteem, maar ook tijdens de daaropvolgende thema's waren aspecten van interactie in groepen, zoals communicatie en luisteren, belangrijke kwesties voor de studenten. De mogelijke redenen voor problemen met bepaalde aspecten van communicatie zijn complex. Vrijelijk communiceren in een tweede taal - Engels - die de studenten alleen binnen de onderwijsinstelling spreken, brengt problemen met zich mee. In landen waar de cultuur vrouwen aanmoedigt om liever alleen met andere vrouwen om te gaan, wordt er van vrouwelijke studenten aan het begin van hun medische opleiding en training een nogal complexe persoonlijke aanpassing gevraagd. Er van hen wordt verwacht dat ze vrijelijk bijdragen aan een groep met tutores die wellicht niet alleen buitenlanders, maar ook nog van het mannelijk geslacht zijn. Het ontwikkelen van vaardigheden op het gebied van "het om de beurt het woord nemen" en "luisteren naar elkaars bijdragen" werd als belangrijk beschouwd, maar niet altijd toegepast door de groepsleden. Problemen rond communicatie die in ons onderzoek vastgesteld werden, weerspiegelden de bevindingen van Harrison, Glasgow & Townsend (1996) en Swadi (1997), wat aangeeft dat er wellicht behoefte is aan een training in communicatieve en sociale vaardigheden die parallel aan het PGO wordt gegeven en die de studenten gedurende het zevenjarige medische curriculum volgen. Het Skillslab van de Faculteit der Geneeskunde van de Universiteit Maastricht biedt een programma voor communicatieve vaardigheidstraining dat van het eerste tot en met het zesde jaar wordt gegeven, met een geleidelijke toename van complexiteit van de vaardigheden waarmee de studenten

kennismaken en met een geleidelijke toename van de complexiteit van praktijksituaties (Van Dalen, Zuidweg & Collet, 1989).

Ten slotte werden in het huidige onderzoek twijfels omtrent de rol van de gespreksleider versus de rol van de docent als tutor in PGO-groepen geïdentificeerd. Dit was een gebied dat in de toekomst nader onderzocht diende te worden. Bij meer dan 50% van de punten op de vragenlijst bleken er geslachtsgebonden verschillen te zijn ($p < 0,0001$). Vrouwelijke studenten concentreerden zich op leren en resultaten, terwijl de mannelijke studenten graag de kans wilden hebben om zelfstandig deel te nemen binnen de groep. Deze verschillen werden aangeduid als cultuurgebonden, wat ook bleek uit eerdere onderzoek door Gallagher (1993).

Het onderzoek toont de tegengesteldheid aan in de manier waarop de faculteitsmedewerkers en de studenten belangrijke vraagstukken rond groepsdynamiek interpreteren. Het weerspiegelt eerdere bevindingen over het belang van het ontwikkelen van communicatieve vaardigheden voor studenten. Het is volledig beschrijvend bedoeld en het slaagt erin om aan te tonen hoe in PGO houding en eerdere ervaringen het functioneren van een groep kunnen beïnvloeden. Het onderzoek geeft aan dat wat de studenten betreft de perceptie over hoe een groep functioneert beïnvloed kan worden door culturele ervaringen en verwachtingen. Vernieuwende onderwijsmethodologieën zoals PGO laten, in tegenstelling tot traditioneel onderwijs, de verwachtingen van zowel studenten als tutores beter tot uitdrukking komen. In PGO-situaties waarin tutores en studenten verschillende culturele achtergronden hebben, zijn het niet alleen de studenten die "leren te leren" in kleine PGO-groepen. Ook de tutores profiteren van de ervaring door meer te leren over hun eigen mannelijke en vrouwelijke studenten.

Vertrouwdheid met de Engelse taal en groepsinteractie bij PGO

Het onderzoek dat wordt beschreven in hoofdstuk 6 richtte zich op de kwestie omtrent de mate van beheersing van het Engels en de interactie binnen PGO-groepen. Verder is geprobeerd om de factoren die de mate van beheersing van het Engels beïnvloeden, weer te geven en vast te stellen of deze factoren ook invloed hebben op de deelname aan de PGO-groep. In de hoofdstukken 3, 4 en 5 werden uiteenlopen vraagstukken belicht waaruit bleek dat geneeskundestudenten en/of faculteitsmedewerkers vreesden dat een gebrekkige beheersing van het Engels een belemmering zou zijn voor het actief bijdragen van studenten aan groepsdiscussies, interactie en communicatie in PGO in het algemeen. Het was van belang dat gepoogd werd om de aspecten van de beheersing van het Engels nader te onderzoeken en om aan te tonen of PGO een geschikte leermethode was voor de Arabische studenten van de Universiteit van de V.A.E.

Er bleek een grote lacune te zijn in de literatuur met betrekking tot de beheersing van het Engels van personen voor wie Engels niet de eerste taal is, omdat de meeste gepubliceerde onderzoeken waren uitgevoerd in westerse landen waarbij de onderzoeksgroep uit buitenlandse studenten bestond, of uit immigranten die in een land woonden dat niet hun geboorteland was. Het huidige onderzoek werd uitgevoerd in een instelling voor medisch onderwijs waar Engels de onderwijstaal is, en waar alle studenten Arabisch zijn en in hun eigen land Engels als tweede taal hebben gestudeerd. De bevindingen zouden daarom zowel nationaal als internationaal van groot belang zijn.

Aan het begin van het voorbereidend jaar werd eerstejaarsstudenten geneeskunde een TOEFL-test (Test of English as a Foreign Language) afgenomen. Verder kregen ze een vragenlijst die tot doel had een beeld te krijgen van de nieuwe lichting geneeskundestudenten. De TOEFL-test meet luistervaardigheid, zinsbouw, schrijfvaardigheid, vocabulaire en grammatica. Met behulp van een interactieprocesanalyse werden de onderzoeksgroepen tijdens PGO-bijeenkomsten geobserveerd. De interactieprocesanalyse is gebaseerd op de in de jaren vijftig door Bales ontwikkelde Interactieprocesanalyse (IPA) (Bales, 1950). De codecategorieën en scoresystemen benadrukken elementaire eenheden van interactie. Aangepaste IPA-gegevens werden verkregen van tutor(en), de gespreksleider, de notulist en groepsleden voor de categorieën "Vraag!", "Geef!",

"Verduidelijkt het Engels", "Zoekt verduidelijking van het Engels", "Arabisch" en "Totaal" tijdens vier van de vijf PGO-thema's.

De gemiddelde totale TOEFL-score lag bij de vrouwelijke groepen aanmerkelijk hoger ($x=468,20$; $SD\ 42,37$) dan bij de mannelijke groepen ($x=439,96$; $SD\ 69,20$). Het verschil was echter niet significant. Uit de resultaten bleek dat naarmate de TOEFL-score bij de vrouwelijke studenten lager was, het minder waarschijnlijk was dat ze informatie zouden geven of erom zouden vragen. Dit was niet het geval in de mannelijke groepen. Voor zowel mannen als vrouwen bestond er een hoge correlatie tussen het geven van informatie en hun TOEFL-score. (een correlatie variërend van $r=0,67$ tot $0,74$). Het "geven van informatie" was voornamelijk het verklaren van verschijnselen, het verduidelijken van bepaalde kwesties. Mannelijke studenten waren minder geremd om vragen te stellen, ongeacht hun TOEFL-scores. Vrouwelijke studenten met lagere TOEFL-scores stelden minder vragen. Wellicht zagen zij hun minder goede beheersing van het Engels als een persoonlijk probleem dat ze niet tijdens groepsbijeenkomsten ontmaskerd wilden zien. Het feit dat er in de PGO-groep alleen Engels werd gesproken, betekende voor deze studenten dus dat hun bijdrage beperkt was.

Verder bleek dat vrouwelijke studenten het Engels tijdens PGO-bijeenkomsten bewust spraken en oefenden. De mannelijke studenten grepen terug op het Arabisch om termen uit te leggen. De kans dat mannelijke studenten gebruik maakten van het Arabisch was vijf keer groter en dit was zeer significant ($p<0,001$). Het viel ook op dat de kans dat mannelijke studenten de spelling en grammatica van anderen verbeterden minder groot was. Een interessante vraag die wellicht in de toekomst onderzocht zou kunnen worden is of de beheersing van het Engels zoals dat was gemeten in de TOEFL-test bij zowel mannelijke als vrouwelijke studenten verbetert tijdens de studie en de training.

Op basis van het aantal jaren dat Engels werd gestudeerd kon geen voorspelling over de TOEFL-score worden gedaan als gevolg van de grote niveaoverschillen in onderwijs in Engels van school tot school. Het opleidingsniveau van de moeder was een predictor met betrekking tot de TOEFL-score en was zeer significant voor de mannelijke studenten ($p<0,01$). Het opleidingsniveau van de vader was geen predictor en er was ook geen correlatie met de TOEFL-scores van de mannelijke of vrouwelijke studenten. Als het opleidingsniveau van de moeder laag was, dan was de kans groter dat de studenten aangaven dat hen was afgeraden om medicijnen te gaan studeren. Uit multivariate analyse bleek dat TOEFL-scores (dus beheersing van het Engels) de beste predictor was voor groepsinteractie.

Uit ons onderzoek bleek dus dat studenten door hun beheersing van het Engels beïnvloed werden bij het geven van informatie in PGO-groepen. Een belangrijke vraag die daaruit voortvloeit is wellicht of de beheersing van het Engels invloed heeft op examenresultaten. Daarom werd PGO in dit onderzoek naar voren gebracht als een leermethode die problemen rond de vaardigheid van de studenten met de tweede taal, het voornaamste communicatiemiddel in het onderwijs, hielp identificeren. Aan deze studenten zou op die manier in een vroeg stadium tijdens hun studie en training passende hulp gegeven kunnen worden. Vanuit dat oogpunt had PGO zijn waarde bewezen; het maakte het gemakkelijker om vast te stellen welke eerstejaarsstudenten dringend hulp nodig hadden bij bepaalde aspecten van het Engels. Weer onderstreepte dit laatste onderzoek dat nieuwe benaderingen van leren zoals PGO het gemakkelijker maakten om leemten binnen het autoritaire, frontale onderwijssysteem te identificeren. Tegelijkertijd wordt benadrukt dat er behoefte is aan verder onderzoek rond PGO.

Conclusie en aanbevelingen

De onderzoeken die in hoofdstuk 2 tot en met 6 worden beschreven, beantwoorden alle vragen en kwesties die de vernieuwing in het onderwijs opriepen. Er is vastgesteld in welke mate de studenten en de FGG er klaar voor zijn om "leren te leren" door middel van PGO, en of dit systeem geschikt is en of het de moeite waard is om het toe te passen. Bij het beantwoorden van bovengenoemde vragen wordt een groot aantal andere kwesties geïdentificeerd.

De toepassing van PGO had gevolgen voor de faculteitsmedewerkers. Het was de aanzet tot speciaal voor de staf ontworpen omvangrijke ontwikkelingsprogramma's die gericht waren op duidelijkere doelstellingen van de modules en vervolgens de constructie van effectievere taken. Bij de totstandkoming van een effectief PGO-programma lijkt het meeste werk van de faculteitsmedewerkers te liggen in weldoordachte en gestructureerde voorbereidingen. Het bleek dat de hechte teams die elk specialistische kennis uit hun eigen disciplines inbrengen eerst een idee van het totaalbeeld moeten hebben, voordat het geheel in kleinere onderdelen gesplitst kan worden. Gebrek aan begrip en aan recente kennis bij de faculteitsmedewerkers op gebieden die verband hielden met "op onderzoek gebaseerde geneeskunde" werden naar voren gebracht. Stereotiepe opvattingen van PGO-tutoren aan de FGG over hun studenten werden aan de kaak gesteld. PGO-medewerkers geloofden niet dat Islamitische studenten de PGO-taken over abortus en drugsmisbruik zouden kunnen analyseren. Er werden grote verschillen vastgesteld tussen de meningen van faculteitsmedewerkers en studenten over wat belangrijk was voor het functioneren van een groep. Deze verschillen leken beïnvloed te worden door eerdere ervaringen en verwachtingen. Bij het toepassen van zelfevaluatie binnen PGO bleken studenten net zo streng te zijn als tutoren en op positieve wijze beroepsgeoriënteerde vaardigheden met betrekking tot zelfanalyse te ontwikkelen. Beheersing van het Engels bleek studenten te beperken bij het bijdragen van informatie in PGO-groepen. PGO bracht een felle dialoog op gang op het gebied van onderwijs, een dialoog die nog steeds gaande is, zowel plaatselijk als op internationaal niveau.

Terwijl er werd gekeken of PGO een geschikte leermethode was, en of leren in groepen op positieve wijze werd geaccepteerd, kwamen bepaalde vraagstukken naar voren. Het onderzoek toonde aan dat PGO studenten in de gelegenheid stelde om hun problemen met de leerstof te verbaliseren. Bij het traditionele curriculum leken problemen met de leerstof vaak verborgen of onopgemerkt te blijven. Communicatieproblemen, problemen bij het begrijpen van de taal die werd gebruikt bij het verklaren van het PGO-proces - het Engels - werden geïdentificeerd. Problemen met PGO-begrippen zoals kritische evaluatie werden eveneens in kaart gebracht. Over het algemeen werd er een grotere bewustwording van de problemen van de studenten mogelijk gemaakt. Sommige van die problemen wijzen op problemen met elementaire kennis van het Engels. Zou het verzwaren van de TOEFL-test met betrekking tot de toelating van studenten aan de FGG een oplossing zijn? Het verbeteren van de kwaliteit van het vak Engels op lagere en middelbare scholen zou op de lange termijn meer succes opleveren. Aan de andere kant is het de vraag of de introductie van een module communicatie en sociale interactie die gedurende het gehele curriculum aangeboden zou worden van nut is voor studenten die reeds bezig zijn met de zevenjarige medische opleiding en het trainingscurriculum aan de FGG. In verschillende situaties bleken er herhaaldelijk verschillen tussen mannen en vrouwen te zijn, die werden aangemerkt als een afspiegeling van de cultuur in de V.A.E. Wat zou het resultaat zijn als mannelijke en vrouwelijke studenten - met inachtneming van de cultuur en de religie van het land - tijdens hun opleiding en training gemengd onderwijs kregen?

Dit proefschrift is een poging om de aandacht te vestigen op de uitdagingen waarmee faculteitsmedewerkers en studenten geconfronteerd worden tijdens het proces waarbij het medisch onderwijs en de training overgaat op PGO. De grootste beperking van het onderzoek is de brede basis. Aangezien getracht is om kwesties te behandelen die verband houden met veranderingen, was dit echter onvermijdelijk. Een andere beperking is het kleine aantal studenten waaruit de onderzoeksgroep bestond. In vele opzichten maakte het onderzoek gebruik van een voor de hand liggende steekproef. Achteraf gezien waren gegevens die over een langere periode waren verzameld wellicht betekenisvoller geweest. En tot slot waren de instrumenten die voor het verzamelen van gegevens werden gebruikt beperkt in de zin dat ze doorgaans aangepast overgenomen waren van andere onderzoeken. Niettemin zijn er uit het onderzoek op directe en indirecte wijze belangrijke bevindingen voortgekomen omtrent kwesties die verband houden met studenten, faculteitsmedewerkers, communicatie en de Engelse taal.

Het proefschrift toont aan dat het introductieproces van een vernieuwende benadering zoals PGO in het medisch onderwijs in een instelling nooit een exacte kopie kan zijn van de ervaringen van een andere instelling. Het doen van onderzoek zoals dit proefschrift helpt een instelling bij het opzetten van een eigen databank.

Met betrekking tot de vraag of PGO noodzakelijk was, bespreekt het proefschrift een aantal fundamentele kwesties die van cruciaal belang zijn voor het onderwijs en de training van studenten geneeskunde in de V.A.E. Het belangrijkste gebied waaraan aandacht wordt geschonken is het gebruik van een tweede taal, het Engels, als het communicatiemiddel in het onderwijs, terwijl de eerste taal van de studenten Arabisch is. Wat zouden de resultaten zijn als er een PGO-programma werd opgezet waarbij een Engelse en een Arabische versie vergeleken werden? Wat is de relatie tussen bijdragen/interactie binnen PGO-groepen en beheersing van het Engels bij andere opleidingen waar Engels de tweede taal is voor alle, of bijna alle studenten geneeskunde? Wat is aan de FGG de relatie tussen deelnemen aan PGO-groepen, beheersing van het Engels en prestaties? Verbetert de beheersing van het Engels tijdens de opleiding? Een andere vraag zou kunnen zijn welk effect PGO-tutores hebben op interactie in kleine groepen. Hebben PGO-tutores een positief of negatief effect op de prestaties van de studenten? Wat zou het effect zijn van twee tutores per PGO-groep in plaats van één?

Tenslotte zou het in verband met het naderende millennium een passend moment zijn om PGO, de FGG en de huidige situatie te evalueren. Ten eerste een evaluatie van de mening van de studenten die PGO hebben genoten, en ten tweede van de faculteitsmedewerkers die de rol van PGO-tutor hebben vervuld, en ten slotte van het ondersteunende netwerk. Een aantal van de reeds gepubliceerde onderzoeken waarbij over een langere periode gegevens zijn verzameld, zou voortgezet kunnen worden om de steekproef te vergroten.

De resultaten van de diverse onderzoeken die dit proefschrift omvat, zijn teruggekoppeld naar het onderwijssysteem van de FGG, en de diverse publicaties houden de dialoog gaande en blijven invloed uitoefenen op ontwikkelingsaanpassingen. Sinds de invoering in 1994 is PGO behalve bij de Module Inleiding in de Geneeskunde ook geleidelijk toegepast bij andere modules. Deze modules zijn: Gedragswetenschappen, Ademhaling, Klinische Anatomie en Huisartsenassistentenschap. In 1999 wordt PGO in de module Menswetenschappen geïntroduceerd. Hoewel de introductie in het verleden en ook nu nog in segmenten plaatsvindt, heeft PGO als onderzoeksinstrument vraagstukken met betrekking tot het curriculum naar boven gebracht die niet opnieuw weggestopt en vergeten kunnen worden. Het proefschrift heeft de waarde van de vernieuwingen aangetoond door kwesties aan het licht te stellen die in de toekomst nader onderzocht moeten worden, en door aan te geven wat er op de lange termijn aan het curriculum aangepast moet worden ten behoeve van de toekomstige artsen die de FGG opleidt. Het zou de curriculumcommissie van de FGG duidelijk worden dat PGO een onderwijsmethode is die in aanmerking komt voor het gehele curriculum. Dit proefschrift bewijst het vermogen van PGO om niet alleen de sterke en de zwakke kanten van studenten te openbaren, maar ook die van de faculteit en het onderwijssysteem. Teneinde studenten het beste van twee werelden te bieden, lijkt het erop dat het op het moment overheersende autoritaire en frontale onderwijs grondiger herzien en ingekrompen zou kunnen worden. Met de benodigde aandacht aan geldmiddelen en mankracht zou het resultaat een curriculum kunnen zijn met een sterke PGO-basis, aangevuld met een daarop aansluitende serie hoorcolleges.

CURRICULUM VITAE

Deborah Mpofu was born in Zimbabwe, where she undertook all her basic education up to 'A' Level. She went to the United Kingdom for higher and University education. Having completed a basic nursing and midwifery programme, she in 1984 completed a B.Sc. degree in Nursing and Health Sciences, at the Metropolitan University of Manchester. She proceeded to complete a Community Health Visitors' programme in 1985 and worked as a health visitor under Stockport Area Health Authority until 1990. In 1992, she completed a Post Graduate Teachers Diploma at Wolverhampton Polytechnic and then worked at the Metropolitan University of Manchester as a lecturer in Health Visiting. In 1993, she completed a Masters in Education with the University of Manchester. From 1993 to 1997 she worked as a teacher and researcher at the Faculty of Medicine and Health Sciences (FMHS), United Arab Emirates University, in the Arabian Gulf. Her Ph.D. thesis is based on work undertaken at the FMHS. Due to family reasons she moved to Saskatchewan, Canada, where she is pursuing work in Health Sciences research.