

**Exploring Project-Based  
Learning: A Case Study of a  
First-Year Medical Education  
Course**

by

**Gavin Weir — WRXGAV001**

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## Declaration

This work has not been previously submitted in whole, or part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature signature removed

Date 28/11/03

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# **Preface**

This study was undertaken to describe a project-based programme that was provided to first year medical students over an extended period. In the process of detailing this programme, the study provides theoretical construct through 'reviewing key aspects of the current debate about how students learn at university, what constitutes appropriate learning at university' and outlines the attempts made by this project-based programme to foster appropriate learning amongst students. The study does not provide definitive answers to complex questions such as:

- how do students learn?
- does project-based learning implicitly foster appropriate learning amongst students?

Nevertheless, the study can provide interested teachers with a useful point of departure as it highlights some salient issues that have to be addressed when designing and implementing a project-based programme for first year students.

I wish to take the opportunity to thank various people who were pivotal in helping me complete this study. Firstly the students and staff whose extraordinary effort gave 'life' to the programme during its existence. Secondly my supervisor Tony Saddington, whose consistent commitment, tact and constructive supervision gave me the encouragement to persevere and complete this work. Thirdly, Brian Gannon who not only expertly edited this work but actively encouraged me to undertake post graduate work despite my obvious reluctance to do so. Fourthly, Kerrin Annett, who with seamless efficiency proof-read this study helping to correct errors of language

and grammar. Last but by no means least, Professor Breen who kindly read various drafts of my work, provided a number of constructive observations and doing so did much to allay my anxiety about the value of my work.

## **Abstract**

This study describes the eleven-year period of preparation and implementation of a project-based learning programme within a first year course for medical students, at the University of Cape Town. The methodology was descriptive reflection using case study research.

The study first describes current understandings of student approaches to learning, learning assumptions and styles of learning and the link with deep learning. Included is also a discussion on ways in which teaching approaches and methods can influence student learning. Linked to this is a review of notions of project-based learning and its place in the spectrum of teaching and learning activities encountered by students at university.

The study then describes the challenges / issues that arose during the eleven-year period and the various ways in which they were responded to. The provided description also outlines ways in which the programme attempted to foster [or hinder] deep learning amongst students, since such learning is regarded as a key outcome of learning at university.

The research ends with an attempt to address why the programme did not foster deep learning amongst students to the extent it could have. It proposed that for project-based learning to foster deep learning amongst students [and particularly amongst first year students] various key elements have to be in alignment. Secondly it argues for the fact that project-based learning amongst first year students should be viewed in terms of an 'apprenticeship in deep learning'. By viewing project-based learning in such terms the advantages advanced for

project-based learning can be more candidly recognised. The research ends with 'implications for practice' for those prospective project-based learning practitioners who would like to harness the power of project-based learning to foster deep learning amongst their students.

# Chapter One

## 1.1 Introduction

The nature of medical education has for many decades been the subject of debate and discussion with a strong contention that a “traditional” medical curriculum is strongly lecture-driven based on rigid subject autonomy and one that is inappropriate in preparing graduates for effective clinical practice (Evans 1964). This contention is based on the fact that such a curriculum seldom offers students learning opportunities to help them reflect on the wider social aspects of health. Consequently students are unable to understand the social and economic forces that can powerfully affect health and disease, with the same level of sophistication as they understand clinical problems (World Health Organisation 1993, and Parsell and Bligh 1995).

In November 1992 the Undergraduate Medical Education Committee of the Faculty of Medicine at the University of Cape Town [UCT] issued a document entitled “undergraduate preparation for primary care at UCT”. In the document the authors made explicit reference to a global effort aimed at encouraging medical schools to train doctors who would be able to work effectively at the primary level of health care rather than in tertiary hospitals. In the conclusion of the document, the authors, argued that the faculty should work towards producing a graduate “who is at home in the varied primary care settings in the country and who is familiar with the nature of the work and aware of the morbidity profile of people in these settings” (UMEC 1992 p11).

Internationally the forces of change had been at work well before the UMEC called for curriculum innovation. In the early 1970s health

systems around the world came under scrutiny. The principle reason for this scrutiny was that despite huge amounts of public and private money invested in these health systems there had not been a commensurate improvement in health of the target populations. By the mid 1970s a crisis point had been reached as governments world wide were no longer prepared to write 'blank cheques' for health care.(Dennill, King, Lock and Swanepoel 1995).

In 1978, in an effort to address the difficulties of escalating health care costs and the seemingly 'poor returns' for such a financial investment the World Health Organisation and the United Nations' Children's Fund co sponsored an international conference on health care. At the conclusion of the conference, delegates endorsed the "Alma Ata" Declaration. The declaration rejected the idea that effective health care meant providing ever more sophisticated and expensive forms of medical treatment. Instead it recommended that countries should reorganise their health services around primary health care rather than around " high hospitals" and secondly that the investment in health services should closely match the social and developmental requirements of the country. (Coulson, Goldstein and Ntuli 1998). Another outcome of the conference was the formation of the "Primary Health Movement". One of the aims of the movement was to review medical education and where necessary encourage and support changes aimed at making medical training more relevant to societies' needs (UMEC 1992)

In 1988 at the Edinburgh Conference on Medical Education, medical educators strongly endorsed the tenents of the Alma Ata Declaration. The Conference acknowledged the obligation of all medical educators to "provide compassionate science-based education, training and



services that respond optimally to the public's health problems as well as to the issues of resources, outcomes and costs" (UMEC 1992 p 3)

In 1991 the then South African Minister of Health announced in parliament that the state department of Health would in future foster the implementation of primary care in state run services. (Coulson et al 1998).

It was in this context that the UMEC issued their document called "Undergraduate Preparation for Primary Care at UCT". In the summary of the document the UMEC stated, "medical educators at UCT are very aware of the need to prepare our graduates for work in primary care in the community in Southern Africa but have not as yet formulated a common vision of how to achieve this".

Similarly over the past decade there has been a growing awareness that effective student learning at university is significantly affected by a range of factors (e.g. prior learning, teaching methods used, assessment and the broader university environment) and that these factors need to be taken seriously when planning and implementing undergraduate programmes. An additional complication is the pressure on universities to widen access and admit even greater numbers of students as undergraduates. For the university teacher this changing environment poses particular demands. On the one hand there is the pressure to teach large classes of students without additional resources, and on the other hand there is the pressure to ensure that "standards" of university courses and programmes are being maintained (Taylor 1997).

These pressures on academic staff have led to a review amongst others of teaching methods and assessment practices and how these can affect

learning and teaching outcomes. Firstly there is growing recognition that established teaching methods [such as lectures and practicals] do not *automatically* facilitate student learning. Thus the decision to use a particular teaching method (be it a lecture, tutorial or project work) has to be based on more than a teacher's familiarity with the particular method. It also needs to be based on an understanding of the particular ways in which the method can encourage appropriate student learning.

Secondly how students are assessed has become an important consideration, and the role that assessment can and must play in encouraging students to adopt an approach to their studies that reflects authentic engagement with their work (Taylor 1997). Thirdly there is the matter of how the timetable and the physical infrastructure can support or undermine student learning. For instance it might be an aim of a departmental course to encourage students to become self-directed learners, but the timetable is crowded with scheduled teaching activities that students have little opportunity to become such learners. In the case of the physical infrastructure it might be built to support particular activities [such as lectures and laboratory practicals] yet a course might be designed around group learning, and students and staff find that there is a dearth of small group venues.

The implications of the above are clear. Teaching activities [however well entrenched in a department's tradition] will not *automatically* encourage effective learning amongst students. For such learning to be encouraged the teacher would amongst others have to:

- be aware of the range of factors that influence student learning

- design and implement learning and teaching activities that encourage appropriate student learning through consciously managing these factors

These two themes of university education and promoting effective student learning are the sign-posts for this particular study. This study looks specifically at *eight years* of the nine years of a particular project-based learning programme. This programme started in 1992 and ended 2001. This programme was introduced as a “node of innovation” within an existing ‘traditional’ medical curriculum to help orientate students to some of the crucial determinants of health within a “community context”. Its closure came about as a result of the introduction of a fundamentally re-structured undergraduate medical curriculum. Nevertheless key aspects of the programme were carried over into the new curriculum so the ‘spirit’ of the programme inhabits in the new curriculum.

After a difficult gestation period [1990/1991] the programme was implemented and provided students with an orientation to some of the key determinants of health as well as an apprenticeship in project-based learning. Initially this orientation to health was modest – students moved off the university campus into various “communities” that comprise the Cape Peninsula and in project groups recorded:

- the ‘health’ of residents of these communities and
- reviewed the health and social services available to residents.

As the programme matured, this initial aim was broadened and students were required to ‘think for themselves’ by interrogating some of the links between health [or its absence] and the physical, social,

personal and economic factors that impacted on individuals living in particular communities. Students were also required to document their 'findings' in various ways [report, poster and oral presentations] to alert them to the fact that academic work can be presented in various ways. Secondly the maturation of the programme marked an increasing level of refinement of the instructional material given to students, with a focus on providing students with detailed and explicit information on:

- the programme's requirements
- how their work would be assessed.

Project-based learning is not a new phenomenon in higher education as many university departments use project-based learning as a method of teaching and learning. Such is its wide usage and acceptance, that Luck calls it a "quiet feature of university education" (Luck 1998, p133). Its wide and varied use has meant that "project-based learning" has become a portmanteau term rather than one that precisely describes a specific set of teaching and learning activities. Of all the varied definitions of project-based learning the one provided by Henry's helps to neatly encapsulate the scope of project-based learning. "...an extended piece of work in which the student (or group of students) is required to select a topic, collect relevant information and organise this material into a presentation" (Henry 1989, p 49).

For the would-be practitioner the inherent versatility of project-based learning is probably its greatest asset. The decision to use project-based learning can nevertheless be based on a variety of factors. For some practitioners the decision to use project-based learning is driven by the

imperative of “efficiency”. In other words a student cohort can be divided up into project groups, and the staff member can then interact with students on a group basis instead of on an individual basis. For others project-based learning is chosen because it offers students particular opportunities to learn knowledge, skills and attitudes that are less readily learnt where lectures, tutorials and seminars are used. In other cases project-based learning is chosen because the staff member’s own experience of such learning was a positive one and wants to replicate this experience for their students.

### **1.2.1 The role of project-based learning in undergraduate medical education**

In the South African context project-based learning offers an effective learning method to prepare medical students for work in primary health care settings.

Since 1994 the South African national government has been engaged in re-organising the public health services around the concept of primary health care (Coulson et al. 1995). A central feature of primary health care is the *team approach* to health care delivery. In other words health care practitioners working in the public sector need be able to work effectively within a health team (Dennill et al.). Project-based learning is an excellent way to provide students with an apprenticeship in group [team] work. Through a project students can learn about the “mechanics” of working in groups as well as learning what are their own strengths and weaknesses as a group member. (Wellington 1998)

Apart from developing group skills project-based learning allows students to develop *academic skills*. Depending on the project students can refine their research skills by analysing texts and writing up their project findings and their general academic skills – constructing a coherent evidence-based argument and presenting their project findings in different forms (in writing, poster or oral presentation). Project-based learning can also add an additional dimension to students' learning contexts, by getting students to learn in community contexts — learning in homes of residents, in non-government agencies and on the streets. By learning in these different contexts students can recognise that valid learning is not limited to the “academy”. By extension students can begin to recognise that health care delivery should not be confined to the hospital ward or the doctor's surgery, but can take place in a variety of settings, both clinical and community.

For staff project-based learning allows them to meet and work alongside students in ways not readily provided for in lectures, tutorials and laboratory practicals. This is particularly the case when it comes to large classes of students. Project-based learning can help staff break the cycle of distance and anonymity created by large classes.

Most students typically encounter project-based learning by doing a research in their second or third year of undergraduate career. In this context the aim is to introduce students to academic research and how such research is conducted. Depending on the undergraduate course the research project might be a substantial one requiring a student to research a topic under staff supervision and submit a research report. In universities where the student cohort is large project-based learning is often viewed by faculty administrators as being too resource

intensive to justify its use with such a student cohort. Instead they see project-based work as the province of post-graduate courses or senior undergraduate courses that have restricted numbers of students. One of the facets of this study will be to look:

- at the particular challenges of implementing project-based learning with a large cohort of students on slender resources
- and what are the lessons that can be learnt from such undertaking

One of the particular challenges of implementing project-based learning within an existing curriculum structure is that it has to “compete” with other learning and teaching activities, and within an environment that does not implicitly support project-based learning. These drawbacks can place a project-based programme at a distinct disadvantage, with students viewing it as difficult and not worth the time and investment required of it. Consequently attention has to be paid to ways in which these drawbacks can be managed to ensure they don’t vitiate the learning opportunities provided by project-based learning.

### **1.3 The Research Context**

The focus of this study is the eight-year period of implementation of a project-based programme. The programme had come into existence in response to a call for change of the undergraduate medical curriculum of the then Faculty of Medicine at University of Cape Town. At the time the Faculty of Medicine was one of eight accredited faculties responsible for training and graduating medical doctors to meet the

demand for trained doctors in South Africa. This call for change was based on the recognition that the external environment had and was changing and that the faculty had to produce graduates who could work in this changing environment.

For four years the programme found an initial “home” within the ‘Human Biology’ course because the convenor of this course had responded most positively to the UMEC’s call for ‘community based education’ by volunteering teaching time. In addition the location of this new programme within ‘Human Biology’ was appropriate as it was the course that had potentially the most in common with the new programme, when compared with the other first year courses [i.e. Physics, Chemistry and Anatomy]. The aim of ‘Human Biology’ was the study of the people of South Africa, their origins, how they interacted, and how these interactions affected their perceptions and experiences of health and disease.

During the period that the programme was part of ‘Human Biology’ it ‘took root’ by developing from a single project entity [of four afternoons] into one that required students to complete two separate projects spread over fourteen afternoons. The student intake also grew from an intake of one hundred and fifty students to an intake of two hundred and sixty students from 1994 onwards.

In 1995 the programme was relocated within a new course called “Health and Society”. This new course had been instituted as another building block of the curriculum change that had commenced in 1990. To accommodate the introduction of this new course within first year the faculty abolished the elective course available to medical students. Faculty had argued for its abolition on the basis that few students had



used the elective option in the way it was intended [i.e. to give students the option to study a humanities course]. 'Health and Society' was designed to help students gain a wider understanding of how health matters are shaped by social, historical, economic and cultural factors. In addition a key aspect of the course was an introduction to primary health care and its implementation. It was this introduction to primary health care that provided the logical nexus between the course and the programme.

Between 1992 and 2000 the project-based programme [known to students and staff alike as the field studies programme] provided learning opportunities for one thousand and forty medical students. This number of students was successfully managed by employing part time staff using structured guidelines to support student learning. Another interesting feature of this eight-year period of implementation was the fact that one person remained convenor for eight years and was able as a result to place his 'personal stamp' on the programme.

Finally the way in which the field studies programme unfolded over the eight years of implementation was also a function of the non-directive approach adopted by the Faculty. Once the programme had weathered the difficulties of obtaining start up core finance, and was moving students into the "community", the faculty, left the programme to develop in the direction decided on by the convenor and associated staff.

## **1.4 The Researcher**

I am a social worker by training and become involved in the design and development of the field studies programme by 'accident'. In 1989 Professor Morris convenor of a course called 'Human Biology' [a required course for first year medical students in Faculty of Medicine] approached the School of Social Work at UCT, to ask their help in designing and developing a 'community-based' module for this course. The aim being that students would visit various health and social service agencies to observe how these agencies were dealing with key health and social issues that faced the residents of Cape Town. The School of Social Work indicated that did not have the staff capacity to help in designing this module, but suggested that he approach the Department of Community Health, UCT, as I was responsible for organising community-based visits for fourth year medical students. After negotiations with the head of the Department of Community Health, I was 'seconded' in a part-time capacity to help assist in the design of the 'community-based' module.

Over the next three months I moved from the role of assistant designer to primary designer. Drawing my experience of organising visits for the fourth year medical students, I was able to convince Professor Morris that the proposed 'community-based' module should have more 'depth' to it by requiring students to do more than simply visit and observe what the agencies were doing. I felt it was important that the students should both observe and reflect in a structured way on the work done by the agencies. To facilitate this observation and reflection I developed a simple set of 'guidelines for visits' for students [see Appendix One].

Within two years of implementation of the module, the module had become a 'project-based' module. This development had come about as a result of a key challenge- the need to provide a 'community-based' module for a relatively large group of students [initially 150 students but subsequently 200 students] with limited resources. To address this challenge I suggested that the student cohort could be divided into 'project groups' and these groups could be expected to undertake a basic research project on a designated area within the Cape Peninsula. This project could be 'facilitated' by providing students with a set of project guidelines. It was through this experience of providing project guidelines that I recognised that I had a facility for developing such materials. Overtime these project guidelines were transformed into a series of handbooks [See the various appendices at the back of thesis]. From 1992 until 2000 I was engaged in an iterative process of developing and refining my ideas concerning 'project-based' learning, the provision of project instructions, the institution of differentiate project requirements [i.e. project report, poster and oral presentation] and its implementation within a context of enduring resource limitations. Thus the field studies programme [which emerged out of the community-based module], the subject of this case study, was in essence a 'creature' of my making and as such reflected my personal notions [both positive and negative] of project-based learning.

## **1.5 Purpose of the Study**

The purpose of this research, then, is to describe and then reflect on this project-based learning programme. This, in turn, will result in:

- the development of a clearer understanding of the concept of project-based learning, and
- a description of the role that project-based learning can play within a First-Year medical education course.

This study aims to show that project-based learning can play a role in undergraduate medical education. It will do this by describing the genesis and implementation of this particular project-based programme. In addition, it will review the strengths and weaknesses of this programme, so that others – who might be considering using project-based learning – can then decide whether such a programme or a variation thereof might be the most appropriate mechanism for facilitating student learning.

## **1.6 Conclusion**

This thesis then is a case study of a particular project-based learning programme. It was introduced into an established undergraduate medical curriculum with the aim of widening the off campus learning opportunities for medical students. The decision to use project-based learning was influenced in part by resource limitations and the need to ensure that the off campus learning was structured and productive.

As will be seen during its eight years of implementation the field studies programme revealed the possibility of implementing project-based learning on limited resources. However by implementing it on modest resources the programme developed in a particular way and with a specific set of characteristics and limitations.

Notwithstanding these characteristics and limitations the lessons drawn from eight years of implementation point to:

- the innate strength of project-based learning
- the ways in which it can facilitate student learning in higher education, and
- the ways in which project-based learning can be used in undergraduate medical education.

# **Chapter Two**

## **Theoretical Background: Perspectives on learning and teaching at a university**

### **Project-based learning**

#### **2.1 Introduction**

The aim of this chapter is to outline and discuss some of the key factors that influence student learning at university and to situate project-based learning within this context. Looking at these factors is appropriate as research evidence indicates that many students graduate from university without having realised their full potential as learners. Instead they leave the university with only a superficial understanding of their area of study and their views of the world little changed from when they first entered the institution (Ramsden 1992). This failure by students to fulfil their potential is at odds with the goal of most universities. This goal is to graduate a changed student who can critically engage with ideas, demonstrate creativity, problem-solve and work effectively in a variety of contexts. Yet this failure of many students to fulfil their potential can be remedied provided sufficient attention is paid to support students to transform their ideas about learning (Boud 1995).

When students first enter university they often bring with them a number of ideas and expectations about how to succeed at university [ie. their personal 'learning history']. Embedded in this history is the notion that they are undertaking a new " learning apprenticeship", that requires them to imitate the knowledge, values and attitudes of

university staff (Perry 1988). This notion is grounded in their past experience at secondary school where they learnt rules of engagement – learn particular sets of information in the manner required (West 1988). Their ‘reward’ was achieving entry into university. Thus newly arrived undergraduates look to their university teachers [in similar ways they viewed their secondary school teachers] to provide them with a new rules of engagement to enable them to succeed at university. These perceptions are all too frequently reinforced by the type of teaching and assessment methods they encounter during the course of their studies (Heywood 1989). Yet the notion that university teachers should be producing their ‘clones’ is seen as contrary to the ethos of university education, where ostensibly a premium is place on debate, discussion and individualism. Instead the discouraging fact is that for many undergraduates the teaching they encounter is confusing and contradictory. On the one hand they are told that university is ‘different’ from secondary school and that credit will be given to those students who demonstrate independent thought and engagement. On the other hand they receive little direct support to do this. Instead the teaching and assessment activities often actively militate against independent thought and engagement (Chalmers and Fuller 1996).

For the concerned undergraduate teacher the idea that students will over time realise their full potential can no longer be justified. Instead teachers need to make concerted efforts to support students to realise their full potential. Such efforts would include carefully analysing teaching and assessment methods that can be used to support the type of student learning desired by the teaching staff (Beard and Hartley 1984).

Project-based learning has been identified as a method that can be used to promote appropriate student learning, and as such is of particular interest for this study. The literature on project-based learning points to its potential in helping students develop abilities such as flexibility, adaptability and problem solving. The very abilities regarded as 'hallmarking' a successful university graduate (Cooper 2000). Like all other teaching methods project-based learning needs to take into account factors such as assessment, and the design and implementation of the project activities.

## **2.2 Learning and teaching**

In this section, discussion focuses on first-year university student approaches to and styles of learning. Included in the discussion is the role that the teaching approach can play in student learning.

### **2.2.1 Student assumptions about learning**

When students first enter university they bring with a set of assumptions about how to succeed at university and their own 'learning history' (a condensation of the student's past learning experiences). An important element of this learning history is the student's ideas about the nature of learning and how it can be achieved (Prosser and Trigwell 2000). These ideas have been described as the student's 'conceptions of learning'. The idea that students have a particular set of ideas about learning comes from Saljo (1988), who identified five conceptions of learning. Subsequent research work confirmed and deepened Saljo's ideas, with the addition of a sixth



conception of learning. Chalmers and Fuller (1996) summarise the six conceptions of learning as follows:

**a) A quantitative increase in knowledge**

Here learning is conceived as a two-fold activity. First the student strives to gain as many facts and knowledge about the particular subject and then retaining such knowledge. Learning is seen as a process of accumulation and what separates the novice from the 'expert' is the difference in the amounts of knowledge and information that each has at their disposal.

**b) Memorising and reproduction**

Learning is conceived as storing amounts of information and facts. The student has no 'personal link' or ownership with the information and facts they have learnt. They will recall the information and facts from memory when required — such as in a test situation — but the information and facts remain external to them. In other words it is not what they have learnt that matters but that they have successfully stored it and can recall it when required.

**c) Applying knowledge**

Learning is seen the process of accumulating knowledge, skills and technical ability to be used as and when required. As with memorisation /reproduction learning is still conceived as an external

activity. Learning is not conceived as something that can and should change the way in which the person conceives their world.

**d) Making sense or abstracting meaning**

Learning is conceived as an activity that is aimed at acquiring information and knowledge to make sense by filling in the gaps in the learner's knowledge base and by helping answer questions /issues of the wider world. In other words learning is the activity aimed at helping students relate new knowledge to their own experience, as well as constructing a broader understanding of the world outside the classroom.

**e) Interpreting and understanding reality in a different way**

Learning is viewed as an activity that can culminate in a changed understanding or comprehension. Learning is seen as enabling the student to use knowledge across contexts and understanding linkages and new connections where they were previously not apparent before.

**f) Changing as a person**

Learning is understood as a transforming activity that should change the learner's world. In this conception of learning the student recognises their personal responsibility to fully immerse themselves in process of learning and to carve out a role as a knowledge builder.

These six conceptions are helpful pointers to teachers who are genuine about wanting teaching encounters with students that are mutually

satisfying and productive. The first three conceptions serve to alert the teacher to the fact that they are essentially about fact gathering and knowledge acquisition with limited application. Conceptions four to six are about the potential that learning can play in modifying and even changing the world of the learner. Whatever conception of learning a student lays claim to will powerfully affect how they tackle their learning and their willingness to engage with and ultimately incorporate new ideas of recognising and understanding the world.

How students learn is one the complex facets of the teaching and learning environment. There are two helpful ways of categorizing how students' learn: student approaches to learning and student learning styles. Together these two categorisations usefully describe and explain how students learn.

### **2.2.2 Student Approaches to Learning.**

When students first enter university they bring with them a 'way' or an approach to learning/studying. In the 1970s Marton undertook what subsequently became recognized as seminal research into the relationship between learning task and student response (Marton and Ramsden 1988). The key conclusion of this research was that students adopted a particular approach to learning and it was the approach to learning that crucially affected student learning responses. Subsequent research identified three such approaches: *surface*, *deep* and *achieving*. (Jacques, 1995).

A surface approach to learning is one most characteristically adopted by a student who has recently completed their secondary school education. The emphasis in this approach is on memorisation and the

rote recall of factual information. The surface approach is closely linked with the “banking” notion of learning. The notion here is of students storing appropriate “deposits” of information that will time be “cashed” at a particular time [in answering an examination question or class assignment] (Freire and Shor 1987). The student seldom demonstrates a wider interest in the subject material, believing that their learning task is to complete a series of discrete and unrelated assessment tasks, within a specific time frame. Once the assessment tasks are complete the student has no further use for the material. A student who adopts this approach to learning generally conceives learning in quantitative terms, and learning seems not to change or deepen their ideas about themselves or the world outside the classroom (Biggs 1987).

With a deep approach to learning the student demonstrates a personal interest in the subject matter. The interest here goes beyond meeting the external demands of assessment. Typically the student wishes to develop a wider understanding of the subject. The particular course material becomes the entry point for the student for further exploration. The goal is not merely memorisation or factual recall, instead the student works towards develop a comprehensive grasp of the ideas and explanatory concepts that under-gird the learning material. Thus the student who adopts this approach seldom demonstrates the factual precision of the surface learner. Instead the student has ‘internalised’ the ideas and unifying themes of the learning material, and is able to use the material in a highly versatile manner, and for a much longer period of time. A student who adopts this approach has a qualitative conception of learning (Eley 1992 and Brown, Bull and Pendlebury 1997).

The third approach to learning is the achieving approach. Here the student adopts a strategic response to learning and assessment tasks. It is a far more sophisticated approach to learning than is the surface approach. The student who adopts this approach is highly motivated and organised, and is committed to achieving success through the strategic use of learning techniques. Such a student will carefully analyse the learning and assessment tasks. If these tasks require factual recall of content, the student will ensure that they are able to do so. If another assessment task requires them to collate and apply knowledge they will do so. Despite their ingenuity the achieving learner, like surface learner has only a quantitative conception of knowledge. A student who adopts the achieving approach to learning is in effect a sophisticated surface learner, since like the surface learner, he essentially values knowledge only for its utility i.e. its value in helping them complete the learning/assessment task (Biggs and Moore 1993).

Thus a student, who believes that learning is about accumulating and retaining such knowledge through memorisation and reproduction, will readily adopt a surface approach to learning. The student, who assumes that learning is not only about accumulation and memorisation, but also about application, would most likely adopt an achieving approach to their learning. While more a sophisticated approach to learning, than the surface approach, the achieving approach is still limited. This is because learning is still viewed in essentially quantitative terms (Entwistle, Odor and Andersen 1988). A student that assumes that learning is geared towards changing an individual's world-view, and as well as enhancing their capacities of abstraction and interpretation, is a student who would adopt a deep approach to learning. This qualitative understanding of learning

represents the highest level of learning and should be the goal of all learning and teaching at university (Brown 1993).

### **2.2.3 Further Exploration of Deep Learning: contextual challenges**

As has been argued deep learning is regarded as the most appropriate form of learning at a university, as it is the type of learning that most adequately prepares a student for life beyond the institution. A life characterised as purposeful and deeply engaged and avoiding superficial generalisations of problems and situations [Boud 1995]. Yet deep learning amongst most undergraduate students is not readily or easily achieved. In essence this lack of achievement can be attributed to a number of contextual obstacles that can militate against such learning.

In many departments academics are not interested in changing their approaches to teaching in order to improve the quality of student learning. For them undergraduate teaching is diversion from what their 'real work' is –academic research and it is success in the area of research that leads to academic accolades and all important promotion. Indeed one of the powerful motivations for academics to seek senior promotion is to enable them to jettison undergraduate teaching and to sequester the time from such teaching to invest in further research (Johns 1997). Thus when they are confronted with undergraduate students they manage their classroom teaching in ways that are most comfortable and familiar to *them*. The ways chosen are those they themselves observed and experienced as undergraduates. They lecture, draw up reading lists and examine in ways that place students on the

margins. Moreover most academics seldom reflect upon or research how their teaching practices impact upon student learning. Such reflection and research is viewed as essential 'vocational' and is not perceived as carrying the same scholarly 'weight' as 'real' research. Added to this if 'good' teaching does take place it is often only evident to students and thus largely an 'invisible' investment from the staff member concerned (Prosser and Trigwell 1999)

Because good teaching practice is not of intellectual interest in most departments, the promotion of such teaching within the university has been largely relegated to 'specialised' units on the margins of the academic mainstream. These units are often only contacted by 'mainstream' academics when these academics face teaching 'difficulties' [e.g. 'my students can read, write or learn and can you help them?']. Thus teaching 'difficulties' are seen as not part of an academic's life. Instead these difficulties conveniently located outside the academic's sphere of responsibility. In other words someone else needs to ensure that students are able to cope with the teaching provided (Bowden 1988).

Flowing from this generalised lack of interest in good teaching practice is the lack of co-ordination of teaching and learning activities that can help students develop into deep learners.

This lack of co-ordination means that students are faced with a variety of conflicting teaching and learning requirements on a daily basis (Laurillard and Margetson 1997). For the student, often without faculty support, is then required to sift, sort and balance these different requirements, and often under pressure. It is little wonder in the face of these conflicting demands they revert to known strategies of '

learning survival'. This assumption of a survival strategy means that students are hesitant to start exploring new ways of learning. Instead they believe that the way to cope with these increased and conflicting demands is to become more proficient 'surface' learners by rote learning ever increasing amounts of facts and information (Andreson 1994).

Notwithstanding the difficulties outlined above alternative ways can be found for at least reducing the impact of contextual obstacles by establishing learning contexts that can help foster aspects of deep learning by:

- Underlining the importance of the individual learner
- Creating a supportive learning context

a) Underlining the importance of the student as an individual learner

When a student first enters the university, they often do so with a sense of achievement and value. Teachers need to help sustain this by underlining to students that they do matter as individual learners, notwithstanding the large class sizes. This sense of individual importance can often be lost in large classes where an individual student is often feels 'absorbed' within a large class. (Thompson 1998) Conveying this sense of importance can be done in simple ways, such as indicating availability for personal consultations, encouraging students to ask questions either during or after lectures or via an email correspondence. The personal consultation is probably the facility that can be most effectively used to convey to students that their learning needs are important. An additional resource is the use of staff and student 'mentors'. Mentors are useful 'sounding boards' for students



when it comes to personal and academic issues. A mentor system can have the added value of alerting academic staff to students who might be 'at risk' academically and could benefit from formal intervention to help them address their concerns (Fisher 1994).

By creating this sense of importance students are given a strong incentive to achieve more than the bare minimum. In the case of extrinsic motivation the focus of the student is usually on simply passing and restricting learning to just that. Extrinsic learning is highly instrumental and a 'detached' activity, that does not lead to any significant personal investment. The counterfactual of extrinsic motivation is intrinsic motivation (Entwistle 1990). Here the student is personally motivated and wants to develop a level of 'expertise' beyond the course requirements. The focus of the learner is on identifying their own 'gaps in knowledge' and seeking ways of filling these gaps to facilitate a greater level of knowledge elaboration. Key signs of such knowledge elaboration include the ability to demonstrate definitional comprehension of key terms and ideas, and the skills to identify and recognise the difference between assumption, opinion and fact (Pask 1988).

#### b) Creating a supportive learning environment

One of the difficulties that students often encounter is that their learning environment is not as supportive as it could be and students are made to feel that their needs are at best only partially catered for (Taylor 1997). The establishment of a physical environment to support student learning might appear to be a self-evident 'given'. However the reality of learning in large institutions is that provision for students to learn on their own [i.e. outside of scheduled teaching activities] is

seldom readily available and students are often forced to compete seat in the institution's library. Similarly there is often limited student access to computer facilities, as these facilities are frequently in high demand for scheduled teaching activities (ibid.).

How the student timetable is designed can either support or undermine role as a learner. For example the provision for self-directed learning is often overlooked on the basis that students should do all such learning in their private time. Instead the teaching timetable is frequently made up of 'wall to wall' activities giving students little opportunity to reflect and 'digest' what they have encountered (Johns 1997). However scheduling time for self-directed learning would be beneficial to students in two important ways. Firstly it would act as a break against the tendency to overload the timetable to ensure that students are 'fully occupied'. Secondly it would signal to students that self-directed learning is 'officially' important and not merely an activity relegated to after hours activity (Knights 1998).

Apart from providing schedule time for self-directed learning it is also important to help students 'manage' their life as learners. A university environment is complex and at times bewildering, particularly for those students who enter it from the sheltered confines of secondary school. How students negotiate this complex environment will have a bearing on the quality of their learning (Chalmers and Fuller 1996). As their studies unfold students' find that there are conflicting demands upon their time and attention. For this reason it is important that they are given pointers as to how to deal with these conflicting demands. Students need to be alerted to the importance of establishing for themselves a set of academic and personal priorities, and developing a plan as how to meet these priorities (Biggs 1999). In effect students

need to develop their own personal timetable which details personal and academic demands and their associated timelines. Once students have developed this plan they have an overview of these demands, where the potential 'conflict of interests' lie and when they will be particularly busy. When developing this personal timetable, students should be encouraged to be realistic in determining what they can achieve. In other words student should schedule sufficient time to complete complex tasks, otherwise they will find themselves under undue pressure when attempting to complete these tasks (Toohey 1999).

Another aspect of negotiating the university environment is the student's role at various teaching activities. This role is frequently imprecisely defined and students are often required to learn their role through trial and error. Providing a degree of role definition contributes to students' sense of purpose when attending these activities (Chalmers and Fuller 1996). For example students often feel overwhelmed when first attending lectures and their instinctive response is to try and capture verbatim every word uttered by the lecturer. In this context the lecturer needs to provide students with pointers on how to take notes during lectures and how these notes can be linked with the reading that students will do outside of the lecture. Pointers are also needed when students attend tutorials and practical sessions(Wyrley-Birch and Wright 2003)

While it cannot be argued that the establishment of a supportive environment will automatically trigger deep learning amongst students but it will go a considerable way to provide an 'infrastructure of learning' that a motivated student can harness for their learning development.

In essence therefore, for deep learning to be fostered amongst students, there are a range of factors both contextual and personal, that need to be 'mobilised' so that students are engaged and then encouraged to move beyond the 'comfort zone' of routine learning into the more demanding terrain of personal engagement and deep learning.

### **2.2.4 Learning Styles**

Learning styles can be understood as the **strategy** students use to learn (Entwistle 1990).

In essence a learning style is a synthesis of a student's learning preferences tested and confirmed through habit and experience (Prosser and Trigwell 2000). Thus a student's learning style is one that has evolved over time and one judged by the student as being 'right for them' [i.e. allows them to 'succeed' as a learner]. One way of viewing learning styles is to see it as a repertoire of responses, that allows a student to respond in 'habitual' ways when completing learning tasks (Fry, Ketteridge and Marshall 2000).

The idea of learning styles has generated a number of descriptive models. The following have been identified as some of the leading models in the field and as such offers a useful overview of this way of seeking of describing students learning strategies.

|                                                                                                           |                                                                                                                                         |                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Honey and Mumford (1984) from<br><br>Brown, Fry and Marshall (2000)                                       | Wolf and Kolb (1984) from<br><br>Brown, Fry and Marshall (2000)                                                                         | Butler (1987) from<br>Brown, Fry and Marshall (2000)                                                                                                                                                    |
| Activists — are those who like learning situations that provide them with interest, challenge and novelty | Divergent learners — are those who use concrete experience and reflective observation to 'fire' their imagination to produce new ideas  | 'A' learners — are strong individualists who prefer to learn on their own by focussing on detail and meeting deadlines. Often lacks a wider perspective on issues                                       |
| Reflectors — are those who like time and structure to reflect on what they have encountered               | Assimilationist learners — are those who use abstractions to create models of understanding from a range of seemingly unrelated sources | 'B' learners — like the structure provided by lectures and invest effort in producing coherent learning notes. They like to work out linkages between ideas and concepts through systematic observation |
| Theorists — like to question, debate and interrogate issues by using a framework                          | Convergent learners — are learners who interrogate abstract ideas through active experimentation and practical application              | 'C' learners — like the novelty provided by new ideas and tends to accept them uncritically. They prefer to develop a broad understanding at the expense of a detailed understanding of issues          |
| Pragmatists — like learning activities that they can identify as relevant and of practical utility        | Accommodative learners — are those who use concrete and active experimentation to engage in new learning                                | 'D' learners — are social learners who like to learn in groups, drawing energy and inspiration from the group                                                                                           |

What is striking about these models is that student learning styles have been constructed in very *positive* terms, which seems at odds with perception that students struggle to realise their full learning potential. An explanation for this apparent contradiction can be advanced in that these styles can be understood as pointing to both the *habitual learning responses* of students as well their *learning potential*. Thus as adult learners [and given the appropriate encouragement] students can 'mature' by adopting a learning style(s) that is consonant with deep learning.

These models can therefore serve the purpose of alerting teachers to the need of designing teaching and learning activities that can use students' habitual learning responses as well as harness their nascent learning potential. Thus there will be times when a particular teaching activity will resonate with a student's learning style [such as the student who likes the structure afforded by lectures]. For this same student another activity [for example a project group] will be a source of discomfort to them as it requires them to move beyond their individual 'comfort zone' and engage with other students in order to learn. Alternatively the student who enjoys the variety and energy provided through groups can become bored and disengaged by the passivity imposed by lectures.

In essence therefore a single teaching or learning activity of its own will not be the 'magic bullet' that activates an appropriate learning style, but rather a range of different activities that requires students use or adopt a learning style that facilitates deep learning (Brown, Fry and Marshall 2000).

### **2.2.5 Teaching approaches to teaching**

In the same way students approach learning in particular ways so do teachers approach teaching in particular ways. The approach used by teachers consciously or unconsciously reflects their understanding of what role they should play as a teacher. (Evans 1990)

Generally speaking the approaches adopted by teachers can be divided into the *transmission approach* and the *two-way co-operative approach*. What tends to happen is that overtime a teacher 'adopts' a particular approach but includes within it aspects of the other approach.

In the *transmission approach* the teacher is in complete control of the learning situation. The role adopted is that of imparting information, concepts and knowledge. Students occupy an essentially passive role and are expected to successfully 'collect' and retain what has been imparted. To help facilitate this process of collection students can ask questions of clarification. The task of knowledge retention and understanding is expected to happen in the student's study time. Reinforcement for this approach often occurs with the type of assessment activities chosen. These activities are usually geared towards factual recall of information and concepts, with assessment activities seldom requiring students to actively apply such knowledge in an innovative situation, or critically examine the information or concepts provided by the lecturer (Chalmers and Fuller 1996).

The transmission approach to teaching with its focus on imparting/transmitting knowledge is essentially a continuation of the secondary school approach to teaching. Like at secondary school, the university teacher is the guardian of all knowledge and information. The notion is that the student will become a successful learner by

absorbing the knowledge and understanding provided by the 'experts'. In essence the teaching/learning interaction between the teacher and the student is carefully scripted and managed by the teacher (ibid.).

The *two-way approach* is based on a partnership between the teacher and student. The teaching approach strives to build on the pre-existing knowledge base of the student. The concern of this approach is more than the development of the student's reservoir of knowledge. Its concern extends to development of the student's critical thinking and problem-solving skills, so that the student is able to construct and formulate their own knowledge base, and engage the world using the knowledge constructs derived from a recognised conceptual framework. Assessment is geared towards testing understanding rather than the factual recall of information (Brown 1993).

In the two-way approach teaching is viewed as encouraging students to devise their own understanding of the world, and are regarded as "knowledge makers" in their own right. Teaching is viewed as a partnership between the student and teacher, where learning is an open-ended activity, not one controlled and managed by the teacher. It is this approach to teaching; that is, most appropriate for university learning, because it is an approach that implicitly encourages students to adopt a deep approach to their learning (Schon 1987 and Lewis 1993).

### **2.3 Encouraging students to adopt a "deep" approach to learning.**

Assumptions about learning, learning styles and the teaching experienced by a student can powerfully influence the learning



approach adopted by a student. In the perfect learning and teaching world every student would automatically adopt a deep approach to learning. The reality is that students need to be actively and consistently encouraged to adopt a deep approach to learning. Without this active encouragement students will most likely adopt a learning approach most congenial to them, with strategic modification when required (Warren 1997).

For any teaching enterprise to encourage students to adopt a deep approach to learning, the following elements need to inform such an enterprise. They are *student motivation*, *active student participation*, *student interaction with each other*, and *knowledge development by students* (Gibbs 1992).

#### **a) Student motivation**

The teaching and learning environment can powerfully contribute towards student motivation and the adoption of an inappropriate learning approach. If the teaching staff are committed to encouraging a deep approach to learning, the learning tasks and context needs to be both challenging of and supportive of students. Thus motivating students is not a simple matter. To do this, a learning task needs to challenge students by signalling to them that the task requires more than the mechanistic completion of it. In addition the learning environment needs to encourage and support students to take risks, and to develop a personal interest in the subject area. A powerful way to encourage student motivation is through the appropriate use of assessment and feedback (Barker 1988). They can more easily understand the link between learning and assessment when

assessment is accompanied by constructive feedback that acts as “sign posts” pointing out to students what learning areas (be the knowledge, skills or attitudes) need further attention. In this way students view assessment in a holistic way, understanding that it can contribute towards their development as learners. Student motivation is also encouraged when assessment is viewed as an integral part of their learning. For staff dealing with a large cohort of students the particular challenge lies in devising an adequate assessment/feedback system that provides students with the necessary information and constructive encouragement but does not overwhelm them with an avalanche of additional marking (Newstead and Hoskins 2000).

#### **b) Active student participation and student interaction**

Student interaction with each other requires the development of a lively partnership between the learners themselves and the teaching staff. Here students become “stakeholders” in their learning, and not passive recipients of “received wisdom” and expertise (Schon 1987). To achieve such participation requires that students have structured contact with staff and other students. This structured contact is of particular importance in courses where there are large numbers of students and the whole-class lecture is the primary method of teaching. The whole class lecture format can be a forbidding and isolating experience for students, particularly if they do not know many of the other students in their class. This sense of isolation does not encourage active student participation. A student’s isolation can be reduced through the use of structured exercises (Gibbs 1996). Typically these exercises require students to work together in pairs on a number of questions, and then to report back to the lecturer and the

rest of the class. These exercises serve a two-fold purpose; they can reduce a student's sense of isolation, and secondly create the opportunity for the student to actively engage with the learning material (Ashcroft and Foreman-Peck 1994).

Another effective vehicle for encouraging student participation and interaction is the small group. For the small group to realise its potential to encourage student participation and learning, the importance of the group in facilitating learning has to be made clear to students. In other words group attendance and participation needs to be seen by students as being as important as attending a lecture or laboratory session. Ensuring that groups are fully integrated into the teaching programme and are well facilitated with relevant tasks can underscore the importance of the group (Gibbs 1995b). This means that careful thought is given to what will be accomplished when students meet together in these groups. The teacher's responsibility centres on the development of a set of learning tasks to be completed by students in their small groups. The tasks are constructed in such a way that the collective knowledge and understanding of the group is harnessed to complete these tasks. Through this deepened understanding students would be able to interact with the course content in a more meaningful and conceptually coherent fashion (Race 1998).

Group size plays an important role in student participation and interaction. Research evidence suggests that whenever possible a group should not exceed eight in number (Johnson and Johnson 1994 and Jacques 1995). The reality is that group size is often decided on the basis of available teaching resources i.e. on the number of people available to do group supervision. This frequently means that students are placed in a group that has more than eight students. In these

instances, the task lies in designing learning activities that encourage student learning and interaction within a large group. For example the students can be divided into a number of sub-groups. Each sub-group is required to work on a series tasks/questions. Within these sub-groups students have the chance to explore and debate issues and ideas. On completion of the set tasks/questions a nominated student from each sub-group then reports back to the larger group on the ideas and answers generate by their sub-group. An effective option is to ensure that each of the sub-groups is given separate tasks/questions. This avoids the situation arising where sub-groups repeat each other when they do their report backs to the rest of the group. Wherever possible students should be able to join the group of their choice. This right of choice gives students a feeling of being valued, and this in turn creates a constructive attitude towards group participation. To facilitate student interaction within their groups it is important to spell out to students their tasks and obligations. Group interaction seldom happens spontaneously. Students need to know that they need to prepare for the group by completing their “home work” prior to the group meeting (Ashcroft and Foreman-Peck 1994).

### **c) Knowledge development by students**

Students can never take up the challenge of becoming active learners without “constructing” an appropriate knowledge base. In essence students construct their knowledge and understanding of the world through interactions with their environment. This knowledge construction is deeply influenced by student ideas of what constitutes learning and its role in preparing students for the world beyond the classroom. “Metacognition” is the term used to describe how students

go about constructing their knowledge base (Biggs 1999). Through metacognition a student is aware of their own particular thinking and learning processes, their role as a learner and how cognition is controlled. Through metacognition, a student's knowledge domain is developed. This knowledge domain can be divided into three aspects, declarative knowledge, procedural knowledge and conditional knowledge.

Declarative knowledge encompasses what is naively recognised as "knowledge" (such as facts, paradigms and argument). Procedural knowledge is about knowing how to undertake a particular action or activity. The use of a mathematical formula to solve a mathematical problem is an example of procedural knowledge. Conditional knowledge is knowing when and how to use declarative and procedural knowledge appropriately (Brown 1993.)

Mature students are more adept at using conditional knowledge, and often experience frustration in courses where the teaching and assessment emphasises declarative knowledge and its mechanical exposition (Boud 1995). By the same token students who have recently left secondary school, value teaching and assessments which allow them to demonstrate their grasp of declarative knowledge (i.e. rote recall of facts and figures). Use of these three knowledge domains, is guided by three metacognitive processes – *planning*, *monitoring* and *checking*. Planning occurs at the start of a learning task, it is at this point the students set learning targets, reviews potential learning strategies, draws on existing knowledge, and decides what type of knowledge (declarative, procedural or conditional) is needed to master the learning task. Monitoring is the process that a student undertakes to review their learning. This review usually includes self-testing their

grasp of new information and comprehension, as well establishing if they have integrated this new knowledge and comprehension within their existing knowledge base (Barker 1988).

Through the process of monitoring students informally reflect on the effectiveness and efficiency of their learning, by comparing what they have learnt against their learning goals. If after this reflection students believe they are not achieving their learning goals, students will take corrective action, by example, speeding up the pace of their reading, or by revisiting content where their comprehension was found to be inadequate. Students also monitor their learning by discussing their learning and understanding with other students. This dialogue is used where students are struggling to understand and comprehend a difficult set of ideas or a theory, and so seek out other students whom they believe could provide them with the explanations and comprehension they desire (Enwistle, Odor and Anderson 1988).

### **2.3.1 Teaching methods and activities that can be used to foster deep learning**

The commitment to encouraging a deep approach to learning has implications for the teaching methods used by staff. In instances where the teaching staff are required to teach large classes the following methods can be used to promote a deep approach to learning amongst students.

### **a) The modified lecture**

Without modification most lectures encourage students to be passive learners. Proponents of this type of teaching argue that it is the most effective and cost efficient way of teaching. One staff member is able to 'teach' a large number of students and cover a predetermined amount of material. Research evidence indicates that the quality of student learning is severely compromised. Firstly such a lecture format seldom gives students the chance to engage deeply with the material as they are often too occupied with the task of trying to obtain a verbatim account of the lecture. Secondly student attention levels vary during lectures so that often students often only remember what was lectured at the start and the end of the lecture. Thirdly how a lecturer lectures influences students. There is an implicit assumption that lecturing a large class becomes easier with experience and over time a person will become proficient and effective lecturer. The reality is that few people are 'natural' lecturers and it takes effort and inclination (Brown and Atkins 1988).

In situations where a large class lecture has to be used (because of a lack of alternatives and teaching resources), modifications to this format can encourage greater student involvement in their learning. Firstly it is important to recognise that students are not automatons and so the lecture should be structured to vary the requirements placed on students. Secondly the lecture should not flood students with a complex host of ideas and concepts. They should be given the opportunity to unpack these ideas and concepts. This can be achieved through the judicious use of focused questions or problems where students in pairs/groups work on a set of questions/problems during the lecture period (Gibbs, Habeshaw and Habeshaw 1984). This is

complemented by a period of feedback where students and the teacher discuss and comment on student answers (Gibbs and Jenkins 1992). By using questions/problems and feedback in this way can help to ensure that lectures have a component of active student participation. Thirdly lectures should provide students with a clear framework so that students not only integrate the lecture material within this framework, but this framework can be used when they are engaged in other learning activities [such as reading/studying]. By so structuring a lecture and using a variety of activities the lecture can be transformed into an arena of active student learning (Beard and Hartley 1984).

#### **b) The tutorial**

Tutorials are often used in tandem with lectures, as the means where students can discuss and clarify ideas that have been identified in lectures. However for the tutorial achieve this goal requires planning and structure.[Without such preparation students will often view the tutorial as a lecture in miniature and expect the tutor to 'hold forth' while they take notes and ask questions of clarification]. For tutorials to succeed in students need to be given appropriate support to make maximum use of the tutorial. Such support can include the provision of carefully constructed guide questions that students can use to review the lecture material and their prescribed readings. Secondly to help facilitate students discussion and participation during the tutorial certain students could be asked to lead the discussion at the forthcoming tutorial. For novice students they would need to be given guidance as to how to prepare and lead a tutorial discussion. The learning achieved in tutorials can then be reinforced through the use of tutorial assignments. Thus by participating in tutorials and completing



assignments a student would be in the position to consolidate and deepen their knowledge and understanding (Bochner, Gibbs and Wisker 1995).

### **c) Project activities**

The purpose of this teaching method is to enable students to acquire a body of knowledge and then to apply such knowledge in answering a set of questions or solving a set problem(s). Properly designed projects can give real expression to the commitment to move away from a transmission approach to learning and teaching, and promote a deep approach to learning amongst students. This can be done through designing the project tasks and instructions in such a way that the students (and not the teaching staff) are responsible for developing their own knowledge base and information (Jacques 1989). This shift in learning responsibility from staff to student can provide critical impetus for students to engage more deeply. Secondly, the project tasks can guide students towards developing a qualitative understanding of their project topic (Stone 1994). Of all the methods outlined projects are of particular interest. (This method will be discussed further and explored in greater depth later in this chapter).

Through the use of the modified lecture, the tutorial, projects and related activities the teacher can harness the different learning styles used by students. Diversification of teaching methods is key here as no single teaching method holds the key to unlocking the learning potential of students. The challenge from a teaching point of view is to help students use a range learning styles that enables them to become deep learners. For students this could mean a modification or change

of their preferred learning styles. Thus a student who prefers the structure and containment [afforded by a conventional lecture and structured laboratory activities] can be helped to see the learning value provided by the ebb and flow of ideas that takes place during a modified lecture or a tutorial. Similarly students who prefer to learn by themselves can be encouraged to value and use group learning that occurs within projects activity.

#### **d) Related Activities**

To help consolidate the learning and enquiry that takes during scheduled learning activities, student can be helped to become 'active' readers. Reading is an integral part of learning at a university yet students are frequently given little formal instruction in how to develop reading skills that help them effectively sift, sort and assimilate what they have read. Yet without such skills students seldom satisfactorily complete the assigned readings. Active reading means that students are thinking about what they are reading by asking questions such as:

- What questions do I want answered?
- What ideas/understanding can I use to help understand the reading?
- Can I follow the writer's arguments and the evidence used to support these arguments? (Beard 1972).

Concept mapping and jigsaw reading are two activities that can be used by students to facilitate active reading. Through concept mapping

students draw a circle within which is a key concept. Related ideas are linked to the key concepts like the spokes of a wheel. Each idea [spoke] can be cross-referenced with notes derived from readings. As the student reads more additions and modifications are made to their 'map'. Over time the map can provide the student with a useful summary of what they have read as well as the means to make links between ideas. Jigsaw reading is an activity of encouraging active reading in groups. Here the students are given a portion of a complex article to read and are asked to make a summary. In groups the 'pieces' of the article are pieced together through discussion and debate. Through this activity students can learn from other students the various ways of interrogating an article and how to measure their level of understanding (Ashcroft and Foreman-Peck 1994).

In essence therefore the promotion of deep learning amongst students is not a 'once off' activity but requires teachers to skilfully use a variety of methods and activities [e.g. the modified lecture, concept planning and jigsaw reading] on a continuous basis, to encourage students along the path towards deep learning. At times students will give signs of having moved along this path but on other occasions they will 'retreat' and resort to familiar 'learning styles' and want to learn everything 'by heart' and so require from their teachers 'facts' and complex ideas reduced to simple and understandable nostrums (Marton and Ramsden 1988)

### **2.3.2 Assessment and deep learning**

An important catalyst for encouraging appropriate learning is how student learning is assessed. Assessment is arguably the most prominent influence on the quality of student learning. It is in effect,

the lodestar that students use to guide them when making learning choices. Thus if the assessment requirements are such, that students are rewarded for demonstrating superficial knowledge and understanding, then that is exactly what most students will do. It is therefore of fundamental importance that the chosen forms of assessment are those that encourage appropriate learning from students (Biggs 1999, Brown and Knight 1995, Brown, Bull and Pendlebury 1997).

A central characteristic of effective assessment is that it should be consistent with a course/programme's objectives. Thus if a course's objective is that at the end of the course students should demonstrate problem-solve abilities and within a group context it makes little sense to require students to demonstrate factual recall in a closed book examination. Yet obvious as this point may seem the teaching staff often opt for what is familiar rather than devising assessment activities that match their course objectives (Wakeford 2000).

There are any number of ways that students can be assessed but the forms of assessment can be categorised under two headings; formative and summative assessment. In formative assessment the purpose is to establish how students are progressing. The feedback that occurs is useful for both students and teachers. In the case of students they can be informed of gap in their knowledge and understanding (Brown and Knight 1995 and Evans 1990). In the case of teachers the feedback can signal to them whether or not the learning activities are succeeding. In the case of summative assessment grading a student's knowledge and abilities is the point of the exercise. In effect a judgement is made about a student's learning performance. Given the difference in purpose between formative and summative assessment it is important

wherever possible, to use them separately. Formative assessment if it is to achieve its purpose of constructive feedback, should, strictly speaking, not be associated with grading a student's performance. Since the point of this form of assessment is diagnostic, to encourage students to take risks and to be open about the gaps in their knowledge and understanding. If such feedback becomes too closely associated with mark allocation, students quickly learn not to take risks and disguise their lack of knowledge and understanding. In practice in most teaching situations, formative and summative assessment are merged together. Thus a hybridised system of assessment is frequently used where feedback and judgement are simultaneously provided to students (Brown, Bull and Pendlebury 1997).

Since assessment is about making a series of judgements about student learning it can be argued that students need to be involved where possible in assessment. Traditionally this has not been the case. Instead teaching staff have exercised complete control over the process, making little effort to disclose criteria that would be used, or how these criteria would be applied except in the most generic terms. The effect of such an assessment process is to de-motivate students and leads them to view the learning opportunities as a series of hurdles to be overcome, and once overcome, to be forgotten (Heron 1995). A useful way to achieve 'student buy-in' around assessment is to require them either as individuals or as a group to mark each others work [such as laboratory reports, posters and short answer questions]. In this arrangement students mark the work using a markers' guide. There are a number advantages to this arrangement. Firstly students develop an insight into what was actually required by the particular assessment activity. Secondly they begin to understand some of complexities and

ambiguity that assessment can throw up. Thirdly through reading and marking another student's work their own understanding can be deepened. Fourthly it can sharpen students' critical faculties as they are required to make an 'informed' judgement of other students' work (Rowntree 1987).

Apart from the issue of including students in the assessment process, there is also the matter of the frequency of assessment. There is little doubt that impending tests or examinations tend to focus the attention of students. If the class test or examination followed up by constructive feedback, there is a strong likelihood that students will use the feedback to guide their learning. Frequent assessment, however, can tend to have a debilitating effect on student motivation and learning. With little time to reflect on, and consolidate their learning, students quickly adopt effort-reducing strategies that enable them to meet only the essential requirements of the course/module (Torrance 1994). Frequent assessment can also have a negative effect on the quality of feedback given to students. This is because it can become a 'tread' mill for the teaching staff. The initial commitment to provide accurate and constructive feedback to students quickly vanishes as staff find themselves caught within a seemingly never ending cycle of marking (Beard and Hartley 1984).

### **2.3.3 Project-based learning**

As mentioned in Chapter One project-based learning is used within a number university teaching courses/programmes. This use by the teaching staff can in part be explained by its utility. Firstly project-based learning can be used to efficiently organise groups of students to complete a learning task. Secondly it can be used to

distribute the responsibility for completing a teaching/learning task between students and staff. Thirdly it can give students the opportunity to acquire skills, capacities and confidence that are the hallmark of a professional graduate (Adderley, Ashwin, Bradbury, Freeman, Goodlad, Green, Jenkins, Rae and Uren 1979).. Morgan, in his discussion, of project-based learning, speaks of a project as “an activity in which students develop an understanding of a topic or issue through some kind of involvement in an actual (or simulated) real-life problem or issue and in which they have some degree of responsibility for designing their own learning activities”(Morgan 1984, p.221).

In his typology of project learning Morgan identifies three models of project work; the project exercise, the project component and project orientation. The *project exercise* is the most frequently used model of project work. Typically a student (or group of students) engages in a piece of supervised research. The aim of the project is to require students to use existing knowledge and skills in a familiar field. Through the project exercise students undergo an “apprenticeship” in research.

The *project component* is more ambitious, since the aim of the project work is to enable students to engage in inter-disciplinary study by requiring students to integrate knowledge from a variety of sources. In its most sophisticated form the project component would require students to build hierarchically upon their existing knowledge and skills (Brown 1993).

*Project orientation* is the most advanced model of project work (ibid. pp. 222-224). This is exemplified by the teaching done at the University of Roskilde in Denmark. All students are required to register

for a two-year interdisciplinary study programme. Fifty percent of this programme is made up of project-based learning. Having completed this interdisciplinary programme, students begin to specialise, with project work continuing to form an important component of their structured learning activities. Moreover the university's physical environment has been explicitly designed to facilitate project-based learning. This has been done through organising the university into a set of self-contained units. These units house requisite number of staff and have the necessary group rooms for students and a canteen (Cooper and McMillan 2000).

There are a number of reasons why teachers use projects in their courses. Projects can help students to:

- Develop a range of personal and transferable skills. A project can be the catalyst for a student developing process skills [problem formulation, numeracy and literacy], presentational skills [data presentation and report writing], management skills [project-planning, working with others and problem-solving] and personal skills [self-reliance and self-enquiry].
- Undertake a specialised study in an area. A project offers students the choice of research in an area of particular interest to them. Such choices are not readily available in many undergraduate curricula.
- Learn to recognise the link between teaching and research. Through working on a project a student can experience first hand the way in research informs teaching.



- Learn about research concepts and methods. By having to undertake a project a student is obliged to learn about explanatory ideas and the methods used to apply such ideas (Luck 1998, pp 136 – 140).

## **2.4 Planning for Project-based learning**

The numerous advantages claimed for project-based learning have to be carefully planned for. But even before such planning commences the staff member needs to be clear about:

- their own motivation for using projects and
- whether their students have the necessary skills and motivation [particularly if the projects will require students to work in groups] (Stone 1994).

Project planning is a complex process, involving three dimensions, *sound design, effective management and supervision*.

1. *Sound design* requires that that the project activities have been carefully designed in terms of clarity and consistency, appropriateness and learning relevance. One of the ways to achieve clarity and consistency is provide students with a set of guidelines. Such guidelines can vary from a simple set of instructions to a detailed set of instructions laid out in a project handbook. Without such instructions students will struggle to understand what is expected of them, and they can quickly become confused and de-motivated. Similarly if project activities assume a certain level of expertise from students where little exists and yet are expected to complete the project without

adequate support the project learning will be compromised (Clarke 1982 and Beswick 1997).

2. *Effective management* requires that amongst others, that, the following factors are taken into account: group size, physical infrastructure and student timetables. When a project is planned to be a group activity rather than as an individual activity, the size of the project group becomes important (see previous discussion). The physical infrastructure also needs to support project learning. Such an infrastructure should include “comfortable lighting, temperature, seating and ventilation... [and venues] conducive to small group teaching” (Taylor 1997, pp 62 and 105). The student timetable should be formulated in such a way that students are given the structured time to work together and on their own, to enable them to complete project requirements. Without this structured time students are seldom in a position to do justice to the project requirements (Williams and Horobin 1992).

3. *Supervision* of students is central in the successful implementation of project learning. An important responsibility of the supervisor is to help students develop into a co-operative unit directed towards completing the project tasks. The style adopted by the supervisor is a key element in helping students develops into a co-operative group. This is because students observe the way in which their supervisor interacts with the group. This “model” in turn serves as a pointer to the ways in which students can interact with each other. Heron (1989) has identified three modes of supervision [facilitation] of groups. These modes of supervision are hierarchical, co-operative and autonomous.

In the hierarchical form of supervision, the supervisor is actively involved in the life of the group and takes decisions for the group. The supervisor is closely involved with the group by clarifying issues/tasks, by helping the group structure its work, and can act as an arbitrator, when disputes arise between group members. In the co-operative form of supervision the supervisor works along side group members and works to create a “learning partnership”. In this partnership the supervisor’s contribution is influential but not necessarily decisive when it comes to group decisions. In practice the supervisor makes decisions with the group. In the autonomous mode of supervision, the supervisor uses their group skills to create a group environment where group members can exercise fullest level of self-determination and decision-making (ibid.). The form of supervision adopted by a staff member can be more fluid than might be first apparent. A supervisor might correctly decide that at the start of the project, students signal a need for strong hierarchical supervision, but once the project is in progress, the supervision would be directed towards encouraging self-directed learning through a more autonomous mode.

#### **2.4.1 Resource factors that influence the successful implementation of project-based learning**

In a perfect world teaching activities would be given the appropriate level of resources. Instead in the real world of higher education the goal becomes one of obtaining an essential level of resources. The challenge, therefore, lies in developing a formula that combines the three ingredients (design, management and supervision) in such a way, that project-based learning can be implemented even with limited resources (Luck 1998).

The single most important resource factor when implementing project-based learning is the cost of providing adequate student supervision. In a context where university administrators are continually demanding “value for money” / economies of scale, using one teacher to supervise a small group of students can be seen as uneconomical. This perception can be further reinforced if project-based learning is used with a large cohort of students. Additional costs are also generated if students are expected to conduct their project activities off campus. If decisions to resource teaching programmes are simply made on the basis of economy of scale project-based activities will never ‘win’ when compared to the economies achieved by whole class lectures. While project-based activities cannot be as ‘cost efficient’ as lectures, supervision costs can be contained by:

- carefully scheduling of supervision contact time
  - assigning appropriate workloads to supervisors
  - dividing the student cohort into manageable student groups
- (Gibbs and Jenkins 1992).

To achieve an adequate level of supervision also requires flexible allocation of supervision time. For example, during the initial phase of the project a supervisor could more intensively be employed to supervise their students. Once the project was established supervisor could reduce their contact with their students, without necessarily compromising student learning. Secondly this supervision time should be carefully structured to ensure that maximum usage is made of available time. To facilitate this supervisors can be given a set of

carefully devised guidelines that identify key tasks and issues that should be addressed during the periods of supervision (Stone 1994). Another aspect of supervision is the workload of supervisors. It is important to ensure that if supervisors are expected to assess their students' project work this is factored into the supervisors' workload (Jenkins 1997). When this exercise is done the types and levels of assessments are often modified and become less intense. Linked to the issue of adequate supervision is the matter of the availability of such supervision. For example in a department with a large complement of staff, project supervision might be accommodated within the existing teaching programme of the department. However in departments with a limited staff complement and a large cohort of students, the availability of project supervisors becomes an acute issue. This can be solved through the recruitment of part-time supervisors. The use of part-time staff comes at the price of "built in instability" (i.e. the continual need to replace such supervisors). This need to continually replace such staff is because they are usually modestly paid, and have to rely on other paid work to "subsidise" their supervisory work. This means that part-time supervisors are generally on the lookout for better-paid work (Warren 1997).

## **2.5 Assessing Students in Project Groups**

The effectiveness of the project method to encourage deep learning is not automatic. Research evidence on student learning indicates that most students continue to resort to surface learning or strategic learning if given the opportunity (Warren 1997). The teaching challenge lies in designing project learning in such a way that deep learning is promoted. Using project groups to facilitate student learning

can be beneficial for a number of reasons. Working in a group requires a student to use a number of skills (e.g. organisational and interpersonal), which they will rely on in later life (Miles 1981). To enable students to recognise and harness the learning benefits of project groups, the process of assessment needs to be able to assess both group and individual learning, as well as assess the contribution that individuals have made to overall performance of the project group. An assessment procedure that simply gives a global mark for a particular piece of project work (such as a project report) will do little to encourage student commitment to learning within a project group. Instead a range of assessment tasks will need to be deployed to ensure that individual and project learning are assessed. These assessment tasks will need to assess both project process as well as the project's "end products". On the matter of project process students can be required to submit a record of their project experience in which they describe and analyse their role and contribution in the project group (Gibbs 1995a).

Another way to assess project process is for the tutor to take the role of a participant observer, and for the tutor to make careful notes of the contributions made by students. Two variations on this form of assessment are group minutes and group diaries, where student contributions are recorded and can then be used for assessment purposes (Heron 1995). A further mechanism for assessing individual participation is the use of written and oral examinations. Here students are required to answer questions that are directly based on the completed project work. The assessment of the "end products" must also be varied. For instance if the group is required to submit a report, the report can be divided up into number clear defined sections, and

then specific students are given the responsibility for completing the section of the report. Alternatively, the group might be required to submit more than a project report for example give an oral presentation and complete a poster. In that case, the students have a greater choice when it comes to completing a particular assessment task (Brown, Rust and Gibbs 1994).

A final element to the assessment of project learning is the use of students to moderate individual student marks. Students can be useful co-assessors as they know who has contributed in the group, and who has “piggy-backed” on the rest of the group. To ensure that student moderation of individual marks works in practice, the procedure needs to be explained to students at the start of the project. Provided this is done, and measures are taken to prevent students from expediently awarding every one an average project mark, a range of student marks will then emerge, more clearly reflecting individual student contribution in the group (Ashcroft and Foreman-Peck, 1994).

The use of assessment is pivotal in realising the goal of encouraging a deep approach to learning through the use of projects. For this reason careful consideration needs to be given as to the purpose of such assessment. A careful balance needs to be struck between the use of formative and summative assessment, as well as the regularity of such assessment. Added to these considerations is the need to use multiple forms of assessment to encourage students to co-operatively learn in their project group.

Projects are a robust teaching method that can contribute towards developing a deep approach to learning amongst students in a context of resource scarcity. Nevertheless an essential resource threshold has

to be available for without such a threshold, no amount of ingenuity, astute management and sound project design will be able to compensate for such critical incapacity.

## **2.6 Conclusion**

The learning world of the undergraduate student is a world made up of a complex topography. Where in the past there has been the contention that students could successfully read, interpret and master this topography with minimal staff support, this contention can no longer be regarded as credible. For students to successfully complete their learning journey and become the skilled individuals capable of understanding their world in a flexible and responsive manner requires the focused attention of both students and staff.

How students learn is a complex matter and researchers have addressed it multiple ways. In this chapter how students' learning has been viewed in terms of *approaches* to learning and *learning styles*. However student approaches and styles of learning are not activated in isolation. On contrary they are activated, influenced and modified by the teaching approaches and activities they encounter.

'Deep learning' is regarded as central to development of the 'successful' university graduate since such learning provides the would-be graduate with the necessary knowledge, attitudes and skills necessary to confidently engage the wider world in a constructive fashion. For teaching staff the challenge is how to help the 'raw' [surface] learner develop into a 'mature' [deep] learner. Research evidence points to the need for staff to systematically review their approaches undergraduate teaching and use a range of teaching and



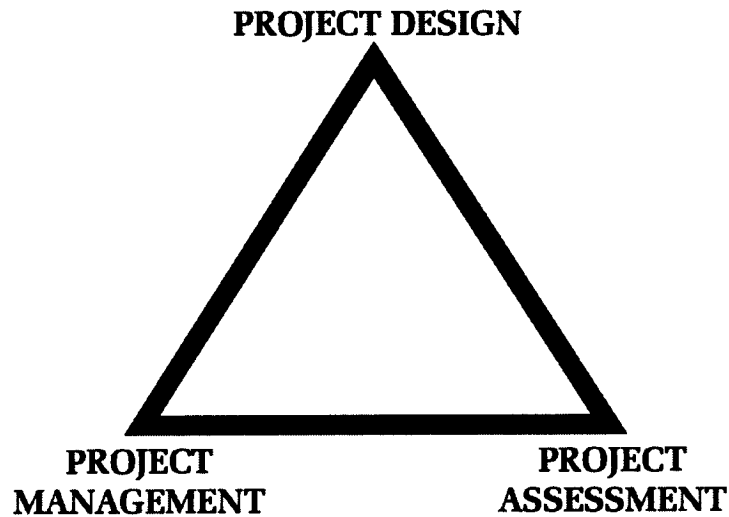
learning activities and clearly understand how assessment influences student learning.

Interested teachers can use a combination of carefully chosen teaching methods [such as interactive lectures, modified tutorials and project work] and properly designed assessment activities to create the conditions conducive to facilitating deep learning. By doing thus students will be provided with the necessary support for them to undertake the difficult and at times perplexing process of a learning metamorphosis.

Students also have an important role to play their own metamorphosis. Their ideas about the nature of university education and their learning styles can be modified and even transformed when students are motivated and have a sense of 'ownership.'

Of all the teaching methods mentioned project work [and more specifically project-based learning] *could* be a vehicle for promoting deep learning amongst students. Proponents of projects contend that it is a widely used as a teaching and learning method because it has many *potential* advantages [including the promotion of process and group management skills]. The fact that it is widely used does not of itself mean that the potential advantages claimed for it are also widely realised. As with all teaching and learning methods projects have to harness the three elements of design, management/implementation and assessment in such a way that deep learning amongst students is promoted.

A helpful way of understanding this harnessing process is to triangulate these elements.



Individually neither *project design*, nor *project management/implementation*, nor *assessment* should be seen as intrinsically more important than the other two factors. Instead these three factors have to be balanced with one another and have to articulate with each other.

*Project design* is one of the points of this triangle. In essence project design is concerned with structuring student learning through project activities/ requirements. To facilitate strong student engagement the activities and requirements need to:

- be explicit, coherent and educationally relevant
- create or support student motivation for and participation in project-based learning
- help students mature in their understanding of learning and their style of learning

- promote deep learning by engaging students in ‘higher order’ activities[e.g. comprehension and analysis] to facilitate knowledge development
- assess project work appropriately to promote deep learning

A second point of the triangle is *project management*. Through competent project management students are provided with an “enabling environment”. Project management comprises those activities that bring project-based learning to ‘life’. Activities included under this rubric are:

- selection and training of staff to support student learning
- preparing students for project-based learning
- providing project materials that supports student learning
- co-ordinating the timetable to facilitate project-based learning
- obtaining the necessary resources for project-based learning
- providing the necessary logistical and administrative support to students and staff

These ‘non academic’ activities are often overlooked or receive scant attention from staff. Yet without paying due attention to such activities project-based learning can be severely compromised.

The third point of the triangle is *assessment*. It is a truism that assessment is a key factor to shaping student learning. Which teacher has not encountered the vexing student attitude: What is the least I must do to pass or get a credit? Assessment can be a powerful

instrument to change such an attitude. Through the judicious use of differing forms of assessment, students can be actively encouraged to recognise that assessment is much more than simply “passing” but it is about giving students constructive feedback on how they are learning. Secondly assessment can help students engage strongly in project-based learning and develop a knowledge base that is characterised by its quality and depth of understanding. Thirdly the design of assessment is important especially when project-based learning is done in large groups. The task here is to construct a number of activities that can appropriately recognise work done by individual students as well as validating the *group dimension* of project-based learning. Fourthly the timing, amount and level of assessment activities should be appropriate so that students do not develop the idea that assessment is essentially a set of hurdles that they must surmount at particular times but has little connection with deep learning.

In essence project-based learning when properly triangulated can challenge and interest both students and teachers. From a student perspective project-based learning can provide an opportunity to:

- develop a new notions about how to learning and succeed at university
- trigger an abiding interest in topic/subject area
- develop or consolidate transferable skills
- serve as an ‘apprenticeship’ in how to work collaboratively in a group

From a teacher's perspective project-based learning can be useful addition to the 'arsenal' of teaching methods at their disposal.

Project-based learning can reinvigorate a teacher's interest in effective undergraduate teaching by giving them the means and opportunity to constructively engage students in their subject area. Moreover projects can allow a teacher to work closely alongside a group of interested and motivated students and break down the 'wall of distance' that can so often exists with a large cohort of students. Finally project work when properly designed, managed and assessed can give the teacher the opportunity of watching students produce project-based learning that is vital, of substance [depth], and worthy of the term 'academic'.

Why then do so many students graduate from university having failed to achieve their full learning potential, even though the key ingredients for successful learning and teaching are apparent? Perhaps the answer lies in the fact that while some of the ingredients are known, the 'formula' for foolproof and successful combination of these ingredients is yet to be elucidated and universally disseminated and accepted. This is because successful learning and teaching is a complex, multi-faceted and at times perplexing enterprise. Thus learning and teaching cannot be readily broken down into the requisite number of easily identified elements, but requires interest and perseverance from both students and staff. Where such interest and perseverance is not in evidence learning and teaching can easily become a hollow counterfeit that permits students to 'graduate' but in name only.

# **Chapter Three**

## **3.1 Introduction**

In this chapter I wish to explore both the nature of the research method chosen as well as how it was carried out in practice.

“Research is a most important tool for advancing knowledge, for promoting progress and for enabling man to relate more effectively to his environment, to accomplish his purposes and to resolve his conflicts” (Mouly quoted by Cohen and Manion 1984 p29).

In the field of academic research there are two broadly defined research traditions – the quantitative approach and the qualitative approach.

The differences between the quantitative and the qualitative approach to research can be summarised in terms of their ‘view of the world’. Generally put the difference lies in the way that the two approaches attempt to categorise and understand the world. For quantitatively focused researchers the strategy lies in dividing up the particular phenomenon into a number of discreet and manageable parts. These parts are then subjected to intensive and careful observation. For the qualitative researcher there is the recognition that the world is far too complex to be able to be effectively reduced to a set of component parts. Instead the qualitative researcher aims to understand in broad terms aspects of social phenomenon [Berg 1989 and Punch 1998].

The large divide that existed between the two approaches has now been recognised as a false divide. Instead there is recognition that each approach has its own set of strengths and vulnerabilities and the role

of the researcher is to make a considered choice by recognising the value of both research approaches.

Within the broad domain of qualitative research a range of approaches and methods of research can be employed. A prominent 'tradition' within qualitative research is that of ethnographic research. Many of the proponents of ethnographic research have in turn have relied on case study method to help them realise their research goals.

It is this self-same case study method that has been used to guide and develop the research work of this particular study.

### **3.2 Qualitative Research**

Qualitative research can be viewed as research directed towards providing *interpretative* explanations that help to illuminate one's understanding of social phenomena .The origins of qualitative research approach lies in the work of social anthropologists of early twentieth century. These anthropologists developed ethnography – the process of researchers immersing themselves [through participant observation] in the lives of the subjects they studying. In this way they were able to provide detailed studies of particular facets of society [e.g. research among “street corner boys” and an investigation of an “Italian-American” community” (Bryman 1993, p 45). What these studies highlighted was “ the rich seam of data” that emerged when the participant observer/researcher engaged directly with their “subjects” and were open to alternative ways of constructing and understanding social “reality”.

By the late 1960s [fuelled by the reaction against the rigid formularies of quantitative research] a new “alternative” research paradigm – qualitative research – began to evolve nourished and invigorated by the intellectual cross-currents of phenomenology, symbolic interaction, naturalism and ethogenics. The votive force behind these intellectual cross-currents was their rejection of the positivist notions of the world. (Bryman 1993 and Lancy 1993).

What then are the characteristics of qualitative research? Tuckman, (1988 p 388-389) using the typology of Bogdan and Biklen identifies five features of qualitative research in the following terms:

- “ the natural setting is the data source and the researcher is the key data-collection instrument
- it attempts primarily to describe and only secondarily to analyse
- the concern is with process, as much as with outcome
- its data are analysed inductively, as in putting together the parts of a puzzle
- it is essentially concerned with what things mean i.e. the *why* as well as the *what* “

From these characteristics it is evident that a qualitative approach to research recognises the rich complexity of phenomenon and sees the role of the researcher as aiming to capture some of this rich complexity through observation, description and interpretation. It is not the role of the researcher to reduce phenomenon to a set of predetermined and narrowly defined variables, rather the researcher is open to new ideas, insights and meanings of reality as the research process unfolds (Lancy



1993). This approach is also sufficiently versatile and accessible to provide a framework to coherently record the day to day and often disregarded aspects of life and work in such a way that it can trigger a fresh appraisal of the apparently banal and commonplace (Hitchcock and Hughes 1989).

### **3.3 Methods of Qualitative Research**

In the field of qualitative research three methods predominate and the particular method chosen depends on the type of research question(s) that wished to be answered:

- observation
- interviewing
- document analysis

#### **a) Observation**

Observation at its simplest is the activity of watching. So in one sense most people use observation to understand their world and therefore most people engage in some form of research. In the case where observation is used deliberately as a research tool there are a number forms of observation. The choice of a particular form of observation depends on how separated the researcher wishes to be from their 'field of study' (Burns 1997).

The 'complete participant' is a researcher who is completely 'disguised' from the research subjects and as far as they are concerned the

researcher is 'one of us'. The point of the disguise is to ensure that the presence of the researcher does not influence or alter the ways in which the research subjects behave or act. This research mode is often adopted when the research subject is controversial and the researcher is trying to obtain as closer approximation of the 'true situation' as possible (Glesne and Peskin 1992).

'Observer-as-participant' is where the research subjects know the researcher's identity. Here the researcher negotiates contact with the subjects and uses the access to record what goes on. The researcher becomes in effect the 'silent and observing eye'

This mode of research is often used when a group or institution commissions research on a particular issue and want the issue investigated by a neutral but 'authoritative party (ibid.).

The 'participant-as-observer' also discloses their identity to the research subjects but is not a neutral observer. Instead they actively interact with the subjects and then record this interaction with the full knowledge of the research subjects (Fraenkel and Wallen 2000).

The 'complete observer' is the most detached/removed form of observation. Here the researcher observes the research subjects from a distance and in such a manner the subjects are never aware that research is being conducted. An example of this is a researcher observing and recording the sessions of therapeutic group behind a two-way mirror. Of all the research modes this mode is potentially the most controversial as the rights of research subjects can be easily abrogated without them been aware of it (ibid.).

## **b) Interviewing**

Interviewing is the second method used in qualitative research. It is often employed to verify and or amplify the observations made by the researcher. In other instances the interview is used as the primary means of obtaining data. As in the case of observation there are different types of interviews: structured, semi-structured, informal and retrospective interviews (Hitchcock and Hughes 1989).

Structured interviews use a carefully designed set of questions that are organised in a very specific way to elicit meaningful information and answers. Frequently the structured interview with its bank of questions is the product of a process of review refinement. During the review process questions have been 'piloted' [i.e. pre-tested] in different forms to arrive at the most appropriate set and sequence of questions (Cohen and Manion 1984).

Semi-structured interviews also use a set of carefully deliberated of questions to generate research data. In addition to this an 'open dimension' is factored into the interview process. In this part of the interview the interviewer can ask a set of follow up or questions of clarification. These questions can be used to either:

- elicit new ideas/information from the interviewee or
- seek to clarify answers to previous questions.

Semi-structured interviews to be effective need to be used by an experienced researcher who is able to deploy unstructured questions in such a way that they elicit more nuance and 'texture' from their interviewees (Fraenkel and Wallen 2000, Hitchcock and Hughes 1989).

Informal Interviews appear deceptively easy. They appear on the surface to be like the ebb and flow of an 'ordinary' conversation. Here the task is to capture a sense of the 'immediate' [i.e. what is a person think about and responding to in the 'here and now']. From the researcher's perspective the value of such an interview is the possibility of capturing the uncensored ideas and feelings of an interviewee. To be able to do this the interviewer has to have the skill and dexterity to understand, respond and record the interview's ebb and flow and ask the 'right' questions (Hitchcock and Hughes 1989).

Retrospective interviews can be either structured or semi-structured or informal. The point of such an interview is to get the interviewee[s] to remember what they had said or done in the past. Historical studies often use this type of interview to generate information and ideas about a previous event. The limitation of this form of interview is that it is dependent on a person's memory and perception, both of which can be unreliable and or biased (Burns 1997).

### **c) Document Analysis**

As the words suggest this research method uses documents as the source of research data. The word document encompasses a wide variety of published documents – such as textbooks, diaries, newspapers, novels and the 'documents' available in electronic form. Given the range of documents that are available for analysis the obligation on the researcher is to choose or develop a set of criteria that can be used to 'effectively interrogate' the particular documents to generate the necessary data. Secondly these criteria must be able to be replicated so that another researcher can use the same criteria to

generate the same data. An advantage of this method is that the documents/texts that are used are normally robust and can be repeatedly analysed without showing signs of 'research fatigue' (Burns 1997, Punch 1998).

### **3.4 Ethnographic Research**

For the researcher apart from choosing the appropriate method[s] the other important research question is how wide and deep will be the researcher enterprise? In educational research the ethnographic research approach has been used in instances where the researcher wishes to obtain as comprehensive a 'picture' as possible of the research subject. The emphasis here is to document as full a picture as possible. To achieve this fuller picture the initial research hypotheses are allowed to develop and consolidate as the research process unfolds (Bryman 1993). This lack of precision is seen by proponents as an innate strength of this approach allowing the researcher to 'mine' and capture the rich seams of data. To mine and capture this data the researcher could use the range of tools (observation, interviewing and document analysis). The greater the variety of data captured the greater the possibility the researcher will be able to obtain the required holistic perspective. Moreover the task of the researcher in such a context is also to grasp how those experiencing them perceive the events/issues. In other words events/issues cannot be researched in isolation from their context (Tuckman 1988, Punch 1998).

Despite it uses ethnographic research has a major drawback – it is highly sensitive to researcher bias and therefore another researcher

using the same research tools cannot easily replicate the results of such research. Flowing from this is the other limitation – that conclusions based on such research cannot be readily universalised (ibid.).

### **3.5 Case Study**

Case studies are commonly used when researcher wants to study *one particular* phenomenon in depth. Having understood the phenomenon in this way the researcher can then use other research methods to broaden the scope of this research. Thus a case study can be both the end point as well as a starting point for research activities (Merriam 1988).

#### **a) Definitions**

Goode and Hatt quoted by Punch (1998, p 151), defines a case study as “not a specific technique; it is a way of organising social data so as to preserve the unitary character of the social object being studied”.

A number of advantages have been advanced for case studies:

- they are sensitive to the broader social context
- they provide a wealth of descriptive detail that is useful beyond their own research area
- they provide accessible research information
- they are strongly grounded in “reality” and their findings can be directly understood and implemented

- they allow a researcher to focus on a defined phenomenon (ibid.)

A number of authors have sought to capture the 'essence' and the variety of the case study method by describing various types or 'styles' of case study.

Stenhouse(1988) identified four types of case study:

- *ethnographic case study* – the researcher through participant observation provides a detailed description of events/issues
- *evaluative case study* – the focus is on doing in depth study so that others can make evaluative judgement
- *educational case study* is used to make a contribution towards the knowledge/ practice base of the profession
- *action research* is used to actively inform and influence policy

Yin (1993) developed the following typology of case study research:

- an *exploratory case study* is concerned with the formulation of research questions and hypotheses
- a *descriptive case study* provides an all encompassing description of a phenomenon within its context
- an *explanatory case study* provides an explanation of the casual links that can occur between phenomena

What these two typologies reflect is the richness and variety of case study research. The choice of the particular 'type' of case study is dependant on what the researcher wishes to 'say' or report about the research subject. It is of particular use when “ the 'how', 'who', 'why' or

‘what’ questions are being asked” (Burns 1997, p 365).

#### **b) Use in educational research**

In educational research three types of case study research predominate – observational, historical, and clinical. In *observational case studies* the emphasis is placed on getting highly detailed information on the ‘subject’. This information is then undergoes very thorough analysis in order to gain a detailed analytical picture of the subject. This picture can then serve as the basis for developing a research hypothesis that would then be subsequently tested (Lancy 1993).

The *historical case study* is often used to review the achievements or failures of an institution. The point of the exercise is to identify the achievements of ‘failings’ of the institution so that “lessons” can be learnt from the institution’s past. This type of research is heavily dependent on records (Charles 1998, McCulloch and Richardson 2000).

*Clinical case studies* are concerned with individuals in educational settings. Such studies are usually undertaken by educational psychologists in an effort to understand and help resolve problems encountered by “problem students”(Verma and Mallick, 1999).

#### **c) The Limitations of Case Study Research**

It would be wrong to convey the impression that the case study method to research is invulnerable to criticism. There are a number of limitations that have to be acknowledged and should serve as a healthy corrective of any tendency towards an uncritical acceptance of this



research method.

### **i.) Subjectivity**

Critics of this research method attack and dismiss it as they contend that it is 'riddled' with subjective bias. They contend that the method does not actively ensure that there is sufficient 'distance' between the researcher and the subject. This lack of distance can lead to a researcher collecting and selecting research data in order to provide 'evidence that confirms their own particular understanding or interpretation (Bassey 1999).

### **ii.) Generalisation**

This area of criticism is that case study results can seldom provide evidence that can be generalised beyond the case itself. The criticism is often summarised by the retort – how can you generalise your findings based on a single case study? A priori assumption of such criticism is that a central aim of research must be towards the development of generalised 'truth'. The reality is that many laboratory experiments designed with this intention in mind are often simply replications of prior experiments rather than activities that further generalised truth (Cohen and Manion 1984). The stricture concerning the lack of generalisation cannot be ignored as there are celebrated instances of this method been used to generalise from the single to the general. Both Freud and Piaget developed their general theories based on 'data' derived from their own case observation and records (Burns 1997).

In essence therefore, the role of the case study is one of illumination of the 'particular' rather than of the 'general'. It is the task of the case researcher to provide the reader with as much information and detail so that the reader is able to make a determination by using the information, data and explanation provided by the case material (Cohen and Manion 1984).

### **iii) Reliability and validity**

Like the issue of generalisation the case method appears vulnerable to attack. While it cannot be claimed that case studies can 'deliver' reliability in the same manner as can laboratory studies, case study reliability can be established through:

- reporting of researcher bias
- providing a systematic exposition of how the data was obtained
- providing explanatory details on the types of categories used to capture/record the research data

With the above the reader is able to reconstruct the research journey undertaken and if necessary replicate the case study (Bassey 1999, De Vaus 2001).

In the case of validity the case study does not have the 'benefit' of the checks and balances provided by randomised sampling. Instead the test of case study validity focuses on satisfying the following:

- construct validity
- internal validity

- external validity

Construct validity requires the case researcher to employ multiple sources of evidence and to then demonstrate how these sources collectively provide the picture of data convergence. Secondly construct validity requires the chain of evidence to be apparent to the reader (Burns 1997).

Internal validity is the test to determine how closely does the case approximate 'reality'. This test can be somewhat contrived considering the premise of the case study is that it seeks to observe and report on a reality that is unique and dynamic. This being the case the issue becomes one of accuracy and consistency in 'capturing' that snapshot of reality (de Vaus 2001).

External validity requires that the case researcher guard against the temptation of using evidence of the particular to claim a more 'general truth'. The task here is to provide rich and detailed description and to marshal the evidence so that the reader can enter the world of the case and determine whether the case has applicability to their own circumstances (ibid.).

In essence the case study is a method that is deployed when a detailed and 'layered' account is required. Its strength lies in its ability to respond with openness to the unexpected and its desire to get to the 'heart of the matter'. On the other hand case studies are vulnerable to charge that it can produce studies that are impressionistic, biased, not readily replicated and of questionable validity (Lancy 1993).

### **3.6 Conclusions**

The limitation of the qualitative approach to research can be summarised by the term subjectivity. In some respects this is a well-earned criticism when research attempts to claim that it is neutral and has managed to capture the 'truth' through personal observation.

However where such research attempts to capture data by a variety of methods [such as observation, interviewing and document analysis] and seeks to offer description, explanation, and illumination it can enrich our understanding of the world.

Case studies feature prominently in the qualitative research and draws on the insights and strengths provided by the ethnographic research. The central plank of this research 'tradition' is to obtain as holistic picture as possible of the subject within its specific context. Thus case studies are often employed to obtain an in-depth understanding of a particular phenomenon. This focus on in depth understanding can lead to subjectivity and limited applicability of the research findings. To guard against subjectivity and to provide a measure of reliability and validity the case researcher needs provide accurate and consistent records and acknowledge where subjectivity could have 'coloured' the recording and writing up of the case. A further 'confidence building' measure is for the case researcher to use more than one data source and to triangulate such sources [e.g. gather data through interviews, observation and document analysis]. Through such triangulation the researcher is able to cross match and identify gaps or inconsistencies in the data gathered.

Case studies have been popular in the field of education because they afford the teacher-researcher an accessible means of investigation of

issues/questions that confront them in the classroom. By using either observational, historical or clinical case studies the teacher-practitioner is able to document, reflect and then if appropriate, act in accordance with what has emerged from their case research.

### **3.7 Research in Practice**

This section outlines the ways in which the research was conducted and how material was collected for this study. After six years of implementation I decided in late 1998 that the time had arrived for the field studies programme to be described and reflected on in a systematic fashion, and this could be the basis of a research thesis topic. Two reasons motivated this decision. Firstly it was my belief that the field studies programme had developed into interesting project-based programme that had thrived in spite initial difficulties. Secondly curriculum changes were being introduced within the first year curriculum that would certainly culminate in closure of the field studies programme in its existing form, and so it would be appropriate to provide a written record of this programme before it ceased to exist. Linked to this was the fact that I was the only staff member who had a 'consistent' memory of the programme from its inception.

For these reasons this study is a case study that is partly historical and partly observational. The historical dimension of the thesis is the 'life history' of the programme and this history is 'charted' by drawing on:

- written documents used during the eight years of programme implementation

- unpublished faculty documents
- personal recollections of the period

The written documents were the project handbooks and guidelines that were issued to students and staff. These handbooks/guidelines provided information on to how the programme was organised, its aims, and what changes were made to the programme overtime. The unpublished documents were those issued by the faculty, they dealt with proposals concerning curriculum change, and as such played a role in the establishment and continuation of the field studies programme. Through reading the handbooks and faculty documents personal recollections of the period were triggered and a forgotten event/ decision recalled. By drawing on these recollections the 'history' of the programme has a 'personal' shade to it and the reader needs to take this into account when reading about the programme.

The observational dimension of the thesis covered the 1999 and 2000 years of programme implementation. During these two years hitherto ignored sources of information/material were 'mined'. These sources were:

- Student Evaluation of the 2000 programme
- Informal conversations/ discussions with both staff and students
- Written work completed by the students

The **2000 Evaluation** of the field studies programme asked students to comment on and rate the various aspects of programme. This evaluation provided an in-depth 'snap shot' of student responses and attitudes towards the programme. While the results of this evaluation

could not be generalised, the results nevertheless confirmed in general terms what had already been anecdotally identified as student responses and attitudes towards the programme.

**Informal conversations** with staff and students provided the 'other voices'. Conversations with staff focused on their anxiety about programme implementation, their ability to meet the demands placed on them and student reactions to having to work in groups. In the case of students the conversations revealed their ambivalence about the programme and the demands it placed on their time and energy. Helpful as these conversations were with students and staff the information and comments volunteered were always 'censored' as both students and staff were conscious of my role of programme convenor. Notwithstanding this censorship these conversations were useful identifying concerns and issues, which in some cases could be addressed. Moreover these conversations served also as a sounding board to 'test out' new ideas or potential changes to the programme.

The **written work** of students provided an important and rich seam of information and insight to draw on as well as a powerful feedback loop. Three 'forms' of written work were consulted [the group report, the poster and student examination answers] and each of these 'forms' shed a different light on how students had approached and completed their project work. In the case of the group report it was the most substantial piece of written work and represented the group's biggest 'investment' in the project and became the source of information that student drew on to complete their poster and prepare for their examinations. The poster revealed to what extent students were able to extract the 'essence' of their project research and then 'express' it in a different form to that of their report. The examination answers

showed to what extent individual students 'digested' their project work and had made it their own. Thus by reading this work it became evident which of the project requirements had been met and which had not. Secondly it provided an indication of how effective the guidelines/project handbooks were in supporting students to complete their project work. It also provided a proxy indicator of the level and quality of supervision provided.

### **3.8 Limitations of this study**

This study is in key respects a personal and reflective account by the researcher of how the field studies developed from a vaguely defined 'community-based' module into a fourteen week programme that required to students to a number of project-based learning activities. This is because the decision to 'document' this programme took place at the final stages of this programme. Secondly the motivation for documenting this particular project-based learning programme was to offer colleagues with a distillation of the researcher's experiences in designing and implementing such a programme. In other words there was no conscious decision to try and record 'objectively' from the start what was taking place. Instead the focus of the researcher during most of the 'life' of this programme, was in ensuring its continuity and development. Thus the 'voice' reporting on the 'progress' or otherwise of this enterprise is that of the researcher alone. What is lacking therefore are other 'voices' and sources of information [e.g. recorded interviews with staff and students and samples of student writing] that the reader could use to corroborate or not the arguments put forward by the researcher. Clearly this means that the study description that follows is not an objective account of what took place over the ten



years of preparation, design and implementation. This means that the 'conclusions', assumptions and deductions contained in this study are personal and 'idiosyncratic' and as such must be viewed with caution by the reader.

### **3.9 Conclusions**

This study will provide the reader with an reflection on a particular project-based programme. It will not pretend to offer the reader a set of ready-made answers to issues that confront the would-be practitioner of project-based learning. Instead the reader will be able to learn about how a programme started out with modest expectations, but overtime with ingenuity and perseverance, was able to face and adapt to key challenges of implementation.

The narrative information and analysis provided I contend will enable the reader to:

- place the programme within its particular institutional context
- understand how and why the programme responded and adapted to the challenges its faced
- determine whether this programme did help to foster deep learning amongst students
- potentially draw on the 'lessons learnt' for future practice

The research approach used been a combination of 'historical' and observational' and what has been created is a case study that serves as the primary source for the analysis that follows.

# **Chapter Four**

## **The Case Record**

### **4.1 Introduction**

This chapter is the case record of the eleven years of preparation and implementation of the field studies programme at the University of Cape Town (UCT). The purpose of this record is to provide the reader with as much appropriate descriptive detail as possible. In the following chapter an interpretation and analysis of the case will be provided. This case record is a carefully edited selection of the written documents used by students and staff during the eight years of the field studies programme. The case has been organised to provide the reader with sequential record of:

- the three years of preparation and piloting aspects of the programme (1989-1991)
- and then eight years of programme implementation (1992-2000)
- and an introduction that situates the case within a particular faculty context.

#### **4.2.1 Introduction to the case**

The time span of the case is an eleven-year period of preparation and programme implementation (1989 –2000).

1989-1991 was a period of preparation and securing the necessary core funding for programme implementation as well as ‘trying out’ some limited forms of project work. In **1992** was the first year of implementation and it had come about because a senior faculty

member had provided the 'space' [ie. six afternoons] from within his course. He had done so as a result of discussions between himself and members of the Undergraduate Medical Education Committee [UMEC] of the Faculty of Medicine at the University of Cape Town. Basis of these discussions had been how to increase the amount of 'community education' within the medical degree. The parameters of such 'community education' were never precisely defined, except that, students should be required to move off campus and learn about 'the community'. By the end of the **2000 academic year** the programme had evolved into a semester programme, involving 260 students and using the services of a full time programme convenor and fourteen part-time members of staff.

During the eleven-year period the programme had various phases, **Preparation** (1989-1991), **Development and Implementation** (1992-1993), **Coming of Age** (1994 and 1995) and **Refinement and Consolidation** (1996–2000).

#### **4.2.2 Preparation phase, setting the stage (1989-1991)**

In **1989** the Undergraduate Medical Education Committee (UMEC) of the then Faculty of Medicine [and subsequently re-named in 1995 the 'Faculty of Health Sciences'] wrote to all heads of departments in the Faculty asking them to document how much community-based medical education was provided for within their undergraduate courses. These letters had been written because the UMEC recognised that the Faculty should make an effort to better prepare graduates for clinical work in Southern Africa. As a result of responses to these letters the UMEC became aware of the "community" aspects of a first

year course called “Human Biology”. A subcommittee of UMEC (charged with introducing primary care and community-based education into the medical degree) had discussions with the “Human Biology” convenor about developing the community aspects of the course into an optional course focussing on ‘health and the community’. The convenor modified the idea by proposing that all students should participate in a small module of six afternoons. In that time students would visit selected community organisations and learn about some of the key social and health issues facing the city of Cape Town. This proposal was accepted by the UMEC and a staff member from the Faculty’s Department of Community Health was asked if he was willing to arrange the visits and be the convenor for this programme. He made a counter proposal, that the visits should be the basis of a project programme for students. The Human Biology convenor accepted the proposal.

In **November 1989** a proposed budget (to pay for this new project programme) was submitted to the university’s finance committee. In early February of **1990** it became evident that the university had only granted a small portion of the requested budget. In response to this setback the module was redesigned. Instead of six visits students visited two agencies (one dealing with “Street Children” and the other AIDS education) and participated in four campus-based tutorials that examined social issues from a medical perspective.

1991 the university granted an even smaller budget. This budgetary reduction was coupled with a significant increase in the number of students enrolled in the “Human Biology” course. In 1990 the student cohort had been made up of 150 medical students, this had increased to 250 students, because first year Physiotherapy and Occupational

Therapy students joined the “Human Biology” course. The smaller budgetary allocation had two effects; it ruled out organisational visits and the campus tutorials. Nevertheless these restrictions were managed by establishing a “poster project”. In groups of six, students were required to produce a poster that illustrated a specific health or social issue and the relevant health/social services associated with that issue.

#### **4.2.3. Development and implementation (1992 and 1993)**

In February 1992 the university finally provided the necessary core finance to enable the full implementation of the project programme. Two key challenges had to be addressed:

- recruiting and preparing sufficient supervisors and
- providing students with guidelines on the project requirements.

Recruiting and preparing staff was then identified as the greater of the two challenges. Firstly there was no existing “pool” of staff to draw on. Secondly given the budget allocation, the staff to be recruited could only be employed on a part-time basis with a modest salary. Three months (February – April) were spent recruiting part-time staff.

A month before the commencement of the programme (April 1992) eight of the sixteen supervisors indicated that they would not be available to supervise on the programme. The convenor set about finding their replacement by widening the scope of his search. Instead of limiting the search to social workers, the convenor decided to look for individuals who had training and experience in running groups. The convenor reasoned that the primary skills needed by a potential

supervisor were not “academic” or “professional”, but rather the skills of helping a group of students complete a set of assigned tasks (i.e. the skills of facilitation). With this change in emphasis the convenor was able to recruit a further eight supervisors and the programme commenced as planned in May 1992.

Developing the handouts also proved to be more difficult than anticipated. The convenor had assumed that prototype guidelines could be obtained from the School of Social Work at UCT. The reason for this assumption was that the programme was loosely based on an existing programme offered by the School of Social Work. In the event the School of Social Work did not have a set of guidelines and the convenor was forced to develop a set of guidelines.

Despite the initial difficulties the **1992 programme** was implemented as originally intended. The class was divided into eighteen groups [comprising fifteen students] and each with their own supervisor. For six weeks students researched a suburb of Cape Town and a social/health agency located within the suburb. Each student group used the information they had gathered to produce a *written report*, *poster* and give an *oral presentation*.

Student and staff evaluations of the 1992 handouts indicated that they had been of limited use. The major criticism levelled against the handouts (particularly the one for the report) was that the explanatory information and instructions provided were too generic, and did not explicitly describe what was required of students. Instead students had to “second guess” what was required to complete the project tasks. (See Appendix One). Overall 1992 was seen as a modest success that could be built upon.

Building on experience gained the **1993 programme** was a modification of the 1992 programme. It was divided into two separate projects – “**Community Diagnosis**” and “**Case Study**”. This separation had come about to promote greater scope for student learning. The “Community Diagnosis” project was focused on the broader or “community” aspects of health. The “Case Study” project used a ‘fictional’/paper case of an individual/family as the means by which students researched a particular health or social issue from the perspective of a future health care professional.

In response to student criticism the 1992 project guidelines were revised for the **1993 projects**. The revision included an introduction that explained relevance of the “Community Diagnosis” project in relation to health care practice. (See Appendix Two for details of the 1993 Project Guidelines). The need to “justify” this project and its successor (the “Community View” project) became a continuous task of both the convenor and the supervisors. The convenor and staff attributed this need to justify the project to students for two reasons. Firstly many of the students came from socially and economically secure home environments so that health and the factors that supported health were taken for granted. Secondly the students had no working clinical experience that obliged them to make the obvious connection between health, illness and community factors.

The 1993 programme helped establish the key two subdivisions of the programme [ie. its division into two projects] that would be used for the next seven years of programme implementation.

#### **4.2.4 Coming of Age (1994 – 1995)**

1994 and 1995 were pivotal years for the consolidation of the field studies programme. By the end of 1993 academic year a number of key issues had been identified that required attention. These issues had to be addressed so that:

- all 250 students were purposefully engaged for the duration of the programme
- students and staff had appropriate information and guidance about project requirements
- the projects could be completed within a limited amount of scheduled time
- inexperienced and part-time supervisory staff could effectively work on the programme.

A strategic decision was taken that a handbook would be the most effective way to manage these key issues. Between **September 1993** and **February 1994** the first project handbook was developed to address these issues.

Drawing on student feedback (the years 1992 /3) the handbook was designed so that a student when reading the handbook would understand:

- the *rationale* behind the projects,
- the *nature* of the programme (ie. that it had two distinct projects),
- the project *requirements* (ie. report, poster and oral presentation)



- how to *complete* the requirements,
- how these requirements would be *assessed*.

Particular attention was paid to provide students with sufficient detail on how to *complete* the project requirements. This was done to support student activity outside of scheduled contact time with staff. The need to support such activity was essential as the amount of scheduled contact time between students and their supervisors was limited to one hour a week. If students had relied on this contact time alone, they would have struggled to complete their projects. It was in this year that the programme became the 'Field Studies Programme' and the two projects were renamed respectively as 'Community View' and 'Case Narrative and Resource Study'.

Student feedback on the 1994 handbook indicated that students liked its design and layout and found the instructions useful and comprehensible. As one student put it "the handbook was a 'road map' for completing the projects" (See Appendix Three, for an edited version of the 1994 Handbook). 1994 was one of the milestones of the programme as it demonstrated how a well thought out handbook could bring added value by providing students with focus and direction.

In 1995 the field studies programme was incorporated into a new first year course called "Health and Society". The establishment of the course was the culmination of the debate that had been started with the publication in 1992 of the UMEC's document called "Undergraduate preparation for primary health care at UCT" in the document the authors argued for the 'development of interdisciplinary problem-based learning modules incorporating community and

primary care exposure that could foster those attitudes in students essential to the delivery of primary care' [UMEC,1992, p2].

The course introduced students to the:

- notion that a range of non-clinical factors powerfully affects the health and well being of individuals and communities and
- concept of primary health care.

The 1995 project handbook reflected the programme's incorporation into the new course by requiring students to investigate the extent to which health services in their research areas provided primary health care. The expectation was that students would see a link between the theory of primary health care and its application "on the ground". Key questions that had to be answered included:

- What access do people have to health services in their area?
- Are these health services affordable and appropriate?
- Do the health services provide promotive, preventative, curative and rehabilitative care (ie. primary health care)?

Student feedback on the 1995 programme was both positive and negative. On the positive side the students commented on the fact that the programme was well organised and staff were available when needed. On the negative side students felt pressurised because they had to complete a lot of work within a tight schedule. Secondly students did not like the practice of awarding a **group** instead of an **individual** project mark. After weighing up the issues the decision was taken not to alter the programme's format.

#### **4.2.5 Refinement and consolidation (1996 – 2000)**

1996 marked an important year in the consolidation of the programme. In that the second project – the Case Narrative and Resource Study – was fused with a module called “Contemporary Health Issues”. By the end of 1995 it was evident that there was overlap between the second project [‘Case Narrative’ project] and a module within ‘Health and Society’ called ‘Contemporary Health Issues’. Moreover it had become apparent that the project programme was becoming too predictable and some of the supervisors were becoming “stale”.

To address these two issues the decision was taken to fuse the second project and the course module. In this way duplication could be eliminated and a new dimension to the project programme was created. The challenge lay in developing a “mechanism” for fusion. The mechanism devised was the “research prologue” to the second project. This prologue required students to examine the research, policy and practice issues of their “case” (e.g. a street child). In this way the prologue placed in a wider context the management plan devised by students, as well as demonstrating the conceptual links between their research and their case narrative (See Appendix Four for the Research Prologue on Street Children).

In addition the fusion of the module and the second project meant that for the first time students were required to sit a written examination on based on their second project.

The research prologue had two other consequences. Firstly it resulted in a major *timetable modification* and secondly it changed the *staff profile*.

Between 1992 and 1995 the programme had been allocated thirteen weeks of scheduled time in all [ie. six weeks for the first project and the remainder of time for the second project]. During these years the first project had been completed under difficult circumstances. Firstly the six weeks of time was not consecutively organised and this meant that students had to switch between the project and other learning activities. Secondly this project straddled the June vacation and the surmise was that students would use a portion of the holidays to do outstanding project tasks before the start of the second semester. In reality this did not happen and students returned to campus after their June holiday with the pressure to submit their project work by the end of the first week of their return to campus.

In 1996 there was a timetable modification that resulted in both projects receiving allocated consecutive time and in addition the second project benefited by:

- each student receiving one 'community research day' [starting at noon and ending at 16h30] per week for the duration of the project and
- three lecture periods a week for library research related to the project.

The introduction of the research prologue also changed the staff profile. This was because it had an impact on the role of supervisors. Whereas in previous years their primary responsibility was one of facilitation based on the handbook, they now had to assume a more active role by researching and developing their group's research prologue. For a number of the supervisors this proved to be too onerous a responsibility and they left the programme at the end of

1996. Thus the research prologue became an influential factor in determining the staff composition of the programme, so that from 1997 onwards, the majority of supervisors were social workers experienced in supervising university students.

The **1996** handbook was further revised. Firstly the section dealing with primary health care was strengthened, by including questions on how to assess primary health care delivery in the community. Secondly a new **assessment protocol** was included. This protocol had been developed in the response to persistent student criticism about the awarding of a group project mark, regardless of individual performance. The protocol was designed to address student criticism and yet retain the group mark. It did this by providing students with the means to assess the contribution of a student who in the opinion of the group did not merit the group mark. By using the protocol students could clearly itemise in what ways the particular student had not contributed. The protocol was in effect an instrument of adjudication (See Appendix Five for details of this protocol).

The assessment protocol proved to be an important development. While its introduction did not remove all criticism of the group mark, it nevertheless signalled to students that there was a concrete way of ensuring that students who did not actively contribute towards the completion of the project would not get the same mark as other students in the group. In the event students seldom used the protocol because they did not want to “pass “ judgement on another student and be responsible for the student getting a lower mark or failing the programme. Instead students would approach their supervisor and identify a particular student who in their opinion had not participated/contributed satisfactorily. The supervisor would then use

the protocol to “document” the student’s non-participation. The student concerned would then be shown the results of the assessment, and be given the opportunity to challenge all or parts of the assessment. The staff member would then adjudicate a mark for the student taking into account their version of events. While the issue of the group mark never disappeared, the protocol did much to take the “heat “ out of the issue.

1996 was viewed as year of new ‘gains’ in that extra time was freed up for project work and the assessment protocol provided a feasible means of addressing student concerns about individual student participation on the programme.

In 1997 the handbook was revised to address two issues. The first issue related to student difficulty in distinguishing between *primary care* and *primary health care* and the application of primary health care at a community level. Most students saw primary care and primary health care as interchangeable, and viewed its application in purely curative terms (ie. as it related to hospital-based services). This was a serious misunderstanding of these terms and its application. Firstly, the country’s public health services were being re-organised in terms of primary health care, and secondly on graduation students would be working within this re-organised health system. To address this misunderstanding the section in the handbook entitled “Health Services” was revised to include definitions of the terms primary care and primary health care, and concrete examples were given to illustrate that primary health care meant more than the provision of hospital based services. Secondly a set of questions was provided to help students assess the local health services from a primary health care perspective. This revision also had the effect of making an explicit

connection was between the course lectures on primary health care and the “Community View” project.

The second revision to the handbook centred on how the project report was assessed. This was an issue highlighted by student and staff feedback. Students had indicated that they wanted more explicit feedback on how their supervisor had arrived at a particular mark for their report. For staff (particularly new staff) they wanted guidance on how to **qualitatively** assess their students’ work. To address these concerns a “marking schedule was devised that could be used in conjunction with the Score Sheet for the Report. This revision took the form of “schedule” that accompanied the existing mark protocol. By providing this schedule in the handbook the students were notified in advance what criteria would be used to assess their report (For details of the Marking Schedule see Appendix Six).

In this year the timetable was further modified with the introduction of a self-directed learning module on primary health care. This module was scheduled to ‘run’ at the same time as the first project. This meant that a similar community research day was created for the first project. Secondly the work that students did for the module could contribute directly to their ‘Community View’ project because it dealt with theory and international practice of primary health care.

As far 1997 was concerned the programme made further steps in the direction of helping students to try and understand the primary health approach and its implementation on the ground. Secondly the 1997 programme sought to increase student awareness about assessment.

In **1998** students were required for the first time to sit a written examination on their “Community View” Project. The examination had

been introduced to achieve academic parity between the two projects (See Appendix Eleven). As far as the handbook was concerned information and instructions dealing with the posters and the “Case Narrative “ Project were revised. In the case of the posters, the revision had become necessary because students needed more guidance on the design and layout of the posters. So a revised **Score Sheet** was provided for this purpose. By reading the score sheet students’ attention was drawn to the importance of:

- providing a range of information (both factual and interpretative)
- achieving a balance between text and illustration
- determining what type of information/data should be used

From an assessment point of view by reading the score sheet carefully students could identify the relative academic value of the constituent parts of their posters. For example the research conclusions had greater academic weight than the introduction. (For more information on the Poster Score Sheet see Appendix Nine).

The **guidelines** for the ‘Case Narrative and Resource Study’ project were also revised to provide a new framework – Circumstances, Options, Resources and Action (CORA). The provision of a framework had become necessary because students had struggled to write up their case in a systematic way that accurately reflected what they had investigated. (See Appendix Eight for details of this framework).

At the conclusion of the **1998** programme it was evident that the revisions to the handbook had brought about some improvement in student work. In the case of the posters, they had been organised



accordance with the score sheet and demonstrated improvements in design and layout. Nevertheless an unintended consequence of the new poster score sheet was that the posters became too “wordy” as students overloaded their posters with written text.

As far as the reports were concerned staff reported that the CORA framework had proven to be useful, as student management plans became more coherent.

In 1999 two versions of the handbook were printed. The facilitator’s version contained a new introduction on how to orientate students to the programme. This had been regarded as necessary because of repeated requests from new staff to give them ideas on how to structure the first afternoon of the programme. The introduction went into some detail on how to do this (e.g. arrange the students in a circle, welcome students and introduce yourself, handout the handbooks and other assigned reading materials etc). Also mentioned in this introduction was the need for staff to be strongly supportive by helping students create a functioning project groups.

Apart from the introduction, word limits were introduced relating to the written reports and the posters. The primary reason for their introduction was reduce the assessment loads of staff. In 1998 three supervisors had said that they were leaving programme because of the marking loads created by the reports. As one of the supervisors observed the reports appeared to have expanded every year. As far as the posters were concerned, the word limits were introduced to ensure that the posters did not become *de facto* “essays with illustrations”.

The word limitations for reports and posters were effective. The consolidated reports were reduced in length (from an average length of

80 typed pages) to a standard length of forty-five pages, while the posters became less “textually dense” and more visually interesting.

In 2000 a major timetable re-organisation occurred. The re-organisation meant that the maximum amount of scheduled time was made available for the field studies projects. This re-organisation meant that for the first time the projects ran consecutively without interruption.

In this year a revised introduction was provided to both handbooks (for students and staff). Both introductions spoke about the need to create a functioning group and gave some “pointers” on how to create a group:

- need for students to “get to know one another”
- develop ground rules by which the group would operate, and
- define the various group roles [such as chairperson, note-taker and timekeeper].

The introduction to the facilitators’ handbook covered the same issues as those in the students’ handbook but in greater explanatory detail so that they could actively help students in establishing a functioning group. It had become increasingly apparent to staff that students needed information on how to create a functioning group coupled with staff support, as they were not formally trained in how to work in groups. In their other courses, although they worked in groups (such as in the laboratory) their learning and assessment was as individuals. In this programme on the other hand, the group played a central role in student learning and assessment. To reinforce the importance of the group process, a new assessment task was introduced – the personal report. The purpose of this task was to help students to “take a step

back” and to think about how their group functioned, and the contribution they had made to the group.

The other revision to the handbook was related to refinements to the score sheets for the posters. The revision had become necessary because students had found it difficult to design their poster, meet the word limit and consistently acknowledge their source material. The revision structured the poster score sheets in such a way that students were given explicit guidance on how to lay out their posters, determine what information should be included and in what part of the poster (e.g. whether the information should be part of the Introduction or the Conclusion) and when to provide citations.

Another innovation of 2000 was the introduction of the ‘Open Book’ Examination. The rationale behind its introduction was its aim to test students’ conceptual understanding of their project topic rather than to simply test their ability of factual recall (See Appendix Fourteen).

During the implementation of the 2000 programme two particular organisation issues came to the fore. The first concerned student safety. A group of students approached the convenor because they felt ‘at risk’ in the area they were expected to work in and wanted ‘something to be done about it’. The group’s solution was for the faculty to put a microbus and driver at the group’s disposal. The microbus would be the group’s ‘mobile office’. After investigation it was found that the group’s feelings of vulnerability were based on two issues. Firstly the group were reluctant to use public transport as they felt they were targets for harassment and theft. Secondly they also felt at risk in the area for the same reasons. These feelings had persisted despite the efforts of their supervisor to look at ways of dealing with

these feelings [such a proposing to students that they travel together as a group and arranging for 'community introductions']. In the event the 'mobile office' option proved to be unfeasible as students were reluctant to make a direct contribution to the hiring costs, and the students resorted to using public transport and continued their project work.

The second organisation issue was of a student's non-participation. The student's supervisor approached the convenor to relate that one of her students had made no contribution towards the completion of the first project, despite active intervention on her part. After discussion it was decided to refer this matter to the group for a decision. After some deliberation the group decided to give the student a 'suspended' mark on the basis that the student had 'family problems' and he had pledged to work harder during the second project. This hard work did not materialise during the second project and so the student received no field studies mark, failed the programme and was subsequently excluded from the faculty.

At the end of the 2000 programme students were asked to complete a questionnaire on various aspects of the programme.

As far as the students were concerned they delivered their 'verdict' on the 2000 programme by completing a questionnaire (See Appendix Twelve). From a design and implementation perspective student comments on the following areas are of interest:

- Aim of the programme
- Project tasks
- Project handbook

- Group size and project requirements
- Projects and developing skills
- Projects and barriers to learning faced by students
- Group size and project requirements
- Project work and marks

The majority of students (138 out of 168) believed that the **programme** had achieved its **aim** of helping students develop an understanding of the various factors that can affect the health and well-being of individuals, groups and communities. Three students indicated that the projects failed in its aim and were a burden to them.

On **project tasks** [writing up a report, and designing a poster] 146 students indicated that these tasks required more thought and effort than attending a lecture or tutorial. Students commented that the project tasks had made them question issues and think for themselves. 16 students on the other hand believed that there was no difference between completing the project tasks and attending a lecture, except that project work involved more out of hours work.

157 students endorsed the role of the **project handbook**, while 17 students found the handbook of only limited use. Those who endorsed the handbook felt that it had provided them a framework to build on with instructions that were clear and easy to follow. The students who had found the handbook of limited use found its instructions to be either too rigid or ambiguous and terms used were difficult to understand.

To the question whether the projects had helped them **develop skills**, students said yes and identified a range of such skills. Analysing information [123], presenting research results in different ways [100] , writing up an academic report [96] and using evidence to develop an argument [83] were the four types of skills most frequently identified by the students. Student written comments revealed that students felt they had become more 'critical' when reading information, were learning to differentiate between relevant and irrelevant and could develop an argument based on facts.

The programme earned the most criticism on the matter of group size. This was regarded as the single biggest **barrier to learning** faced by students. Students felt that their group was too large to work constructively, that there was a lack communication between students within the group and that students had different work ethics. Poor supervision and co-ordination compounded these difficulties.

An alternative view on the size of the group emerged when students were asked whether the size of their group affected the ability of the group to complete their **project requirements**. Some students believed that the size of the group made it easy to divide up the project workload, to collect data, and draw a variety of skills that were available within the group.

On the issue of **project work** and **marks** students contented that high marks were given when [in order of importance] students:

- analysed and argument and explained a problem/issue
- developed an argument
- gave information/ facts

The final section of the questionnaire asked students provide recommendations concerning **changes to the field studies programme**. A few students advocated its abolition, while others suggested that there should be only one project and it should be complete before the September vacation to allow students to concentrate on their end of year examinations. The other recommendations were for smaller sized groups and to allow students more freedom when it came to completing the report, presentation and poster (For a detailed summary of the questionnaire results see Appendix Thirteen).

### **4.3 Conclusions**

The end of the 2000 programme marked eight years of programme implementation during which **1 700** students completed project-based learning. It was period during which the programme faced a number of challenges [e.g. the sudden departure of staff, managing large cohorts of students, student dissatisfaction about group assessment and timetable constraints]. By managing these challenges in certain ways the programme underwent a particular process of incremental change over time.

This incremental change was most pronounced in a *structural sense* in the years **1993** and **1996**. In 1993 the programme was divided into two projects, while in 1996 the research prologue was introduced. This prologue then triggered a series of changes in the timetable that culminated in the allocation of uninterrupted time for the projects in 2000.

Alongside these structural changes were the regular revisions to the handbook aimed at improving its utility for students and staff.

Linked to these regular revisions of the handbook were the evolution of the project tasks and requirements for both students and staff. This becomes apparent when one compares the requirements of 1993 with those of 1997 and 2000. This holds true even when one discounts the amounts of time scheduled for project work in 2000 when compared to 1993 and 1997. In other words as the handbook increased in utility so did the project requirements increase in qualitative challenge.

The deepening of the academic requirements over time was also a reflection of the programme's increasing maturity as a vehicle for project-based learning. In the early phases of project implementation the concerns were about the need to:

- establish and ensure the continuity of the programme
- delineate its requirements [ie. the report, poster and presentation]
- provide students with a project 'map' [ie. the handbook].

Once these foundational aims had been secured the issue of assessment came to the fore. In the early years assessment was used in a narrow sense to help ensure the programme's continuity. It was only later that the programme used assessment in a more positive sense as a mechanism to support and enhance student learning [See Appendices Six and Seven].

Another dimension of the programme's evolution was the role that the timetable played. Initially the timetable was not recognised for what it could do to support project work, however by 2000 its role was being fully exploited.



One of the under developed facets of the programme was preparing students for project-based learning. Its importance was only recognised late into programme implementation and as a consequence students generally saw their project work in task terms. This view of project work was reinforced by the structure of programme. Firstly until 2000 students were not required to consciously reflect on their project experience or their personal contribution to their group [See Appendix Fourteen]. Secondly students were not assessed on their project participation. When the group process was assessed it was for negative reasons (i.e. a student had not satisfactorily participated). This failure to prepare students for project-based learning and to require them to reflect on group process was an unintended consequence of the 'success' of the project handbook. Perhaps had the handbook not worked as well the staff might have been compelled to ask the basic question – are students prepared for the type of project-based learning demanded of them by the field studies programme?

Student comments on and general endorsement of the 2000 programme provides a degree of validation of the decision to structure and implement the programme in the way it was. Even the criticism of the programme (the project groups were too large and some groups experienced poor supervision) were not unexpected. These were in built limitations imposed on the programme from the start.

Lastly, the fact that the programme existed for as long as it did is an achievement in itself. On relatively slender resources, not only did the programme survive, but also it developed into a vigorous programme that became a central learning activity for the students during their first year of study. After eight years of implementation it is easy to forget that the lack of core funding postponed its implementation for

three years, and that the programme was in the balance for a further three years. The struggle for core funding was not unique to this programme; it has been the leitmotif of South African higher education for many years. Nevertheless what is striking about this particular story of project implementation was the way in which students and staff rose to the challenge and transformed the field studies programme into one that far exceeded the ill-defined and modest expectations of the Faculty's UMEC. In so doing, demonstrated the value of project-based learning can play in undergraduate education.

# Chapter Five

## 5.1 Introduction

The chapter identifies what were the key project challenges over the eleven year period, how they were responded to and the results that occurred. The chapter then discusses how this process [of challenge-response-result] influenced the character of the field studies programme.

As described in a previous chapter the programme had four phases – **Preparation** (1989-1991), **Development and Implementation** (1992 and 1993), **“Coming of Age”**(1994 and 1995) and **Refinement and Consolidation** (1996 – 2000).

**Preparation for project work and piloting project activities** charts the struggle to obtain university finance for implementation. This struggle for university finance was not unique as academics can provide a wealth of anecdotal evidence on how promising courses were jettisoned because of institutional disinterest. What was perhaps unusual was the degree of perseverance and ingenuity used to keep the vision of the programme alive prior to full implementation

**Development and Implementation** was a critical period for the programme, as it required the translation of the vision into a set of concrete learning activities. The experience gained by the convenor during the pre-implementation phase stood him in good stead as he worked to surmount the hurdles of staff recruitment and materials development.

**“Coming of Age”** was the period when the broad characteristics of the programme were confirmed (i.e. it was a project-based learning

programme strongly directed by a handbook). The handbook by this stage had become the central focus of concern for the convenor. It was his belief that improvements to the functioning of the programme could be most effectively achieved by modifications to the handbook.

**Refinement and Consolidation** was the period that witnessed programme refinements that resulted in the deepening of project tasks. Assessment requirements were also enhanced. In tandem with these enhanced assessment requirements, students were given more detailed explanatory information on the criteria used to assess their project work. Towards the end of this phase the first tentative efforts were taken to prepare and support students to create co-operative groups. In summary this chapter outlines how the programme was managed over time, and, how it responded to key challenges of implementation. The results of this cycle of challenge and response included:

- the programme becoming more carefully structured
- more tangible support given to students and staff
- an over reliance on project task at the expense of group process

## **5.2 "Preparation"**

In 1989 the convenor persuaded a senior member of faculty that a feasible way of implementing 'community-based' learning would be to divide the students into groups and require each group to complete a project. He had made this proposal based on the recognition that whatever programme came into existence it would have to be based on modest resources. Thus projects were proposed as the means of achieving community-based learning with limited resources.

Once this proposal had been agreed to, the key challenge became obtaining the necessary core finance.

For two years [1990 and 1991] the university failed to provide adequate core finance to for programme implementation; in 1990 budget allocated was a third of what had been requested and in 1991 an even smaller budget was provided. This failure to provide the necessary finance represented a disjunction between the university's spending priorities and the UMEC's commitment to "community based" learning. In hindsight this disjunction demonstrated that the UMEC did not represent the prevailing faculty view on this issue. Instead they probably represented the minority view. However this rejection was never explicitly articulated instead the proponents of the programme were encouraged to make the necessary application for funds for programme implementation.

When in early **February 1990** it became evident that the university had provided an inadequate budget, the decision was taken to use the available money in such a way that it could realise some aspects of 'community-based learning'. This was done by organising a schedule of visits to local community organisations combined with four campus-based tutorials that examined topical health issues from a community perspective (ie. " a community view"). The visits were structured in such a way that students were required to find out what role these organisations played in meeting the health/social needs of their target groups (e.g. street children). The tutorials were devised to challenge "medical orthodoxy" by requiring students to explore controversial issues from a holistic perspective.

The following year (1991) with an even smaller budget than in 1990 with the result that the organisational visits and the four tutorials had to be scrapped. It was at this point that the convenor came close to believing that 'community-based' learning would not be realised and he should cease efforts aimed at implementing such learning. Nevertheless he overcame his disappointment by instituting a poster project. The idea for the poster project had come about as a result of chance encounter with a colleague who had mentioned how impressed he had been by the student posters in the Zoology Department. He expressed the hope that medical students could have an opportunity to learn how to produce a poster and thereby develop such skills, given the fact the academic posters played a prominent role at medical conferences.

The convenor then went to view the posters and also spoke to relevant staff members in the Zoology Department about the role the posters played in their department's teaching programme. The convenor ascertained that the posters were used as an alternative medium for Zoology students to use a range of skills (e.g. writing and creativity) to demonstrate what they had learnt when researching a topic.

On the basis of the poster viewing and the discussion the convenor realised that a poster project would be the solution to the problems posed by the reduced budget allocation, as the posters would enable:

- students to pursue a new learning activity
- them to work in groups and study health issues from a "community perspective"

- the convenor to implement a credible learning programme on a modest budget.

Thirty-six project topics were generated along with some guidelines on how to produce a poster. For six weeks students [in groups of four] researched a particular topic and submitted a poster for marking. Student evaluations had indicated that they had liked the opportunity of producing a project but had found the project guidelines inadequate.

The responses to the budgetary difficulties had long term and positive results for the programme. Firstly it taught the convenor the importance of crisis management and to persevere even when the conditions appeared not to be favourable. Secondly the setbacks became opportunities to test out new ideas. For instance the 'organisational profile' in the project handbook has its genesis in the 1990 requirement that students complete a descriptive report on their organisational visit. Thirdly the 1991 poster project proved to be a ground breaking experience by :

- demonstrating the educational value that posters could bring to a programme by engaging students in a range of different tasks [e.g. collecting and organising information in a variety of ways]
- proving its potential as a possible project requirement
- demonstrating the importance of providing explicit instructions to students concerning project requirements

### **5.3 Development and Implementation (1992-1993)**

In early 1992 the university finally granted the necessary core finance for programme implementation. The challenge now became of programme implementation, in particular, the need to recruit **eighteen facilitators** and to provide **necessary guidelines**, as neither was available for the programme.

Firstly the need to recruit so many staff was based on the fact that there were no faculty staff available for student supervision. On the matter of guidelines – none were immediately at hand.

Initially the convenor had been quite sanguine about the prospect of recruiting so large a number of supervisors. He had assumed that colleagues in another university department would have on file a number of people who would be interested in part-time paid work. It soon became apparent to the convenor that his assumptions had been misplaced and recruiting suitable staff would be difficult as the department concerned did not have the hoped for list of part-time staff. Nevertheless a departmental staff member suggested that he contact the directors of local of social work agencies and ask them if they could recommend any potential supervisors. The convenor spent the next two months contacting social work agencies and following up “leads”.

A month before the commencement of the programme nine of the eighteen supervisors indicated that they would not be available to supervise on the programme. The sudden withdrawal of the nine represented the **single biggest critical incident** in the history the programme. The choice was a stark one, either find replacements or close down the programme before it had even begun. It was at this critical point that decision was taken to widen the search for



supervisors beyond social workers. By widening the scope of the search nine replacement supervisors were found and the programme was implemented.

The months spent recruiting staff was a steep learning curve for the convenor during which he learnt the importance of:

- developing networks to recruit staff
- recognising that part-time staff can represent a 'threat' to the viability of a programme by suddenly withdrawing

Providing project guidelines for students also proved more difficult than initially believed. Instead of a number of pro-type guidelines been available for suitable modification none existed. Instead a set had to be devised in time for the commencement of the programme. What emerged was a page of generic instructions that aimed at helping students to write up their project report.

The experience of having to recruit so many supervisors at once was beneficial. Firstly it underscored the importance of networks [within the university and beyond] to source staff. Secondly it demonstrated the importance of offering work to people wanted part-time work, not to individuals already in full-time work or those looking for full-time work.

On the matter of the project guidelines the need to write guidelines was invaluable. It forced the convenor to attempt to put down in writing what was expected of students. Secondly it started the 'tradition' of 'materials development' that would serve the programme well in future years.

## **5.4 “Coming of Age” (1994 and 1995)**

Having surmounted the first two years of project implementation the next set of challenges were those of a programme which would either take “root” or ‘wither on the vine’. By **1994** the number of enrolled students had risen from 160 to 260 students. There were two reasons for this increase. Firstly the first year intake of medical students had increased from 160 students to 200 students, and secondly, first year students from the departments of Physiotherapy and Occupational Therapy joined the programme. At the start **1994** academic year the programme challenge centred on how to manage a large cohort of students and with an even larger cadre of part-time staff. It was decided that the programme could manage by:

- Recruiting more staff
- Providing students and staff with the necessary support so that students could realistically meet the project requirements

The programme met these challenges as follows:

On the question of the need to recruit additional staff, there was the real prospect of not being able to recruit sufficient staff in time for the commencement of the **1994** programme. The various networks that had been used had only provided replacements for existing staff who were leaving, not the additional staff now required. It was almost by accident that the solution to this challenge was provided. The convenor had been grappling with the various administrative conundrums created by the faculty’s rigid timetable. It was in the course of dealing with these conundrums that he realised that he could use faculty’s timetable to his advantage when it came to the issue of project supervision. In essence the timetable divided the student

cohort into three separate segments and these segments were rigidly allocated to specific afternoons for their project work (ie. either on a Tuesday, Wednesday or Thursday). This meant that each afternoon had a fixed number of students and that students could not switch between afternoons to do their project work. This timetable arrangement meant that it was possible for a supervisor to supervise more than one project group during the course of a week (ie. they could supervise a group on a Tuesday and on a Thursday afternoon). This arrangement was investigated to determine its feasibility.

By using the opportunity provided by the timetable the need to recruit more than eighteen facilitators became unnecessary. On the contrary the number of facilitators required was **reduced**. By offering selected staff one additional group each week only sixteen facilitators were needed as opposed to the notional twenty-one. Secondly an unintended [but beneficial] consequence was the retention of a greater number of experienced staff as the additional work made it worthwhile for them to remain on the programme rather than to look for alternative work.

By end of **1993** student feedback pointed to the need to consolidate and amplify the project guidelines to provide a usable document of reference. This document could in turn play a benchmark role by requiring a basic level of consistency in the work submitted by students. This in turn would make it easier to mark the projects, as a level of expectation would be established. By commencement of the **1994** programme the first ever project handbook was made available to students and staff.

The **1994 handbook** did serve as the document of reference. Student and staff queries about project requirements were reduced significantly, as the handbook provided them with explanatory guidance and information on how to complete the project requirements (i.e. the report, oral presentation and poster). Secondly the handbook conveyed to students a strong sense that the field studies programme had been carefully thought out. Thirdly the handbook was an important marker as it established the “boundaries” of the programme and gave the convenor the confidence to deal with periodic criticism that came his way from students and staff.

The 1995 student feedback highlighted an issue that went to the heart of the field studies programme – the group project mark. Students were adamant that a ‘fairer’ system would be the awarding of a project mark to each student. The group mark had been originally introduced to signal to students the importance of group participation. This intention had been compromised by the size of the groups that allow a disinterested student to benefit at the expense of involved students. The convenor recognised that this arrangement could negatively influence student motivation. The student proposal that an individual project mark be instituted was problematic from a management point of view as it would greatly increase the marking load of staff and this would have to be paid for.

For two years the staff grappled with this issue without providing a satisfactory response to student criticism.

## **5.5 Refinement and Consolidation (1996-2000)**

Between 1996 and 2000 a number of challenges emerged as the programme moved from its infancy, through “coming of age” and into its final stage of maturity. The key challenges of this period were:

- merging of a course module with the second field studies project
- project assessment
- adapting the timetable to support the programme
- the changing staff profile
- getting students to recognise that project work is a combination of task and process

### **a) Merging a course module with the second field studies project**

By the end of 1995 two things became apparent. Firstly the field studies programme was well established and the decision to provide the handbook had [in the view of the convenor] been an appropriate one. Secondly it was evident that unnecessary overlap had occurred between the second project [‘Case Narrative’ project] and a module called “Contemporary Health Issues”. This overlap was the consequence of the introduction of a new course “Health and Society” in 1995 and the inclusion of the field studies programme within the course without carefully determining whether potential overlap occurred between the two. The challenge then faced by the convenor lay in developing a mechanism that would eliminate this overlap without compromising either the module or the second project.

The issue of overlap lay unresolved for several months and then the idea was mooted of eliminating the overlap by merging the course module and the second project by reconfiguring the module into a research prologue for the second project. The research prologue would then strengthen the second project by providing it with an explicit research/theoretical framework. The project on the other hand would provide the practice context that had been missing from the module.

The research prologue had the desired effect in three ways by eliminating duplication, strengthening the *theoretical* dimension second project and finally by requiring students to write an examination paper on their second project.

The prologue had one unintended consequence — it brought about a major change in the profile of staff. Between 1992 and 1995 the role of the supervisors had been essentially to support their students by using the project guidelines/handbook. This changed in 1996 when for the first time staff had to provide their group with a research prologue. This meant that staff had to familiarise themselves with a particular topic and then identify key research and practices issues linked to the topic. For a number of staff this task proved too onerous and they left the programme at the end of 1996 because they felt they lacked the expertise and skills to master the art of developing a research prologue. Those that replaced them entered the programme on the basis that they could amongst others skills develop a research prologue.

#### **b) Project Assessment**

Since the institution of the programme assessment was a thorny issue. In the early days of the programme the primary concern was to use

assessment activities as one of the means whereby students would take the programme 'seriously'. Thus assessment was viewed as a means of endowing the programme which "due academic weight". Overtime there was growing recognition amongst the staff of the need to provide *variation* in assessment and to give students sufficient information to enable them understand *what* was being assessed and *why*.

### **Group verses an individual project mark.**

Until 1996 there was no adequate response to student dissatisfaction concerning the group project mark. **1996** marked a turning point with the introduction of an assessment protocol to be used in cases where a student had not satisfactorily participated on the project. By using the protocol a differentiation could be made between those who had worked on the project and those who had not. This assessment protocol had been devised based on the recognition that the group mark was most often contested in those instances where one or two students had not participated satisfactorily but still 'earned' the same mark as other students. The assessment protocol sought to provide the remedy for such situations.

### **Written examinations**

They were introduced in 1996 and 1998. In 1996 a written examination paper became part of the requirements of the second project. It "inherited" an examination requirement from the module "Contemporary Health Issues". A written paper for the first project was introduced two years later to ensure a degree of assessment parity and consistency between the two projects.

### **Assessment of report, poster and oral presentation**

Prior to 1997 the project handbook provided students with generic frameworks that was used to assess their report, poster and oral presentation. By 1997 it became apparent [via student feedback] that these frameworks were inadequate, as it did not provide students with sufficient information on how their work was *qualitatively* assessed. This recognition was indicative of the programme's increasing recognition of value that such information plays in signalling to students what is expected of them. Between 1997 and 2000 the type of assessment information concerning the report, poster and oral presentation was continually revised to provide students with appropriate information.

With the introduction of the *assessment protocol* and *written examinations* student criticism became more muted, as greater mark variation between students was achieved. It would be correct to say that students would have preferred a project mark solely based on their **own** project performance.

From implementation point of view what was of more interest was the provision of detailed assessment information between **1997** and **2000**. This resulted [in the staff's view] in improved project work. For instance the assessment weighting shifted strongly in the direction of analysis and evaluation, and away from the reproduction of discrete facts and figures. Secondly word limits were introduced for the report and poster to alert students to make the important distinction between the *quality* of work as opposed to the *quantity* of work.



### **c) Adapting the timetable to support the programme**

During the early stages of project implementation the challenge was to obtain sufficient scheduled time to allow student to complete their project work. This challenge arose out of the fact that the field studies programme had to fit within the confines of an already existing course timetable. This meant competing with other existing scheduled activities such as tutorials and practicals. With the introduction of the “Health and Society” course in **1995** and the incorporation of the programme within this course, the concern became how to adapt and shape “Health and Society’s” timetable so that it could more directly support the programme.

Between **1992 – 1994** the focus on creating an essential amount of consolidated time for students to complete their project work. Within this two-year period the amount of scheduled time expanded from the original six afternoons to twelve afternoons.

In **1995** the convenor took on the additional responsibility of the convenorship of ‘Health and Society’ and during the next four years worked within the constraints imposed by the timetable. In essence the response was directed at ameliorating the effects of the timetable had on the field studies programme, by creating uninterrupted blocks of project time.

In the period (**1999** and **2000**) the focus was more pro-active, and directed towards ways in which the timetable could actively support project-based learning. By 1999 the convenor had become fully conversant with responsibilities and vested powers of a course convenor and so was willing to “experiment” with the timetable. In that year [1999] course activities were re-organised so that lectures and

academic tutorials were completed first, followed by project work. The course had in effect been divided into two discreet sections.

The consolidation and adaptation of the timetable to support project work proved positive. In the early stages of the programme [1992-1996] staff often mentioned how the timetable disrupted flow of project work, as students had to switch between project work and other scheduled activities. However once the consolidation and sequencing of scheduled time had been achieved, staff reported that students engaged with their project work with more interest and commitment, because the timetable was supporting their work, instead of acting as a hurdle.

#### **d) The changing staff profile**

In 1996 the second project ("Case Narrative" project) was merged with a course module "Contemporary Health Issues". By the end of that year it was apparent that a different type of facilitator would be needed for the programme because of the demands created by the research prologue. These demands had proved too burdensome for a number of facilitators and they left the programme. The challenge that faced the programme was to "source" facilitators who had both facilitation skills as well as the capacity to develop a research prologue.

The convenor decided that the way forward lay in attracting registered social workers and senior postgraduate students from disciplines such as psychology and sociology. Between 1997 and 2000 advertisements were placed in the departments of Psychology and Sociology (University of Cape Town), inviting post graduates to apply for work as

a field studies facilitator. A similar advertisement was placed in a local newsletter for social workers in private practise.

Through these advertisements the programme gained wider access to a larger pool of potential facilitators. Drawing on previous experience and identified need most staff selected were professionally trained social workers. Notwithstanding this informal selection process it was understood that some staff would only provide an essential level of supervision because the work was modestly paid and of a part-time nature.

To deal with this fact the following was implemented:

- a new facilitator was given a 'strong' group to supervise
- new staff were paired with a more experienced supervisor and both met periodically to discuss their groups progress
- quarterly staff meetings were instituted to encourage and support new staff
- new guidelines were drawn up to help student research and devise their research prologues and copies of 'exemplar' prologues were provided to new staff

In some respects the programme was the "victim" of its own success as the issue of recruiting and retaining quality staff remained an "internal matter". In other words the faculty never had to address the issue that the programme was almost entirely run by part time staff not on the faculty establishment. If on the other hand there had been a continual struggle to secure staff and the programme was jeopardised as a result, the faculty might then have been forced to address this issue. The

convenor however took the view that the faculty's concern for the programme only extended as far as providing core finance and there was an implicit expectation that there would be no further calls on the faculty's resources.

**e) Helping students recognise that project work is a combination of both task and process.**

For most of the review period the programme was structured in such a way that students were given little information and preparation on how to work effectively in groups and secondly the emphasis of the programme was on the completion of the project requirements. Often students only became conscious of process 'issues when conflicts arose between them and they were forced deal with these conflicts before they could complete their work. By the end of 1999 the need to help students recognise the importance of group process and to help them create and maintain a functioning project group was recognised as important issue.

In an effort to address this two things were done. Firstly a special section in the Introduction to the **2000 Student Handbook** entitled "Creating a functioning field studies group" was provided. The section drew students' attention to the importance of creating a functioning group and provided a checklist that could be used by students to create a functioning group. Secondly students were required to submit a written evaluation of their project experience. The aim of the report was to enable students to critically reflect on their project roles and contribution, and to describe how (in the student's opinion) members of their group worked together. At the conclusion of 2000 programme

it was apparent that students required more than a written checklist to help them create and maintain a functioning group. This was confirmed by the written reports that students submitted on their project experience. What was required was scheduled time for a systematic and thorough introduction on how to work in groups. In the following year [2001], four afternoons were allocated to prepare students for working in groups. On the issue of student reflections on their project experience staff indicated that the majority of their student reports had been written in a thoughtful and considered fashion. Students had used “critical incidents” to illustrate their points/arguments. In essence students had become more conscious about how their project group functioned and their roles in the group. Some students also consciously drew parallels with their group experience and their future professional roles and responsibilities.

The students’ verdict on the **2000** programme was broadly positive. The feedback indicated that the programme had met its aim by providing students with the chance to develop an understanding of the various factors that can affect the health and well being of individuals, groups and communities. For the majority of students the programme was more demanding when compared to lectures and tutorials. The handbook had been well received with a clear majority of students indicating that it had been useful in providing them with a framework and clear instructions on how complete their work. Another positive feature of the feedback was the perception by students that they learnt new skills (such developing an argument and using evidence to support such an argument). Linked to this was the other perception that to achieve high marks in the programme required students to do more than simply reproduce facts and information.

Negative feedback provided on the programme was not unexpected such as comments that the size of the groups was a barrier to student learning. But even this criticism was ameliorated by other comments to the effect that the group size had provided students with the additional capacity to successfully complete their project requirements. On student recommendations concerning changes to the field studies programme the one recommending that there be only one project rather than two coincided with staff views on the matter and as a consequence the 2001 programme comprised of only one project.

## **5.6 Conclusion – challenges, responses and results**

If one takes a bird's eye view of the period under review one sees a programme that moved along a particular trajectory.

The preparation phase tested the commitment and resolve of the convenor and he used the time to pilot and refine ideas about project activities. He thus turned the severe budgetary constraints from a threat into an opportunity. The question arises could the convenor have done more during this period to secure the necessary finance? Perhaps approached an external agency and convinced them of the value of the programme and secured 'seed money' until the university provided the necessary core finance? On reflection this was not an avenue that the convenor considered and in retrospect he was fortunate that the university did eventually provide the budget. On the other hand is it appropriate and realistic to expect a junior staff member to raise funds for a core activity of the institution?

The first two years of project implementation (1992 and 1993) were the convenor's apprenticeship in project management. During the first year

circumstances were such that the programme was not put at risk by the two incorrect assumptions that had made concerning *recruiting staff* and developing *project materials* for students. This was because there was time to make things “right”, a relatively rare situation in academic settings. Nevertheless the difficulties in recruiting staff for the 1992 programme had a lasting effect on the convenor. From then on he never took it for granted that there was an easy supply of potential staff. In the case project materials the convenor recognised the intrinsic value and importance of developing materials rather than rely on other programmes’ materials.

During the Coming of Age phase (1994 and 1995) the programme had to face the issues of:

- managing a relatively large cohort of students on limited resources with a cadre of part-time staff

To do this the programme went the “materials route”. This meant that a handbook was the chosen mechanism to deal with these issues. This was based on the premise that a handbook afforded a number of advantages. Firstly through the handbook a base line of expectations could be set that all project groups were expected to work towards. Secondly a handbook could provide students and staff with a map for their project journey.

The two years (1994 and 1995) were crucial years in the formulation of the handbook’s template. The importance of this template cannot be underestimated because the template was the catalyst for the development of the handbook. The handbook in turn became the mechanism for implementation and thereby strongly influenced the character of the field studies programme.

**1996-2000** was the period of refinement and consolidation. Firstly there was the focus was on providing students with appropriate information on how and why their project work was assessed in a particular fashion. This focus developed as a result of a review of student work that revealed that despite the handbook, students were not entirely clear on how to meet the various project requirements. As the assessment guidelines were revised and strengthened the staff became increasingly aware of the educational value of providing students with such information. Coterminous with the recognition of providing students with quality information on assessment, was the greater understanding of the role played by the timetable in either hindering or supporting project-based learning. Efforts were thus directed towards providing students with a sufficient amount of uninterrupted scheduled time to complete their work.

It was only in the last two years of the programme that the some attention was paid to the need to adequately prepare students for project work. A major reason for this was the programme's strong reliance on the handbook to drive and support project-based learning. Too late it was realised that students were seeing project work purely in terms of task and under valuing the process side of project work. Some amelioration was provided, but this lack attention to group process can be regarded as an inherent weakness of this project programme.

The student review of the 2000 programme was instructive. Firstly it provided a degree of validation for the time and effort [in previous years] on developing and refining the handbook. Secondly the feedback indicated that the programme by the year 2000 had a key attribute claimed for project-based learning [viz. It provided opportunity for



students to develop academic, personal and transferable skills].

Thirdly it underscored the role that design and planning does play in programme implementation in a context of resource constraints.

In summary it can be argued that from modest and uncertain beginnings the field studies programme developed into a coherent and academically demanding programme. A contributory factor in its development was the ongoing process of refinement managed by one convenor. This continuity of convenorship provided the programme with a degree of stability and reservoir of experience. On the other hand it meant that the programme took a particular direction favoured by the convenor, and thus did not benefit from other perspectives that others might have introduced into the programme. For example the central role accorded to the handbook was emblematic of the convenor's view of how implement project-based learning with a large cohort of students. A different convenor might have taken a different route and been less "determinist" in guiding the project work of students. Furthermore the issue of "working in groups" might have been addressed at a much earlier stage in the life of the programme and an appropriate balance attained between task and process within the programme. Secondly a different cadre of supervisors might have been recruited bringing with them different ideas and expertise.

What also needs to be acknowledged that this programme was something of an exception as it was programme for *first year* students, while most project-based learning takes place in the senior years of undergraduate learning (Luck 1998 and Marshall 2000). This achievement can be easily overlooked because its 'longevity'.

Finally the reality of project-based learning at most South African universities is that there will seldom be more than the bare essentials for its implementation. The task for interested staff lies in using these bare essentials creatively to develop and implement a programme that can open up for students the learning potential inherent in project-based learning.

# **Chapter 6**

## **“From theory to practice”**

### **6.1 Introduction**

Most university teachers when asked the question ‘does your programme /or course encourage deep learning amongst students?’ they would probably answer in the affirmative or say they did not know. The fact is that fostering deep learning amongst students is a complex and not fully understood process. Indeed the evidence seems to suggest that many students graduate from university without ever becoming deep learners (Chalmers and Fuller 1996). The learning path that leads students in the direction of deep learning comprises many ‘stepping stones’ and one of particular interest is the one marked ‘project-based’ work, as project-based work is a central theme of this study.

This chapter first identifies some of the key descriptors of deep learning and project-based learning and then goes on to:

Review the field studies programme’s efforts at fostering deep learning amongst students.

- Identify characteristics of the programme that made it a project-based enterprise
- Discuss the importance of planning for project-based learning and
- Determine whether this programme made any difference to students learning [i.e. did the programme’s activities help

students, however modestly, shift away from the surface approach to learning towards deep learning.

- Finally conclusions are drawn about the intentions and efforts of this programme to foster deep learning amongst students.

## **6.2. Project-based learning**

Proponents of project-based learning argue that such learning is in keeping with the broad goals of university teaching as it encourages:

An increase student motivation

- A personal interest in a subject area
- The transfer knowledge and skills from one course to another (Luck 1998).

By encouraging the above students will some of the 'qualities' of a successful university graduate (Chalmers and Fuller 1996).

Project-based learning opportunities can only be realised if projects are carefully designed and implemented to promote such qualities. Some advocates of project-based learning contend that the inherent strengths of projects will only be realised if the projects are unstructured to give students the maximum space for exploration and discovery. They argue that structured project work on the other hand circumscribes students' autonomy and sense of 'ownership' of their project learning (Williams and Horobin 1992). On the other hand advocates of a more structured approach to project-based learning argue that students value structure as it gives them focus and reduces the possibility of them drifting around in a direction-less manner (Marshall 2000).

The utility of project-based learning means that students can experience such learning as an individual or group-based activity. In most instances students encounter such learning in their 'senior' years of their undergraduate study or more usually as post-graduate students. Full scale project-based learning is seldom used in amongst first year students, as the perception is that first year is about developing foundational knowledge rather than about developing a deeper understanding of a particular subject or research skills (ibid. and Marshall 2000).

### **6.3 The Field Studies Programme and the aim of fostering deep learning**

In this section I will consider whether there was any discernible link between the four aspects [the handbook, programme assessment, group size and supervision] of the programme and the fostering of aspects of deep learning amongst students.

#### **6.3.1 Project Handbook and Requirements**

During the early phases of programme implementation [1992/1993] the focus of the staff was on getting the 'mechanics' of implementation right:

moving students off campus and into the community without incident

- ensuring that students completed their work on time

The project guidelines were framed to help achieve this and consequently when examples of written student work were read by the researcher it appeared to him that the work was characterised by

reproduction of factual information and data, with limited efforts at application.

The introduction of the first handbook and the subsequent two versions marked a move in the right direction. What the handbook attempted to do was to provide students with explanatory details concerning the format of the report as well as a 'Score Sheet' on how the report would mark. Both the format and the score sheet signalled the importance of providing comment and analysis, rather than reproduction of information. Despite the improvement in the instruction student work provided little 'evidence' that they were shifting, sorting and organising their information in a qualitatively different way. Students were not apparently able to clearly distinguish in their own minds the qualitative differences between the 'Findings' section of their report and the 'Discussion' section. Instead these two sections conflated and comments and observations in the 'Findings' section were frequently repeated in a modified form in the 'Discussion' section. The limitations of these early versions of the handbook was the failure to give strong enough pointers on how to achieve an appropriate balance between description, comment and explanation within the reports. Secondly these versions did little to challenge student notions that quantity was equal to quality. In other words students believed that if they submitted a report of sixty pages they would invariably obtain a higher mark than a group that had submitted a smaller report. When this did not happen, students felt short-changed by the programme. Another factor that probably undermined student efforts was the fact that these projects had to be researched and assembled under considerable pressure.

Inclusion of a 'marking schedule' was a further attempt to help students move away from simple reproduction of factual information. The schedule provided students with explanatory information on the 'markers' that would be used to assess their reports. In spite of the provision of the schedule project reports did not provide convincing data that the schedule's inclusion had made any material difference to the quality of student writing. Two reasons could explain this. Firstly no attempt was made to discuss and 'interpret' the marking schedule for students. Secondly the schedule was really written for a different audience – the staff to help them provide appropriate written feedback to students.

In providing a new preface and revised framework for the second project, the 'Case Narrative' project was yet another effort aimed at fostering forms of deep learning. This preface had become necessary because students had been struggling to develop credible and coherent 'management' plans for their 'paper' patients. These 'management' plans required students to assemble, sort and organise in an integrated manner. In other words gather appropriate background information, and using the planning framework to work out conceptually what their 'paper' patient required.

The reason for their difficulty was the fact that the framework had overtime become too elaborate and as a consequence students found it hard to 'decipher' and use it. Secondly the 'planning' dimension of the second project far too demanding. As a staff member observed – the project required students to construct management plans with a degree of insight that few professionals in the field could achieve.

The revisions had a positive impact and student management plans were more credible and realistic. Yet it would be difficult to suggest that this provided 'evidence' that the revisions acted as a trigger in the direction of deep learning. The improvement in these plans was more likely the result that students had been more strongly 'cued' to produce the 'desired' management plan. Underscoring this point is the fact that despite these revisions students still appeared to favour quantity over quality. This quantitative notion was particularly noticeable in student poster work of 1998. The poster guidelines had been introduced to help students to design posters that were systematically laid out and were more 'academic' i.e. provide the readers with citations for the information and data provided within the poster. These guidelines were at best only partially successful – the layout of the posters improved substantially and the reader was helped along their 'reading journey'. The negative consequence was that the guidelines triggered a 'riot' of dense ill -digested text as students attempted to cram as much information between 'crusts' of diagrams and illustrations.

In the penultimate year of implementation page and word limitations were introduced for both reports and the posters. These limitations were introduced as a means of retaining staff rather than shift students' beliefs about quantity versus quality.

Notwithstanding this motivation concerning page limitations some effort was made to frame them in a way that students were given strong pointers on how to distribute their page allocation. In other words the instructions indicated that students should apportion pages according to the relative value of the various sections of the report. The instructions had the desired effect, as more pages were allocated to comment and explanation than to description. In the past no such



discrimination had occurred with the Introduction receiving a similar page amount to that of the 'Discussion' despite the fact that the Introduction was only worth 10% while the 'Discussion' was worth 30%. On the surface the word limitations had the effect required, but this was really a function of the very strong cues provided by the word limitations. In other words this was a strategic move on part of students, rather a genuine preference to reduce the 'size' of their project reports. The strategic nature of this re-apportioning is seen by the fact that there was no equivalent re-apportioning when it came to the posters. While there were overall word limits there were no explicit cues on how to breakdown the word limit between the sections of the poster. Instead the posters still reflected a mal-distribution between the various sections of the poster. The following year these instructions were revised in line with those of the reports and the posters reflected a more appropriate internal balance with a greater emphasis given to comment and explanation.

Overall the project handbook and the requirements attempted to 'cue' students so that their project work was more than an extended exercise in reproduction of unrelated units of information/data. As the programme 'matured' the 'cues' become stronger and students were able with greater confidence to:

collect and record information/data from a range of different sources [government reports, annual reports, research bulletins, newspapers and interviews]

- sift, sort and organise the accumulated information/data
- provide limited comment and basic explanation based on their 'research data'

By the end of the programme, the handbook, played the role of actively 'cueing' students. It can't be claimed that this 'cueing' resulted in students shifting in any meaningful way towards deep learning. At best it could be said that students recognised that to 'succeed' in their project work they had to demonstrate that they had made some effort to 'organise' and re-constitute the information/data they had collected in the course of their project research.

### **6.3.2 Programme Assessment**

The programme's system of assessment like the handbook, changed over time, as the staff became more aware of the need to more strongly 'shepherd' students in the direction desired by them.

This intention to shepherd students in the right direction is apparent in the ways in which the reports and posters were assessed [viz. the 'Score Sheets' and 'Marking Schedules']. Where intention started to have the desired effect [as far as the reports and posters were concerned] was with the introduction of the page and word limitations. With their introduction students were forced for the first time to consider what information/data they should include in their reports and posters. In previous years [without word/page limitations] students indiscriminately included a host of non-essential information /data because it provided 'padding' and made their report look sufficiently 'weighty' i.e. important. Furthermore the explanatory commentary that accompanied the page limitations provided students with the 'missing' triggers that helped them more clearly recognise the value of comment and basic explanation over mere description.

Overall, the intention of assessment to promote deep learning amongst students was not achieved. This was despite efforts to synchronise the project requirements with those of the written examinations. At best this synchronisation achieved a higher level of 'shepherding' of students away from surface learning to 'cued' learning i.e. the achieving approach to learning.

### **6.3.3 Group Size**

The size of the project groups was perhaps the most problematic aspect of the field studies programme. For the entire period of programme implementation the average group size was fourteen. [The literature indicates a group size of between eight and ten allows the advantages of group learning to be satisfactorily realised (Jacques 1995 and Jenkins 1997)]. The size of the group thus had a direct bearing on student learning. This factor was identified as primary barrier to student learning as students found their groups:

Inefficient and difficult to manage

- Frequently divided into various sub-groups which affected group cohesion
- Allowed disinterested students to 'coast' along and yet obtain the same group mark as other more hard working students

These factors then impacted on student learning by discouraging a personal interest group-based project work, so that many students finished their project work having acquired only a superficial understanding of their topic and their 'world view' was largely intact. Efforts aimed at minimising these difficulties [via the handbook and

extending the scope/demands of the project requirements] made little positive difference. Compounding the situation was the fact that it was only the last year of the programme students were given any preparation in working groups and how to manage large groups. Instead students were expected to make a 'go of it' with supervisory intervention provided if the group started to disintegrate.

In essence therefore group size was a major factor that militated against the fostering of deep learning. For those who disliked group work their worst fears had been confirmed [i.e. that group work was difficult and unrewarding]. For other students the large groups meant that the potential and possibilities of working in-groups was never properly realised [i.e. the sharing of ideas and knowledge and experience].

#### **6.3.4 Supervision**

Supervision was another problematic feature of the programme. As a consequence of ongoing resource constraints the level of supervision was uneven and limited. As a result much of the supervision provided was concerned with the 'mechanics' of programme implementation [i.e. achieving deadlines] rather than providing opportunities for:

'unpacking' the educational intentions of the projects

- exploring how and what ways the project requirements expected students to approach their work
- reflecting on whether the project work had influenced the way that students approached the 'world'

Another problematic feature of supervision was the quality of feedback provided to students. Because of resource constraints the full burden of assessment fell heavily on the supervisors – they were expected to mark the project reports and the student assessments, often under pressure. For inexperienced staff this was a difficult undertaking and they tended to over compensate for their inexperience by either marking too strictly or too leniently. While a system of moderation existed this only acted to neutralise the more florid instances of inappropriate marking. Thus in a number of cases the mark and written feedback provided to students was not an accurate barometer of their project performance or the learning that might or might not have taken place.

On the positive side the supervision provided to students provided students with a structured opportunity for them to discuss and plan their project work. Secondly the supervisors played an essential role in facilitating student entry into ‘communities’ and the various agencies that provided the ‘bedrock’ experience for students. Thirdly in the face of considerable resource constraints supervisors did their level best to provide students with supervision that was encouraging and reliable.

In summary therefore supervision [like group size] was where the effects of resource constraints were most acutely felt, and so strongly contributed towards the programme’s inability to:

- strongly open up learning opportunities for students
- encourage students shift away from entrenched ideas on what constituted ‘real’ learning

## **6.4 The features of the field studies programme that 'made it' a project-based learning enterprise**

From its inception the programme was designed around students undertaking some form of project work, and its ambition always was that students should complete a piece of substantial 'research'.

Overtime students were required to undertake two projects and convey their research in three different mediums – a report and poster and oral presentation.

In certain respects the field studies programme was a hybrid of Morgan's project work and project component. Firstly the programme served as an introductory experience in university project work for first year students, as no other course required them to undertake project work. Secondly it required students [by the end of the programme] to demonstrate a degree of hierarchical development in their knowledge and skills. This is apparent when one looks at the requirements of the second project. For this project student were expected to research and then develop a management plan for their 'paper' individual or family. This requirement was designed on the premise that by the time students entered the second project that would be in the position to draw on and develop their knowledge and skills derived from their first project experience. Secondly the projects and posters of both projects obliged students to draw on and organise information and data from a variety of sources. Thirdly the reports, posters and examinations provided students with different opportunities to demonstrate a basic level of understanding and the skills they gained. Fourthly the programme did allow students the chance to develop a deeper elementary understanding of a subject. This occurred during the second project where through the research prologue students were

able to 'excavate' a particular topic [e.g. Autism] in way that went beyond a brief survey of the subject. Fifthly the programme created opportunities for students to start to develop basic research skills [analysing information, using evidence to develop a basic argument].

The counterfactual is the fact that while the programme offered students opportunities to

- engage in a deeper understanding of a topic area
- begin to develop research skills;

these opportunities were not taken up every student, but rather confined to a committed core of students [within each group] who worked every year to complete the reports and posters.

Notwithstanding the above mentioned limitations, it can be argued that, the programme had all the essential features for it to be called a project-based learning enterprise viz.:

It expected students to work over an extended period of time by researching a topic area and

- to 'document' their project 'research' by producing a report, poster and sitting written examinations.

#### **6.4.1 Planning for project-based learning**

Planning was an essential component of the field studies programme for without it project-based learning would not have taken place no matter how well researched had the original idea had been. Yet the literature is generally silent on the 'planning steps' for project-based learning [Luck 1998]. Yet the success or failure of project-based

learning is located as much in the planning process as in the other 'educational' aspects of project-based learning. One the reasons that planning is not discussed in the literature, is that planning, is under rated by academic staff. They tend to view it as comprising a series of banal administrative tasks [i.e. dividing students into groups, allocating supervisors, drawing up timetables and booking venues] that are of little academic consequence.

The difficult gestation period of the field studies programme bears testimony to the importance of seeing planning more broadly. In the case of the field studies programme planning was conceived as including the piloting potential project requirements. Thus the enforced delay of implementation, instead of becoming a wasted opportunity, become instead an educational 'opening' to plan and 'pilot' new project requirements [i.e. the posters and the organisational inventory] before the first year of programme implementation.

Apart from planning being useful in overcoming the initial barriers, it became essential to help realise the aim of moving large numbers of student into the 'community' on a tight schedule, with limited resources and provision of part-time supervision. For planning to achieve this ambitious aim it required that the planning process be infused with a qualitative understanding of the educational purpose of the field studies programme, viz. 'to help students gain a holistic outlook that recognises that the determinants of health and varied'. This qualitative understanding of the role of planning found expression in the decisions to:



Create two separate projects (1993)

- Provide a handbook (1994)
- Gradually reconfigure the timetables so they could more actively support project-based learning (1995 onwards)
- Institute the research prologue (1996)
- Introduce written examinations (1996 and 1998)
- Provide a separate handbook for supervisors (2000)

These decisions could not have been considered let alone implemented without a firm grasp of planning, as each of these decisions had consequences that had to be planned for. For example the institution of the research prologue resulted in a change in the staff profile and these staff changes had to be planned for [i.e. new staff had to be recruited and ready]. Had this not happened the programme would have encountered severe difficulties and then possibly disrupted student learning. Similarly the reconfiguration of the timetable was achieved because the impact of timetable changes on the other course activities was neutralised through careful planning.

One final aspect of planning was the balance achieved between continuity, change and refinement. This balance becomes apparent when one compares the 1992 project requirements with the 2000 project requirements. While both sets of requirements shared the same origins the 2000 project requirements are qualitatively more demanding than their 1992 predecessors. Yet successive cohorts of students were able to complete successively more demanding

requirements without major difficulty because they had been carefully planned for.

## **6.5 Conclusion**

What is striking about the description of the field studies programme's attempts to foster deep learning amongst students, is the fact that it was as much an apprenticeship for students as it was for staff. Like the students the staff entered the programme with certain ideas as how students learn and the 'best' ways of achieving results. Overtime and with insight the programme attempted to align the factors [the handbook, the requirements and assessment activities] that could cue deep learning. With this attempted alignment successive cohorts of students were afforded limited opportunities to move in the direction of deep learning.

Notwithstanding the attempts at alignment two key factors [group size, and limited supervision] acted as a significant countervailing force that militated against a shift by all students in the direction of deep learning and remained in force through the period of implementation. In the case of group size, it meant that students had to complete their project work under difficult conditions [e.g. large groups that ended up splitting into sub groups with differing work routines and approaches to project work]. This difficulty was compounded by the lack of formal training for students in how to work and manage groups.

Limited supervision meant that students were not given the type of supervision and feedback that could have more strongly triggered aspects of deep learning. This meant that supervision was mostly 'routine' driven with the focus on project deadlines rather than

providing students with the space to explore and reflect on what they had learnt and whether this had changed their views/ perceptions.

As a project-based learning enterprise the field studies programme was an example. It enabled groups of first year students to engage in group-based learning opportunities. Secondly it required students to extend their academic repertoire of knowledge and skills by meeting a range of project requirements.

On the matter of planning it is contended that its role was vital helping to try and realise the programme's overall aim [i.e. helping students develop a holistic outlook]. Planning also enabled the 'management' of difficulties created through resource constraints in such a way that the difficulties did not overwhelm or actively subvert the learning opportunities available to students.

In summary the field studies programme during its eight years of implementation was an amalgam of the 'appropriate' and the 'inappropriate'. For the students it meant moving beyond the safe confines of campus and entering the 'community' to observe, record and learn. On occasions especially during the first project, how they observed, recorded and learnt appeared no different to what they done before entering the programme. At other times they began to show that they were beginning to outgrow their past and established ways of engaging with and learning from their environment in ways that indicated that their view of the 'world' was changing.

For the staff there was the gradual and deepening realisation that a number of factors [both direct and indirect] powerfully influence the quality and type of student learning. In the case of direct factors [e.g. the handbook, project requirements and assessment] these were factors

that are under the direct 'control' of the programme staff and over the course of the programme they were adjusted and adapted to try and more actively support students in their project work. The indirect factors [e.g. resource allocation, university timetables and broader environment] on the other hand could not be actively 'controlled' as they were determined by the faculty and left their 'mark' on the programme. In some instance no modification was possible [as in the case of the budgetary allocation] while in other instances modification took place overtime as it did with the timetable. In the early days of the programme the lecture centred timetable was a serious barrier to project-based learning, but gradually the timetable was so modified that it did play a role in supporting project work. Thus over time the central task of the staff shifted from 'mere' programme implementation to the more complex task of orchestrating the various factors in such a way that a project framework was created that might cue aspects of deep learning.

# **Chapter 7**

## **Concluding Observations**

### **7.1 Introduction**

This case study has documented the 'life history' of a particular project-based programme that spanned an eleven-year period. This chapter looks at:

- some observations about project-based learning that can be drawn from this life history and key factors that influenced its character
- key lessons learnt
- further research that could be done
- the role that project-based learning can play in undergraduate medical education
- final conclusions

### **7.2 General Observations**

These observations serve two purposes. Firstly these observations can serve as a cautionary statement of intent for those contemplating using project-based learning. As a method it is versatile, but to realise its' full potential in a context of resource constraints, can require of the would-be practitioner knowledge, skills and tenacity. This is because the prospective practitioner needs to manage a broader environment that is frequently "at odds" with the aims of project-based learning.

Secondly it serves as a valedictory statement on the field studies programme:

- that it had a difficult gestation period
- that its' formative years were marked by managing various critical incidents in particular ways
- whose subsequent maturity reflected resilience and innovation as well as opportunities lost.

When looking back over the eight years of implementation what are some of the general observations that can be made about the field studies programme?

The first observation is that programme gave students a foundational experience [apprenticeship] in project-based learning in their first year of study. No other first year faculty course required students to work together and learn in this way. Secondly it provided students with an “off campus” learning experience. For students this meant that they explored Cape Town in new ways and met people they would otherwise never have met. Moreover it provided them with learning experiences that were seldom replicated within the confines of a lecture, tutorial or a laboratory, where “learning” in these contexts is often safe and anodyne.

The third observation is that the programme allowed students to draw on or develop a range of different academic and interpersonal skills. Confirmation of this observation is provided from the 2000 evaluation. Students indicated as a result of the programme they had learnt:

- to use evidence to develop an argument

- new ways of gathering data
- to communicate with each other
- group work skills

Moreover over programme gave students a range of options within which to apply their skills [when completing their projects]. For some it was learning how to do basic research and compiling a report, for others it was creating and developing a poster, and for others it was developing and giving an oral presentation. Likewise for other students it was the opportunity to meet and interview people from different “walks of life” and then to use this experience to construct for themselves a future professional role that went beyond the hospital bed and the consulting room.

The fourth observation is about project design and management. For the programme, the central design issue was about the development and refinement of the handbook. Between 1994 and 2000, eight versions of the handbook were ‘published’ for use. Another important dimension of this design process was the progressive ‘deepening’ of the programme’s academic requirements. In other words overtime the requirements became progressively more challenging for students both at a group level as well as at an individual level.

On the matter of management the primary concern was implementation. Over an eight-year period 1 700 students completed their projects. To have achieved this, meant managing a range of diverse factors both internal and external to the programme. Central amongst these were:

- recruiting staff
- allocating sufficient scheduled time
- obtaining off campus venues
- negotiating access to health and social services
- securing interviews with residents and other interested parties

Programme management was less successful when it came to *group size*, and *quality supervision*. This lack of success was due to resource constraints imposed on the programme by the faculty. This resulted in project groups that were too large. The size of the groups in turn negatively impacted on how student experienced the programme. For a number of students it provided direct confirmation for their negative perceptions about group work [ie. that working in groups was difficult, time consuming and provided opportunities for non-involved students to earn a project mark without effort].

Likewise resource constraints meant that project supervision was limited both in *time* and in *quality*. If more resources had been available supervision could have been on a more regular basis, perhaps twice a week – at the beginning and the end of the weekly cycle project work. In this way issues [both practical and process] could have been more rapidly identified and addressed. Secondly time could have been spent ‘unpacking’ what students were learning. As it was the hour of weekly supervision could only address issues in a very cursory manner. Furthermore had more resources been available the programme might have been able to attract and retain a greater number of experienced staff.



A fifth observation concerns assessment. In the formative period of the programme [1992 – 1995] assessment was viewed in too narrow a sense – as a means to oblige students to take their project work seriously. However over time the notion of assessment was broadened and steps were taken used to it to encourage students to engage more deeply with the issues/ideas generated by their project work. Secondly assessment became more nuanced by moving away from a unitary group mark to a composite project mark, which could more accurately reflect a student's individual project contribution.

Another limitation of assessment was the late recognition of its value in helping students recognise that project-based learning was also about how they functioned as a group. This facet of assessment was only introduced in the last stages of the programme's existence.

A sixth observation is linked to the above in that students were not prepared adequately for project-based learning. It was an implicit assumption of the staff (for most of the period of implementation) that the students had, the skills, aptitude and experience for this form of learning, or if not, they would develop the necessary skills and aptitude as the programme unfolded. The reality was that students did not easily adapt and respond to this form of learning; especially since the project groups were on the large side. Instead an orientation in 'how to work in groups' should have been an integral part of the programme from the start, so that students could have covered essential issues about group work viz.:

- how to form and maintain a functioning group
- creating ground rules

- defining roles within the group
- organising and sharing work
- how to “trouble shoot” and resolve problems

By providing students with such orientation they would have been far better prepared for the “ups and downs” of project work and alerted to the fact that effective group work is as much about *task* as it was about *process*. Secondly that all groups go through ‘rough’ patches and the effective groups are ones that surmount these patches.

### **7.2.1 Key lessons learnt**

Like any educational enterprise the field studies programme’s character and ability to provide a project-based learning experience for students was strongly influenced by:

- faculty context
- structural limitations imposed by this context
- convenorship of the programme

### **7.2.2 The Faculty Context**

When planning to introduce such a programme within an existing curriculum it is important to clearly establish from the start whether the programme has secured the necessary faculty resources for implementation. This was the hard lesson learnt by this programme’s convenor – he embarked on a venture without any such guarantees

from faculty. Amongst academics there is often the naivete that makes them believe that because their idea has academic merit resources will surely follow. The reality is that in an environment of continuous resource constraint any new programme needs a 'street wise' advocate who will use their networks to secure the necessary resources from faculty. Once initial resources have been secured the task then becomes to ensure the continuity of the programme. A way to promote such continuity is to 'embed' the programme within the academic 'mainstream' of the faculty and encourage faculty 'ownership'.

A sign of a programme's 'coming of age' is the amount of scheduled time that is given to the programme so it can mature. Like funding scheduled time is a reflection of its educational importance within faculty. All too often faculty want new programmes to address new requirements in established ways with built-in limitations. [For instance a community-based programme is expected to operate within the confines of a lecture-based programme]. Thus from the beginning new programmes are undermined by the constraints imposed on it. In the case of the field studies programme was to overcome its initial timetable constraints because its convenor was in the fortunate position to be able to initiate changes and so remedy the timetable deficiencies. Had this not been the case the programme would probably have remained undeveloped and hamstrung by timetable constraints.

Another influential aspect of the faculty context that new programme's have to deal with relates to learning activities and modes of assessment. Often one of the reasons for introducing a new programme is to introduce into the existing curriculum different learning activities and modes of assessment. What can happen as the programme unfolds

it faces a shifting coalition between disaffected students and sceptical staff who make it their business to contest the value of the programme by questioning the activities and how these activities are assessed. For staff implementing the programme in these circumstances it is important to address the challenge posed by this coalition. This can be useful done by recruiting influential members of faculty to participate the programme [e.g. as an examiner] and then mobilising them to engage with the sceptical staff. In the case of students it is important to engage the 'hearts and minds' of students. Firstly there needs to be recognition that students will not automatically take to the learning activities of the programme. Thus for example if the chosen mode of learning is working in groups students need an orientation on how to work in groups [ie. establishing ground rules and alerting students to the 'ebb and flow' of such work]. Secondly staff need to demonstrate to students an enthusiasm. It is a truism that students show a greater willingness to engage in new activities if they relate to staff who are enthusiastic and 'believe' in what they are doing.

### **7.2.3 Structural limitations that can face a new programme**

The field studies programme was structured in particular ways because of various constraints it had imposed on it in the early and formative phases of its development. In essence these constraints were about resources. (In 1989 the convenor was prepared to tolerate such limitations because he was wanted the programme to succeed despite such limitations). In accepting these constraints he imposed on the field studies programme a number of "structural" limitations.

The first structural limitation was group size. Resource limitations meant that students had to work in large groups [sometimes in groups as large as fifteen]. This resulted in groups splitting into sub-groups with attendant difficulties:

- lack of cohesion and co-ordination
- poor communication between students
- inter-group tension/conflict

The second structural limitation was the use of part-time staff on modest salaries. While part-time staff are not of themselves problematic, their appointment did generate problems for the programme. Firstly there was continual staff turn over so that experience and expertise was consistently lost to the programme. Secondly resource constraints meant that the programme had limited ability to attract and select suitable staff. This in turn affected the quality of supervision provided. To compound matters in-service training for staff was not provided because of lack of funds.

The third structural limitation was the circumscribed time available for project work, particularly in the early years (1992-1994). In these early years the students were given insufficient time to do justice to their project work. Instead the programme resorted to the expedient of requiring students to do a considerable amount of their project work in their “private time” ie. over weekends and during their holidays. This severe imbalance was rectified over time, when it was belatedly recognised that student holidays were not there to compensate for poor timetable arrangements.

## **Responses to these structural limitations**

The truth of the matter is that most new programmes will face structural limitations in one form or another. The question therefore is how can one most effectively 'manage' these limitations?

In the case of the field studies programme the provision of a detailed handbook and a range of project requirements was the strategy chosen to manage these structural limitations. In one sense it 'worked' and enabled eight years of project-based learning to take place, during which 1 700 students passed through the programme. On the other hand this strategy had negative consequences. Firstly it allowed the handbook to assume too central a role in the 'life' of the programme. This meant that student / staff role was largely reduced to 'interpreting' what the handbook required rather than it being a catalyst for students to explore, debate and reflect on core issues [e.g. notions of community, health and service delivery]. In other words the handbook was the 'expert' and students were expected to validate this 'expertise' by completing their project work in accordance with requirements laid down by the handbook. This had the effect of creating a distancing between the students and the projects. This was particularly noticeable when it came to the 'Community View' project, as they were unable to strongly identify with the questions and categories devised for this project. In this respect students were allowed to become passive disengaged learners.

An alternative response would be to use the handbook as a resource that students and staff could draw on. In other words it would be a catalyst / starting point for students when they commence their project work. This would avoid the situation where the handbook is seen as an imposition and students struggle to identify with pre-determined

questions and research categories. Linked to this question of requirements. All too often as a programme progresses the requirements become more and more ambitious and student learning is seen in terms of 'achieving' these ambitious requirements through concrete verification [ie. completing a project report]. What is then overlooked are those intangibles of group-based project learning [e.g. how students interacted with one another and learnt from one another]. Thus these 'intangibles' should receive as much attention as that given to formulating project requirements. In other words efforts should be made to ascertain whether students have the skills to work in groups and if not provide students with the necessary training for such work. Moreover the preparedness of students to work in groups should be taken into account when devising project requirements.

Another lesson learnt was the need for ongoing staff development when using new part-time staff. This must be a *sine qua non* when using such staff, for without such training the quality of supervision for students will always be a matter of concern. An important aspect of in-service training should be on helping staff to understand and monitor the 'process' and 'content' elements of project work. Moreover a helpful way to encourage this understanding amongst staff is to ask them to provide one with episodic progress reports on their students groups. Linked to this requirement is it useful to devise a job description that outlines in concrete terms the roles and responsibilities of staff. By devising such a job description one begins 'benchmark' minimum expectations. Another benefit of such a job description is that it can be used to motivate for better conditions of service for such staff.

### **7.2.4 Convenorship of a programme**

The field studies programme was probably unusual in having only one particular convenor. This arrangement had both positive and negative aspects. On the positive side it provided stability through continuity. On the negative side it resulted in the programme strongly reflecting the educational and administrative assumptions of one person.

The lessons learnt from this arrangement are as follows. Firstly convening a programme requires a range of responsibilities that straddle both the academic as well as the administrative domains. While the academic responsibilities are often more easily itemised, the administrative duties are frequently seldom mentioned. Thus what often happens is person is appointed to convene a programme because of their academic expertise and then find out that they are expected to be able to formulate budgets, recruit staff and ensure that there is an administrative infrastructure that can support both students and staff. Few in the academic world straddle these two domains with ease or interest. Consequently a prospective convenor should candidly assess what their strengths and weaknesses are in this regard, and plan accordingly to minimise future difficulties. Part of such planning should be to network with staff who have the experience and knowledge of how to 'operate' within the university environment.

On the matter of the academic domain the establishment of an informal 'reference/support' group of fellow academics can be helpful. In other words the convenor can use this group as a sounding board on the range of issues that inevitably surface when implementing a programme. Secondly such a reference group provides the convenor with a 'conduit' of re-assurance particularly when a course of action results in unexpected consequence. Thirdly this group [if drawn from



within the faculty] can serve as a potential 'advocacy' group for the convenor if the programme comes under attack from within the faculty.

### **7.2.5 Project-based learning and fostering deep learning**

The field studies programme was never explicitly designed to actively foster deep learning. The lessons learnt in this regard are that such a programme has the *potential* to play a constructive role in fostering deep learning amongst students.

Notwithstanding the above it is contended that the field studies programme provided a form of apprenticeship in deep learning as it did for project-based learning, although to a much lesser extent. The opportunities for foster deep learning were most apparent during the second project [the 'Case Narrative Project']. A number of reasons can be advance for this. Firstly students more readily identified with the project topics. Secondly the students were able to draw on their first project experience. With these two factors students approached their project work with greater confidence and were able to engage and reflect on the issues, arguments and theoretical constructs generated by the second projected. Added to this, students were able to 'test' these issues and arguments against what they had found out in the 'community'.

For some students the project experience helped foster aspects of deep learning. Firstly the programme allowed students to observe first hand how other students tackled project tasks and then use these tasks to learn. In this way students were introduced different learning approaches and styles. This in turn gave students the opportunity to

consider their own learning priorities and styles against what they had observed. Secondly the group experience revealed to students their strengths and weaknesses as a 'group' learner. With such knowledge students could begin to develop an increased understanding of the various dimensions of learning. Fourthly the programme gave students the opportunity to value those intangible aspects of learning [such a change in attitude and respect for social diversity] that would stay with them long after they had 'passed' through the programme.

### **7.2.6 Project-based learning can play in undergraduate medical education**

The role that project-based learning can play in undergraduate medical education hinges largely on the extent to which such learning is accommodated within the undergraduate curriculum. As this study points out for project-based learning to play a constructive educational role certain basic requirements need to be met (e.g. sufficient resources and a learning and teaching environment that supports project-based learning). If these basic requirements are at hand, project-based learning can add value to student learning.

Firstly it can provide students with the structured opportunity to learn together that are not available when students meet together at a lecture, in the laboratory, or in tutorial or seminar group. Secondly project-based learning groups can provide students with an apprenticeship in team work. Teamwork is now an integral part of a medical graduate's professional life in both the private and public sector [Mogensen, Elinder, Widstrom and Winbladh 2002]. Thirdly project-based learning can provide students with the opportunity to

develop in-depth knowledge of a particular subject/topic, skills of 'initiative, organisation and creativity' [Jacques 1995 pg. 96]. Fourthly project-based learning can be the vehicle for students moving beyond the walls of the academy into the 'community'. In so doing the students' learning context is opened up in ways that cannot be replicated in a lecture, tutorial, laboratory or hospital ward. For instance in a lecture one can illustrate health and social inequalities in a lecture through statistics and graphs, but it is when students face these inequalities 'on the ground' through their project work, that such inequalities become more than a set of 'sanitised' statistics and graphs. Fifthly project work [as this study illustrated] can allow students to 'imagine' for themselves a professional role that can extend beyond the hospital bed.

### **7.3 General Recommendations arising from the case study**

First general recommendation – that project-based learning be more actively considered by teaching staff for use in first year courses. This recommendation appears to go against current practice, which avoids using project work in first year as students are viewed as insufficiently prepared to benefit from such learning [Marshall 2000]. Nevertheless this recommendation is made is based on the researcher's ten years of involvement in project-based learning and the contention that despite the recorded limitations of the field studies programme it was of educational merit. This merit resided in the fact that it allowed groups first year students the opportunity to explore health issues in ways that would not have been available to them had they attended lectures or tutorials or been required to write an extended term essay.

The second general recommendation- that project-based work be incrementally introduced within undergraduate courses. In other words project-based work in first year can be viewed as providing students with an 'introductory apprenticeship' in project-based learning. During this apprenticeship students can begin to develop **basic skills** in:

group work [e.g. managing meetings and developing deadlines]

process skills [e.g. gathering and organising information, writing and computer skills]

presentational skills [e.g. data presentation, oral communication and report writing]

'management' skills [e.g. project planning, setting objectives, time management and conflict resolution]

personal skills [e.g. independence, self –confidence and self-reliance]  
(Williams and Horobin 1992)

In the subsequent years of project work these skills can then be developed to an intermediate level, and then perhaps even to an advance level.

By using project-based work as an *incremental* activity over the course of a student's undergraduate career, this activity can be another educational 'resource' that can help students mature into 'successful' graduates. That is to say graduates that can think critically, reason logically, problem-solve and work constructively in a team (Wellington 1998).

## 7.4 Research Possibilities

Having viewed project-based learning from a general as well as particular vantage-point what are some of the research possibilities?

Firstly given its wide application in various university courses it would be useful to explore how such learning could be more *effectively* implemented in learning environments where a range of other learning methods are used in tandem with project-based learning. For example would tutorial work if properly structured support group-based project learning? Secondly could laboratory work and practicals also be designed to create appropriate opportunities for students to learn collaboratively in groups? If so student experiences of learning in groups could be widened so that project-based group learning would then not be viewed by students as a learning activity that is at variance with their generic learning experiences.

Secondly it would be of value to determine whether the *particular* design of a project-based programme can positively or negatively influence the way in which students engage and complete project work. For example does the provision of detailed materials inhibit students and prevent them from engaging deeply with their project work?

Thirdly if appropriately designed and supported can project-based learning be a *primary* catalyst for fostering deep learning amongst students. In word words does project-based learning have particular characteristics that can be harnessed to help students make the transition from surface learners to deep learners?

Fourthly are the advantages claimed for project learning (e.g. development of personal and transferable skills) materially different

from the claims made by other teaching methods such tutorial and seminar groups? Does project-based learning provide opportunities for students to develop a knowledge base and skills that cannot be easily realised in a tutorial / seminar group?

Fifthly in the context of resource constraints can the conundrum of poor student/staff ratios to be better managed through 'efficiencies' achieved by using well designed project-based learning? Could an alternative case be made for using it in settings where student-staff ratios are smaller (as in some post graduate courses) and that undergraduate activities focus rather on preparing students for such learning?

Sixthly are large-scale and obligatory programmes the most appropriate way to introduce students to "community-based" learning? Could not a case be made for such programmes to be limited in size and restricted to students who 'volunteered' to learn about community issues via project-based learning? While it could be said that large programme can achieve certain efficiencies [e.g. larger student / staff ratios] are these efficiencies in reality the hidden cost that such programmes have to bear by having large and inefficient student groups that have limited staff support? Do not these hidden costs actually vitiate these cost efficiencies and prejudice students against project-based learning?

Finally can a case be made for limiting the role and duration of an individual convenor? Can student learning be better served by encouraging a regular infusion of fresh perspectives and ideas?

Secondly are there feasible ways in which part-time staff can be encouraged to make a more active role within project-based learning?

By obtaining greatly clarity on these issues one might determine more precisely the role and function that project-based learning could play in an undergraduate curriculum.

## **7.5 Conclusions**

This study commenced as an evaluation of the use of project-based learning in medical education. As the research unfolded key research themes emerged:

- student approaches to learning and their learning styles
- teaching approaches encountered by students
- the potential of project-based learning to foster appropriate learning amongst students [ie. deep learning]

Against these themes a particular form of project-based learning was 'benchmarked' and the strengths and the limitations of the programme were itemised. The limitations identified pointed to the fact that potential opportunities for fostering deep learning were not taken advantage of and thus full learning potential of students who entered and 'graduated' from the programme was not realised.

Notwithstanding the identified limitations of the field studies programme had a number of strengths. In the first instance it provided 1700 students with learning opportunities that were material different to those they encountered in their other courses. Secondly it provided them with an apprenticeship in how to work in groups and to complete a range of learning tasks. Thirdly it provided students with opportunities to either develop or refine skills that could be used in

other learning contexts. Fourthly from a staff point of view the field studies programme gave them the means to surmount the hurdles of resource constraint and institutional inflexibility and enabled them to pioneer and then develop a particular form of project-based learning. This form of learning encouraged students to venture beyond the safe confines of the campus and to start to engage with the complex world beyond. By so doing students were helped recognise that this world does reach into and powerfully affect what goes on in those apparently detached domains of the hospital ward and consulting room.



# **Appendix One**

An example of the handout that was given to students to help them write up their report of the 'community'/suburb they had investigated.

University of Cape Town

Faculty of Medicine

**1992**

## **Consolidated Report**

Each group of students will be required to submit a 15 paged typed report. The report will be divided into two parts: part one, dealing with their community attachment and part two dealing with the organisation they have studied.

To help students complete their report the following guidelines are offered.

### **Introduction**

This introduces the study to the reader and sets out the main aims of the study. Where appropriate reference is made to relevant published literature on the subject. In the introduction reference is also made to the study's findings and their implications.

### **Methods**

Here students discuss how they obtained their information and what sources were used. For example information obtained through

interviews and reference material. Students also need to discuss how and why various people /organisational officials were chosen to be interviewed.

## **Results**

Under this heading students can use the handout (dealing with community study and organisational profile).

## **Summary and Conclusion**

Here the students briefly summarise the major findings of their study and draw appropriate conclusions.

## **Appendix Two**

What follows is an example of the guidelines given to students to complete their 'Community Diagnosis' Project

University of Cape Town

Faculty of Medicine

1993

### **Guide to Project on Community Diagnosis (1993)**

#### **1. Community Profile**

- a. Name of the community, when it was established, how it developed?
- b. What is the estimated size and composition of the population of the area?
- c. Classification: what type of community is it e.g. residential, industrial metropolitan centre, informal settlement?
- d. What is the form of local government? Is there a ratepayers' association or community organisation? Does a city councillor represent the area? How much control does the community have over its own affairs?
- e. Is the community represented in parliament? If so, what political party represents the area?

## **2. Resources in the Community**

- a. Housing – private, state-provided, informal, high or low density?
- b. Economic – shops, factories, businesses, and hawkers?
- c. Transport –buses, trains, taxis, private vehicles
- d. Infrastructure – roads, water supplies, sewerage, electricity?
- e. Educational – crèches, schools, colleges, universities?
- f. Health and Medical – clinics, hospitals, medical and dental practices, pharmacies, ambulances?
- g. Recreational and community facilities – parks, sports fields, swimming pools, halls, theatres, cinemas, libraries?
- h. Civic services — fire and police services, social welfare organisations, self-help schemes?
- i. Religious – churches, mosques, synagogues?

## **3. Social Issues in the community**

- a. Are there significant problems, conflicts or sources of tension in the community e.g. crime, violence, gangsterism, alcoholism, drugs, divorce, child abuse, overcrowding, squatting?
- b. Are there serious economic problems within the community e.g. poverty and unemployment?
- c. What is it like to live as a resident in this community? — Interview a resident to find out.

#### **4. Implications for Health care**

How do all of the above factors influence health care in the community?

- a. What are the health needs and problems of the community?
- b. What medical resources are available to the children, adults and senior citizens of the community? How adequate are they?
- c. What access do members of the community have to health services in the area? Do they have to rely on public transport? Do they have to go outside the community for proper medical attention? To what extent can they afford medical attention? What happens in the event of a medical emergency?

# **Guide to Consolidated Report on Community Diagnosis Project**

## **Introduction**

This sets out the main aims of the study, makes reference, where appropriate, to relevant published literature on the subject. It also discusses briefly the implications of the main findings of the study.

## **Methods**

Here the researchers discuss how they obtained their information, and what sources were used, such as reference material and personal interviews. How and why various people or officials were chosen to be interviewed, should be explained.

## **Findings**

Under this heading, the students set out the information obtained during the study – in this case, the community profile, resources and social issues (see project guidelines, sections 1 to 3).

## **Conclusion**

Here the findings are analysed in the light of the main aims of the study, and the main conclusions are then summarised – in this case, how health care is affected by various factors in the given community (refer to section 4 of the project guidelines).

## **Appendix Three**

An example of the Handout given to all students in 1994

University of Cape Town

Medical School

Course: Human Biology (MBI 100W)

The Field Studies Programme 1994

### **Community based medical education**

Formal learning medicine, occupational therapy and physiotherapy has tended to concentrate on theoretical and clinical aspects of disease. Many feel that there should be more emphasis on health and strengths, on the individual's capacity for choice and well being. UCT's Faculty of Medicine has recognised that health care practice will in future concentrate more on primary health care in the community. Accordingly, students will want to learn about community factors that affect the health and well being of individuals, groups and communities. Such learning will best take place in the community itself.

### **The Field Studies Programme**

The field studies programme of the Human Biology course provides students with just such an opportunity. This programme is given equal academic value to that of lecture and laboratory teaching, as it can be regarded as the foundation for much of later course work. And, in turn,

experience gained in this programme will be of practical value when students learn about the clinical management of patients.

The learning context of this programme is the community itself. Students will find that they are using skills and insights that are qualitatively quite different from those required in a lecture or laboratory setting. They will be expected to develop an ability to problem-solve and work creatively and co-operatively within a group.

## **Semester 1**

### **Community View**

Students will study the personal and community functioning of the people of a given geographical area, including economic, health, political and social aspects. Students will be able to develop for themselves a clearer understanding of what a community is, and the factors within it that influences the well being of its members. On the surface, factors such as housing, sanitation may appear far removed from health care. On closer study, however, and especially in poorer communities, these factors are the very foundation of health. Similarly, it will be discovered that the absence or inadequacy of social infrastructure and support networks can impact negatively on a community's health.



## **Semester 2**

### **Case Narrative and Resource Study**

Building on their learning and experience gained during the community View section, students now have the opportunity to study an individual patient or family, focussing on significant psycho-social issues that affect health, and to learn at first-hand about community services (formal and informal, state and voluntary) that might – or might not — be helpful to the patient or family.

### **Academic Requirements of Students in the Programme**

The field studies programme accounts for 14 percent of the year mark for Human Biology. For each section of the programme, students are assigned to a project group and must attend all meetings of this group. A register is marked, and each project group works under the guidance of a facilitator.

The mark given to each individual student is the mark earned by the project group. However, there have been instances when individual students when individual students have not made a contribution comparable to that of the group as a whole, and have therefore not been awarded the group mark. The facilitator in consultation with the individual student concerned would make (such a decision).

Marks are awarded for:

- a) A typed and bound consolidated report
- b) An oral presentation to facilitators and fellow students
- c) A poster

## **Section One**

### **Community View**

#### **Content**

The purpose of the Community View study is to help students gain a holistic outlook that recognises that the determinants of health are many and varied: just as important as clinical medicine are public health issues like prevention (immunisation, sanitation), health promotion, and social and personal resources which give a community a sense of well being.

To help students understand their assigned community, a number of guide questions are offered. When collecting information for this section, students should focus on how resources contribute or fail to contribute to the quality of life in the community.

#### **Profile of the Community**

Here students will collect information about the historical, political, social and economic context of the community. [A range of questions was provided to help students collect information for the community profile]. What follows is a sample of these questions.

- a) Name of the community, when it was established, how it developed.
- b) Size and composition of the population
- c) Classification of the community, e.g. residential, industrial, informal settlement
- d) Civic services – ambulance, fire police
- e) Educational Services – crèches, schools, colleges

f) Economic resources – shops, factories, businesses, hawkers

## **2. Health Services in the Community**

Those who frequently use health services include mothers with children, women, persons with chronic illnesses or physical disabilities and the aged. [What follows is a sample of questions provided].

- a) What access do people have to health services in the area? Are all their health needs catered for in the community? Are the available services affordable/accessible/appropriate? What happens in the event of a medical emergency?
- b) Is there a clear understanding on the part of the health services of the real health needs and problems of the community?
- c) Is the local health service integrated and providing preventative, promotive, curative and rehabilitative care?
- d) What types of services do the local authority clinic, day hospital, private hospital, state hospital and general practices in the area provide?
- e) What function do the allied health professionals and complimentary health practitioners play in meeting the health needs of the community?

### **3. Social Services in the Community**

The origin of much ill health lies in emotional or stress related problems. In turn health care practitioners make use of social services to help their patients. An understanding of the personal and social functioning of the residents, and knowledge of local social services, is therefore relevant.

- a) NGOs working in the area.
- b) Programmes for specific target groups (e.g. street children, the disabled, and the aged).
- c) Local programmes addressing community issues, such as crime, alcoholism, drugs and abuse.
- d) Local initiatives promoting individual and community development.

### **Sources**

Students should distinguish between different types of sources and information.

### **Formal and official sources**

Examples of official; sources are state and city departments and local government and ratepayer/civic associations, through whom one can gain helpful documents and reports. Other formal sources would be neighbourhood traders and professionals (banks, shops, pharmacists), schools and local clinics.

## **Informal sources**

These would include residents, action groups (neighbourhood watch), clubs and churches, from all of which one can gain helpful anecdotal information and insights.

To find out what it is really like to live in the community, students should interview a variety of residents who differ in terms of age, gender, and occupation. Ask them their personal views and feelings about the community, their knowledge and expectations of local facilities, and about social and health issues in the community. An interview with the residents counterbalances and complements “official” information.

## **Consolidated Report**

Students are assigned tasks by the group and may find they are working in pairs or alone on specific aspects of the study (for example aspects of the profile or the health services). All the information is then sorted and analysed by the group and gathered into a consolidated report.

### **1. Format of the Report**

- a) The report must be typed (double-spaced) and bound on A4 paper with pages numbered.
- b) The report must have a cover sheet with the title (name of the community studied), the facilitator's name, and the students' names and initials in alphabetical order.

c) Please proof read your report before submission.

## **2. Organisation of the Report**

a) **Introduction.** This sets out the main aims of the study. It concisely outlines the implications of the main findings of the study.

b) **Methods.** Here students discuss how they obtained their information and what sources were used, such as reference material and personal interviews, indicating how and why various sources were chosen.

c) **Findings.** Under this heading information concerning the community profile, health and social services and residents will be presented.

d) **Discussion.** Here the findings are analysed in the light of the main aims of the study and the group's conclusions are summarised – in this case, how the health and social functioning of the community is affected by various community factors. Original thinking as to causation and possible improvement is particularly appropriate here.

e) **List of Resources.** Here students will list relevant community services and discuss how adequate these resources are.

f) **References.** The consolidated report is a document of record. Consequently all information must be properly acknowledged. A list of references must appear at the end of the report so that a reader can easily determine the various sources used in compiling the report.

g) **Appendices.** Students may wish to append illustrative material, which they consider helpful, such as maps, tables, brochures and interview transcripts.

### **3. Score Sheet for the Report.**

Using the following will arrive at the facilitator's mark.

Introduction    Scored out of 10

Methods        Scored out of 10

Findings       Scored out of 20

Discussion     Scored out of 30

Resource List   Scored out of 10

References     Scored out of 10

Presentation   Scored out of 10

|              |                   |
|--------------|-------------------|
| <b>TOTAL</b> | <b><u>100</u></b> |
|--------------|-------------------|

## **Appendix Four**

An edited example of a research prologue used by students to research a particular research topic.

“Health and Society” PRI 100W

Field Studies Programme – 1996

### **Case Narrative and Resource Study Project**

#### **Topic: Street Children**

##### **Background**

Street Children are a phenomenon of our cities. They evoke a range of responses from pity to hostility. They are a visible sign of the dysfunction of social institutions in our society. It is noteworthy that these children are all “other than white”.

The capacity of children to survive on the streets could be viewed as evidence of their resilience, strength and “health”. In reality, however, they are susceptible to various diseases like malnutrition, measles, syphilis and tuberculosis. In addition, even though health care is available, these children are afraid to go to local health services.

##### **Aims**

The aims of this project are to

- consider what laws and rights apply to street children



- establish the incidence and various causes of the phenomenon of street children in Cape Town
- identify existing resources and services for them
- assess how far current resources are adequate in meeting their basic needs
- use your knowledge of the above to suggest ways to help the child (Faried) discussed in the case narrative

## **Case Narrative**

Refer to the document provided by your supervisor.

## **Issues to be Examined**

**To place your case narrative in its wider context, you will need to consider the following:**

### **(a) Policy Issues**

What are the main principles of the UN Convention on the Rights of the Child, and how might these affect street children?

What are the main provisions of the Child Care Act, and how do these apply to street children?

### **(b) Understanding the phenomenon of street children**

What is the incidence of street children in the City Bowl area of Cape Town?

Explain the economic, social and political causes of this phenomenon

**(c) Practice Issues**

What are the health, educational and social needs of street children?

What resources, services and organisations exist to cater for street children?

How adequate are they in meeting the needs of street children, and to what extent do they reflect the PHC principles of prevention, rehabilitation and promotion?

**(d) Intervention and management**

Using what you have learnt from your above research, draw up a “management” plan of action for assisting Faried.

## **Appendix Five**

The following assessment protocol is taken from page 16 of the 1997 Project Handbook. Every student received a copy of this handbook.

Assessment of the contribution made by individual group members towards the Community View project.

The mark given to an individual student is generally the mark that has been earned by the group. To help establish what has been the relative contribution of each member to the project a peer-assessment protocol has been devised. This protocol has been devised to help ensure that the group mark is an accurate reflection of each group member's contribution. For example a group might obtain 70% for their project mark. The protocol can then be used to ensure that only those group members who legitimately contributed to the project will receive the awarded mark of 70%. Those students who did not adequately contribute would have their project mark adjusted accordingly.

## **Community View Project**

Name of student being assessed

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Research area (e.g. health services)

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For each of the questions below you are asked to rate the student with a score of 1 to 3 as follows:

1 = Contribution on a par with that of the group average

2 = Contribution somewhat less than the group average

3 = Contribution markedly lower than the group average

At the end of this assessment form there is a space for any comments you wish to make.

### **Did the student in your opinion contribute towards?**

**a) the design of questions /questionnaire?**

Your rating: 1 ☐ 2 ☐ 3 ☐

**b) collection of data?**

Your rating: 1 ☐ 2 ☐ 3 ☐

### **Did the student in your opinion**

**a) meet pre-arranged deadlines?**

Your rating: 1 ☐ 2 ☐ 3 ☐

**b) when requested provided information on time?**

Your rating: 1 ☐ 2 ☐ 3 ☐

**c) demonstrate a willingness to do group tasks?**

Your rating: 1 ☐ 2 ☐ 3 ☐

### **Consolidated Report**

Name of student

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**In your opinion did the student make a contribution in drawing up the report by:**

**a) helping to collate and summarise the data from the various research groups?**

Your rating 1 ☐ 2 ☐ 3 ☐

**b) contributing towards the layout, editing, or printing of the report?**

Your rating 1 ☐ 2 ☐ 3 ☐

## **Poster**

Name of student

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In your opinion did the student help in the tasks that were necessary to complete the poster by:

**a) helping to collect material and information to illustrate the poster?**

Your rating: 1 ☐ 2 ☐ 3 ☐

**b) contributing to the design and layout of the poster?**

Your rating 1 ☐ 2 ☐ 3 ☐

## **Oral Presentation**

Name of student

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In your opinion did the student participate in the preparations needed for the group to give its presentations to the class by:

**a) collecting, summarising and preparing the required information?**

Your rating 1 ☐ 2 ☐ 3 ☐

**b) helping to design the format of the presentation?**

Your rating: 1 ☐ 2 ☐ 3 ☐

## **Comment**

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## Appendix Six

From page 21 of the 1997 Project Handbook

'Community View' Marking Schedule

### **The following Schedule to be used in conjunction with the mark protocol**

**< 50%** The report fails for a number of reasons. The content of the report is inadequate as little attention has been paid to answering basic questions about the **profile, health services, social services and residents** of the community. As a consequence the findings of the report give no evidence of research having happened. The discussion provides no analysis and is in effect a repeat of the Findings Section. The report has no systematic form of referencing, while the resource list and appendices are merely a list of randomly collected names and publications. The report shows no evidence of being edited, but is rather a collection of separate pieces of writing.

**50-59%** The report gives the impression of being rapidly put together. While the content of the report provides information about the **profile, health services, social services and the residents**, it is limited in scope. Thus the findings section provides a 'patchy' picture of the community. The discussion section is marked by a superficial analysis of the community. In the place of measured analysis, the discussion features sweeping generalisations that are not supported by facts/data. There are some signs that efforts have been made to integrate the information – but a number of writing styles are present. The resource list and appendices have been organised but the reader is unable to



understand on what basis were drawn up. References are provided on an intermittent basis.

**60-69%** The report has been put together in a careful way. The content of the report gives a clear indication that serious effort has been made to ensure that a broad picture of the community is provided.

Consequently most of the questions dealing with the **profile, health and social services** and the **residents** have been conscientiously done. The findings of the report provide the reader with a range of interesting information about the community. The discussion shows that effort has been made to provide the reader with a commentary on the factors that contribute or hinder the health and well being of the community. There is systematic referencing throughout the report and the resource list and appendices have been carefully laid out to help the reader deepen their understanding of the community and its resources.

**70-74%** This report shows a high degree of thematic integration. The content of the report indicates that the research areas of **profile, health and social services** and **residents** have been carefully covered. The findings provide the reader with an in depth understanding of the community, its resource base and the challenges that it faces. The discussion provides the reader with insights into the ways in which the various factors make a contribution or hinder the health and well being of residents of the community. Original thinking as to causation and possible improvement is evident. There is systematic referencing throughout the report. The resource list and appendices are organised in such a way that the reader is able to determine what roles these resources/organisations plays in the community.

**75%** This report is outstanding and provides the reader with a vivid account of the community. The discussion is characterised by range and depth [with respect to the **profile, health and social services and residents** of the community], with careful attention to detail. The discussion section is well developed with the correct use of specialised terms (such a primary health care). The writing in this section gives evidence of original thinking particularly when it comes to analysing and interpreting the research findings. The report correctly acknowledges all sources of information. The resource list and appendices have been carefully complied giving the reader a clear idea of the role that these services/organisations play in the community.

## Appendix Seven

The following extract is taken from page 13 of the 1998 Handbook.

### 1998 Score Sheet for the 'Community View' Poster

When designing the poster the group needs to take the following marking criteria into account:

#### **Content**

Introduction: here the poster provides an overview of the community studied. This section will give the reader the reader **key** information about the geographical location, profile, residents, health and social services of the community. (10 marks).

Community Issues: here the poster gives the reader a clear idea of the **important** health and social issues facing members of the community. (20 marks).

Conclusions: Here the reader is given an analysis of what the group understands are the **significant** factors that are contributing to, or are preventing members of the community achieving a sense of well being. Well-argued observations and use of evidence are of particular importance in this section. (40 marks).

#### **Presentation**

Impact: Does the poster "invite" the reader to learn about the subject area? Is the information put across in such a way that when the reader

finishes viewing the poster they are left with a strong sense of the subject area? (10 marks).

Presentation: Is the layout of the poster such that it helps the reader more fully understand the subject area? The layout is the **most important aspect** of a poster's presentation. This is because layout involves the *spacing* and *size* of text ("writing"), use of *diagrams*, *graphs*, as well as the **balance** between text and visual material. (20 marks).

### **CORA Framework**

The purpose of the case narrative is to give students the opportunity to learn how health and social issues can impact on the lives of individuals and families, as well as having the chance to develop and formulate a coherent management strategy to address the health and social issues indicated in the case narrative. Pivotal to the development and application of a management strategy is a guiding framework, since the collection of information and the identification of appropriate services is not a haphazard process, but one which is goal directed. The purpose of a guiding framework is to help one achieve your identified goals. There are many frameworks available to a health professional; the following is offered to help students develop the skills of research and formulating a feasible management plan.

The CORA Framework is adapted from Michael Payne's book 'Social Care in the Community'.

CORA is a mnemonic that stands for *Circumstances*, *Options*, *Resources* and *Action*.

**Circumstances:** this refers to the personal and social circumstances that have led the individual or family to seek professional help, or their circumstances have brought them to the attention of health professionals.

**Options:** this refers to the choices that are available to the individual or family after their circumstances has been thoroughly investigated.

**Resources:** this refers to the services and associated work that will need to be done to enable the individual or family to realise their choices.

**Action:** this refers to how the individual or family will be helped to realise their choices.

## **Appendix Eight**

“Community View” supervisory responsibility was divided into administrative, process and assessment tasks.

### **1. Administrative tasks were to:**

- select a geographical area within the Cape Peninsula that was accessible by public transport
- become familiar with the resource infrastructure of the selected area
- make personal contact with key people living and working in the area (e.g. residents, health care professionals and social workers) and set up appointments with these people for students to interview them
- secure a venue in the area that would serve as the meeting place and the entry point for students

### **2. Process tasks were to:**

- establish a learning contract between the group and the supervisor (items covered in the contract would include the meeting times of the group, roles and responsibilities of the students and supervisor)
- encourage students to formulate a set of “ground rules” that guide group interaction

- help students to draw up a “skills inventory ” within the group, so that this inventory would help in determining which specific project task group members would be best suited to undertake
- support students in their efforts to create a functioning group.

### **3. The assessment tasks were to:**

- mark the project report by using the instructions in the handbook
- set and mark the group’s open book examination questions
- mark the individual student reports
- co-mark their group’s oral presentation

For the “Case Narrative Project ” a similar set of tasks was identified.

### **1. The administrative tasks were to:**

- identify the range organisations and services in the Cape Peninsula that students might consult during the course of the project
- select the key organisations and services that students would have to consult in order to successfully complete their research
- set up interviews for the students with these key organisations/services.

### **2. The process tasks were to:**

- revisit the learning contract and make changes if deemed appropriate
- continue to strengthen the group's functional capacity
- enable students to revisit the "ground rule" and the skills inventory and make changes to both if appropriate.
- 

### **3. The assessment tasks were to:**

- devise the research prologue that would guide their students' research
- mark the group report (as per the instructions in the handbook)
- set and mark their group's open book examination questions
- mark the individual students reports



- co-mark their group's oral presentation.

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## Appendix Nine

The following is an example of the type of examination questions based on the “Community View” project.

### Research Area: Wynberg

#### Question One

Using the WHO definition of health and the PHC principles of **intersectoral collaboration** and **community participation**, evaluate the efforts made by the Civic Services of Wynberg to address the issues of drug abuse and vagrancy.

500 words/ 200 marks.

#### Question Two

Using the PHC principle of **accessibility**, explain whether you believe that the private and public sector health services of Wynberg are accessible to all residents of Wynberg.

500 words/200 marks.

#### Question Three

You have been elected to the Wynberg Health Forum with the task of devising a plan to promote health amongst all the residents of Wynberg. Using the health promotion tools of **advocacy**, **enabling** and **mediation**, describe how your plan would promote health amongst all the residents. In your answer pay particular attention to the tasks of

encouraging *community action*, developing *personal skills* and re-orientating the *private health services*.

**1000 words/400 marks.**

# Appendix Ten

University of Cape Town  
Faculty of Health Sciences  
Department of Primary Health Care  
“Health and Society” (PRI 100W)

## May — October 2000

Please give your ratings, observations, or information as required from the questions below. The Field Studies Staff value constructive comments and observations. Your feedback will help the staff in planning the field studies project next year.

### Field Studies Projects

1. How useful were the *Community View* and *Case Narrative* Projects in developing your understanding of the various factors that can affect the health and well being of individuals, groups and communities?

### Rating system

1. = Of no use at all
2. = Of limited use
3. = Useful
4. = Extremely Useful

Rating 1 ☐ 2 ☐ 3 ☐ 4 ☐

Please support your rating with written comments

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2. At the beginning of the field studies projects (in May of this year) you were asked to tick the statement that most closely matches your own view on health. Please re-read these statements, and then tick which statement most closely matches your own view on health. If none of the statements match your own view, then write a statement, which reflects your view on health.

- i). ☐ Health is freedom from illness
- ii). ☐ Health can be defined as “a state of complete physical, mental and social well being, and not merely the absence of disease or infirmity”
- iii). ☐ Health is complete physical and mental equilibrium
- iv). ☐ Health is not a static state but a dynamic process, which includes the continuous interaction of physical, social and environmental factors, as well as illness and the recovery from illness.

v). Your own statement

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3. Given your answer in Question Two, have your *ideas* about health changed in any way, as a result of the field studies projects? If so, in what way(s)?

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4. Have your ideas about working and learning in groups changed in any way(s) as a result of the field studies projects? If so in what way(s)?

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5. In your opinion did the project tasks (such as writing up the report and designing the poster) require the same amount of thought and effort as attending a lecture and attending tutorial? If not, in what ways were the project tasks different in terms of thought and effort?

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6. How useful was the Project Handbook in helping you and your group complete the various project requirements (e.g. the report, poster and oral presentation)?

**Rating System**

1= Of no use at all

2= Of limited use

3= Useful

4= Extremely Useful

Rating 1 ☐ 2 ☐ 3 ☐ 4 ☐

Please support your rating with written comments.

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7. In your opinion did the projects help you develop skills in (please tick next to the statement(s) that you agree with:

☐ Collecting information

☐ Analysing information

☐ Using evidence to develop an argument

☐ Writing an academic report

☐ Presenting research results in different ways (ie. oral presentation and academic poster)

☐ Other (please specify)

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Please support your rating with written comments.

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8. What were the barriers/obstacles that you faced as a learner, when working in your project group (e.g. prefer to work on my own, prefer to learn from lecture notes)?

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9. Did the size of your project group make a difference to your ability to complete the project tasks (e.g. the report, the poster and oral presentation)? If so in what way(s)?

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10 In your opinion, can you obtain high marks in your project work if you:

- ☐ provide facts
- ☐ give information
- ☐ develop an argument
- ☐ analyse and explain a problem/issue

Please support your rating with written comments.

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11. How helpful was your supervisor in assisting you and your group to complete your field studies projects?

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12. What community did you research for you first project?

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13. What subject did you research for your second project?

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14. If you were responsible for the Field Studies projects would you make any changes? If so, in what ways?

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## **Appendix Eleven**

A summary of student ratings and comments concerning the **2000 field studies programme**

**1. The aim of the programme.** To the question “How useful were the “Community View” and “Case Narrative” Projects in developing your understanding of the various factors that can affect the health and well being of individuals, groups and communities?, students answered accordingly:

- **38** students found the projects extremely useful
- **101** students found the projects useful
- **26** students found them of only limited use
- **3** students found the projects of no use at all

These ratings were supported by written comments. Students who were negative about the projects argued that the projects were a burden. Students who were positive commented that the projects had:

- given them a clearer understanding of health issues
- challenged perceptions that health was only a biological issue
- developed a clearer understanding of primary health care and how to implement it
- affirmed what had been taught in lectures
- shown how important it is for health professionals to work together

- helped students develop new skills (e.g. communication skills)

**2. Project Tasks.** Students were asked ‘ in your opinion did the project tasks (such as writing up the report and designing the poster require the same amount of thought and effort as attending a lecture and a tutorial?

- **162** students answered the question
- **46** replied no, and **16** replied yes.

The students who had replied **no** to the question gave a range of positive comments such as:

- project tasks required more work and were more challenging than lectures
- lectures were not as stimulating as the projects
- more time outside of “working hours” was spent on project tasks
- projects made us think for ourselves and forced us to start questioning issues normally taken for granted
- projects required more skills and talents, in lectures you were passive
- projects required self motivation and ownership of the learning process
- writing the report and designing the poster required more involvement

- abilities were far better use in projects and more satisfaction was gained

Students also made negative comments about the work required by the project tasks:

- tutorial assignments stimulated more thought, project tasks just created stress and did not teach us anything
- project instructions not always clear and so a lot of time was wasted
- project tasks were more tedious
- project tasks were taxing on a student's private time.

**a) Project Handbook.** Students were asked how useful the handbook was helping them and their group to complete the project requirements

- 17 students indicated that the handbook was only of limited use
- 75 students felt the handbook was useful and
- 79 students found the handbook extremely useful.

Positive student comments about were as follows:

- it provided a framework to build on
- it had all the instructions
- the handbook's questions helped us to conduct interviews
- the instructions were clear and easy to follow

- without the handbook, the projects would have been impossible to complete
- project marks were given if you followed the handbook's instructions

Negative comments about the handbook were as follows:

- instructions for the report were too rigid
- some of the instructions were ambiguous and this caused frustration
- the wording and terms used were difficult to understand
- the "Community View" project instructions were unclear

**d) Projects and developing skills.** Students were asked whether the projects helped them develop skills. In numerical order the skills learnt were:

- analysing information [123]
- presenting research results in different ways(i.e. oral presentations and academic posters) [100]
- using evidence to develop an argument [83]
- writing an academic report [96]
- collecting information [38]
- other skills – ( group work skills, communication skills, conflict resolution and stress management) [16]

Written comments revealed that students felt that they had learnt to:

- more critical when reading information
- to obtain information from libraries and archives
- new ways to gather data
- use information for research purposes
- differentiate between relevant and irrelevant information
- develop an argument based on facts
- do a professional presentation

**e) Projects and barriers to learning faced by students.** Students were asked to identify what barriers they faced as learners when working in their project group. They felt that:

- project groups were too big to work constructively
- there were different work ethics within the group
- that there was a lack of communication between students
- that there was conflict within their group
- lack of co-ordination made project work difficult
- poor facilitation by supervisor
- difficulty co-ordinating work with different student timetables

**f) Project group size and project requirements.** Students were asked if the size of their group affected the ability of the group to complete the project requirements. For students who believed that the group size was a positive feature this meant that:

- it was easy to divide up the project work load
- the collection of data became easier
- there was a variety of skills and talents
- sub-groups could be created and these worked well.

For students who were negative about the group size this meant that:

- it was difficult to keep track of the overall project work as students were working in sub-groups
- it was difficult to arrange meeting times
- in a big group it was easier for students to get away with doing no work

**f) Project work and marks.** Student were asked to comment on whether it was easy to obtain high project marks if a student provided facts, gave information, developed an argument and analysed and explained a problem/issue. The order of importance students felt that a high project mark would be obtained if a student:

- analysed an argument and explained a problem/issue
- developed an argument
- gave information



- provided facts.

**g) Recommended changes to the Field studies Projects.** Students were asked 'if you were responsible for the Field studies projects would you make any changes? Student recommendations ranged from:

- I would abolish the programme
- limit the amount of work required as there are more important subjects like Anatomy and Biochemistry
- start the programme earlier in the year and finish before the September vacation
- have one project instead of two
- have smaller groups with fewer project requirements
- allow for more creativity in terms of the report, presentation and poster

## Appendix Twelve

A set of questions that formed part of the “Open Book” Examination Paper for the **Case Narrative and Resource Study Project in 2000**.

Topic: People living with “mental illness”.

### Question One

You are part of a multi-disciplinary team in a general hospital. On your ward round you come across a patient who was admitted because of several self inflicted stab wounds. From what you can gather the patient claims that he has a “special dream” where a voice told him to sacrifice a goat. The patient appears to be very confused; unable to make sense in his communication with you and the nurses’ claim that he looked “possessed” when he was admitted.

a) Offer **three** possible diagnoses for his condition, and briefly outline the typical features of each diagnosis.

**300 words/100 words**

b) If the person is experiencing **ukuthwasa**, explain the positive, as well as the negative impact that **certification** may have on his recovery.

**300 words/ 100 words**

c) From your understanding of the concepts “*prevention, promotion and rehabilitation* “ outline the role that NGOs play in ensuring mental health for people living with schizophrenia.

**400 words/ 200 marks**

## **Question Two**

You have been contacted by a diverse group of people including health care providers, traditional healers and parents of people who have been diagnosed as having a “mental illness”. This group would like you to provide them with an effective protocol to meet the needs of persons with a diagnosed “mental illness”. Drawing on your research, outline a protocol which:

- details a management plan (CORA) for persons with a “mental illness”, which implements the key principles of **functionality, linkage, and social/cultural/ community support**
- explains how traditional healers and psychiatrists can work effectively and creatively together for the benefit of people living with a “mental illness”
- emphasises the critical role that family members must play in the care of persons living with a “mental illness”.

**1000 words/400 marks**

# Appendix Thirteen

University of Cape Town  
Faculty of Health Sciences  
Field Studies Programme 2000

## Evaluation of the Field Studies Project Experience: The Case Narrative and Resource Study Project

### Introduction

The purpose of this second evaluation is to require students evaluate their project experience. The point of the evaluation is to compare this project experience (the Case Narrative Project) with the previous Community View project experience. To complete this task a student will need to demonstrate that they have:

- Reflected on their project role(s) and contribution
- Explained the ways in which their role(s) and contribution might have *differed* from the previous project
- Described how their group worked together

### Framework

To help students complete this evaluation the following framework is provided as a guide to enable students to gather the necessary information for their report. The framework has two sections, one section dealing with their personal contribution and the second section

dealing with the project experience. It is recommended that students keep a weekly diary in which they record how they and other members of the group worked together, and outline in what ways did they contribute towards the completion of project tasks.

## **1. Personal Contribution**

During the course of the project I contributed to the work of the group by being:

- An innovator(one who produced ideas, showed imagination, suggested solutions)
- An investigator (enjoyed finding out things, brought important information back to the group)
- A leader (guided the group, chaired group meetings, encouraged other members when faced difficulties, made things happen in the group)
- An evaluator (tested out ideas and group suggestions, helped the group avoid mistakes)
- A team worker (showed a strong concern for the way in which members related to another, put group needs before personal needs)
- An organiser (turned ideas into action, completed assigned tasks, could be relied on to complete their work and paid attention to deadlines).

## **2. Project Experience**

Drawing on experience gained during the previous project I felt that I:

- Worked with greater confidence with other members of my group
- Was valued as a member of the group
- Was able to use my skills in such a way that I made qualitatively different contribution to the group
- Was better able to deal with periods of frustration and difficulty
- Was more able to help the group to work more effectively, and avoid unnecessary difficulties
- Was able to ensure that I did not end up doing the work of others

### **Format for writing the Evaluation Report**

At the conclusion of the project students will be required to submit a typed report. The report must not exceed 1 600 words. The report must include:

- A face-sheet which provides your name, date of submission and the name of your project supervisor.
- A brief introduction that summarises your project experiences [100 words].
- A discussion of your contribution and role(s) undertaken during the course of the project. It is here that a student should indicate

whether their role/contribution differed in any way(s) from the previous project. [500 words].

- An analysis of the project process, and in what way(s) did the group work differently when compared to the previous project (ie. how the group worked together and why the group worked together in that particular way). [500 words].
- Conclusions. Here the student reflects on what they have learnt about working in groups. [500 words].

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**COMPETING PARADIGMS FOR EXPLAINING THE ETIOLOGY OF HUMAN  
MALE HOMOSEXUAL ORIENTATION: A CASE STUDY IN THE  
APPLICATION OF THE METHODOLOGY OF SCIENTIFIC RESEARCH  
PROGRAMS**

**Karori Mbûgua**

**Thesis Presented for the Degree of  
DOCTOR OF PHILOSOPHY in the DEPARTMENT OF PHILOSOPHY,  
UNIVERSITY OF CAPE TOWN**

**JUNE 2003**

**Competing Paradigms for Explaining the Etiology of Human Male Homosexual  
Orientation: A Case Study in the Application of the Methodology of Scientific  
Research Programs.**

**Abstract**

This thesis is a case study in the application of the principles of the methodology of scientific research programs to a contemporary scientific debate: the debate concerning the causes and origins of human male homosexual orientation. It begins by identifying two major research programs that seek to explain homosexual phenomenon, namely, the biological and experiential research programs. Using the methodology of research programs as a framework for analysis, the study shows that the two programs have stagnated. Neither of them meets the Lakatosian criterion of 'progressivity'. The study argues that lack of progress in this area may be a consequence of the two groups of researchers, the biologists and the experientialists, rigidly clinging to the hard cores of their respective programs. The study calls for an interactionist approach to the study of homosexual etiology and suggests that such an approach could benefit from recent trends in developmental systems theory and evolutionary psychology. It is also argued that this episode in the history of science undermines the normative generalizability of Lakatos' account of science.

Karori Mbûgua  
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## **Introduction**

Sexual relations between members of the same sex have existed throughout recorded human history in almost all societies both primitive and civilized. Homosexuality, as this behavior is called, has given rise to considerable interest and controversy among scientists and the public at large. The debate revolves around the question of whether homosexuals are born or made, that is, whether homosexual orientation is primarily determined by biology or it is the result of experiential factors. A survey of the literature on human sexual orientation research reveals that there are two major research programs seeking to explain the genesis of human male homosexuality, namely the biological and experiential research programs. It is the aim of this study to reconstruct and comparatively evaluate the history of these two programs using the methodology of scientific research programs, which was first formulated by the philosopher Imre Lakatos.

One of the main reasons why scientists are interested in the etiology of homosexuality is because it seems to flout what is generally regarded as the most important function of sexuality, which is to produce offspring. Homosexuality is also a paradox for those who believe in the truth of the Darwinian theory of evolution by natural selection. If we assume that sexual orientation has some genetic basis, how are we to explain the persistence of the gay gene over time? Why has it not been eliminated from the gene pool? What selective advantages, if any, might those who carry the gene enjoy?

The question of what causes homosexuality is itself controversial because it implicitly assumes that homosexuality is a pathological condition and that heterosexuality does not

need an explanation. Some people fear that those researching into the causes of homosexuality may be unknowingly laying the foundation for a genocidal campaign against gays and lesbians (Murphy 1997). It is feared that the results of etiological research into homosexuality may lead some people to attempt to 'cure' or eliminate homosexuals. In fact, one of the leading researchers in this area, Simon LeVay, has been accused of secretly trying to eliminate gay people (LeVay 1996). Others, especially supporters of homosexual rights, are interested in scientific research into the causes of homosexuality because they think that such research has social, legal and ethical relevance. For example, they believe that a biological explanation would show that homosexuality is natural in a morally significant sense and that it would improve their standing in the eyes of the public and the law. In fact, early sexologists such as Richard v. Kraft-Ebing, Havelock Ellis and Magnus Hirschfeld based their argument for legal equality for homosexuals on the claim that homosexuality had a biological basis (Haumann 1995: 81). However, other scholars such as Schüklenk (1996) have questioned the appropriateness of allocation of scarce healthcare and health research funds to the study of the etiology of homosexuality. She urges that such funds should be used for ethical research, which would be of benefit to homosexual people.

There are good reasons to be worried about the possible misuse of the results of sexual orientation research. Research into the causes of homosexuality has in the past been driven by the desire to eradicate the trait rather than understanding it. Many homosexual people have been forced to undergo treatments to change their sexual orientation, while others have undertaken to undergo them in order to avoid being stigmatized. In Nazi Germany, for example, homosexuals were considered biologically defective and were

therefore castrated, imprisoned and even killed. And as recently as 1991, a German endocrinologist by the name of Gunter Dörner suggested that hormone injections could be used as a vaccine against homosexuality (Dörner 1991).

In view of the ethical, legal and political controversy that research into the causes of homosexuality generates, and considering that people's attitudes towards homosexuals are to a large extent influenced by beliefs about the causation of homosexuality, an objective evaluation of the methods, assumptions and the evidence adduced by researchers on the two sides of the debate seems called for. Whereas the few philosophical studies on homosexuality have tended to focus on the ethical aspects of this debate, this study will depart from that tradition by examining the competing paradigms for explaining the causes of human male homosexuality from an epistemological and methodological point of view.

As already indicated, the relative merits of two research traditions will be appraised in the terms provided by Imre Lakatos' methodology of scientific research programs or MSRP in short. MSRP is a set of rules for interpreting the history of science and its developments. It has proved to be an effective tool for epistemological analysis and evaluation of historical episodes especially in the physical sciences (see Howson 1976). MSRP is also becoming increasingly popular among philosophers of science interested in other branches of human knowledge including mathematics, geology, economics, ethics, and evolutionary psychology to mention but a few.



This study will proceed from the assumption that there are two rival research programs for explaining the origins of human male homosexual orientation, namely the biological and experiential programs. Moreover, different hard cores and problem solving techniques characterize the two programs. According to the biologically oriented view, genetic, neuroanatomic as well as hormonal factors play a primary role in the causation of homosexuality. This line of research can be traced back to the 1860s when the German sexologist, Karl Ulrichs, hypothesized that homosexual men were biological males with female psyches (Herrn 1995: 35). Since then, researchers have been trying to find a biological explanation of homosexuality. The experiential research program, on the other hand, holds that homosexuality is socially and psychologically created by experience and opportunity. This line of thinking can be traced back to Sigmund Freud (1905), who ascribed male homosexuality to unconscious conflicts and fixations that have their origins in childhood.

In summary, the aim of the present study is to appraise and reconstruct the history of the experiential and biological explanations of human male homosexuality. More specifically, this study will be concerned with the question of whether the two rival research programs meet the Lakatosian criterion of 'progressivity', which postulates that a progressive program must be able to successfully account for apparent anomalies and generate novel predictions and explanations. The normative value of Lakatos' methodology will also be assessed. It is important to reiterate that this study will be principally concerned with epistemological and methodological questions and not with the moral and political issues that sexual orientation research generates.

# Chapter 1

## The Methodology of Scientific Research Programs

History of science without philosophy of science is blind; philosophy of science without history of science is empty.  
Lakatos (1970: 91)

### *1.1 Introduction*

It is not the objective of this dissertation to defend any particular account of the origins and development of erotic desire. The primary purpose of this study is to identify and appraise two main rival research programs for explaining the etiology of human male homosexuality. The methodology to be used to accomplish this task is that of scientific research programs (hereafter abbreviated as MSRP), which was developed by the philosopher Imre Lakatos. In this chapter, I will explore the basic tenets of this methodology and then show how it will be used to reconstruct the history of sexual orientation research in subsequent chapters.

As the first part of the dictum quoted above suggests, one of Lakatos' prime motives for developing his research programs methodology was to set standards for the evaluation of episodes in the history of science. These standards, as we shall later see, apply to research programs, not to individual theories and they judge the evolution of a program in comparison with the evolution of rivals, not by itself. Indeed, Lakatos treats the history of science as a history of competition between rival research programs with the world acting as the referee. He believes that this kind of competition produces rational and objective advances in scientific knowledge and a better approximation to the truth.

What makes Lakatos model appealing is that it appears to avoid the conceptual difficulties that characterized older historiographic models of science such as inductivism, conventionalism and Popperian methodological falsificationism. It is also able to rationally reconstruct many episodes in the history of science, which these other models of science would consider irrational. These methodologies, Lakatos argues, are at odds with the ‘basic appraisals of the scientific elite’ as revealed in history and are therefore inadequate (Lakatos 1971: 111). He also notes that, unlike MSRP, these older historiographies of science are more dependent on external facts in the historical reconstructions they generate.

### ***1.2 MSRP, Popper’s Falsificationism and Kuhn’s Paradigms***

In formulating the MSRP, Lakatos saw himself as improving Popper’s falsificationism while at the same time not succumbing to what he considered to be Kuhn’s irrationalism. His aim was to save the most important feature of Popper’s methodology while taking account of the various criticisms to which it had been subjected by some eminent philosophers of science, notably Agassi, Feyerabend and Kuhn. Lakatos maintained that theories could not be empirically tested without accepting a chain of related theories, assumptions and agreed upon facts. And while he agreed with Popper that a rational reconstruction could be given for the growth of scientific knowledge, Lakatos realized that Popper’s model could not fully account for the considerable stability and continuity of science. He objected to Popper’s claim that development in science is to be achieved solely by conjecture and refutation. Against Popper, Lakatos argued that scientists do not

reject their theories when they encounter falsifying empirical data. On the contrary, scientists tend to take such data as anomalies, which the program will be able to explain in the course of time. In fact, Lakatos proposes a shift in focus from empirical refutations to empirical confirmations and explicitly rejects the idea that a research program can be decisively eliminated by a single experiment. He points out that the clash between a given theory and observation could be due to some auxiliary assumptions that have been made in deriving the theory. Lakatos goes on to suggest that a program should be given time to develop sufficiently to show its potential and to outgrow 'infantile diseases' such as anomalies, inconsistencies and *ad hoc* moves (Lakatos 1974: 249).

Lakatos was also influenced by Thomas Kuhn's account of scientific growth especially as presented in his influential book *The Structure of Scientific Revolutions* (1962). Using examples from the history of science, Kuhn had shown that science is sometimes conducted even when confronted with anomalies or phenomena that do not fit the accepted paradigm. And although the notion of paradigm has been shown to be ambiguous (see Masterman 1994), it does have certain identifiable characteristics. A paradigm, according to Kuhn, is a constellation of beliefs, values, procedures, and past scientific achievements that is shared within a community of scientists. It directs their research activity, and is learned during their training or in their common research experiences. Furthermore, a paradigm provides a way of seeing problems and suggests what kinds of techniques are appropriate and what kinds of solutions are acceptable. Lakatos shares with Kuhn the conviction that for productive research to be undertaken, it is necessary to have a basic set of shared and agreed facts to serve as the starting point for

scientific inquiry. However, although he acknowledges that Kuhn was right to emphasize continuity in science, he criticizes him for treating revolutionary episodes in science as instances of mystical conversion.

According to Kuhn, the decision to switch from one paradigm to another is not steered by arguments based on logic and experience alone, nor does he think it should necessarily be. The rejection of one conceptual framework and its replacement by another involves a non-rational process akin to a religious conversion. This means that for Kuhn scientific revolutions, which are central episodes in the advance of knowledge, ultimately lie beyond the bounds of rational intelligibility. Consequently, Lakatos sought to develop a model devoid of the irrationalist and subjectivist overtones present in Kuhn's conception of science.

As already pointed out, Lakatos intended the MSRP to be a standard for appraising the scientific and rational status of contemporary conceptual systems as well as a conceptual tool for the historian of science for constructing explanatory accounts of scientific change. He accepted the fact that there are discontinuous transitions in science, but unlike Kuhn he argued that such transitions are rationally intelligible. And although his model was originally intended for the physical sciences (see Howson 1976), it has been applied to other fields of study including mathematics, biology, evolutionary psychology and economics to mention but a few. Lakatos himself argued that the 'methodology of scientific research programs may be applied not only to norm-impregnated historical knowledge but also to any normative knowledge, including even ethics and aesthetics

(Lakatos 1971: 132). Two of his former students, namely, John Worrall and Eli Zahar have used the MSRP to appraise two different episodes in the history of physics while Peter Urbach has used it to appraise the environmentalist and hereditarian debate on IQ (Zahar 1973, Worrall 1974, Urbach 1974).

From the foregoing, the MSRP should be viewed as an outcome of the attempt to reconcile the main principles of Popper's methodology and the historical criticism presented by Kuhn. It is, in fact, a synthesis of what Lakatos regarded as the positive aspects of Kuhn and Popper's accounts of scientific change.

### ***1.3 Hard Cores and Protective Belts***

The starting point of MSRP is the claim that the appropriate unit of appraisal in science is not an individual theory, as Popper thought, but a sequence of related theories, which Lakatos calls a scientific research program. Indeed, he considers the use of word 'theory' for the unit of appraisal a 'category mistake' since appraisal can only be applied to a succession of theories (McMullin 1976). Theories for Lakatos do not have a history, as they do not evolve. Research programs, on the other hand, have a history during which the theories within them are replaced by different theories. Thus the unit of appraisal for Lakatos is an organic unit and not a fixed set of sentences or a theory. In some respects, the concept of a research program is similar to Kuhn's notion of normal science. As Lakatos himself explains: "the concept of a 'research program' may be construed as an objective, 'third world' reconstruction of Kuhn's social-psychological concept of paradigm" (Lakatos 1970: 179).

Like Kuhn, Lakatos is aware of the fact that theories cannot be evaluated in isolation from the auxiliary concepts, which specify initial conditions, and relevant evidence. (Pierre Duhem was the first to formulate this thesis when he pointed out that an experiment in physics could never condemn an isolated hypothesis but only a whole group of ideas and assumptions (Duhem 1954)). It is this larger theoretical scheme (i.e. research program) that Lakatos takes as the entity to be judged as progressing or degenerating and as the basis for estimating the rationality of a particular scientific enterprise. A program is said to be rational if it is progressing, irrational if it is degenerating.

A Lakatosian research program consists of a hard core, a protective belt and methodological rules, which fall into two categories: a negative heuristic and a positive heuristic. Different scientists may be working on different problems within the same program. What is common to all scientists working in the same program is that it is the program that generates the problems and the approach utilized to solve the problem is guided by positive heuristic of the program.

The hard core is non-negotiable and takes the form of general theoretical hypotheses that form the basis from which the program is to develop. And although it may never be explicitly stated, the hard core may be identified from the principles that guide the scientist in his or her practical research. It is comparable to Kuhn's paradigm in that scientists pursuing a particular research program do not question its fundamental tenets.

The only major difference is that while Kuhn speaks of the scientific community being committed to its paradigm, Lakatos speaks of scientists making a methodological decision not to tamper with the hard core of their research program. This distinction is important because it means that a scientist could decide not to modify some part of a theoretical system without committing him or herself to its truth (Musgrave 1976). As an example, Lakatos cites the hard core of the Newtonian research program, which consisted of the three laws of dynamics and the universal law of gravitation. In addition, this program had a protective belt composed of the assumptions about the gravitational center of large bodies, the number and paths of planets in the solar system, the distance of the fixed stars, Newton's theory of atmospheric refractions and many other auxiliary hypotheses.

The decision to accept the hard-core is not necessarily a conscious decision on the part of the individual scientist. Rather, the hard-core exists implicitly in all she or he does. In fact, acceptance arises more from a process of indoctrination into a field than from any rational decision. However, it is important to note that Lakatos tells us little about how these hypotheses are to be selected. His critics regard this as one of the main weakness of MSRP.

Heuristics, on the other hand, are organizing principles that determine the form that inquiry will take. The negative heuristic stipulates that the basic assumption underlying a program, its hard core, is not abandoned in the face of experimental difficulties. In the words of Lakatos: 'Instead, we must use our ingenuity to articulate or even invent



‘auxiliary hypotheses’, which form a protective belt around this core, and we must redirect *modus tollens* to these’ (Lakatos 1994: 48). The rationale for this proposal is that if the hard core of a program were not protected from disconfirming evidence, no research programs could evolve, since there always will be anomalous data to be found. Thus the rules of negative heuristic forbid the scientist from regarding the hard core as being falsifiable. A most instructive example of this is the famous story of the discovery of the planet Neptune. When the planet Uranus was found not to be fulfilling its Newtonian predictions, this did not lead to the conclusion that Newtonian gravitational theory was false. Instead, two astronomers John Adams and Urban Leverrier, introduced the new auxiliary hypothesis of an undiscovered planet beyond Uranus, perturbing its motion through conventional gravitational effects. This proposal, according to MSRP, was scientific because it was independently testable. In fact, it led to the discovery of the planet Neptune in 1848. The discovery was a novel and dramatic success, which justified the program being evaluated as progressive. In order to save a research program from refutation, the protective belt can be modified but such modification must be able to extend the empirical content of the theory beyond the refuting cases. They must imply ‘novel facts’ that can be empirically supported. In fact, the protective belt of a research program is constantly changing in response to the empirical developments and under the program’s positive heuristic.

A scientist who modifies the hard core of his research program automatically opts out of that particular research program. Astronomer Tycho Brahe, for example, abandoned the Copernican research program and started a new one when he hypothesized that all the

planets other than the earth revolve around a stationary earth (Chalmers 1994, Kuhn 1985). Copernicus himself had earlier on rejected the hard core of the Ptolemaic astronomy, which, among other things, postulated that the earth was the center of the universe and that all the planets and the sun revolved around it.

The other important component of the MSRP is the positive heuristic. This is a research policy or a set of guidelines for ordering research priorities. It anticipates empirical refutations and gives directions in advance about how they are to be dealt with. It also concentrates on generating novel facts and expanding the explanatory power of the program. The positive heuristic tells the scientist how to supplement the hard core in order for the program to be capable of providing explanations and predictions of the phenomena under consideration. It also protects the scientist from the confusing influence of counter observations. Consequently, a scientist may ignore the anomalies as long as his research program continues to predict novel facts. Like the hard core, the positive heuristic cannot be abandoned without giving up the program altogether.

#### ***1.4 Progress and Degeneration***

According to the MSRP, scientific knowledge grows by progressive programs overtaking degenerating ones. A program's success largely depends on the strength of its positive heuristic, which should be able to foresee anomalies and turn them into successful applications of the program. Consequently, Lakatos distinguishes two types of progressiveness: theoretical and empirical. A program is theoretically progressive if each change in its protective belt leads to novel predictions and it is empirically progressive if

these novel predictions are corroborated by data. On the other hand, a program degenerates if it accounts for new facts with what Lakatos calls *ad hoc* hypotheses unanticipated in its positive heuristic and fails to make and confirm novel predictions.

Initially, Lakatos classified a prediction as novel if and only if the phenomenon being predicted had never been observed prior to prediction. But his pupil Elie Zahar modified this definition to include phenomena that may have been observed before the time of prediction but which did not belong to the problem situation that led to the formulation of the hypothesis in question (Zahar 1973). In other words, according to Zahar, a program will still be considered progressive so long as it predicts some known fact for which it was never intended to provide an explanation.

For scientific progress to be made, the adjustment of the protective belt of a research program must not only protect the hard core, it must also increase its domain of explained facts beyond the addition of the explained anomaly. Consequently, Lakatos distinguishes three different ways in which theories within a given research program can be *ad hoc*:

*Adhoc 1*: the theory has no excess empirical content over its predecessor

*Adhoc 2*: the theory predicts novel facts but it is not corroborated

*Adhoc 3*: the theory is arbitrary in relation to the protective belt, that is, it does not form an integral part of the positive heuristic

Lakatos allows a progressive research program to be *ad hoc* 1 and *ad hoc* 2 but not *ad hoc* 3. A research program whose series of theories persistently makes *ad hoc* 3 moves and does not lead to the discovery of novel facts is said to be degenerating. A research program is progressive in respect to other programs if it provides an excess of corroborated information in comparison to what they prohibit. Lakatos regards a theory in a series falsified when it is superseded by a theory with higher corroborated content. MSRP teaches that 'one must treat budding programs leniently, programs may take decades before they get off the ground and become empirically progressive' (Lakatos 1978: 6). However, Lakatos admits that it is difficult to decide when a program has irrevocably degenerated, or when one of two rival programs has achieved a decisive advantage over the other. He notes that a creative shift in the positive heuristic may push a degenerating program forward again.

### ***1.5 Commensurability of Research Programs***

Unlike Kuhn and Feyerabend, who assume that two theories involved in a revolutionary development are mutually incommensurable and that there is no algorithm for theory choice, Lakatos maintains that we can rationally compare and appraise competing research programs in terms of their theoretical and empirical progressiveness. In fact, as a rationalist, Lakatos is committed to articulating a set of principles which provide for the assessment of the relative merits of rival theories against any given background knowledge. For Kuhn and Feyerabend there are no objective theory-neutral principles relative to which the theories embedded in rival paradigms can be compared. Lakatos cites Newtonian and Einsteinian mechanics as specific examples of two incommensurable

paradigms. In fact, he explicitly rejects the standard view that Newtonian mechanics can be derived as a limiting case from relativistic mechanics. Competing programs differ so radically from each other that they are incommensurable. Consequently, each research program contains its own standards of appraisal. For Kuhn, then, 'scientific change is a mystical conversion which is not and cannot be governed by rules of reason and which falls totally within the (social) psychology of discovery' (Lakatos 1970: 93). Lakatos objects to this socio-psychological explanation of paradigm shifts and argues that the empirical contents of competing paradigms can be objectively compared and assessed. He even suggests that a single scientist can simultaneously work on two rival programs (Lakatos 1976: 11). Indeed, Lakatos sees himself as defending science against Kuhn's irrationalism. He writes:

*Can there be any objective (as opposed to socio-psychological) reason to reject a program, that is, to eliminate its hard core and its program for constructing protective belts? Our answer, in outline, is that such an objective reason is provided by a rival research program, which explains the previous success of its rival and supersedes it by a further display of its heuristic power. (Lakatos: 1994: 155)*

According to MSRP, significant progress in science is attained when a program makes novel predictions, which agree with facts. When successive modifications of the protective belt fail to produce any new independent tests, which are passed, the research program is degenerating. But a research program can never be justified once and for all. It can however overtake another if it successfully predicts all that its rival predicts and more besides. Einstein's theory of relativity, for example, superseded Lorentz's ether

program, when it explained the anomalous precession of the perihelion of the planet Mercury in 1915 (Zahar 1973).

Lakatos maintains that it would be rational to give up or 'shelve' the overtaken research program. He even goes so far as saying that researchers in a degenerating program should be denied research funds and that editors of scientific journals should not publish any work submitted by researchers in a degenerating program. However, he also says that a degenerating program can recover and attain unforeseen splendor and that it is equally rational to stick to it. What Lakatos is suggesting here is that it is always rational to continue to work on a degenerating research program provided only that one remains aware that the program is degenerating. In his own words: 'it is perfectly rational to play a risky game: what is irrational is to deceive oneself about the risk' (Lakatos 1971: 104-5).

### ***1.6 Reconstruction of Episodes in the History of Science***

According to MSRP, the history of science shows that competition between scientific research programs produces rational and objective advances in scientific knowledge and a closer approximation to reality. Consequently, the historian of science should provide a rational reconstruction of episodes in science. But in reconstructing such episodes, Lakatos finds it useful to demarcate between internal and external history. This distinction is intended to keep the logic of discovery separated from the psychology of research. It is important to Lakatos because it is what differentiates his philosophy of science from the Kuhnian socio-psychological approach.

External history is concerned with the social forces which affect the development of science but which do not have anything to do with the content of science. It is the history of what *actually* happened which takes note of economic, social and technological conditions. External history will also include 'any failure of scientists to act according to MSRP, as, for example, preferring a degenerating SRP to a progressive SRP, on the ground that the former is more 'elegant' than the latter possibly accompanied by the denial that it is in fact degenerating' (Blaug 1976: 158).

Internal history, on the other hand, has to do with how theories are proposed, rejected and accepted within the scientific community and how this contributes to the advancement of knowledge; it is history reconstructed as if the scientist had always proceeded in a rational manner. In the words of Ian Hacking, internal history 'is to be a history of Hegelian alienated knowledge, the history of anonymous and autonomous research programs (Hacking 1992). It is the history of what Popper (1978) would call world three or the world of objective contents of thought. Lakatos contends that only when the actual history of an episode fails to match the rational reconstruction may the historian of science resort to social or psychological factors to explain the deviation. He even goes so far as suggesting that the philosopher of science should put the rationally reconstructed version of events in the main body of the text, while relegating the history of what actually happened (external history) in the footnotes (Lakatos 1971: 107). Lakatos maintains that MSRP is superior because it turns many problems that were considered external by other historiographies into internal ones.

The Lakatosian historian searches for the competing programs of the period he is investigating and attempts to identify their respective elements (hard cores, negative heuristics, developing sets of theories, etc). He also notes the appraisals made by scientists of the research programs; he then describes and documents the ways in which the programs progressed or degenerated. This study will attempt to reconstruct the etiology of homosexuality debate from a Lakatosian perspective. Of particular interest will be to see how workers in the two rival research programs have been handling counter-examples. I will also be interested to find out why, in the last decade, the pendulum of popular and scientific opinion has swung back to favoring the biological hypotheses.

In evaluating the sexual orientation research using MSRP, two issues need to be distinguished: *normative* recommendation and historical *description*. MSRP was meant to serve both as (i) a normative recommendation on how science ought to be appraised and (ii) a historical description claiming to reflect scientific practice in so far as science is done well. This is true of all the methodologies of science including conventionalism, falsificationism and inductivism. In this regard, the present study will not only attempt to find out whether the story of homosexual etiology research fits the Lakatosian model, it will also be concerned with the question of whether MSRP is a rational method that practicing scientists *ought* to follow. Of course Lakatos has been at pains to say that his model was not meant to provide heuristic advice to *practicing* scientists. However, as a number of writers have conclusively shown, no clear distinction between methodological



appraisal and heuristic advice can be logically defended (Quinn 1972, Feyerabend 1976, Amsterdamski 1992). Indeed, to say that a particular program is progressing or degenerating is to suggest that it deserves more support, or less, from scientists. Similarly, to say that degenerating programs are risky, as Lakatos himself says, is to make a heuristic proposal.

It is important to note that one of the central theses of MSRP is the claim that scientists rigidly hold on to the hard cores of their research programs even in the face of empirical difficulties. This stress on the fixity of the hard core has however been disputed by a number of philosophers of science. Newton-Smith, for example, has noted ‘that even when a program is having great success, the scientist’s faith in its basic postulates is not such as to preclude the exploration of the possibility that they may be mistaken as they stand’ (Newton-Smith 1994: 85-86). A similar point has been made by Allan Chalmers who notes that when faced with empirical difficulties, Copernicus adjusted the hard core of his research program by moving the sun a little to the side of the centers of planetary orbits and had the moon orbit the earth instead of the sun (Chalmers 1999: 145). Allan Musgrave makes the same point when he argues that throughout the history of Newtonian research program, there were suggestions that the law of gravity (part of the hard core of this program) was in need of revision (Musgrave 1976).

It would be interesting to find out whether by polarizing the sexual orientation research into nature versus nurture and by failing to adopt an interactionist approach, the two groups of workers in the homosexual orientation research have impeded or promoted the

growth of scientific knowledge in this area. Recall that according to Lakatos, competition between research programs produces rational and objective advances in scientific knowledge and a closer approximation to reality.

### ***1.7 Research into Homosexuality: The Biological and Experiential Research Programs***

The first step in the application of MSRP is of course to identify the research programs that are to be compared. An examination of the literature dealing with homosexuality reveals that there are basically two competing research programs for explaining the etiology of human male homosexuality: biological and experiential. These programs not only have a long history but also have distinctive hard cores and positive heuristics. In addition, there are two distinct research communities pursuing these research programs: those who proceed from the assumption that homosexuality has a biological bases and who therefore seek to prove that this is indeed the case; and those who proceed from the assumption that it is caused by experiential and social environmental factors and who therefore seek social-cultural evidence to support their theory. It is important to note that while the majority of the proponents of the biological research program have some training in biology, many of the proponents of the experientialist program are social scientists.

Thus, in line with the Lakatosian philosophy of science, the two research programs are characterized by distinct hard cores and employ quite different heuristic techniques for resolving empirical difficulties. Furthermore, researchers favoring either of these programs have been able to find at least some empirical support for their own theories

and some empirical disconfirmation for competing views. In the following four sections I shall identify the hard cores of the two programs as well as their positive and negative heuristics.

### ***1.8 The Hard core of the Biological Program***

The biological research program takes as its hard core the proposition that an individual's sexual orientation is primarily determined by innate biological factors. Within this program, a number of hypotheses or sub-programs can be identified: genetic, hormonal, neurobiological, and sociobiological explanations. All these hypotheses form part of the same dominant research program with one identifiable hard-core and one negative heuristic. Philosopher Edward Stein describes the hard core of the experientialist research program as follows:

A person's biological make up at birth or at an early age determines or strongly constrains his or her sexual orientation, in particular, it determines (or strongly constrains) whether a person is attracted to men or women. This is an interesting and non-trivial claim. It is important to keep in mind that this is the claim at the heart of the emerging research program concerned with sexual orientation (Stein 1999: 124).

By 'the emerging research program' Stein is of course referring to the biological research program although it is not clear why he refers to it as 'emerging' considering that it has been in existence for more than a century (Bullough 1994). The first person to have formulated a biological theory of homosexuality appears to have been the German lawyer, Carl Heinrich Ulrichs in the eighteenth century. Drawing from recent advances in the study of the human embryo, he hypothesized that homosexuals were 'biological males with female psyches'-in Latin: '*anima muliebris in corpore virili inclusa*' (Ellis 1897/1975: 69). This was a radical departure from previous and subsequent theories that

regarded homosexuality as an acquired 'vice'. Although Ulrich's theory was rejected by the medical establishment of his day, his legacy lives on as exemplified by the continued quest for biological causes of homosexuality today. Another serious attempt to explain sexual orientation in biological terms was made by Von Kraft-Ebbing (1886/1965) and later elaborated by Havelock Ellis (1915). The two explicitly rejected social learning as a major cause of homosexuality and argued that homosexuality was 'in born'.

Genetic factors of homosexuality have been primarily investigated through twin studies. Kallman (1952a,b) provided a case for a hereditary basis of homosexuality in his famous twin study with exclusive homosexuals. The dramatic results of this study indicated that of a total of 37 pairs of monozygotic twins, all were concordant in exclusive homosexuality, whereas no homosexual trend was found among 26 pairs of dizygotic twins. Kallman concluded that genetic factors did serve a critical function in the onset of homosexuality. However, a number of cases of divergent sexual orientation in monozygotic twins have been reported (Rainer et al. 1961; Klintworth 1962; Parker 1964; Zuger 1976; McConagy and Blaszyński 1980; Farber 1981).

Evidence for a genetic basis for homosexuality was also reported by Hamer et al. (1993), who claimed to have found a locus on the X chromosome, which is associated with homosexuality in men. Another recent addition to research on biological correlates of homosexuality postulates the existence of anatomical differences in the size and cell number of various nuclei in the brains of homosexuals as compared to heterosexuals (Swaab and Hofman 1990, LeVay 1991, Allen and Gorski 1991). These differences are

thought to play a crucial causal role in determining whether one becomes heterosexual or homosexual.

Research on the biological causes of homosexuality has also focused upon the hypothesis that homosexuality has an endocrine basis. During the 1940s, shortly after sex steroids had first been synthesized, many attempts were made to investigate their possible relationship to homosexuality. Glass, Devel and Wright (1940), for example, reported reduced androgens and elevated estrogens in their male homosexual subjects as compared to controls. A similar conclusion was reached by Myerson, Neustadt and Kolodny (1971) who found that homosexual men had depressed plasma testosterone levels in comparison to those of heterosexual men. A study by Evans (1972) involving both heterosexuals and homosexuals found that the homosexual group had significantly lower levels of nonadrogenic urinary metabolites and lower levels of blood serum lipids. Although Evans did not make any specific conclusions, his findings supported the hypothesis that an unidentified common biological factor underlies the etiology of homosexuality.

Most psychoendocrine research on homosexuality is currently focused on prenatal hormones. Dörner (1975, 1976 and 1980) theorized that androgen deficit during a critical prenatal phase led to homosexuality in men but that androgen excess at such a phase produced homosexuality in women. Despite the suggestive findings outlined above, considerable disagreement exists with respect to their interpretation.

Also included in the biological research program are sociobiological explanations of homosexuality. Edward Wilson advanced one such explanation in 1975. He suggested that homosexuality might involve a form of genetic altruism, through which homosexuals benefit those closely related to them and in this way offset their own lowered reproductivity (Wilson 1975: 229-231, 343-344). This model predicts that homosexuals would be more altruistic than heterosexuals. Since sociobiological hypotheses presuppose the existence of a gene for homosexuality, I shall include them in the biological research program.

### ***1.9 The Positive Heuristic of the Biological Research Program***

The positive heuristic of the biological research program directs the researcher to look for biological differences (e.g. genetic, hormonal, and anatomic) between homosexuals and heterosexuals (see Haumann 1995: 60). If no such differences are detected, advocates of this research program will blame the method used in deciding who is a homosexual and who is not. Workers in this research program may also argue that familial factors commonly thought to account for homosexuality may be the result of the pre-homosexual child being 'different' to begin with. Even if the mother was overprotective and the father aloof or hostile, this behavior can be explained by saying that it was provoked by the homosexual child's *innate* peculiarities. In other words, the homosexual child's behavior and characteristics may themselves have an impact on the parental behaviors. Researcher bias as well as other methodological inadequacies may also be invoked to explain away anomalies.

### ***1.10 The Hard Core of the Experiential Research Program***

The hard core of the experientialist research program, on the other hand, consists of the proposition that experiential factors determine an individual's sexual orientation. Stein describes this hard core as follows:

Although today the most widely believed theories of the development of sexual orientations see biological factors playing the primary role, experiential theories once held the greatest sway. For much of the twentieth century, most people believed that the effects of a person's experience on his or her psychological make up would explain how he or she develops sexual orientation (Stein 1999: 229).

Within this program, two major hypotheses can be identified: psychoanalytic and social learning hypotheses. The psychoanalytic hypothesis can be traced back to Sigmund Freud. Although he did not reject the biological explanations entirely, Freud (1905) thought that male homosexuality was caused by the presence of an intensely affectionate, possessive and domineering mother or the absence of a dominant father. In fact, Freud's theory predicts that male homosexuals would tend to be emotionally dependent on their mothers and emotionally distant from their fathers.

Most experiential and social environmental explanations continue to emphasize the theme of a romantic triad including a dominant mother, a weak or absent father and the mother's favorite son. Fenichel (1945), for example, has argued that male homosexuals tend to be mother-fixated and to have identified with their mothers because these mothers were domineering in contrast to weak fathers. The now famous study by Beiber et al (1962) claimed to support some of the psychoanalytic predictions about the parental causes of homosexuality. In this study, Beiber and his associates investigated the early family

patterns of 106 mainly homosexual patients and a group of non-homosexual patients. Beiber *et al.* found that in a majority of cases, the behavior of the mothers was seductive and over-indulgent, domineering and inhibiting, while the behavior of their fathers were hostile or indifferent. Similar findings have been reported by O'Connor (1964) and Bene (1965).

Social learning theorists e.g. Feldman (1966), Churchill (1967) and Bandura (1969) maintain that homosexuals have failed to learn appropriate sexual behaviors and preferences. These authors maintain that children learn through social reinforcements and conditioning patterns to express themselves sexually more toward one sex than the other. Bandura (1969) and Mischel (1969) also contend that parents are actively indoctrinating the child to his appropriate sex role by such actions as selective reinforcement of sex appropriate behaviors, differential dressing, selection of sex-appropriate toys and activities, and promotion of association with same-sex playmates. Empirical support for this position has been provided by several studies (e.g. Moss 1967, Goldberg and Lewis 1969). Kardiner (1963) attributed homosexuality to excessive societal demands on boys to be 'masculine'. Boys who felt inadequate in complying with those demands were believed to seek refuge in female sex roles.

Some social learning models have also attributed homosexuality to seduction in early childhood by an older same-sex sibling, suggesting that this too could prematurely arrest psychosexual development. Other writers have ascribed male homosexuality to the absence of eligible women, either because there are too few women or because of their excessive training in chastity (Westermack 1922). It is important to note that most of the earlier studies in this area examined emotionally disturbed subjects or criminals, and to



generalize to all homosexuals from this clinical and prison samples would be unreasonable. Recent studies cast serious doubt on the prevalent assumption that negative parental behavior, especially mother's, play a critical role in differentiating the backgrounds of homosexuals and heterosexuals (Bell, Weinberg and Hammersmith 1981, Seigelman 1981).

### ***1.11 The Positive Heuristic of the Experiential Research Program***

The positive heuristic of the experiential research program directs the experientialists to look for the experiential and social-environmental factors, which bring about differences in sexual orientation.

When monozygotic (MZ) twins are found to be concordant for sexual orientation, workers in this program may argue that the two individuals must have shared a common environment. On the other hand, if the twins have been brought up together but are found to be discordant for sexual orientation, proponents of this program may blame the techniques used to determine the sexual orientation or the zygosity of the individuals concerned. They will also argue that the environments under which the twins were brought up were in fact different despite their superficial similarity. And where there is a high concordance rate for homosexuality in dizygotic (DZ) twins compared to non-twin biologic brothers, the experientialists will attribute this to the increased similarity of the trait-relevant environment in the former. This is because DZ twins and full biological siblings share the same genetic material and any difference in true concordance rates would be attributable to environmental rather than genetic factors. The environmentalists may also argue that 'biological factors exert at most a predisposing rather than a determining influence on sexual orientation (Byne et al 1993: 228).

### ***1.12 Research into Homosexuality: Two Programs or One?***

It may be argued that research into the causes of homosexuality (and sexual orientation in general) is best understood not in terms of two parallel programs, but in the context of one interactionist model. According to this view, homosexuality (and most aspects of human behavior) is a joint product of biological (genes) and environmental factors. John Money, for example, asserts that people become homosexual, bisexual or heterosexual because of what happens to them partly in their prenatal history and partly in their postnatal history (Money 1988: 4-5). Byne et al (1993) have suggested a similar interactionist model. According to this model, genes or hormones bias particular personality traits and thereby influence the manner in which an individual and his or her environment interact as sexual orientation unfolds developmentally. Haynes reaches a similar conclusion when he says that sexual orientation is a result of 'the interaction between the genotype and the environment' (Haynes 1995: 93).

It is of course true that some researchers *believe* that both nature and nurture have a role to play in molding an individual's sexual orientation. However, as Peter Urbach has pointed out, and as Lakatos would agree, 'the private, psychological beliefs of scientists have no place in the appraisal of their work. What must be taken into account are the heuristic principles they follow *in practice*' (Urbach 1974: 109). Peter Clark made a similar point when he wrote:

What the identification of hard core and heuristic presupposes is that the working scientists *utilized a common approach to, and set of techniques*

*for, solving their problems.* In general, in locating the hard core and heuristic of a program what is important is not what working scientists say about what they are doing, nor their beliefs about the truth or falsity of the specific theories they espoused, but what principles they *adopted and followed in practice* in developing their theories (Clark 1976: 46).

The fact of the matter is that while one group of researchers is guided by the assumption that biological factors determine homosexuality, the other group is guided by the assumption that homosexuality is determined by experiential factors. In other words, the two groups of researchers continue to approach the etiology of homosexuality debate as if it was an either/or issue. Indeed, although some of these researchers claim allegiance to an interactionist banner, they still use the same nature-nurture framework they claim to deride. Dean Hamer, for example, explicitly states that his study ‘favors an explanation based on genes rather than on the rearing environment’ (Hamer and Copeland 1993: 104). Simon LeVay betrays his biological-determinist inclinations when he concludes his book on the neurobiology of sexuality, *The Sexual Brain*, by saying that ‘our range of individual development is defined and limited by what we are born with (LeVay 1993: 138). He says this despite having said three sentences earlier that neither nature nor nurture can provide an adequate account of sexual orientation. In the media LeVay has on several occasions said that his ‘brain study will be foundational for determining whether nature or nurture causes sexual orientation’ (Halley 1994: 534).

### ***1.13 Conclusion***

In this chapter I have identified an episode in the history of science, which requires a rational reconstruction, namely: research into the genesis of human male homosexuality. I have also identified two competing research programs as well as their respective

elements (hard cores, positive heuristics, developing set of theories, etc.). In the chapters that follow I shall examine a number of hypotheses that have been advanced in the two rival programs to explain the etiology of human male homosexuality.

## **Chapter 2**

### **Homosexual Orientation**

#### ***2.1 Introduction***

As already indicated, the aim of the present study is to appraise the competing paradigms for explaining the etiology of human male homosexuality. It is only fitting that such a study should begin with an attempt to tease out the meaning of the term 'homosexuality'. A clear and widely accepted definition of homosexuality has been very difficult to attain. In fact, although some people are classified as homosexual, there is no standard of agreement about what it is to be homosexual. In their search for causal explanations, different investigators have adopted different assumptions about the nature of homosexuality. As a result, controversy, ambiguity and confusion have characterized research into the etiology of homosexuality. In this chapter I will highlight and discuss some of the problems that arise from the lack of a clear definition of the term 'homosexuality'. Other issues that will be discussed along the way will include the prevalence and distribution of homosexuals in the population as well as homosexuality in different cultures. The debate between essentialists and social constructionists about sexual the categories of orientation will also be briefly discussed.

#### ***2.2 Definition***

As I have just pointed out, one of the main problems underlying any discussion of the causes of homosexuality is that of definition. Yet, in spite of more than a hundred years of study and debate, there is still no unanimously accepted definition of the term 'homosexuality' among both clinicians and behavioral scientists (Panel 1986). In fact, a

close examination of the literature on homosexuality reveals a definitional crisis. This state of affairs has partly been occasioned by the confusion between description (homosexuality as behavior) and explanation (homosexuality as an explanation abstracted from observed or self-reported overt behavior). The term 'homosexuality' is ambiguous for it may refer to sexual behavior or to sexual orientation. John Money puts it well when he says that 'all discussions of homosexuality become wasteful word games unless, at the outset, a differentiation is established between homosexuality defined as a behavioral act, versus homosexuality defined, by inference, as a permanent state of erotic disposition and preference' (Money et al 1972: 228). Apart from hampering research into the causes of homosexuality, lack of a satisfactory definition has also contributed to the current disagreement between the social constructionists and essentialists over the nature of the categories of sexual orientation. Whereas the former hold that homosexuality is an artifact of culture, the latter believe that it is a real category that transcends culture and historical epoch. The scientific study of homosexuality requires reliable assessment of heterosexual and homosexual behavior.

The first person to have used the term homosexuality to denote sexual attraction between members of the same sex appears to have been the German scholar, Karl Maria Kertbeny (born Karl Maria Benkert) in 1869 (Bollough 1976). Magnus Hirschfeld popularized the term in Germany, while Havelock Ellis, who used it in his *Psychology of Sex* (1936), popularized it in the English-speaking world. However, Ellis made a distinction between homosexuality and sexual inversion, with homosexuality including all sexual attractions between people of the same gender, even when seemingly due to situational

unavailability of members of the opposite sex. He reserved the term sexual inversion to congenital or fixed forms of homosexuality (Ellis 1936: 1).

The concept of homosexuality has received several different definitions. Some authors consider individuals to be homosexual if they so identify themselves and if their sexual desires and overt sexual behavior are both predominantly directed towards members of the same sex. But others consider a dominant fantasy for members of the same sex as evidence of homosexuality without the requirement of overt homosexual affairs. According to this view, then, overt homosexual behavior is neither a sufficient nor a necessary condition for an individual to be considered homosexual. In fact, it is not unusual for heterosexuals to have sexual experiences with people of their own gender while they maintain their heterosexual identity. For this reason, individuals who are driven into transitory homosexual patterns of behavior as a consequence of intense heterosexual frustration and who return to exclusive heterosexuality as soon as the opportunity arises cannot be regarded as genuine homosexuals. Sex between individuals of the same gender may also be an expression of power relation rather than sexual gratification or love. This is particularly true of same-sex relations between men in prisons.

In defining the term homosexuality, therefore, it is fundamentally important that a conceptual distinction must be made between homosexuality as behavior and homosexuality as a form of sexual orientation (disposition). Some writers have tended to conflate the two. Homosexuality defined as the sustained erotic attraction to one's own

gender must not be confused with occasional homosexual experiences because behavior alone does not determine sexual orientation. Homosexual experiences are fairly common, especially early in adolescence (Ellis 1987: 233) or in the absence of alternative sexual outlets and are no more indicative of homosexuality than occasional heterosexual experiences are indicative of heterosexuality. Furthermore, studies have shown that sexual orientation is not necessarily expressed in sexual behavior. Homosexual behavior refers to same-sex physical relationships but it does not imply sexual orientation. This may occur among predominantly heterosexual individuals, who are unable to engage in heterosexual relationship due to the situational unavailability of members of the opposite sex. Homosexuality of this kind is to be found in monasteries, convents and boarding schools. It is also to be found among sailors and prisoners. This is not the kind of homosexuality that most of those researching into the etiology of homosexuality have in mind. The ritualized homosexuality as practiced by the Sambia of Papua New Guinea in which older men anally or orally inseminate young men must also be excluded from the definition of homosexuality as a sexual orientation. In fact, despite universal homosexual experience during early adult life, only a small minority of Sambian men become homosexuals in adulthood (Mondimore 1996).

Definitions of homosexuality that focus solely on manifest homosexual behavior are bound to be deficient and misleading. Such definitions assume that all homosexuals act out their same-sex erotic fantasy whereas research findings of Kinsey et al (1948) revealed that this is not always the case. Consider a man who is erotically attracted to other men but who has never had sexual relations with anybody. Or consider a catholic



nun who is sexually attracted to members of the opposite sex but who takes her vow of celibacy very seriously. Are these individuals to be classified as asexual, heterosexual or homosexual? What of the person who dies without ever having engaged in sex with any male or female? Proponents of the behavioral view would not assign any sexual orientation to such individuals. The truth of the matter however is that one does not have to act on his or her sexual desires in order to be described as having a particular sexual orientation. Definitions of homosexuality in terms of overt homosexual behavior will exclude those individuals who suppress their same-sex erotic desires due to fear of disapproval or punishment. In fact, an enormous number of homosexuals in highly repressive societies never act out their sexual feelings at all. Another group of individuals that will be misclassified are those married men who fantasize about males when having sex with their wives and must do so in order to attain orgasm (Harry 1984: 113). Besides, by ignoring motivational factors, behavioral definitions of homosexuality will fail to distinguish between true homosexuality, situational homosexuality, and transitory adolescent homosexual behavior viewed as a normal developmental phase, not necessarily indicative of future adult homosexuality.

As I have already pointed out, a person may have sexual relations with people of the same gender and still maintain a heterosexual identity. Heterosexual males who engage in homosexual prostitution, for example, cannot be categorized as true homosexuals although they engage in homosexual behavior. The same is true of heterosexual females who engage in lesbian acts for monetary gain. Kurt Freund puts it well when he says that 'homosexual interaction, even if occurring regularly, is not by itself a very reliable

indicator of homosexuality and this applies conversely to heterosexual interaction as well' (Freund 1974: 29). The main problem with the behavioral view of sexual orientation is that it fails to recognize that people have a privileged access to their feelings including their sexual desires.

A better and more inclusive definition of homosexuality takes both motivational and behavior characteristics into account, as a result of which it appears to be more adequate and acceptable. I find the following definition by Reiter quite useful:

A homosexual is an adult whose fantasies, attachments and longings are predominantly for persons of the same gender, who may or may not express those longings in overt behavior, and whose orientation may or may not be accompanied by homosexual identity (Reiter 1989: 140).

The advantage of this definition is that it does not dichotomize homosexuality into overt and covert types, but treats them as variants of one condition. It allows that a person can be said to be homosexual even before he or she has sex. It also rules out the heterosexual male prisoner or male prostitute who have sex with other men from being counted as homosexual. Despite these advantages, however, the application of this definition could erroneously imply that homosexuality and heterosexuality are a rigid dichotomy. Sexologists have attempted to overcome this problem by proposing various scales for rating sexual orientation. I will discuss these scales in the next section.

### ***2.3 Sexual Orientation Rating Scales***

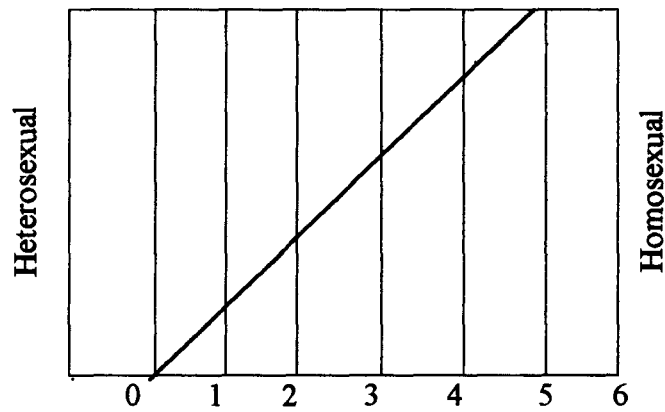
As already indicated, lack of a satisfactory method for determining an individual's sexual orientation has partly contributed to the ongoing controversy concerning the cause(s) of

human homosexuality. Because of their tremendous plasticity, human erotic lives have proved very difficult to categorize. Prior to the publication of the pioneering work of Alfred Kinsey and his colleagues in 1948, a person was considered to be either a heterosexual or a homosexual. And although some people allowed a third category of bisexual, others believed that a bisexual was a homosexual in disguise. Kinsey is credited with challenging this dichotomous categorization of sexual orientation. He realized that a bipolar categorization does not adequately reflect the complex realities of human sexuality.

Kinsey discovered that homosexuality was much more prevalent than previously thought. He also claimed that engaging in homosexual acts did not automatically make a person homosexual. For Kinsey, the best way to view sexual orientation is in terms of a unidimensional continuum in which an individual is rated in terms of heterosexual and homosexual behavior. And as Kinsey himself wrote:

Males do not represent two discrete populations, heterosexual and homosexual. The world is not divided into sheep and goats. Not all things are black nor all things white. It is a fundamental of taxonomy that nature rarely deals with discrete categories. Only the human mind invents categories and tries to force facts into separated pigeon-holes. The living world is a continuum in each and every one of its aspects. The sooner we learn this concerning human sexual behavior the sooner we shall reach a sound understanding of the realities of sex (Kinsey 1948: 639).

According to Kinsey, an individual's sexual orientation is to be defined primarily in terms of the type, extent, and frequency of his or her erotic fantasies. To determine the balance of heterosexual and homosexual, Kinsey and his colleagues developed the following seven point rating scale.



### Key

- (0) Exclusively heterosexual with no homosexual
- (1) Predominantly heterosexual, only incidentally homosexual
- (2) Predominantly heterosexual, but more than incidentally homosexual
- (3) Equally heterosexual and homosexual
- (4) Predominantly homosexual, but more than incidentally heterosexual
- (5) Predominantly homosexual, but incidentally heterosexual
- (6) Exclusively homosexual

(Source: Kinsey et al. 1948)

Kinsey's sexual orientation scale is an equal interval scale with continuous gradations between heterosexuality and homosexuality. According to this scale, 0 represents exclusive heterosexuality and 6 represents exclusive homosexuality. People who fall between scale point 2 and 4 show equal erotic response to both homosexual and heterosexual stimuli and are referred to as bisexual or *ambisexual*. Kinsey's ratings are allocated on the basis of overt sexual activity and psychological responses to members of

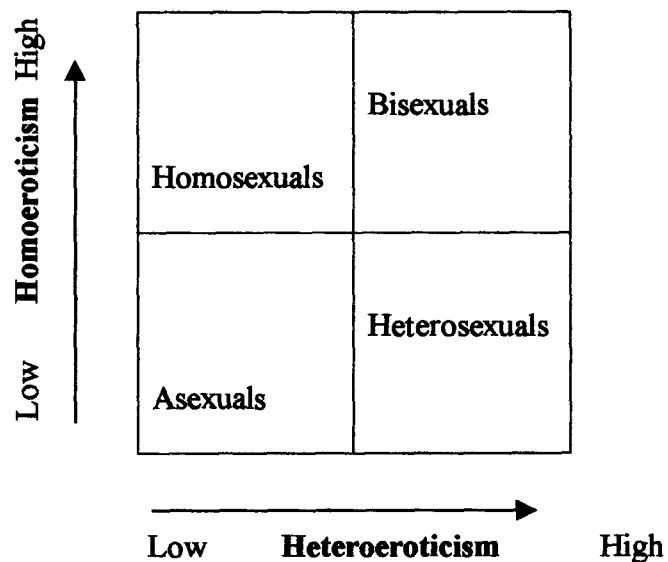
both sexes. These categories were defined in terms of sexual arousal leading to orgasm and ejaculation in the case of males. It is noteworthy that Kinsey thought of his scale as a way of classifying behaviors and not persons.

Despite its attractiveness, Kinsey's scale has many limitations for describing an individual's sexual orientation. In the first place, the scale does not take into account the dimensions of time or the multivariable aspects of sexual orientation such as attraction, behavior, fantasy, lifestyle and emotional preference. It is therefore very difficult to label a person using the scale (Klein et al 1985). Besides, the scale erroneously assumes that the more heterosexual an individual is, the less homosexual she or he is and vice versa. In other words, the scale assumes that an individual loses degrees of one orientation as he or she moves towards the opposite end of the scale. In addition, the scale assumes that sexual behavior and erotic responsiveness are the same within individuals.

The universality of Kinsey's scale has also been questioned. Some commentators have argued that the scale is only applicable to middle class white American males and that it cannot be used to assess the sexual orientation of people from other cultures (McWhirter 1990: xviii). This is because it was based on the interpretation of answers supplied by a group of white American males and was therefore not representative enough. The Kinsey scale has also been criticized for its orgasmocentric bias and for its reductionistic assumption that an individual's sexual orientation is determined by his or her own gender and the genitalia of the individual to whom one is attracted or has sexual relations with (Coleman 1990: 269). In fact, his emphasis on orgasm as a necessary criterion would

This grid is considered a reliable and suitable instrument that can differentiate sexual orientation by taking into account the meaningful dimension of time as well as other varied dimensions. However, because of its potential number of variables, some people have found this scale too complicated to administer. It is therefore not very useful for research purposes (McWhitrter 1990: xviii).

Psychologist Michael Storms (1980) has proposed a modification of Kinsey's unidimensional model of sexual orientation. According to Storm's model, heterosexuality and homosexuality are independent, orthogonal erotic dimensions rather than opposite extremes of a single bipolar dimension. This model postulates that bisexuals are high in both heteroeroticism and homoeroticism while asexuals are low in both. Heterosexuals, on the other hand, are high in heteroeroticism and low in homoeroticism while homosexuals are high in homoeroticism and low in heteroeroticism. This is what might be called a two dimensional view of sexual orientation (see figure below):



(Source: Storms 1980)

The advantage that Storm's model has over Kinsey's model is that whereas the former distinguishes between asexual and bisexual individuals, the latter combines these two categories. Failure to distinguish these two categories can obscure research on sexual orientation. However, as with the other sexual orientation scales, this particular scale has not been universally accepted and some writers have questioned its usefulness as a research tool.

#### ***2.4 Prevalence of Male Homosexuality***

Homosexuality, broadly defined as sexual relations between members of the same gender is stigmatized and socially rejected in most cultures. For this reason, it has been extremely difficult to secure factual data concerning its frequency and nature, and the reports of different researchers show significant discrepancies. The matter is compounded by the lack of a universally accepted definition of the term 'homosexuality'. The most frequently cited but dated estimates for the incidence of homosexual behavior are those published in the pioneering studies of Kinsey and his associates in 1948 and 1953 respectively. These studies consisted of interviews involving more than 2000 subjects, covering a wide range of human sexual activities.

Kinsey et al found that 4 percent of adult white males in the United States were exclusive homosexuals for a period of at least three years during adulthood while 37 percent had some overt homosexual experience between adolescence and old age. They also found that among males who had remained single until age 35, this incidence rose to 50 percent. In the case of females, 13 percent of those who were interviewed had some overt

homosexual experience to the point of orgasm and between 1 and 3 percent of unmarried women were exclusively homosexual.

The accuracy of Kinsey's figures on the prevalence of homosexuality has been questioned. Critics have complained that Kinsey's research lacked probability samples. Indeed, his sampling strategies were haphazard by modern standards. The figures were based on a sample that included a high proportion of prisoners as well as ex-convicts. Many of these men may have been heterosexuals who due to the unavailability of the opposite sex availed themselves of opportunities for homosexual intercourse. Moreover, what Kinsey's study focused on was homosexual behavior rather than inner orientation or fantasy (Gonsiorek 1991: 3).

More recent attempts determine to the base rate of homosexuality in modern western societies include McConaghy et al.'s 1979 study of medical students at the University of New South Wales in Australia. The study showed that 60 percent of the subjects reported that they were aware of homosexual feelings during adolescence, and more than forty percent were still aware of homosexual feelings. However, it should be noted that most of the subjects were in their late teens or early twenties, so many may not have reached their final adult sexual preference. Moreover, a sample of medical students can hardly be generalized onto the Australian population as a whole. Another study carried out in the 1980s by Fay, Turner, Klassen and Gagnon (1989) reported that between 3 and 6 percent of the male population in the United States is exclusively homosexual. The study also found that homosexual contact increased with educational level and was highest among



single, male college graduates. Finally, Fay and his associates found that 8 percent of married men reported having homosexual experiences fairly often. The consensus today is that the incidence of homosexuality is between 4 and 10 percent of the general population (Bower 1993: 37)

Outside the Western world, there is no authoritative data on the prevalence of both male and female homosexuality. And where the figures are available they must be regarded as underestimates because in most non-Western societies, people are unwilling to report sexual desires and behaviors that are still considered by some to be unnatural and pathological.

### ***2.5 Homosexuality Across Time and Culture***

Homosexual activity has existed throughout human history. Although different societies and cultures have looked upon homosexual activities with a wide range of attitudes, there are very few cultures, and certainly no historical epochs, in which there is no record of some homosexual activity (if by homosexuality we mean sexual relations between persons of the same phenotypic sex).

In different cultures and at different historical epochs, homosexual behavior has variously been socially rejected, tolerated, treated with reverence or regarded as a normal variation of human sexual behavior. In most societies, however, homosexuality is regarded as an aberration. The Judaeo-Christian tradition has generally perceived it as sinful, and thus homosexuality is viewed as socially unacceptable throughout most of

Western culture. Homosexuality is condemned in the Old Testament and the practice seems to have been widespread among the ancient tribes of Israel. The destruction of Sodom and Gomorrah in Genesis is said to have been an expression of God's abhorrence of homosexuality. Homosexuality is also condemned in the New Testament especially in the epistles of Saint Paul, which suggests that it was common during the time of Christ. With the exception of Buddhism, which takes a neutral doctrinal position towards homosexuality, all the other major religions of the world condemn homosexual behavior.

Sexual relationships between members of the same sex was both tolerated and condoned in ancient Egypt, Greece and Rome. Although the ancient Greeks did not have a single word for what we now call 'homosexuality', same-sex love was considered a higher form of love than ordinary heterosexual love. It was considered an honor for a youth to become the homosexual partner of a nobleman. Early Greek writings as well as vase paintings depict same-sex erotic behavior and Greek legends describe sexual relationships between members of the same sex. The Greek philosopher, Aristotle, considered homosexual disposition perfectly natural and dismissed Plato's suggestion about prohibiting homosexual behavior as 'ridiculous'. Plato himself was a bachelor and is thought to have exclusively homosexual (Boswell 1980: 49). However, it is important to note that in Ancient Greece, the vast majority of men who engaged in sexual relationships with other men were in most cases married (or later became married), had sexual relationships with their wives, and they sired children. They should therefore be regarded as having been bisexual rather than exclusively homosexual. Furthermore, the relationship was in most cases trans-generational, that is, between a young boy (the beloved) and an older man

(the lover). Also, a person's status in the society was important to how culture viewed his or her sexual interests (Halperin 1990). For instance, a citizen was allowed to penetrate but could not be penetrated by non-citizen who included slaves, children and foreigners. This is what has led some social constructivists to the conclusion that contemporary categories of sexual orientation in the west cannot be applied to the inhabitants of ancient Greece. Homosexual marriages were also common in both Greece and Rome throughout the middle ages.

Among the Sambia people of Papua New Guinea, homosexuality was institutionalized and compulsory for pre-pubertal males. A man who did not engage in this practice would be stigmatized and considered a deviant (Money 1990: 43). The Sambia believed that homosexual behavior among adolescent boys was essential to the attainment of strength and virility. According to the Sambia, a boy could not mature physically unless an older male implanted semen in his body. Male qualities such as courage and proficiency in hunting as well as ability to dominate women were thought to be transmitted this way (Greenberg 1990: 29). However, it is important to note that virtually all Sambian men turned out to be predominantly heterosexual in adulthood and even took brides despite having spent their entire adolescence engaging in male-male sexual relationship (Herdt 1981). Only a few continued with same-sex sexual relations and these are the ones who would perhaps fall on point 6 on the Kinsey scale. It is important to distinguish this type of institutionalized homosexuality from obligatory or compulsive homosexuality, which occurs even when members of the opposite sex are available.

There is no term for homosexuality among the Gikûyû people of Kenya. In fact, they do not seem to have an awareness or even a concept of someone whose erotic and sexual fantasies are directed *primarily* at the members of his or her own sex. As Kenyatta (1953) explains in his *Facing Mount Kenya*, the Gikûyû were free from homosexuality. This would seem to support the social constructionist's claim that homosexuality is not a universal category. Yet, homosexuality was quite common among the Nyakyusa boys of Tanzania and was viewed as a substitute for heterosexual intercourse (Broude 1996). Holmberg (1950) observed no homosexuality among the Dogon of Mali and the Siriono Indians of Bolivia.

In a cross-cultural survey of sexual patterns in preliterate societies (they called them primitive), Ford and Beach (1951) reported that in 49 out of 76 of these societies, homosexual activities were considered acceptable under certain circumstances. Among the Siwans of North Africa, for example, all men were expected to engage in homosexual sodomy and a man who did not have both female and male affairs was considered peculiar. The Aranda youths of Australia went through a stage of homosexual marriage in which they lived as husband and 'wife' with an older bachelor for several years until they were ready for heterosexual marriage. Ford and Beach also report that although the Cubeo Indians of North West Amazon were very strict in preventing premarital heterosexuality, they permitted and even encouraged adolescent homosexuality.

The forgoing review is not exhaustive. It only serves to show that homosexual behavior is a common occurrence in many cultures and that it has existed throughout recorded

human history. However, it is important to emphasize that what has been reported in this survey is the existence of homosexual behavior and not necessarily the existence of homosexual orientation. In the following section, I will focus on the essentialism-constructionism debate, which addresses this very important distinction.

### ***2.6 Essentialism- Constructionism Controversy***

One other issue that needs to be addressed at this stage is the debate between the social constructionists and essentialists concerning sexual orientation and homosexuality in particular. James Weinrich has described this debate as ‘the hottest philosophical controversy to hit psychology in recent years’ (Weinrich 1992: 175). Essentialism-constructionism debate revolves around the question of whether homosexuality is a natural kind or a social kind. The debate has deep ramifications for scientific research into the causes of homosexuality because most biologically inclined investigators assume that homosexuality is a real category existing discretely in nature, uninfluenced by social mores.

The central claim of constructionism is that homosexuality as an identity or membership in a community is a comparatively new phenomenon and cannot be properly or completely understood apart from the social milieu in which it is embedded. On this view, homosexuality does not reflect an entity, which exists irrespective of the social circumstance. It is not, as Hacking (2002) would say, a natural human kind. In other words, there is no underlying quality that characterizes homosexuality in all places and at all times. Categories of sexual orientation, according to this view, refer to empty natural

kinds and can be compared to witches and warlocks who were once thought to possess supernatural powers (see Stein 1998:439). Some proponents of this view trace the emergence of homosexual identity in the west to the late nineteenth century. They claim that homosexuality did not exist until Karoly Kertbeny coined the term in 1869. Before this time, they contend, individuals were not socially defined in terms of their sexual behaviors (either homosexual or heterosexual). Thus, before the nineteenth century, there was no such a thing as homosexual. The sex of the person that one wanted to have sex with was not taken to provide a definition of the type of person one was. As the French theorist Michael Foucault (a self-confessed pedophile who died of AIDS in 1984) explains in his famous statement: 'Homosexuality appeared as one of the forms of sexuality when it was transposed from the practice of sodomy into a kind of interior androgyny, a hermaphrodism of the soul. The sodomites had been a temporary aberration; the homosexual was now a species' (Foucault 1980: 43). David Halperin echoes the same point when he says that 'Before 1869 there was no homosexuality, only sexual inversion' (Halperin 1990: 29). Indeed, for these two theorists, the term 'homosexual' is nothing but a label inscribed into individuals as a means of controlling them. If it is true that sexual orientation is a social construct as the constructionists allege, then it should come as no surprise that the quest to discover its cause(s) has not been successful.

While the social constructionists admit that same-sex activity may exist in all cultures, they think that only in some cultures are people categorized according to their sexual orientation. According to this school of thought, sexual orientations, and homosexuality

in particular, is culture dependent, relational and subjective. In other words, those engaging in same-sex acts are defined, and in part, created by the societies and families in which they grow and live (Dickerman 1995: 177). There is an element of truth in this. History shows that although same-sex relations was regarded as a sin in the middle ages, those who committed that 'sin' were not regarded as constituting a type of people different from others. Indeed, the focus was on the homosexual acts themselves (i.e. sodomy) and not the homosexual condition of the individual. But some social constructivists make a much stronger claim than this. They deny that homosexuality is a natural kind or that it plays a role in scientific explanation.

Social constructionists appeal to bisexuality, historical variation as well as cross-cultural differences to support the view that homosexuality is a socially constructed phenomenon and not an objectively detectable, erotic orientation. For example, they point out that the early Greeks did not have single word for what we now call homosexuality and they take this to mean that homosexuality did not exist in classical Greece.

Social constructionists contend that since homosexuality is a socially malleable trait, it is best studied using the methods of hermeneutics or critical political analysis. However, it should be noted right at the outset that some social constructionists do not just question the findings of scientific research into homosexuality- they question the very enterprise itself. Mary McIntosh, a social constructionist, puts it well when she says that failure to find the causes of homosexuality results from asking the wrong question rather than the lack of scientific rigor or inadequacy of the available evidence. She adds, "one might as

well try to trace the etiology of 'committee chairmanship' or 'Seventh Day Adventism' as of homosexuality' (McIntosh 1992: 21). Dupre makes the same point when he says that the search for biological differences between homosexuals and heterosexuals 'may be no more firmly grounded than the search for the typical characteristics and genetic peculiarities of stamp collectors or aficionados of crossword puzzles' (Dupre 1993: 253). For the social constructivists, the choice of one's preferred sexual partners does not have any kind of categorical primacy over other aspects of the choice of sexual partners such as their age, physical appearance or even race. Instead of trying to trace the etiology of homosexuality, social constructivists insist that researchers should investigate why and how the 'erroneous' idea of homosexuality as a real category came into being in the first place.

Although the social constructionists are right in asserting that the term 'homosexual' was coined in the nineteenth century, it would be wrong to conclude from this fact that homosexuals did not exist before then. The truth of the matter is that it is possible for a homosexual person to exist in a society that has no name for the trait. And as Boswell aptly puts it 'the absence of a concept can hardly be taken to demonstrate the absence of what it applies to' (Boswell 1992: 142). As an example, he notes that although the Romans did not have an abstract word for 'religion' they did have religions, including Christianity. The same is true of blood types. Even though the ancient Greeks did not categorize people according to their blood types, this does not mean that there were no blood types in ancient Greece (Stein 1999: 98). One could therefore argue that the coining of the term 'homosexual' only helped to classify the world differently. People



had been performing homosexual acts long before the word homosexual came into existence and this suggests that homosexuality might in fact be a real category that transcends both culture and history. Moreover, many writers in the past were able to characterize homosexuality as a distinct mode of erotic expression without finding the need to invent a name for it (Boswell 1996: 194).

Essentialists, on the other hand, are of the view that sexual orientation is a fixed objective aspect of human nature. On this view, our contemporary categories of sexual orientation can be applied to people of any culture and at any point in history. Thus sexual orientation is an innate quality in individuals, stable and unchanging. Essentialists look at homosexuality as a mode of being and not simply as the performance of sexual acts. They are realists for they believe that sexual categories reflect an underlying reality (Epstein 1992: 244). And as Boswell has noted, 'the heterosexual/homosexual dichotomy exists in speech and thought because it exists in reality: it was not invented by sexual taxonomists, but observed by them' (Boswell 1996: 185). According to this view, being homosexual, bisexual or heterosexual is as innate a characteristic as skin complexion. It is not, as some constructivists have claimed, a superficial matter of taste like the preference for blondes, fat women or white wine. This means that an essentialist would have no problem saying that there were homosexuals in traditional African societies or in ancient Greece. And as Edward Stein puts it 'it is just a matter of whether or not a person has the relevant properties such as certain genes, hormones or psychological condition' (Stein 1992: 326).

Essentialists are also committed to the view that law-like generalizations can be made about the nature and causes of homosexuality. And even though essentialists acknowledge that different societies have different ways of expressing sexual desire, they argue that this does not in any way contradict the view that homosexual desire is innate. They maintain that there is an underlying reality in the categorization of homosexuality that has outlasted the cultural changes that have taken place in the past two thousand years and as such it is a legitimate candidate for biological and/or psychodynamic explanations. Supporting the same view, philosopher Michael Ruse draws an analogy between homosexuality and the physicist's notion of mass. He writes:

The physicist's notion of mass has changed drastically from the nineteenth-century Newtonian concept to the twentieth century Einsteinian concept; yet there is continuity, and we can now see that both the nineteenth- and twentieth century scientists were talking about the same thing. The same, I suggest, is true of homosexuality, or more particularly the homosexual (Ruse 1988: 17).

The point that Ruse is making here, and I think he is right, is that the homosexual is a real category and not a mere artifact of culture.

The essentialist-constructionist debate should not be conflated with the nature/nurture debate concerning the etiology of homosexuality. Some people wrongly think that all essentialists believe in the innateness of sexual orientation and that all social constructionists hold that sexual orientation is learned. It must be emphasized that essentialism does not require a biological explanation for the universal qualities assumed to constitute the 'essence' of homosexuality. Indeed, although most essentialists believe that sexual orientation has a biological basis, others believe that it is the result of the

social environment. But it is not even necessary that an essentialist specify any particular cause of sexual orientation, be it biological or experiential. Indeed, some essentialists are agnostic about the origins and etiology of human sexuality.

However, it is important to note that radical social constructionism is not compatible with the view that sexual orientation is innate or that it is the function of biological factors. This is important because if sexual orientation were socially constructed, as the social constructionists suggest, then biological research into its causes would not make sense. Conversely, if investigators were to prove beyond any shadow of doubt that sexual orientation had a biological basis or that it was innate, it would not make sense to argue that homosexuality is nothing more than a social construct (Stein 1998: 436). At least such a finding would give us a definition of homosexuality that is not socially or culturally dependent.

It must be emphasized that historical and anthropological evidence that has so far been adduced is fully compatible with essentialism. Prior to the eighteenth century, as a reading of Plato's *Symposium* (1935) indicates, people were aware of homosexuality although they did not have a term for it. Aristophanes' speech, as a number of commentators have pointed out, suggests that there was a class of males in Attic Greece who had a lifelong sexual preference for males. This, as Greenberg tells us, included the founder of stoicism philosopher Zeno of Citium and Alexander the Great (Greenberg 1988). Indeed, far from being a superficial point of taste, Aristophanes regarded homosexual desire as an expression of something, which lies deeper in the soul and not

merely a cultural artifact. This piece of evidence is suggestive of essentialism although it does not completely discredit constructionism (see Halwani 1998). Moreover, even among the Sambia people of Papua New Guinea where homosexuality is ritualized, studies have shown there is a small minority of men who, despite social ostracism and disapproval, continue to have same-sex relations even after completing their rites of passage into manhood (Stoller et al 1985). This seems to be consistent with essentialism.

Rictor Norton, a cultural historian, has exposed what he considers to be the fallacies of social constructionism by providing strong anthropological and historical evidence, which suggests that homosexual identity (third sex) was a commonly accepted category in many societies well before the term homosexual was coined in the nineteenth century (Norton 1997). The berdache role in Native American cultures and India's hijra are two good examples. These roles stress sexual attraction to members of the same gender and thus undermine the notion that homosexuality did not exist prior to 1869. Norton also notes that literary works by Italian writers in the fifteenth century, for example, portray homosexual characters rather than homosexual incidents. In addition, he observes that the looks gestures, and vocal intonations that are shared by homosexuals transcend language and culture and cannot possibly be an imposed social construct.

Although the social constructionists are right in maintaining that different societies have different ways of expressing sexual desires, I think it would be wrong to use this fact as a premise to conclude that sexual orientations are produced and sustained by social practices alone. While the ways in which sexual orientation is expressed are dependent on

history and social context, it does not mean that various sexual orientations share no common aspects that can be traced to biology or psychology. Furthermore, the social constructionists have not been able to demonstrate how cultural notions of homosexuality cause people in the culture at large to have homosexual interests (Murphy 1997). In fact, they have been unable to explain why one individual rather than another comes to have the sexual orientation that he or she has.

## ***2.7 Conclusion***

In this chapter I have attempted to highlight some of the difficulties involved in defining the term 'homosexuality'. We have seen that assessing an individual's sexual orientation is a complicated affair. Failure to make a correct identification of the trait being studied could lead to spurious results. In the chapters that follow, I will appraise a number of hypotheses that have been advanced to explain the genesis of human male homosexuality. In evaluating these hypotheses, it is important that we remember the definitional problems and metaphysical worries raised in this chapter because they have a direct bearing on how etiological research into homosexuality is carried out. In fact, as we shall see later, most biologically inclined investigators assume that homosexuality is a real category that transcends both history and culture.

## **Chapter 3**

### **Experiential Research Program: Family and Social Learning**

#### **Hypotheses**

##### ***3.1 Introduction***

In chapter 1, we saw that there are two rival research programs that seek to explain the genesis of homosexual orientation, that is, the experiential and biological research programs. I also argued that two different types of positive heuristics guide the workers in the two research programs. The aim of the present chapter is to use the methodology of scientific research programs to appraise the series of hypotheses that have been advanced by workers in the experiential research tradition to explain the genesis of human male homosexuality. A huge body of literature exists purporting to show that human homosexual orientation is an acquired behavior and attempts to explain its genesis by discovering correlations between childhood experiences or parental situations. Indeed, in spite of the recent rise in the popularity of the biological explanations, some people today still believe that early childhood experiences play a greater role than biology in accounting for differences in people's sexual orientations.

I will begin by examining Freud's psychoanalytic theory of homosexuality. Freud's theory emphasizes the importance of early family relationships in the establishing of male sexual adaptation. I will then consider a number of social learning hypotheses, which have also been advanced by the experientialists to explain why people have different

‘a theory may well be invalidated by known evidence, even as its proponents refuse to accept the refutation’ (Grünbaum1993: 51). In other words, whether a theory has potential falsifiers or not can be determined independently of the behavior of its advocates. Furthermore, the fact that some Freudians refuse to let their theory be falsified does not mean that the theory itself is essentially any less falsifiable than any other.

The following propositions contained in Freud’s theory of male homosexuality are testable:

1. The male homosexual, unlike his heterosexual counterpart, has had an unusually close and intense involvement with his mother. In the Oedipal phase, attachment to her was strongly erotic. The erotic attachment is subsequently replaced by defensive identification with her.
2. The homosexual male’s relationship with his father is characterized by distance, coldness and antagonism. He perceives his father as a hostile rival.

These hypotheses have been tested in a number of studies (for example Westwood 1960, Beiber et al 1962; Bene 1965; Snortum et al 1969; Thompson et al 1973 and Bell et al 1981). All these studies have been concerned with the question of whether Freud’s concepts of the family patterns that foster homosexuality do actually appear in the backgrounds of homosexual persons. However, as we shall later see, most of these studies are riddled with methodological difficulties and considerable disagreement exists with respect to the interpretation of the research findings.

### ***3.4 The Nature of the Evidence***

In this section, I will describe a number of studies that have been carried out to test Freud's psychoanalytic theory of homosexuality. I will then evaluate them to see whether the experiential research program has been progressive.

One of the earliest attempts to test the psychoanalytic theory was carried out by Westwood in 1960. This study, which involved a sample of 127 male homosexuals, revealed that half of these men had come from reasonably happy homes, in which neither parent was dead or absent. Thirty eight percent reported unsatisfactory relations with their father and 44 percent were of the opinion that their mother was possessive or over-protective in some way. When asked which was the more dominant parent, 29 percent of the homosexuals named their father whereas 57 percent named their mother. Although these findings do seem to support the psychoanalytic theory to some extent, it is important to note that this particular study included no control group of heterosexuals with which to compare these incidence figures, consequently the findings remain suggestive rather than conclusive. The fact that some of the homosexuals reported happy relationship with their parents must however be regarded as an anomaly for the psychoanalytic theory. Proponents of the experiential research program have not been able to account for this anomaly.

In another study, Chang and Block (1960) tried to test Freud's idea that homosexuality in males is a manifestation of the identification with the mother figure rather than the usual identification with the father figure. The subjects were made to describe themselves and



also their parents by means of a series of adjectives. As compared to a control group of heterosexual men, homosexual men tended to identify more with mother and less with father. This was consistent with the Freudian predictions. However, it is important to note that this particular study was retrospective in nature and retrospective accounts of childhood relationships with parents are subject to gaps in memory and distortions. In addition, the answers given by adult homosexuals regarding their childhood may be influenced by their own acceptance of a particular theory of homosexual etiology.

The first major attempt to test the psychoanalytic theory was carried out by Beiber and his associates in 1962 (Beiber et al 1962). This study involved 106 male homosexual patients and a control group of 100 heterosexuals in psychiatric treatment. The subject's psychotherapists filled out long questionnaires about their patient's childhood years, relationship with parents and so on. The patients themselves were not aware of the study. A majority of homosexual's mothers were reported to have formed a close-binding-intimate association with their homosexual sons, favoring them over their other children and even over their husbands, spending a lot of time with them, over protecting them, discouraging masculine attitudes and interfering with their heterosexual interests. On the other hand, the study found significant trends for the father to be removed, hostile, minimizing and openly rejecting. In addition, the study found that the attitude of homosexuals towards their fathers was characterized by hatred and fear. Beiber and his colleagues emphasized that that it would be simplistic to incriminate one particular type of parent interaction in the etiology of homosexuality. Instead, they argued that a particular mother-father-son interaction appeared to be influential and any son exposed to

this parental combination had a higher chance of becoming homosexual. They summed up their findings as follows:

Our findings are replete with evidence of a close mother-son relationship and confirm the observations of Freud and other investigators that "mother-fixation" is related to homosexuality. The data also provide convincing evidence of the importance of the Oedipus complex in the etiology of homosexuality. Our material highlights the parental distortions of this phase of child development, as noted in the over-closeness and seductiveness of the H-mother and the hostility of the H-father (Beiber et al., 1962: 308).

Thus Beiber and his co-workers concluded that the home environment during development was the most important causal factor in determining whether one became homosexual or not. However, Beiber et al did address the question whether paternal rejection and hostility were stimulated out of feelings of disappointment and failure because of the son's homosexuality. They maintained that this was not likely since only 17 percent of the fathers were reported to have been aware of their sons' homosexuality. The Beiber group also argued that the fathers' attitudes could not be attributed to the fact that the sons were inadequate and unattractive children, since the mothers did not find them so. This argument has been challenged by Evans who says that the fact that the mothers did not find their sons unattractive does not imply that the fathers did not (Evans 1969).

Beiber's study is subject to criticism on several counts. The most commonly expressed criticism is that it was concerned with patients who were severely disturbed, which leaves open the question whether similar disturbances would have been found in the life histories of the broader gay population. Critics of this study have also pointed out that it is possible that it is those homosexuals who had unsatisfactory relationships with both

their fathers and mothers who most often came to the attention of psychiatrists. It has also been noted that the sample was not representative enough in that most of the subjects were university graduates holding high income, professional and managerial positions in the New York City area. Another point of contention is that Beiber et al employed the services of psychoanalysts to fill the subject's questionnaires. While this method may be useful in elucidating deep underlying dynamics, there is a very real possibility that the subjects will be inadvertently influenced by the theoretical commitments of the interviewer. The psychoanalysts themselves may also read into the data the precise things they intended to find.

Later studies tried to avoid the methodological weaknesses that characterized Beiber's study. Evans (1969) compared homosexual and heterosexual men in their response to a questionnaire dealing with multiple aspects of parent-child relationship. Unlike the Beiber study, which was based on the psychoanalyst's reconstruction of the subject's early life, Evans' study was based on retrospective self-reports of how the subjects viewed their childhood. In order to expand the database beyond patients in psychotherapy, Evans questioned 43 homosexual and 142 heterosexual males who had not sought therapy. The subjects filled a 27-item questionnaire which was similar to the one used by Beiber and his colleagues. The results were very similar to those of Beiber. The study at face value confirmed Freud's view that the male homosexual is raised in an environment in which the mother is close, binding and seductive, and the father distant and unfriendly.

Although he was able to replicate Beiber's findings, Evans was cautious about the interpretation of his own findings. Without rejecting the influence of parents on a child's personality, he argued that some consideration must be given to the notion that the child's inner characteristics partially determine parental reaction and attitudes towards him. He thus seemed to be suggesting that biological factors might in fact play a role in the causation of homosexuality. It is also important to note that some diseases such as autism, and manic-depression were once blamed on poor parenting, but now they are regarded as due to biological causes that parents cannot be blamed for.

Another study by Bene (1965) involved a sample of 83 self-reported homosexual men and the same number of married men (supposedly heterosexual) of roughly equivalent age and class. Bene used a semi-projective technique (Bene-Anthony Family Relations Test) and questionnaires to gather information on the subject's early life. The subjects were asked to think back to their early years and to say which member of their childhood family most closely fit each description. Bene's findings confirmed Freud's claim that homosexual men recall bad relations with their fathers. However, she did not find the expected evidence of strong attachment to mother predicted by the psychoanalysts. On the contrary, mothers of homosexual men were reported to have been more nagging and hostile than those of heterosexual men. Bene's study corroborated the earlier findings of Westwood (1960), who reported that his male homosexual group showed more evidence of inadequate fathers than of over-possessive or domineering mothers.

From this study one cannot say with confidence that defective parental upbringing causes homosexuality, since the memory of adult homosexuals may be subject to bias, and even if the parental behavior described took place, it might have been provoked by the homosexual child's inborn peculiarities. Indeed, the fact that two variables correlate with one another does not tell us which is the cause and which is the effect. Freud might as well have confused cause with effect. Thus a son who displays feminine characteristics or homosexual tendencies might well arouse a mother's sympathy while at the same time arousing the father's hatred. In other words, the homosexual child's effeminate behavior may itself influence the way his parents behave towards him (Evans 1969). Michael Ruse expressed the same point when he wrote:

Perhaps it is the delicate 'mother's boy' who alienates the potentially friendly father. The coldness and distance does then exist, and later the adult homosexual is reporting truly. Yet what he is reporting is effect, not cause. How could he (the homosexual) know that it was his own childhood nature that made his father what that father ultimately became? (Ruse 1988: 39).

The fact that most boys raised by single mothers do not become homosexual must also be an embarrassment to the advocates of psychoanalytic theory. And as Simon LeVay, one of the chief proponents of the biological research program, has pointed out, in spite of the fact that over the last three decades a whole generation of African-American youth has been raised by single parents, there has been no explosion of homosexuality among black male teenagers (LeVay 1996: 279). If lack of a relationship with one's father causes male homosexuality, one would also expect that the generation of European boys born in early 1940s during the second world war or Kenyan boys born in early 1950s during the Mau Mau rebellion would have a much higher incidence of homosexuality than other

generations, because so many fathers were away. No such evidence exists. A study carried out by Schmidt et al (1995) found no evidence of increased numbers of homosexuals in German cities most affected by the Second World War (this study was designed to test Günter Dörner's hormonal hypothesis, which among other things, postulates that more homosexual men are born in wartime than in peacetime due to maternal stress caused by war).

Investigators have also found no significant differences between children raised by lesbian parents and those raised by heterosexual parents (Flaks et al 1995, Golombok and Tasker 1996). In fact, children who grow up with a homosexual parent are not themselves likely to become gay. Bailey et al (1995) found that sexual orientation was unrelated to the amount of time that the sons spent living with their gay fathers, a result that is at odds with many versions of experientialist theories about the transmission of sexual orientation (Freud attributed the prevalence of male homosexuality in ancient Greece to the fact that young boys were tended by male slaves (Freud 1953: 230)). It is also important to note that there are very many men whose parents were well adjusted and who displayed no preadolescent cross-gender behavior and yet became homosexual. The findings of Fredrick Whitam also refute Freud's theory of homosexuality. In a cross-cultural study of male homosexuality, he found that gay men brought up in societies where homosexuality is tolerated report less hostile relationships with their fathers than those brought up in homophobic societies (Whitam 1983).

The most recent and thorough attempt to test the psychoanalytic theory of sexual orientation was carried out by Bell et al (1981). This study, which involved 979

homosexual men and women and 477 heterosexual men and women living in the San Francisco Bay area in the United states, found no empirical support for psychoanalytic theories of homosexuality. This study was done more carefully and according to better scientific standards than many previous surveys. And although the sampling had an obvious geographical limitation, it enabled the researchers to obtain a large number of gay men who could be open enough to cooperate and participate in the research. Bell et al followed a path analysis model which enabled them to trace the flow of possible causal influence in parental and familial associations through childhood and peer relationships and sexual experiences, to the final outcome of heterosexuality and homosexuality. This model enabled the researchers to determine which variables are causally connected to the development of homosexuality, and which are associated with it only spuriously (Bell et al 1981).

The results of this study indicated that experiential explanations of homosexuality are inadequate and are not supported by the data. Differences in family background did not seem to make any difference in whether one becomes heterosexual or homosexual. The tendency for homosexual males to perceive their fathers in a relatively negative fashion was found to have very little influence on their psychosexual development. The study provided no support for the notion that homosexuality is associated with a seductive mother-son relationship as described by Freud. Indeed, only a minority of the subjects said that their mothers acted like girlfriends and lovers, and there was no difference between homosexuals and heterosexuals in this regard.

Additionally, the study found that dominating and seductive mothers as well as weak, hostile, or detached fathers (factors believed to cause homosexuality) characterized the

biological basis for sexual preference' (Bell et al 1981: 216). However, they were reluctant to say that a biological basis for sexual preference had been established since they had actually collected no biological data.

In this section I have surveyed attempts to explain sexual orientation differences in terms of family dynamics. The failure of these attempts to achieve any progress in the experientialist program has caused most experientialists to stop using psychoanalysis as a theory for explaining the etiology of homosexuality. Freud's ideas appear to have been based on an outdated theory of libido development to which very few people today subscribe. Indeed, in the past thirty years or so, serious students of sexuality have abandoned the ideas of Freud although they have not abandoned the idea that the mind is an empty slate on which experience is inscribed. It is also important to note that much of the early psychodynamic research into the causes of homosexuality was done by psychiatrists and physicians and as Michael Ruse 'many of these researchers were obsessed with questionnaires and surveys and did not show even the experimental ingenuity of a first year physics student' (Ruse 1988: 43). Indeed, Freudian explanations have fallen out of favor and a number of psychologists have concluded that a new theory of sexual orientation is needed (Steen 1996). In the next section I will examine the social learning theory of homosexuality.

### ***3.5 Social Learning Explanation***

In an attempt to save the experiential research program from refutation, some investigators have advanced the social learning theory to explain the genesis of



homosexuality. Social learning theorists such as Churchill (1967), Bandura (1969) and MaCulloch and Feldman (1967) have postulated that sexual orientations are learned behaviors. Proponents of this model focus on the social context within which learning of sexual orientation and gender role attitudes and behaviors occurs. Like the Freudians, these theorists hold that early experiences play an important role in the development of sexual orientation. According to this view, humans have relatively amorphous, undifferentiated pool of sex drive which, depending on circumstances (rewards and punishments), may be channeled in any of several directions. Consequently, homosexuality simply reflects sexual relationships between two people of the same-sex, which have been particularly rewarding so that the preference for sex partners of the same sex becomes a conditioned behavior.

Kinsey and his co-workers (1948) stressed the role of social learning and conditioning, as well as social-cultural pressures, in the development of sexual orientation and sexual attitudes. He argued that although people are born with the capacity to respond sexually, the direction in which this capacity comes to be expressed is learned. He thus rejected the notion that people are innately heterosexual, homosexual or even bisexual. For Kinsey the development of sexual response, and therefore of sexual preference, is the result of both childhood and adulthood experiences, not just of childhood experiences as some researchers had stated. On Kinsey's view, the first sexual encounter as well as the most intense experience with the same-sex exerts a significant conditioning effect on the individual's sexual orientation. The opinions of others and social codes can also influence the decision to reject or accept sexual contact.

Similarly, Masters and Johnson (1979) attributed homosexuality to social learning. They maintained that a person's sexual orientation at birth is neither homosexual nor heterosexual. More specifically, Masters and Johnson hypothesized that homosexuality arose as a result of failed or ridiculed attempts at heterosexuality. They categorically rejected the view that homosexuality has a physiological basis.

There are many problems with the social learning theory of sexual orientation. First, it predicts that in societies in which homosexuality is tolerated or encouraged, the number of homosexuals would increase or even predominate. This prediction is refuted by the observation that even in societies where adolescent homosexuality is institutionalized, adult homosexuality is the exception rather than the rule. Social norms do not seem to facilitate or impede the emergence of homosexual orientation. For example, among the Sambia people of Eastern Highlands of New Guinea, boys are expected to engage in ritualized homosexual contact for several years during adolescence but they turn out to be predominantly heterosexual in adulthood and even marry (Herdt and Stoller 1984). Indeed, as Mondimore explains, only a small minority of Sambian men 'seemed to become adult "homosexuals" despite universal homosexual experience during adolescence and early adult life' (Mondimore 1996: 18). Similarly, same-sex behavior is known to occur among boys and girls in traditional British Boarding schools but again, as Le Vay (1996: 90) observes, attendance at such schools does not increase the likelihood of homosexual orientation during adulthood. More puzzling still is why there are any

homosexuals at all in most societies given that the practice is almost universally discouraged. All these cases constitute anomalies for the experientialist research program.

Social learning theorists have also postulated that the first sexual encounter leading to orgasm plays a crucial role in shaping an individual's sexual orientation. McGuire et al (1965) has cited several cases in support of this hypothesis. Babuscio (1977), himself a homosexual, appears to support the same view when he says that the conditioning of the first sexual experience with persons of the same sex *is* important to the later development of homosexuality.

There are a number of problems with this theory. In the first place, studies have shown that sexual encounters between people of the same gender during adolescence, even if pleasurable, do not always lead to an adult homosexual orientation. Indeed, if sexual orientation developed as a conditional response to contexts of teenage orgasm, as some experientialists allege, Sambian men should be mostly gay. However, as I noted above, this is in fact not the case. Many heterosexuals have had adolescent homosexual encounters without being swayed in their adult sexual orientations. Hertoft (1976) supports this view and maintains that young people frequently encounter homosexual advances and learn how to deal with them. What is more, as Bell et al (1981) have reported, the overwhelming majority of gay people are aware of sexual interest in people of their own gender long before they had any sexual encounters with them, pleasurable or otherwise. Bell's study also showed that sexual orientation is established early in life and that childhood and adolescent sexual expressions by and large reflect rather than

determine a person's underlying sexual orientation. In other words, early childhood and adolescent involvement in homosexual activity may be an indicator of an underlying homosexual disposition rather than cause of it. Learning theorists have also been criticized for their exclusive focus on objective aspects of behavior, to the exclusion of subjective aspects (Scholeid 1965). The complexity of human behavior demands that both objective and subjective aspects of behavior be considered. The truth of the matter is that at the moment we do not know which environmental factors, if any, influence sexual orientation even after more than a century's theory and research.

### ***3.6 Conclusion***

From the forgoing it should be clear that the evidence for the experientialist research program is fragmentary and weak and many of its theoretical assumptions are unsupported. The program is also riddled with numerous methodological difficulties. We have seen that most of the studies that have so far been carried to test experientialist hypotheses have been retrospective in nature and in such studies it is difficult to determine the direction of causal relationship. The fact that homosexual males report that their fathers were either absent, aloof or hostile and that their mothers were domineering and possessive does not conclusively demonstrate that defective parenting is the cause of human male homosexuality. Correlation between homosexuality and 'faulty' parenting does not equal causation. As already pointed out, it is logically possible that the homosexual son's behavior is the cause of parental attitude towards him.

A scrutiny of current literature on the etiology of homosexuality reveals that most investigators have abandoned the experientialist research program. (Since the publication of Bell et al's *Sexual Preference: Its Development in Men and Women* (1981), no serious work has been carried out in this area). The program's inability to make both theoretical and empirical progress has contributed to this state of affairs. Indeed, many researchers today appear to subscribe to a biological or nature explanation of sexual orientation although they are careful to hedge this conclusion in their written work. Nevertheless, this in itself should not be construed to mean that experiential factors do not have a role to play in the etiology of homosexuality. As we shall see in the next chapter, workers in the rival biological research program have reported experimental results, which seem to suggest that experiential factors may after all have a role to play in the causation of homosexuality. For instance, in some studies, monozygotic twins have been found to be discordant for sexual orientation (Reiner 1960, Parker 1964, Bailey and Pillard 1991). This observation alone would seem to require the inclusion of non-genetic variables as part of a causal scheme some of which could be experiential. The high correlation of homosexuality among fraternal twins also makes a powerful case for environmental causes. Indeed, in the absence of biological markers and given the uniqueness of each individual's upbringing and the impossibility of replicating it, we can only suppose that certain psychological factors might have contributed to a person's thoughts, feelings or behavior.

From a Lakatosian perspective, it is clear that the positive heuristic of the experiential research program for explaining the genesis of human male homosexuality has

completely run out of steam. Since its inception, this program has not been able to digest anomalies nor has it been able to generate any novel predictions and explanations. In fact, this program does not seem to have had a progressive stage during its lifetime. It seems to have reached a dead end. But this is hardly surprising. For progress to be made, experientialists would have to radically modify the hardcore of their research program by incorporating biological factors into their explanatory scheme. However, from the point of view of the methodology of scientific research programs, this would mean abandoning the program altogether. As we saw in chapter 2, any scientist who modifies the basic assumptions of his research program automatically opts out of that particular program. Perhaps what is needed is an interactionist research program – a program that takes seriously the role of both biology and experience in the development of homosexual orientation.

## **Chapter 4**

### **Biological Research Program: Genetic Hypotheses**

#### ***4.1 Introduction***

As we saw in chapter 2, the hardcore of the biological research program is the proposition that biological factors play a primary role in the causation of human male homosexual orientation. Two models of the role that biological factors might play in sexual orientation can be distinguished: direct model and indirect model (Byne 1994: 27). Most workers in the biological research program subscribe to the former model. According to the direct model, biological factors (e.g. genes and hormones) act directly on the developing brain to wire it for sexual orientation probably before birth. The indirect model, on the other hand, holds that biological factors predispose individuals to certain personality traits that influence the relationship and experiences that ultimately shape sexual experience.

Those who advocate biological causes have argued that homosexuals possess different hormonal mechanisms, genotypes or brain structures. But how are these factors related to one another? Simon LeVay and Dean Hamer have suggested that there may be individual differences in how brains respond to sex hormones (estrogens and androgens) and that this may be determined by genes(s) (LeVay and Hamer1994). A 'gay gene', for example, may make a brain that fails to take advantage of androgens circulating in the blood stream so that the individual (male) becomes homosexual.

In this chapter, I will focus on the biological approach that emphasises the role of genes in the causation of homosexual orientation. The genetic approach promises the most direct support for the 'born that way' argument for homosexuality. In evaluating this research program, it is

important to remember that according to the methodology of scientific research programs, scientific theories are not evaluated in a vacuum. On the contrary, their evidential basis and plausibility are compared to those of the competition. In this particular case, biological theories of homosexuality will be compared to experiential theories already discussed in the last chapter.

#### ***4.2 Genetic Explanations***

The idea that homosexuality is genetic, or at least biologically predetermined and unchangeable, is not new. As far back as 1899 the German scholar, Magnus Hirschfeld (1986), argued that homosexuality was hereditary and called for legal equality based on this thinking. He used August Weibmann's theory of the inheritance of latent characteristics to explain the inheritance of homosexuality (Hirschfeld 1914). Havelock Ellis and Kraft-Ebing also regarded homosexuality as having a constitutional or hereditary origin (Bell et al 1988).

However, the first serious study of the involvement of genetic factors in the causation of homosexuality can be traced back to 1940. Thomas Lang postulated that homosexual males were chromosomal females with male bodies (Lang 1940). On the basis of this theory he predicted that there should be a higher proportion of brothers in families with gay males than those that do not (the normal sex ratio of males to females at the time was taken to be 106:100). Lang went on to corroborate his theory in a study based on German police records and involving 1015 male homosexuals. He reported a sibling sex ratio of 100 females to 121 males. This theory was later shown to be false and abandoned. Two studies involving a detailed examination of actual chromosomes taken from exclusively homosexual men showed that they had normal male chromosomal pattern just like their heterosexual male counterparts (Pare 1956, Pritchard 1962).



Scientists have designed a number of methods for studying human behaviour genetics. The first approach is based on the assumption that traits that are genetically influenced aggregate in families. If this can be shown the case, the genetic hypothesis is corroborated. The problem with this method, however, is that members of the same family often share environment as well as genes and it is difficult to separate the two. Moreover, not all traits that run in families have a genetic basis. Poverty, wealth, habits, values and religious affiliation, for example, may aggregate in families but this does not mean that they are genetically influenced. These traits are familial more for cultural and social factors than for genetic reasons.

Another method that is often used by scientists to test whether a particular trait has a genetic basis involves the study of monozygotic (MZ) and dizygotic (DZ) twins. The underlying rationale of the twin method is very simple. MZ twins are genetic clones i.e. they share 100 percent of their gene, but DZ twins share only 50 percent of their genes. Therefore, if a particular trait is genetically influenced the degree of concordance should be greater for MZ twins than for DZ twins, who in turn should show greater similarity than biologically unrelated people. Conversely, if a trait is not genetically influenced, MZ twins should be no more concordant for a given trait than DZ twins. However, it is important to note that concordance for a given trait even in the case of MZ twins could be due to a shared environment rather than to shared heredity. Indeed, because they are identical appearance, MZ twins are likely to be treated more similarly by friends and family than DZ twins and this may contribute to concordance for a particular trait. Another technique involving twins is the study of twins raised in different environments. If the twins are concordant for a particular trait, this can be attributed to heredity.

### ***4.3 Kallman and the Twin Method***

The first large study aimed at testing the genetic theory homosexuality using twin studies was carried out by Frantz Kallman (1952), an American authority in heredity who claimed a genetic predisposition for many behavioural traits. Kallman's study involved 85 twin pairs: 40 of these were MZ while 45 were DZ. The control group included 112 non-twin homosexual siblings and 116 employees drawn from his Psychiatric Institute. All the homosexual subjects were recruited from prisons and psychiatric institutions in New York.

The concordance for homosexuality among the MZ twins was found to be 100 percent while that of DZ twins was found to be 60 percent. For non-twin siblings the concordance rate was 11.5 percent. From this data, Kallman concluded that his study "plainly diminishes the plausibility of studies which overstress the importance such precipitating or perpetuating factors as social ostracism, incompetence of a particular parent, or other potentially traumatizing experiences arising from the effect of uncontrolled imperfections in the structure of modern societies" (Kallman 1952a: 295). Kallman's findings were consistent with two earlier but smaller studies, which had reported a high concordance rate for homosexuality in MZ twins (Sanders 1934, Habel 1950).

However, it is essential to note that some studies immediately following Kallman's failed to find any concordance for sexual orientation while others found concordance rates between 10 percent and 50 percent thus refuting Kallman's findings (Rainer et al. 1960, Klintworth 1962, Parker 1964, Heston and Shields 1968). Unfortunately, most of these studies either involved very small samples or studied twins who were raised together at birth thus making it difficult to compare the relative contributions of genetics and environment. Kallman himself later claimed that his MZ concordance rate was a statistical artefact (Kallman 1960).

Kallman's study is subject to criticism on both methodological and theoretical grounds. In the first place, his sample was not representative enough. As already said, all the subjects were recruited from psychiatric institutions and prisons. Such a sample can hardly be said to be representative of the gay population as a whole (Rosenthal 1970). In fact the behaviour displayed by these subjects may actually have been an expression of psychopathology rather than homosexual orientation.

A related point is that Kallman did not indicate how he determined whether the twins in the study sample were either MZ or DZ. The way that this is done is critical as some DZ twins may wrongly be classified as MZ simply because they physically resemble each other or because they share the very trait that is being examined. Similarly, MZ twins discordant for sexual orientation or who do not share physical characteristics may be classified as DZ (McGuire 1995: 115). It is noteworthy that when this study was carried out, reliable methods for determining zygosity such as finger printing and blood sampling were not in use. Kallman may have relied on what the subjects told him about their zygosity but since the majority of the twins were maladjusted, their testimony cannot be trusted.

Furthermore, Kallman never bothered to carry out his analysis blind, that is, without knowing whether his twin pairs were either MZ or DZ. In this regard, some critics have speculated that the greater similarity that he observed between MZ twins compared to DZ twins may actually have been due to his prior knowledge of his subjects' degree of relatedness (Allen 1997).

It is also important to note that although Kallman claims that the twins became homosexual independently of one another, there is no indication in the study that they were reared apart.

Consequently, some critics have argued that there is no way in which the similarities can be claimed to be more the result of genetics than environment. In fact, environmental factors might well explain the high concordance rate that Kallman reported. Proponents of the experientialist research program have argued that monozygotic (MZ) twins are likely to react more similarly than dizygotic (DZ) twins are to the same environmental influences (Rose et al 1984). MZ twins are also more likely to be treated and dressed alike than DZ twins, making genetic influence seem more important in shaping their behaviours.

As already indicated, several case studies involving both identical and monozygotic twins suggest that the true monozygotic rate is less than 100 percent and probably near 50 percent. A study by Michael Bailey (discussed in greater detail below) confirmed the view that Kallman's findings of perfect concordance for homosexuality for MZ pairs was too high. The 52 percent concordance rate was similar to both the 50 percent rate estimated by Pillard et al and the 40 percent found in Heston and Shields who reported the only systematically ascertained sample of homosexual twins to date.

Kallman has also been severely criticised for lack of objectivity in his research (Marmor 1965). His study, it has been argued, was motivated by strong eugenic concerns and this may have biased his findings. Earlier on he had claimed a genetic basis for tuberculosis and schizophrenia but his findings were based upon a highly selected population. He has also been accused of carelessness, including diagnosis of schizophrenia from very old hospital records (West 1967).

#### ***4.4 Michael Bailey and Richard Pillard: Twins and Other Siblings***

Since MZ twins unlike DZ twins and adoptive brothers share identical sets of genes, the biological research program predicts that the former will have a higher concordance rate for homosexuality than the latter. An attempt to test this hypothesis was carried out by Michael Bailey and Richard Pillard (1991).

Using a combination of twin and adoption methods, Bailey and Pillard conducted a two-year study involving a sample of 56 homosexual MZ twins and 54 DZ twin brothers, as well as 57 adoptive brothers. All the subjects were obtained through homophile publications. The researchers assessed the zygosity of the twins by self-reports while the subject's sexual orientation was assessed by personal phone interviews, ratings by relatives and co-twins and questionnaire responses. The study found a 52 percent concordance for homosexuality in MZ twins, 22 percent for DZ twins, 11 percent for adoptive brothers of homosexual men and 9 percent for non-twin biological brothers.

This study suffers from a number of methodological flaws. In the first place Bailey and Pillard did not use a random sample of homosexuals. The men in the study were recruited through advertisements in gay magazines and newspapers as well as through homosexual organisations, thus effectively excluding those men who may engage in homosexuality from time to time but do not read gay publications. And as one critic has put it, 'instead of finding a correlation to sexual orientation per se, Bailey and Pillard's study could just as well indicate that there is a genetic underpinning to coming out of the closet', that is, their research may indicate only a gene for self assertiveness and bravery (Terry 1995: 282). MZ twins who were concordant for homosexuality are likely to have been more willing to participate in the study

than discordant pairs if they believed that the study would bring benefits to the gay community. This possibility may have skewed the findings and cannot be ignored.

As already pointed out, this study reported that adoptive brothers were more likely to be both gay than non-twin biological brothers who share half of their genes. This unexpected result is at odds with a simple genetic hypothesis, which would predict a higher concordance for biologically related siblings. In fact, this particular finding is consistent with the experiential research program.

Bailey and Pillard have attributed this anomaly to the different ways the twins and adoptive brothers were recruited for the study. They believe that the true rate is closer to that shown in an earlier study (Weinrich and Pillard 1986) in which the concordance rate for non-twin brothers of gay men was found to be 22 percent, the same rate found in DZ twins. Bailey maintains that their work still leaves room for environmental influences but he thinks that they are likely to be predominantly *biological* ones, in the form of hormonal variations, rather than psychosocial ones. In fact, he explicitly rejects all experiential accounts of homosexual orientation (see Holden 1992).

One other weakness of this study is that the subjects were reared together in the same environment. For this kind of study to be truly meaningful, one would at least have to look at twin brothers raised apart. A final point that is worth mentioning is that neither of the two researchers in this study is a geneticist or molecular biologist and no attempt was made to analyse the subjects' DNA for genetic markers.

#### ***4.5 Hamer's Pedigree and Gene Linkage Analysis***

Consistent with the teachings of Lakatos, advocates of the biological research program have continued to work on the genetic theory of homosexuality in spite of a growing list of anomalies. Guided by the heuristic of the biological research program, Dean Hamer and his co-workers have attempted to isolate what they consider to be markers of a gay gene on the X chromosome of selected homosexual subjects. Hamer explicitly states that scientific study of human sexuality, and sexual orientation in particular, 'must produce specific and testable predictions, not just vague generalities that defy empirical examination' (Hamer et al 1993: 14).

Hamer and his group were motivated by Bailey and Pillard's study, which had suggested that homosexuality runs in families. However, unlike Bailey and Pillard who merely sought to demonstrate that homosexuality is inherited, the Hamer group was interested in identifying a direct genetic marker that could be linked to homosexuality in males. The study was in two parts. The first part involved reconstructing pedigrees of 117 families that had at least one male homosexual. The researchers found that 13.5 percent of the gay men recruited for the study also had a gay brother compared to 2 percent of men without gay brothers. Besides the high incidence of gay brothers, Hamer et al noticed a pattern of homosexuality in male relatives of mothers of gay men. They found that 7.5 percent of gay men in the study also had a gay maternal uncle or cousin on the mother's side. This led the researchers to the conclusion that for some male homosexuals, the trait is passed through the X chromosome, the only chromosome inherited exclusively through the mother.

The second phase of the study involved analysing the DNA of homosexual brothers with a view to identifying the genetic markers. Hamer's reasoning was that if homosexuality is really

same DNA sequence close to the gene. On the other hand, if no such gene exists, then there is unlikely to be a shared piece of DNA. DNA samples were prepared from a pair of 40 brothers who were concordant for homosexuality. The samples were scanned for 22 markers that are scattered throughout the X chromosome from the tip of the short arm to the end of the long arm. If the brothers inherited the same markers from their mothers, they were marked as concordant, and if they inherited different markers they were marked as discordant. The study found that over most of the X chromosome the markers were randomly distributed between the gay brothers. However, in region 28 of the long or q arm of the X chromosome 37 of the 40 pairs of brothers (82 percent) shared the same markers. Seven pairs of brothers did not share the same markers. The findings led the researchers to conclude that genes influencing sexual orientation may reside in region Xq28 of the X chromosome.

It is important to emphasise at the outset that Hamer et al did not find a particular gene linked to sexual orientation. What they found was a general area in the X chromosome within which the gene is presumed to be located. As Hamer himself puts it: 'the most important limitation of our research was that we didn't isolate a 'gay gene'; we only detected its presence through linkage. We narrowed the search to the neighbourhood, the X chromosome-and even the block, Xq28-but we didn't find the house' (1993: 147).

In an attempt to corroborate their earlier findings, Hamer and his colleagues carried out a second study involving both males and females (Hu, Hamer et al 1995). In this study 23 out of 32 gay brothers (66 percent) were found to share the Xq28 markers. In 9 out of 11 families with two homosexual brothers and one heterosexual brother, the heterosexual brother did not have the Xq28 markers that his gay brothers shared. No correlation between female homosexuality and lesbianism was found.



Hamer has gone on to explain how a gene favouring homosexual orientation but not reproduction could continue to exist without being eliminated from the gene pool by natural selection. He suggests that men who receive a copy of this gene from their mothers are disabled from reproducing because the gene causes them to adopt their mother's sexual orientation (which is the desire to have sex with men). In addition, Hamer argues that those women who carry two copies of this gene will produce more offspring than their heterozygous sisters. And since some of their offspring will be female, the 'gay gene' will be passed on to the next generation. Thus Hamer sees homosexuality as a by-product of heightened heterosexual desire. This is a plausible hypothesis but it will remain a mere hypothesis until the gene for homosexuality is isolated. However, it is important to point out that, at the moment, no evidence exists to suggest that the mothers of gay men have more children than the mothers of straight men. The same applies to their maternal aunts, female cousins and nieces. I will say more about this kind of sociobiological explanation in the last section of this chapter.

The design and conclusions of Hamer's first study are open to challenge on a variety of levels. In the first place, an attempt by Rice and his co-workers (1999) to replicate Hamer's study found no evidence of the so-called gay gene. Rice et al studied the sharing of alleles at position Xq28 in 52 pairs of homosexual male siblings from Canadian families. Four markers at region Xq28, namely, DXS1113, BGN, Factor 8, and DXS1108, were examined. The study found that gay brothers were no more likely to share the Xq28 markers than would be expected by chance. A statistical analysis ruled out the possibility of any gay gene in Xq28 region having a major genetic influence on male's chances of being gay. However, Rice has pointed out that in spite of his group's failure to corroborate Hamer's findings, genetics may still

contribute to homosexuality but he thinks that researchers should be looking for the gene at another place in the genome (Rice et al 1999: 66).

Robert Pool has cautioned against uncritical acceptance of Hamer's study. He reminds us that the 'field of behavioural genetics is littered with apparent discoveries that were later called into question or retracted' (Pool 1993: 291). Initial reports of genetic linkages for complex traits such as manic depression and alcoholism have fallen apart under further scrutiny. Other commentators have found the family history data given by Hamer rather shaky. King (1993), for example, has suggested that maternal male relatives may have been more willing to reveal their family history than were paternal male relatives. Indeed, women are more likely to know details of family history than men.

The statistical significance of Hamer's study is also open question. His findings were based on the assumption that the base rate of homosexuality in the general population is two percent, which is an extremely conservative estimate. His definition of homosexuality was also rather stringent as it included only those people who were exclusively or predominantly gay and who disclosed their sexual orientation to family members and outside investigators. Most investigators today believe that the base rate of male homosexuality is between 4 and 10 percent. Hamer's findings lose their statistical significance when the data are reanalysed using the four percent figure (Risch 1993).

Other critics have pointed out that male homosexuality is likely be polygenic and not a simple Mendelian trait. In fact, there would be strong selective pressure against homosexuality if it was such a trait (Wickelgren 1999: 571). Hamer's group can also be faulted for failing to conduct DNA linkage with the non-gay siblings of the homosexual subjects. In fact, the study

did not have a control group, which is a serious flaw in scientific method. Concordance of the Xq28 region in those straight brothers would have strongly suggested that the DNA sequences in question were not responsible for homosexual orientation (Sober 2000: 355).

Another factor that weakens Hamer's study is that the xq28 marker was not found in seven of the forty pairs of homosexual twins. This is not a small number. It is hard to establish that factor A causes behaviour B if in a significant number of cases we have behaviour B and we don't have factor A. Furthermore even if we were concede that there is a correlation between a particular gene and homosexuality, that would not mean that the two are causally connected. An additional possibility worth noting is that the correlation identified in this study may be relevant not to homosexuality per se but to another trait that gay men have in common (Murphy 1996: 35). A gene that increases the tendency of brothers to psychologically identify with one another, as Fausto-Sterling notes in her critique of Hamer's study, 'might influence their similarity in such matters and sexual orientation would be picked in the present study (Sterling 1993: 261). And as Pool speculates, a gene might give mothers a tendency to smother their sons, a phenomenon traditionally associated with nurture rather than nature (Pool 1993: 291).

A similar kind of interpretation of Hamer et al's findings has been suggested by John Maddox. Writing in the prestigious journal *Nature* he asks:

What if it is accepted, for example, that it is true what the psychoanalysts say that male homosexuality is in part determined by the influence of an over-loving mother? And what if the gene located at the end of the long arm of the X chromosome does not determine homosexuality, but instead plays a part in telling whether a mother is 'over-loving' in the appropriate sense? Then the gene concerned would be strictly irrelevant to the causation of male homosexuality, whose determinants would remain those of nurture rather than of nature' (Maddox 1993: 364).

The kind of explanation that Maddox has in mind is called parental manipulation hypothesis and is discussed at greater length in section 5.9 below.

Unfortunately, Hamer has resorted to *ad hoc* arguments to explain away those facts that did not fit his theory. For example, he explains the absence of Xq28 markers in the seven of the twin pairs in the first study by saying that perhaps these men inherited different genes from those associated with Xq28, or that different genes in different families predispose an individual to homosexual behaviour. This is what Allen (1997) has described as the 'moving target approach'. The problem with this kind of theorising is that it reduces the scientific status of Hamer's theory by making it unfalsifiable. It is also important to note that one of Hamer's collaborators in this research has accused him of manipulating the scientific data and biasing the results. Hamer is said to have excluded pairs of brothers whose genetic makeup contradicted his finding (Horgan 1995:26). If true, these allegations seriously undermine Hamer's credibility as a scientist and raises doubts about the trustworthiness of his research findings.

With regard to the concerns raised by Rice et al, Hamer has pointed out that the way the latter selected the families in their study would tend to hide Xq28 contribution (Wickelgren 1999: 571). These researchers made no effort to select families that display the maternal pattern of inheritance. Hamer has also been at pains to point out that the gene does not influence all cases of homosexuality but only those that are maternally transmitted.

On the whole, there is much work to be done before it can be taken as settled that genes at region Xq28 determine the sexual orientation of some males. However, even if the gene for homosexuality were to exist, biologists would still have to explain how such a gene could

survive given that homosexuals are reproductively disabled. In the following section I will discuss a number of theories that have been advanced within the biological research program to explain the persistence of homosexuality.

#### ***4.6 Sociobiological Explanations of Homosexuality***

As I have just indicated, one of the main problems for genetic theories of homosexuality is to explain how a gene for homosexual orientation could continue to exist in the population. Critics of the biological research programme have pointed out that if homosexuality had a genetic basis, it should have disappeared long ago since homosexuals have reduced reproduction. Indeed, several empirical studies have shown that homosexual men and women reproduce less than their heterosexual counterparts (Bell et al 1978, Saghir et al 1973, Curran et al 1957). One possible explanation for the persistence of homosexuality is that it is a continuously occurring mutation with no adaptive value. In other words, it is suggested that maladaptive genes for homosexuality do indeed rapidly die, but new mutations are created at a rate high enough to compensate for the loss of the old mutations from the gene pool. This hypothesis is weakened by the observation that most maladaptive genes rarely exceed 1 percent of the population, while homosexuality apparently occurs much more frequently (Whitam and Mathy 1986, Gadpaille 1980). Indeed, if homosexuality were a product of mutation, as some people have suggested, the number of homosexuals would not be as high as it is today.

Workers in the biological research program have advanced a number of theories to explain why the homosexual gene has not been weeded out of the population. Their central claim is that all aspects of both human and animal behaviour are coded in the genes and have been moulded by natural selection. In the following three sections I will describe and appraise four

main sociobiological theories for explaining sexual orientation. These are: balanced superior heterozygotic fitness, kin selection and parental manipulation.

#### ***4.7 The Balanced Superior Heterozygotic Fitness Hypothesis***

According to this theory phenotypic homosexuality is the result of homozygosity for homosexual genes. This theory was first formulated by Hutchinson in 1959. Hutchinson theorised that if homosexuality were indeed controlled by a gene, those who carry only one copy of the gene must have a reproductive advantage over those who do not.

Advocates of the superior the heterozygote theory maintain that a gene may confer a differential reproductive advantage despite its harmful nature. On this view, there can be recessive genes for a trait that inhibits the reproduction of an organism, but which, when co-occurring with the dominant trait-suppressing allele, give rise to an organism more inclusively fit than a comparable organism with two dominant alleles. The most well known example of this kind of phenomenon is sickle cell anaemia, a genetic condition that occurs in African and Asian populations. Sickle cell anaemia partly results from an inherited genetic defect in the instructions that code for the development of haemoglobin, the oxygen-carrying pigment in red blood cells. This result in blocked blood vessels, severe pain, anaemia and damage to the kidneys, lungs and liver. If an individual is homozygous for sickle cell anaemia, that is, if he has inherited a gene for sickle cell from both parents, he or she will develop severe form of anaemia and may even die before having children. On the other hand, if the individual is homozygous recessive, that is, has the weak gene from both parents, he or she will not develop sickle cell anaemia but will be susceptible to having malaria. However, if the individual is heterozygous for the sickle cell allele (i.e. has one allele for sickle cell haemoglobin and one for normal haemoglobin), not only does he not develop sickle cell

anaemia, but he also has resistance for malaria and he therefore goes on to have children. This ensures that the gene for sickle cell anaemia is preserved in the gene pool. Another gene that is preserved in the population by natural selection in a similar manner is the gene for cystic fibrosis, an inherited disease that mostly afflicts Caucasians. Persons with cystic fibrosis have difficulties absorbing fat-soluble vitamins and suffer from frequent respiratory infections. Two different studies have shown that individuals who carry just one copy of the cystic fibrosis gene (and thus don't suffer from the disease) have increased resistance to cholera and typhoid-or rather to the diarrhoea that often kills people with cholera or typhoid (see Gabriel et al 1994, Meindl 1987). Like the sickle cell anaemia gene, if the cystic fibrosis mutation were merely a killer and did not have some benefit to the person who carries it, natural selection would have eliminated it from the population long ago.

Applied to homosexuality, the superior heterozygotic fitness theory holds that homosexuality is the result of homozygosity for homosexual genes. In other words, since the gay gene is presumed to be inherited in a recessive manner, a person will only become homosexual when he inherits one copy of the homosexual gene from each parent. It is also assumed that the homosexual gene, like the sickle cell gene, confers some benefit to heterozygous carriers. This ensures that the gene for homosexuality is maintained in the population even if individuals with two copies of the gene have reduced fitness.

Psychologist Jim McKnight has suggested that the homosexuality gene survives because the gene for homosexuality makes straight men more successful heterosexuals (McKnight 1994). It has also been suggested that those straight men that carry only a single copy of the homosexual gene may have a higher libido and, as a consequence, leave more children than either homozygote. They may also be better at caring for the young, which may make them

better fathers. In addition, such individuals may possess longer penises, more vigorous and fresher sperms, a higher concentration of sperm per ejaculation, and shorter refractory period between sexual encounters (incidentally a study by Bogaert (1999) reported that homosexual men had larger penises, both in terms of length and girth than heterosexual men). This, it is claimed, would ensure that they enjoy a sperm competitive fertility advantage, compared to heterosexual men who don't carry the homosexual gene (MacIntyre and Estep1993).

Some theorists have also postulated that heterozygotes may be better at detecting the peak ovulation periods of their sex partners compared to heterosexuals who don't carry the homosexual gene (McKnight 1994). Others such as William Turner have claimed that the homosexual gene persists because it confers resistance to small pox on heterozygous individuals who carry the gene (see LeVay 1996: 189). Thus, according to this view, homosexuality persists in populations, not because gay men, as such, are adaptive, but because the homosexual gene makes straight men (those who carry one copy of the gene) more successful heterosexually.

Unfortunately, there is very little evidence to suggest that certain individuals are heterozygous for the homosexual gene, assuming that such a gene exists. Nor, as Michael Ruse has pointed out, 'has any study shown that over a number of generations the ratios and distributions of homosexual to heterosexual offspring match those to be expected were a balanced heterozygotic mechanism at work (Ruse 1982: 15). The matter is complicated by the fact that we have no way of distinguishing homozygous carriers of the gay gene from the heterozygous carriers of the same. Furthermore, if male homosexuality, like sickle cell anaemia, consisted of a simple possession of two copies of the homosexual gene, then all MZ twins would be concordant for sexual orientation. This prediction is contradicted by a number of studies that



have reported identical twins that are discordant for sexual orientation (Rainer et al 1960, Green and Stoller 1971, Bailey and Pillard 1991). In fact, if one twin is homosexual, the other is almost always heterosexual. The matter will only be settled if the gene for homosexuality, like the gene for sickle cell anaemia, is discovered. However, it is highly unlikely that a single gene controls sexual orientation.

#### ***4.8 The Kin Selection Hypothesis***

The second theory that has been put forth by sociobiologists to explain the persistence of homosexual genes in the population is called kin selection. This theory was first proposed by W.D. Hamilton as an explanation for apparently altruistic acts in certain animal species (Hamilton 1964). Kin selection modifies natural selection by replacing the individual with the gene as the unit of selection. According to this theory, what matters is how many genes are passed on to the next generation and not the mode of transmission. In fact, Hamilton proposed that in addition to producing offspring directly, an individual could ensure that copies of his or her genes are passed on the next generation if he or she helped close relatives such as brothers and sisters to reproduce.

The essentials of kin selection theory are summarised in the following formula known as Hamilton's rule:  $C/B < r$ . According to this equation, if the altruistic individual is to survive natural selection, then the cost  $C$  (the loss in reproductive success arising from altruistic behaviour), divided by the benefit  $B$  (which is the kin's expected reproductive success) must be less than  $r$  (which is the probability that the relatives have the same allele). Put differently, Hamilton's rule says that kin selection will occur if the altruist gains more from his relatives' increased reproductive success than he loses by foregoing reproduction. Altruistic behaviour is common in many species especially birds, insects and mammals. It may take the form of

giving a warning call to a group that a predator is near, sharing food, grooming others to remove parasites, and adopting orphans.

Applied to homosexuality, the kin selection theory holds that although the male homosexual necessarily leaves very few offspring, if any, the gene pool is preserved because his altruistic behaviour results in increased reproductive fitness of his close family members who share the recessive gay gene. In other words the homosexual produces not directly, but through relatives. The assumption here is that every individual shares half of his genetic characteristics with his brothers and sisters, and about a quarter of this with his nieces and nephews. Accordingly, if such an individual is homosexual and assists his close kin in ways that promote their reproduction, he will in effect be guaranteeing the perpetuation of his own genes. And as Edward Wilson, a leading sociobiologist puts it:

The celibate monk, the maiden aunt, or the homosexual need not suffer genetically. In certain societies their behaviour can redound to improved fitness of parents, siblings, and other relatives to an extent that selects for the genes that predisposed them to enter their way of life (1975: 343).

Elsewhere Wilson has described homosexuality as a 'distinctive beneficent' behaviour that evolved as an important element of early human social organisation. He speculates that, freed from the need to direct energy toward raising their own children, homosexual members of primitive societies may have helped (by resource allocation and childcare) their close family members to reproduce more successfully. Indeed, Wilson compares homosexuals to worker-bees, who are sterile yet reproduce themselves indirectly by devoting all their energies to rearing their sisters (Wilson 1978). However, it is important to note that the worker-bees referred to here are not homosexual but asexual.

Wilson has also postulated that in pre-industrial societies, homosexuals may have played the role of seers, shamans, artists, and keepers of tribal knowledge, which could have benefited

study reported that heterosexual men were more likely to provide financial support to their siblings than would homosexual men. In addition, the study found that homosexual men were more alienated from other family members (especially from fathers and oldest siblings) than the other heterosexual siblings.

Lewontin (1979) criticises the application of kin selection hypothesis to homosexuality arguing that homosexuality is dependent on history and culture and that there is no evidence to suggest that it has a genetic basis. There is also no evidence to suggest that homosexual offspring do really increase the fitness of their relatives and thus indirectly increase their own inclusive fitness (McKnight 1997: 129). In fact, no proof has yet been offered showing that immediate relatives of homosexuals are markedly more productive than the population average. It is also important to note that in many societies today homosexuals are often alienated from their families.

The fact that parents in most societies have a negative attitude towards homosexuals must also be an embarrassment to the advocates of kin selection hypothesis. Parents would not be expected to be homophobic if by foregoing reproduction their gay children would be in better position to help their siblings reproduce (Dickemann 1995: 176). Also if homosexuality resulted in benefits to kin as sociobiologists claim, child-care should be a major component of gay culture but as a number of studies have clearly shown this is in fact not the case (Steen 1996). In actual fact, one stereotype about homosexuals is that gay men have a tendency to molest children. Moreover, rather than aiding their kin, it has been observed that many gay people invest most of their energy, time and money supporting the gay community and defending gay rights. And as LeVay asks, 'why do gay men waste so much time cruising each other, time that according to this theory would be better spent baby-sitting their nephews and

nieces?’ (LeVay 1994: 129). The same point is echoed by Bobrow and Byne when they note that the ‘amount of time and effort that homosexual men spend pursuing non-reproductive sex and relationships must be at the expense of distributing resources towards kin’ (Bobrow and Bailey 2001). Indeed, from an evolutionary point of view, it would make more sense for these individuals to be asexual rather than homosexual.

The proponent of the kin selection might of course respond by saying that the modern environment, unlike the environment of evolutionary adaptation, is not conducive to homosexuality. But as a number of critics have noted, if individuals are to devote their energies to helping relatives, it would make more sense for them to be asexual rather than homosexual since the latter would require that they expend their efforts pursuing members of their own sex. Furthermore, as McKnight has pointed out, even ‘if homosexuals were to commit a large measure of resources helping their kin produce they would simply be aiding the decrease of their overall genetic contribution by having more homosexual relatives who will not be able to reproduce’. Indeed, McKnight has demonstrated mathematically that the gene for homosexuality is not likely to survive if homosexuals are simply helping kin to reproduce. He notes: ‘Kin selective breeding success ensures more relatives but more reproductively disabled ones in your direct line. So as advantage turns to a disadvantage, producing more homosexual kin reduces genetic representation in subsequent generations’ (McKnight 1997: 135). According to this viewpoint, although kin selection may help the homosexual gene spread initially, it does not aid its ultimate survival. From the foregoing, it should be clear that whatever the merits of kin selection, direct reproduction is the best way of ensuring that one’s genes are passed to the next generation. Furthermore, as already indicated, it is not clear why some people would become homosexual rather than asexual if the ultimate aim is to help their relatives reproduce.

#### ***4.9 The Parental Manipulation Hypothesis***

This hypothesis was first presented by Trivers (1974) and later elaborated by Ruse (1988). It is based on the assumption that sometimes it is more beneficial to a parent's inclusive fitness to limit an offspring's reproduction. Accordingly, parents may unconsciously manipulate some of their children to become homosexual in the expectation that instead of having their own children, homosexual offspring will direct their kin investment toward their siblings' children, and that this would contribute to their parents' inclusive fitness. As Ruse explains 'if the genes could give rise to behaviour in one or both parents that would in some way and under special circumstances cause one offspring to be a non reproducer, and if this were in the parent's reproductive interests, such genes would be preserved and even multiplied by selection (Ruse 1985: 12). This hypothesis differs from the other three in that it postulates that the phenotype, which is passed on genetically is not homosexuality per se, but the parental behaviour, which leads them to manipulate the child to become homosexual. It is also to be distinguished from kin selection hypothesis in that the beneficiary of the homosexual's altruistic act is not the homosexual himself, but his parents whose genes he helps to propagate (Trivers 1974).

No systematic study has been specifically carried out to test this hypothesis. However, the same evidence that refutes kin selection hypothesis would seem to refute parental manipulation hypothesis. As our discussion of kin selection hypothesis has shown, there is no evidence to suggest that families with a homosexual member are more reproductively successful, compared to those whose members are exclusively heterosexual. Homosexuals do not seem to provide greater services than people who are heterosexual. And although Ruse (1988) and Weinrich (1976) have cited cases where parents in certain societies encouraged

their children to change their gender role, most of those examples are anecdotal and in any case change of gender role is not the same as change in sexual orientation. Furthermore, even if it could be shown that there is a correlation between homosexuality and certain kinds of parental behaviour, such kind of behaviour could very well be the consequence of homosexuality rather than the cause of it. In fact, it is difficult to distinguish this particular hypothesis from the psychodynamic theories of homosexuality discussed in chapter four.

Another objection to the parental manipulation hypothesis is that although it may very well explain why parents would want some of their children to forego reproduction, it does not explain why such children become homosexual. As mentioned previously, these individuals would be in a better position to assist their kin if, like worker-bees, they were simply asexual.

The parental manipulation hypothesis is also at odds with another evolutionary based hypothesis, which postulates that there has been selection for parents to counter any social process that would increase the chances of any of their children becoming homosexual (Gallup 1995). Gallup's reasoning is that homophobia may have evolved as a means of minimizing the chances that offspring would become homosexual. The assumption here is that contact between adult homosexuals and children would increase the chances of one's child becoming homosexual and this would lower the parent's inclusive fitness. Why parents would display negative attitudes towards homosexuals and at the same time manipulate some of their children to become homosexual must be regarded as an anomaly for this particular subprogram. Again, as was pointed out earlier, the best way to get maximum returns on genetic investment would be to ensure that all offspring reproduced profusely.

Sociobiological explanations of homosexuality are very speculative and assume a priori the existence of homosexual gene(s). In fact, they have been criticised for being too gene-centred and deterministic. However, as the forgoing evaluation has shown, these theories have been subjected to empirical tests and although they have been found wanting, they do at least meet the Popperian criterion of falsifiability.

#### ***4.10 Conclusion***

In this chapter I have considered a number of genetic hypotheses advanced by workers in the biological research program. I have shown that many of these hypotheses have been falsified. Moreover, studies claiming to provide evidence in support of some of these hypotheses have been found to suffer from a number of conceptual and methodological problems. However, compared to the rapidly degenerating experientialist research program discussed in the previous chapter, the biological research program does appear to have a more powerful positive heuristic, which explains why many researchers continue to invest their energies in it. But as William Byne has cautioned the popularity of current biological theories of homosexuality may derive more from discontent with current status of experiential (psychosocial) explanations rather than a substantiating body of experimental evidence (Byne 1993). In the next chapter I will examine hormonal hypotheses, which also fall under the biological research program. These hormonal studies, as we shall later see, claim to show that homosexuality is biologically influenced. Nevertheless, as we saw in chapter four, we should bear in mind that human behaviour cannot be reduced to distinct biological or environmental causes. We should be wary of an extreme biologism for rarely do either genes or the environment determine a trait. Usually, as Susan Oyama has repeatedly pointed out, phenotypes are the products of interactions between genes and the environment (Oyama 1985, 2000). What this study has demonstrated so far is that although the experiential explanations

discussed in chapter 4 have been discredited, a *simple* genetic account of homosexuality is not strongly supported by current evidence either.



## **Chapter 5**

### **Biological Research Program: Hormonal Hypotheses**

#### ***5.1 Introduction***

In addition to the genetic explanations discussed in the previous chapter, biologically oriented researchers have hypothesized that hormones play an important role in the development of human male homosexuality. Two main hormonal hypotheses can be distinguished: the postnatal and the prenatal hormonal hypotheses. According to the postnatal-hormone hypothesis, homosexual men have lower levels of testosterone and higher levels of estrogen in their bloodstream than their heterosexual counterparts. In other words, the ratio of testosterone and estrogens is disproportionate in male homosexuals. The prenatal-hormone hypothesis, on the other hand, postulates that male homosexuality is caused by androgen deficiency during the prenatal period of hypothalamic differentiation. According to this view, homosexual men were exposed to androgens at a certain point in development and this gave them a male anatomy, but the quantity of these androgens was not high enough and this resulted in a feminized brain. Whereas the postnatal hormonal hypothesis has been discredited and abandoned by most investigators, the prenatal-hormone hypothesis has continued to attract the attention of endocrinologists as a possible explanation for homosexuality.

#### ***5.2 Hormones, Sex and Behavior***

Because of the important role that sex hormones play in the development of secondary sex characteristics in both men and women, workers in the biological research program

have speculated that they could also play an important role in the development of homosexual orientation.

There are two types of sex hormones: androgens and estrogens. The two hormones are present in both sexes but in different amounts; estrogens are generally higher in females and androgens higher in males. Estrogens are primarily produced by the female's ovaries and are responsible for the stimulation of the growth of a woman's sex organs, breasts, pubic hair and other secondary sex characteristics although the absence of androgens also plays a role in this. In fact, in the absence of testosterone, estrogen serves as the default hormone and causes female development (see Delcomyn 1998).

Androgens, on the other hand, are mainly produced by the male testes, but are also produced in small amounts by the female ovaries and by the adrenal glands in both sexes. Androgens are responsible for the stimulation of the development of the testes and penis in the male fetus as well as other male sex characteristics such as the deepening of the voice and the growth of beards. Studies have shown that too much androgen during the critical period of sexual differentiation can make an organism that is chromosomally female have a male appearance, including the outer sex organs. Similarly, androgen deficiency during a can produce female sexual characteristics in a fetus that is genetically male.

### ***5.3 The Postnatal Hormonal Hypothesis***

The hormonal theory of homosexuality was first formulated in the 1930s following the isolation and identification of sex hormones in the 1920s. C.A Wright expressed this theory when he wrote:

All individuals are part male and part female, or bisexual, and this fact is substantiated by hormone assays in the urine. The urine of the normal man or woman shows the presence of hormones of both the male and female types... In the normal male, the female hormone predominates: in the normal female, the female hormone predominates. This, in my opinion, is the cause of the normal hormone attraction. In the homosexual the dominance is reversed. In the homosexual man there is predominance of the female element and in the homosexual woman a dominance of the male factor (Wright 1938: 249).

Earlier on, Magnus Hirschfeld had observed that the human embryo underwent a process of sexual differentiation, which entailed a stage of 'ontogenic' bisexuality. He went on to suggest that the 'study of endocrine secretions was the most promising way to arrive at a greater clarity about the ultimate causes of homosexuality' (Hirschfeld 1914: 378). A similar observation was made by the English sexologist, Havelock Ellis, when he pointed out that homosexuality might be linked to some abnormality in the process of sexual differentiation, probably having 'a fundamental source ...in the stimulating and inhibiting play of the external secretions (Ellis 1948: 310-316). Indeed, by the late nineteenth century, it had been firmly established that the fetal tissue that eventually developed into either male or female was undifferentiated until about the seventh week of pregnancy and that certain 'secretions' played a role in this differentiation. These secretions turned out to be the sex hormones: testosterone and estrogen.

A number of studies were carried out in the 1930s and the 1970s to test this hypothesis but the results met with little success. Wright himself tested this hypothesis and found various degrees of reversal of the normal androgen-estrogen ratio in 49 homosexuals. He reported that most of the homosexual men had lower concentration of androgen levels and higher concentration of estrogens than the heterosexual men in the study (Wright 1935). Similarly, Glass and McKennon (1937) demonstrated these differences but their data turned out to be insufficient for statistical analysis. Two other studies by Glass, Deuel and Wright (1940) and Neustadt and Myerson (1940) reported reduced androgens and elevated estrogens in most of their gay subjects as compared to heterosexual controls.

It is noteworthy that some investigators resorted to *ad hoc* hypotheses to explain away those cases that did not fit their predictions. For example, Wright (1940) suggested that the few homosexual men in his study with high androgen-to-estrogen ratios were not true homosexuals, while the heterosexual men with low androgen-to-estrogen ratios were latent homosexuals. The problem with this kind of theorizing is that it is insulated from any possibility of being contradicted by fact. Recall that according to the MSRP, in degenerating programs theories are fabricated only in order to accommodate known facts.

Acting on the assumption that there is a relationship between sex hormone levels and sexual orientation and without questioning its validity, attempts were made to 'cure' gay men of their homosexuality by injecting them with high doses of androgen. This method of treatment, also known as organotherapy, was especially popular in the 1940s. In one such case, out of 11 homosexual men treated with androgen, 8 experienced no change in

Loraine *et al.* (1970) reported abnormally low urinary testosterone in two exclusively homosexual men. A third man who was bisexual was found to have no such abnormality while normal levels of testosterone were found in four female homosexuals. A more ambitious study by Kolodny *et al.* (1971) reported significantly lower plasma testosterone levels for a group of 30 male homosexuals (5 and 6 in the Kinsey scale), in comparison to a control group of 50 heterosexual subjects. Studies that followed Kolodny's reported contradictory results; while some supported the hormonal imbalance hypothesis (e.g. Starka *et al.* 1975), others (e.g. Birk *et al.* 1973) refuted it. Evidence from one study indicated that the low levels of testosterone reported by Kolodny *et al.* (1971) were probably due to greater marihuana use in the homosexual group (Gatrell 1982).

Inconsistencies in methodology and outcomes make these studies inconclusive. Apart from being based on fairly small sample numbers, most of them failed to control for confounding variables such as the general health of the experimental subjects, age, diet, physical and emotional stress, alcohol, and the use of recreation drugs such as marihuana. All these factors are known to influence the level of hormones circulating in the bloodstream of an individual. Furthermore, hormone levels are known to fluctuate throughout the day and some of these studies did not take this variable into account (Gooren 1995). Emotional stress is particularly important because many homosexuals live in very stressful conditions arising from homophobia and irrational prejudice. Studies have shown that stress affect the functioning of the pituitary and this in turn lowers the amount of testosterone secreted by the testes (Rose 1969). For this reason, the differential hormone levels reported by some researchers might in fact have been the

effect of homosexuality rather than the cause of it. Indeed, most of the studies that controlled for these factors did not record any significant differences in the testosterone levels of homosexual and heterosexual men.

A review of twenty five studies of hormone levels and sexual orientation carried out between 1970 and 1984 found that only 3 studies had indicated lower testosterone levels in male homosexuals, while 20 studies found no differences. Two studies reported elevated levels in male homosexuals (Meyer-Bahlburg 1984). It would be safe to say that, presently, there is no conclusive evidence that the hormone levels of adult heterosexuals and homosexuals differ uniformly in any substantial way as predicted by the postnatal hormone hypothesis. This has induced most workers in the biological research program to stop using the postnatal hormonal hypothesis as a theory for explaining human sexual orientation. Psychoendocrine research is now focused on the role of hormones during the prenatal period.

#### ***5.4 The Prenatal Stress Hypothesis***

The prenatal hormonal hypothesis of homosexuality predicts that, regardless of the genetic sex of the individual, the presence of androgens in fetal life contributes to the development of a sexual orientation toward females while the deficiency of prenatal androgens or tissue insensitivity to androgens leads to a sexual orientation toward males.

This hypothesis rests on findings from a series of laboratory experiments with rats conducted in the late 60s and early 70s. Günter Dörner, a German endocrinologist, had

shown that male rats exposed to androgen deficiency during the critical period of fetal development displayed female-typical sexual behavior (e.g. lordosis, the typically female act of submitting to being mounted) in adulthood, which he equated with homosexuality (Dörner et al. 1968, 1969, 1970). In contrast, male rats castrated two weeks after birth and given androgen in adult life showed preference for partners of the opposite sex. Similar behavioral patterns were reported by Ward (1977) in a number of experiments that involved subjecting pregnant rats to prenatal stress. When these rats were confined in narrow spaces and then exposed to very bright lights, most of them gave birth to male offspring that displayed feminized and demasculinized sexual behavior. In addition, these rats were found to have low levels of testosterone in their blood stream. The results of these studies led researchers to conclude that maternal stress altered the testosterone levels circulating in the fetus's blood and this in turn led to demasculinization and feminization of its brain. Consequently, by the time a rat reaches adulthood, its sexual orientation is permanently fixed. It would seem that the absence or presence of high levels of testosterone play the most important role in brain sexual differentiation. Estrogens seem to play a role only in puberty when they are secreted by the ovaries.

Dörner has extrapolated these observations in rats to humans. He postulates that homosexuality may be caused by a pregnant mother's stress hormones blocking the masculinization of her unborn child. This is the so-called prenatal stress hypothesis. Dörner maintains that stressful events in life such as war, matrimonial conflict, unwanted pregnancy arising from rape, and bereavement could cause a drop in fetal androgen levels in pregnant women, which can in turn make their offspring homosexual. In a study

involving 865 gay men attending venereal diseases clinics in the then German Democratic Republic (GDR) and published in *Endokrinologie*, one of the oldest and highly regarded journals of endocrinology, Dörner reported that significantly more homosexuals were born during the stressful period of the second world war than in the years before or after this stressful period (Dörner 1980). He ruled out the possibility of father-absence and malnutrition arising from food shortage as possible reasons for increased frequency of homosexual males born in this period, arguing that most children born at the beginning of the war had a paternal deficiency for many postnatal years yet they did not become homosexual. In addition, he says that there was no food shortage in Germany during the war years.

In another study, Dörner (1983) asked 100 heterosexual and 100 homosexual and bisexual men about the possible stressful events that may have occurred during their prenatal life. As predicted, he found greater incidence of stressful events during the pregnancies of women whose sons eventually became homosexual than in those of women whose sons became straight. Over 60 percent of the mothers of the male homosexuals recalled severe stressors such as the death of a close relative and divorce compared to 30 and 6 percent of the mothers of bisexual and heterosexual men respectively. Dörner went on to suggest that the prevention of unwanted pregnancies and war could prevent homosexual orientation (Dörner 1983: 87). In an earlier study, he had suggested that neuroendocrine-conditioned male homosexuality could also be prevented by androgen administered during the critical period of brain differentiation (Dörner and



Hinz 1972). This suggestion was severely criticized by the German Society for Sex Research on both scientific and ethical grounds (Sigusch 1982).

Dörner's stress theory has not stood up to critical examination, however. Michael Bailey, for example, interviewed 215 women who had given birth to straight and gay sons and found no difference in the frequency or severity of stressful events in the gay and straight pregnancies (Bailey et al 1991). Another study by Günter Schmidt et al (1995) found no evidence for the claim that more homosexual men are born in times of war than in times of peace. German cities that were most affected by war did not record a higher birth rate of homosexuals than the cities that were not affected.

Dörner's study also suffers from a number of methodological flaws. In the first place the sample was highly selected. All the subjects were VD patients and the study was carried over a very limited period of time. In addition, there is no indication that interviews were conducted blind to the subject's sexual orientation. The interviewers, as LeVay (1996) points out, may have unknowingly pressured the gay men to report more stressful events. It is also not clear why the patients in this study found it necessary to disclose their sexual orientation to the hospital workers.

Because all the subjects in Dörner's study were patients attending venereal disease clinic, the high incidence of homosexuality that he found among the men born between 1939 and 1945 (the war years) may actually only reflect the incidence of sexually transmitted diseases in homosexual and heterosexual men (Mondimore 1996). Furthermore, even if

homosexuals are born more often during wartime than peacetime, experientialists might interpret this as confirming their prediction that a father's absence from home may contribute to male homosexuality. (There is greater likelihood of fathers being away from home during wartime).

Another problem with Dörner's stress hypothesis is that it contradicts the maternal dominance hypothesis, which seeks to explain why more boys than girls are born in times of stress such as famine, epidemics and wars (see Grant 1998). As Richard Badock explains, 'this comes about because women respond to stress by producing more testosterone, which in turn predisposes them to giving birth to more sons (Badock 2000: 181). It is noteworthy that while Dörner believes that stress causes a drop in testosterone levels in pregnant women, proponents of the maternal dominance hypothesis actually think that stress induces women to produce more testosterone. One or both of these two theories must be false.

The major problem with Dörner's theory stems from the fact that it is based on an inappropriate model -the 'rat copulation' model. Defining rodent homosexuality raises conceptual difficulties. Dörner defines a gay rat as one that shows female-typical sexual behavior such as lordosis regardless of the sex of the partner and a male heterosexual rat as one that shows male-typical behavior such as mounting again regardless of the sex of the partner. A parallel argument holds for female homosexual and heterosexual rats respectively. This is what might be described as a behavioral definition of homosexuality. Although it has been established that mating behavior in rats is clearly affected by early

hormone exposure, neither mounting nor lordosis behavior is directly analogous to human sexual orientation in which the sex of attraction is primary. Hormonal manipulation resulting in male rats mounting male rats and female rats, female rats, cannot by any stretch of the imagination be equated with human homosexuality in which the psychological components are more important than the physical act. Unlike rats, human males and females do not display rigidly different sexual behaviors. Indeed, there is no single position or pattern of movements that human beings are obliged to follow in order to copulate. The term 'homosexuality' which Dörner uses for his rats has no obvious relation to what the term 'homosexuality' denotes in the humans. Furthermore, in humans and other animals in the evolutionary scale, sexual behavior is largely independent of immediate control of sex hormones.

Curiously enough, in Dörner's rat experiments, the male that allows itself to be mounted by another is considered homosexual, but the one that does the mounting is considered heterosexual. On the other hand, a female rat that mounts another is considered homosexual while the one that shows receptivity to mounting is considered heterosexual. From these definitions it would seem that there are no *same-sex* couples in the neuroendocrine laboratory (Byne and Lasco 1997). Paradoxically the only instance when you can have two gay rats in a sexual encounter is when one is male and the other female but both displaying opposite sex behavior.

Although in sexual intercourse between two human males one partner takes a receptive role (insertee) and the other takes an active role (the inserter), neither of the participants

in the sexual act can be said to be assuming the role of the opposite sex. They are both considered homosexual. In any case, most homosexuals often perform both often in the same sexual episode. Indeed, although the distinction between the 'inserter' and the 'insertee' in homosexual intercourse was once considered important, it is no longer considered operationally useful. As we saw in chapter one, the basis for ascribing human sexual orientation depends primarily on the *morphological* sex of persons to whom one is sexually attracted, rather than the specific motor patterns of copulation. I emphasize the term *morphological* because a male who falls in love with a male-to-female transsexual (that is, one who has undergone gender reassignment) cannot possibly be regarded as homosexual. The same applies to a woman who is sexually attracted to a male-to-female transsexual.

It should also be pointed out that if the level of androgens during fetal development determines sexual orientation in humans, the effects should be seen in the choice of one's sexual partners rather than the kind sexual positions that one prefers when having sex. In any case, the sexual postures displayed by rats in the endocrine laboratory are mechanical reflexes and can even be induced by the researchers hand (Byne 1994). And as Simon LeVay explains, 'the fact that a female rat readily mounts other rats does not necessarily mean that she prefers males as sexual partners, nor does the fact that a male rat submits to being mounted necessarily mean that he prefers males as sexual partners' (LeVay 1996: 120). As already indicated, in humans what is important is the sex of the person that one is sexually attracted to and not the role that one takes when he or she has sex. Furthermore, there is no indication that the hormonally manipulated male rats were ever

given a chance to choose their sex partners, something one might think important in drawing conclusions about sexual orientation.

Another finding that greatly weakens the prenatal hormone hypothesis is that manipulation of hormones in rats during the prenatal stage of development results not only in changes of sex dimorphic behavior such as mounting and lordosis, but also in corresponding alterations of the external genitalia. This is not the case with humans. The typical human homosexual, as Meyer-Bahlburg notes, 'has normal gender, appropriate genitalia as well as normal secondary sex characteristics' (Meyer-Bahlburg 1984).

Dörner has responded to some of these criticisms by saying that he only 'cautiously' compared neonatally castrated rats with male homosexuals. In addition, he argues that there are apparent evolutionary continuities between humans and animals and that even some of the great men of science such as Aristotle and Galen extrapolated from animals to man. He also rightly points out that a model can only approach reality, not represent it (Dörner 1979). While these observations have some merit, Dörner's case would have been much stronger had his experiments been based on apes, which are man's nearest relatives and have a more sophisticated sexual life. The analogy between rodent sexual behavior and human homosexuality has been pressed too far. Indeed, such an analogy, as Beach rightly points, 'will remain scientifically meaningless until both phenomena have been examined by a common analytical procedure and in terms of similar dimensions' (Beach 1979).

### ***5.5 Estrogen Feedback Effect***

The hormonal research program predicts that male heterosexuals and homosexuals should differ in their luteinizing hormone (LH) response to estrogen exposure. (This response is known as endocrine feedback effect or EFE in short). According to this view, homosexuals should exhibit an estrogen feedback effect that is intermediate between that of heterosexual men and heterosexual women. This was a novel prediction in Lakatos' sense. Again this hypothesis is based on the study of rats. In a series of experiments, Dörner had observed that male rats deprived of testosterone during the critical period of brain differentiation responded to increasing levels of estrogen with a surge of ovulation hormone known as luteinizing hormone (LH). A positive endocrine feedback effect (also known as Hohlweg effect) could not be elicited from male rats and female rats that were neonatally androgenized. Instead, a negative endocrine feedback effect was observed. (In mammalian females, a rise in estrogen levels causes a rise in LH levels, which in turn triggers the release of the ovum from the ovary).

The results of this study led Dörner to conclude that androgens have an organizing action on the developing brain, abolishing the ability of estrogen to exert positive feedback on LH release. He went on to hypothesize that because male homosexuals are supposed to have suffered androgen deficiency during the critical period of brain differentiation, they should show an LH response to estrogen administration that is between that of heterosexual men and normally menstruating women. (In heterosexual human males, a rise in estrogen levels usually suppresses LH, thereby producing a negative feedback).

This hypothesis has been tested by a number of endocrinologists but inconsistent findings have been reported.

Dörner et al (1975) has tested the EFE in heterosexual, homosexual and bisexual men and heterosexual women. As predicted, in 21 homosexual men injected with estrogen, a decrease of serum LH levels followed by an increase above the initial LH values was reported. In contrast, in 20 heterosexual and in 5 bisexual men, estrogen injection was not followed by a surge in LH. Interestingly, the LH response of bisexual men was more 'masculine' than that of heterosexual men. From this study, Dörner has concluded that the elicitation of a positive feedback effect in the majority of gay men suggests that homosexual men may have a female differentiated brain. Even so, it is important to note the rise in LH in the homosexual men was weaker and more delayed than that found in homosexual women in the control group.

Dörner's experiment was later replicated by Gladue et al. (1984). Gladue's study involved 12 heterosexual women, 17 heterosexual males and 14 homosexual males. All the subjects were given an estrogen injection and luteinizing hormone and testosterone levels were measured. The study found the pattern of secretion of LH hormone in homosexuals in response to estrogen to be intermediate between that of heterosexual men and that of straight women thus corroborating Dörner's earlier findings. However, it should be pointed out that although Gladue's research was well controlled for factors such as stress and the use of drugs, some of the subjects in the study were infected with HIV, which is known to depress the level of testosterone in the bloodstream. This may

have contributed to the positive feedback response that he observed. Also, given the small number of subjects in the study, it would be too quick to conclude that Dörner's hypothesis has been confirmed.

The victory of Dorner's endocrine feedback hypothesis was short lived. His prediction that homosexuals will show an estrogen feed back effect appropriate to the opposite sex was been refuted by Gooren in two ingenious experiments (Gooren 1986a, 1986b). In the first study, he tested the EFE in 6 male transsexuals and 6 female transsexuals undergoing gender reassignment. The male-to-female transsexuals displayed 'male' response to estrogen injection before gonadectomy and cross-gender therapy and a 'female' response after. On the other hand, the female-to-male transsexuals displayed 'female' response to estrogen injection before gonadectomy and cross-gender therapy and 'male' response after. In my judgment, these experiments can be described as crucial and should have settled the question whether EFE response can be used as criterion for distinguishing homosexuals from heterosexuals once and for all. These findings were consistent with an earlier study by Goh et al (1984), which showed that estrogen treatment lasting for four months or more can elicit an LH surge in nonorchidectomised male to female transsexuals.

In demonstrating that the LH response to estrogen exposure can be altered in the same individual, Gooren was able to demolish Dörner and Gladue's basic premise that the positive feedback response can be used as an indicator of early sexual differentiation of the brain in primates and in man. He was also able to show that the LH response to



estrogen injection is not sexually dimorphic in humans nor is it permanently imprinted in the prenatal brain as Dörner had suggested. On the contrary, the type of feedback response elicited is determined by the hormonal status of an individual at the time of estrogen administration rather than chromosomal sex or sexual orientation of the individual concerned.

In a second study, Gooren (1986b) was unable to demonstrate a statistically significant difference in LH response between homosexual men and their heterosexual counterparts. In 11 out of 23 homosexual and 5 out of 15 heterosexual men, LH levels rose at day 4 following estrogen injections above pretreatment values (a female-type response). Of the remaining 10 heterosexuals and 12 homosexual men, LH levels on day 4 after estrogen administration were lower than pretreatment values (a male-type response). In fact, some heterosexual men showed an LH response to estrogen administration that was similar to that reported in homosexual men by Dörner. Gooren also noted that the LH response to estrogen administration was weakest in men who had the weakest production of testosterone regardless of the sexual orientation.

From Gooren's study, it is clear that although males and females may display different patterns of LH secretion, this is because they have different levels of hormones in circulation and not because they have differently organized brains. Furthermore even in rodents, as Kawakami and Kimura (1978) have shown, the male brain is formed independently of future luteinizing hormone response. Gooren's findings are also consistent with an earlier study by VanLook et al (1977), which showed that genetic

human males with the complete androgen insensitivity syndrome (AIS) displayed an estrogen feedback effect appropriate to their chromosomal sex. If Dörner's theory were valid, these individuals should have displayed a positive estrogen feedback effect, considering that they lacked the specific protein receptors required to utilize testosterone at the target cell level during early fetal development.

There is another problem with Dörner's endocrine feedback hypothesis as an index of homosexuality. It predicts that lesbians will display a male-like endocrine feedback response on estrogen administration since they have a masculinized brain. This theory is contradicted by the observation that most homosexual women have normal menstrual cycles and are even able to conceive and give birth. As previously indicated, a positive endocrine feedback effect is required for the ovum to be released from the ovary in all mammalian females. Workers in the hormonal subprogram have not been able to account for this anomaly.

Gooren suspects that the positive endocrine feedback response reported by Dörner and Gladue in male homosexuals could have resulted from testicular dysfunction. As already indicated, a number of factors such as aging, alcohol and viral infections are known to interfere with testicular functioning. In this regard, it is noteworthy that some of the subjects in Dörner's study were drawn from venereal disease clinics. Sexually transmitted diseases such as AIDS and the drugs used to treat them are known to interfere with the hormonal balance. This might have caused a positive endocrine feedback effect following estrogen administration.

It is also useful to note that LH response in several species of primates has been found to be different from that found in rats. Among rhesus monkeys and marmosets, for example, investigators have shown that estrogen exposure leads to LH surges in both males and females (Karsch, Dierscke and Knobil 1973). This finding raises doubts about the appropriateness of using the rat as a model to explain human sexual behavior.

### ***5.6 Human Experiments of Nature***

Because of ethical considerations, human beings cannot be manipulated experimentally as can laboratory animals. For this reason, proponents of the hormonal research program have relied on a number of naturally occurring endocrine disorders to test the validity of the prenatal hormone theory for human sexual orientation. Indeed, these disorders have been used as the human experimental analogs to androgenized female rats or castrated male rats. I will discuss some of these endocrine disorders in the following three sections. These disorders are known to alter the production or receptivity of hormones in the individuals affected. Proponents of the hormonal research program have claimed support for their program by saying that the hormonal imbalance that affects the phenotype of these individuals also determines their sexual orientation. On the other hand, experientialists have claimed support for their program by saying that irrespective of hormonal imbalance, the way these individuals were reared turned out to be the most influential in shaping their sexual orientation. Unfortunately, as we shall presently see, empirical studies of individuals with hormonal abnormalities don't provide unambiguous evidence linking homosexuality with hormones.

### ***5.7 Congenital Adrenal Hyperplasia (CAH)***

Congenital adrenal hyperplasia (CAH) is an inherited endocrine condition that is characterized by an enlarged adrenal gland, which produces abnormally large quantities of plasma androgen. When present in genetic females, the additional androgen partially masculinizes the external genitalia, producing an enlarged clitoris with the urethral opening at the base, and partially fused labia that resemble a scrotum. In most cases, these individuals are treated with glucocorticoids to halt excess androgen production and their external genitalia are surgically modified to more closely resemble those of females. Males affected by this syndrome are erotically attracted to females but they tend to be excessively aggressive and competitive.

Several studies have found high rates of male-typical behavior in women with CAH, including preference for masculine toys, rough and tumble play, and other tomboyish behavior (Berenbaum and Hines 1992, Ehrhardt 1985). CAH women have also been found to be more likely to become bisexual or homosexual in adulthood than do comparison groups of women such as unaffected sisters (Money and Russo 1979, Dittmann et al 1992). A similar study by Hines (2000) arrived at the same conclusion. Some investigators have argued that the atypical sexual orientation of CAH women results from the high levels of androgens to which their brains were exposed to during fetal life and that this supports a hormonal theory of homosexuality. But in a recent survey of CAH research, Angela Pattatucci concluded that because a majority of CAH women develop a heterosexual orientation, 'CAH plays a minor role in the overall

variability of women's sexual orientation within the general population' (Pattatucci 1998: 27-28). For those CAH women who do not become lesbians, LeVay (1996) has offered the following auxiliary assumptions:

- (i) the androgen levels may not have been high enough;
- (ii) the time of the increased androgen levels may not have coincided with the critical period of brain differentiation;
- (iii) the women under study may not have been followed long enough to allow their true sexual preference to be apparent.

However, none of these hypotheses has been independently tested, and they are therefore all *ad hoc*.

Although the CAH syndrome has been interpreted as supporting the prenatal theory of homosexuality, it could also be interpreted as supporting the experientialist research program. Some authors sympathetic to this program have suggested that the heterotypical behavior displayed by CAH women may actually be a psychological consequence of the realization that their genitalia are not entirely normal (Rubin et al 1981). Thus the environment of CAH children is likely to be remarkably different from that in which normal children would grow up in. Their ambiguous genitalia might confuse their parents and this may in turn influence the gender identity and sexual orientation that these individuals adopt. Unfortunately, as Meyer-Bahlburg has pointed out, the available data is not sufficient to settle this matter (Meyer-Bahlburg 1994: 382).

### ***5.8 Androgen Insensitivity Syndrome (AIS)***

Another of nature's experiments is the condition known as androgen insensitivity syndrome. This syndrome is caused by a genetic mutation that prevents the formation of functioning androgen receptors. In order to have a masculinizing effect, testosterone in the bloodstream must combine with a receptor on the surface of a cell. Genetic males affected by this syndrome develop intra-abdominal testes that produce testosterone but because they have no functioning androgen receptors, they develop female external genitalia despite having internal male organs. These individuals are responsive to the estrogens produced by their testes and are therefore able to develop a feminized phenotype.

In most cases AIS individuals are naturally raised as girls and their true genetic sex is only discovered at puberty when they fail to menstruate. Studies have shown that these genetic males have no problem with their female gender identity although they are infertile. Since these individuals have a feminine body structure and are erotically attracted to males, they are socially regarded as heterosexual. However, since genetically they are males, these individuals could be considered homosexual if by 'homosexual' we mean being sexually attracted to a person of the same genetic sex. The genetic male who is attracted to these individual could also be defined as homosexual if we adopt the narrow definition of a homosexual as one who is attracted to members of his own genetic sex. Some proponents of the prenatal hormonal theory of homosexuality believe that AIS syndrome offers strong support for their theory. In fact, Dörner and his co-workers

believe that male homosexuality is a mild case of androgen insensitivity syndrome (Dörner et al 1991).

However, given that AIS individuals are raised as females and have a normal female appearance, it would be wrong to attribute their female gender identity to androgen insensitivity alone. That these genetic males are erotically attracted to men may actually be a logical consequence of having a female body rather than the possession of a feminized brain. Furthermore, a study by Anono et al (1978) found that unlike normal women, individuals with complete androgen insensitivity syndrome are unable to generate a positive LH response on estrogen injection, which contradicts Dörner's claim that these individuals have a female-like brain.

It is also important to note that the vast majority of homosexuals do not have a history of atypical endocrinological development. Indeed, there is no evidence to suggest that homosexuals have a higher incidence of intersexed genitalia or of sex chromosome abnormalities than heterosexuals. It is also noteworthy that unlike homosexuality, whose genes are yet to be identified, the genetic basis of androgen insensitivity syndrome is well understood and its genetic markers have even been identified (McPhaul et al 1993).

### ***5.9 5 Alpha Reductase Deficiency (5-ARD)***

This is another condition in which the genetic sex and the phenotypic sex are in conflict. Proponents of the hormonal research program have interpreted this endocrine condition as supporting their prediction that homosexuality is a function of hormones. This

syndrome is caused by a defect in the reductase enzyme, which leads to abnormally low conversion of testosterone to a more physiologically active hormone known as dihydrotestosterone (DHT). Since DHT is required for the formation of the male phenotype, chromosomal males with this condition are born with ambiguous genitalia and are raised as females. However, with testosterone surge at puberty the phenotype changes to male: the testes descend, the penis enlarges and becomes capable of erection, the voice deepens and a male psychosexual orientation develops.

Imperato-McGinley and his co-workers (1979) have reported a study of a unique subgroup of children in the Dominican Republic who were affected by this condition. The study involved 38 individuals, 18 of whom appeared to be girls at birth and were raised as females. At puberty, these children underwent a physical transformation to maleness, including growth of the penis and descent of the testes. Sixteen of these children were able to make the social and psychological transition to male roles with ease despite 12 years of female socialization. They were also erotically attracted to women and considered themselves as male. Only one subject continued to maintain a female gender identity after puberty.

The results of this study would seem to contradict the experientialist program and to support the prenatal hormonal hypothesis, which postulates that hormones operating during the critical period of sexual differentiation determine an individual's sexual orientation. Indeed, Imperato-McGinley and her co-workers interpreted the data as showing that nature was more important than nurture because the individuals concerned



were able to move easily into a masculine gender role at puberty despite having been raised as female. Imperato-MacGinley postulated on the basis of these observations that prenatal exposure to testosterone must have shaped the sexual orientations of these individuals irreversibly.

However, proponents of the environmentalist research program have attempted to explain this apparent anomaly by pointing out that in the Dominican Republic where this hormonal disorder was first reported women are afforded very low status and the children in Imperato-McGinley's study may have been pressurized to adopt a male gender identity once they reached the age of puberty. This explanation has some merit. In the United States where this syndrome has been reported, it has been shown that most genetic males affected by this syndrome continue to live as females even after the bodily changes at puberty (Benderly 1987).

It is also useful to note that the transition from a girl to a boy at puberty was a common occurrence in the Dominican society and the locals had even invented a name for it - *guevedoces* or penis at twelve (the Sambia of the highlands of Papua New Guinea use the term *kwolu-aatmwol*, which has a similar meaning (Herdt 1990)). Given that this transition was known to occur and considering that these children had ambiguous genitalia, it is unlikely that they were reared unambiguously as girls (Sagarin 1975).

There are also some methodological problems in Imperato-McGinley's study that weaken her findings. In the first place, critics have noted that the subjects were not actually

observed as children or as adolescents. Besides, the researchers obtained information about the subject's gender identity and sexual orientation by hearsay as no attempt was made to interview them directly (Money 1977). A re-evaluation of the Dominican Republic study revealed that most of the subjects in the study had realized at an early age that they were different from other girls and were even associating with boys before they reached puberty (Rubin et al 1981). Again this raises doubts about the claim that these individuals were unambiguously brought up as females.

### ***5.10 Summary and Conclusion***

I began this chapter by examining the postnatal hormonal hypothesis. This hypothesis has been shown to be false. There is no consistent evidence to suggest that homosexual men are different from heterosexual men in their circulating hormone levels. Nevertheless, consistent with the teachings of Lakatos, this has not led to the abandonment of the hormonal research program. Instead, investigators have shifted their focus to prenatal hormones. Unfortunately, the prenatal hormonal theory is also beset with numerous difficulties. Most of the predictions derived from this theory have been falsified. The prediction that homosexuals and heterosexuals will differ in their luteinizing hormone (LH) response to estrogen administration, for example, has not been refuted. Furthermore, we have seen that the prenatal hormone hypothesis is based on an animal model whose relevance to the understanding of human homosexuality is suspect. Turning to naturally occurring endocrine disorders, we saw that studies of individuals with these disorders are open to contradictory theoretical interpretations and in any case most homosexuals have no measurable hormonal abnormalities. More research, which includes

larger sample sizes and better methodological control, is needed before a causal link between homosexuality and hormones can be established. But perhaps more important an attempt should be made to find out how hormonal and experiential factors could interact to influence sexual orientation.

## **Chapter 6**

### **Biological Research Program: The Brain Structure Hypotheses**

#### ***6.1 Introduction***

In addition to the hormonal hypotheses discussed in the preceding chapter, workers in the biological research program have hypothesized that there exist anatomical differences in the size and cell number of various nuclei in the brains of homosexual men as compared to heterosexual men. This particular subprogram relies on the idea that the brains of gay men are characteristically feminized, and hence assumes that if men desire other men they must be like women. Thus gay men are to be viewed as failed men while lesbians are to be viewed as failed women. Indeed, according to this line of thinking, homosexuality should be viewed as a 'hermaphrodisism' of the brain. The brain structure hypothesis can also be viewed as a subset of Gunter Dörner's prenatal-hormone theory (which was discussed in the previous chapter) in that it assumes that androgen deficiency during the critical period of fetal development feminizes the male brain while androgen exposure masculinizes the female brain (Dörner 1976). According to Dörner's theory, homosexual men, are, in hypothalamic terms, like women. But the idea that homosexuals are cross-gendered is not entirely new. Karl Ulrichs, a nineteenth century thinker and father of the gay rights movement, conceived of homosexuals as a distinct class of people in that they possessed the bodies of their biological sex but the minds of the opposite sex (Kennedy 1988).

In this chapter I will focus on three studies that have reported differences between the brains of homosexual and heterosexual men in three different regions of the

hypothalamus. These are: the third institial nucleus of the anterior hypothalamus (INAH3), the anterior commissure (AC) and the suprachiasmatic nucleus (SCN).

## ***6.2 The Search for Neuroanatomical Differences***

The existence of structural anatomical differences correlated with sexual dimorphism in the human brain has implicitly been presumed since the days of Aristotle. However, the actual research into these differences can be traced back to the late 1970s, when Roger Gorski and his co-workers discovered a group of cells in the medial preoptic part of the rat's hypothalamus that was 5 to 6 times larger in volume in males than in females (Gorski 1978). This sex difference was so clear, it could even be observed without the aid of a microscope. Gorski and his group named this cell group the 'sexually dimorphic nucleus of the preoptic area', or SDN-POA. This region of the hypothalamus has long been associated with general life functions such as eating, sleeping and reproduction. In rats, the SDN becomes sexually dimorphic as a result of perinatal hormone exposure. Investigations have shown that prenatal stress or castration of male rats on the first day of life reduces the volume of this nucleus permanently (Gorski 1984, Gorski et al 1978, Anderson et al 1985). Conversely, when newborn female rats are injected with tamoxifen (an anti-estrogen) the volume of their SDN-POA is decreased, suggesting demasculinization (Hines et al 1987). Although the hypothalamus in general is a crucial area for the regulation of sexual drive and behavior, the exact function of the SDN is not known. However, a study by De Jonge et al (1989) has shown that lesioning the SDN in male rats produces lordosis and affects their libido.

The human analogue of the SDN-POA is thought to be contained in one of the four interstitial nuclei of the anterior hypothalamus or INAH, but precisely which of the four is unclear. One morphometric study of what Swaab and Fliers considered to be the human SDN-POA (formerly known as the intermediate nucleus), revealed that the volume is more than twice in men as it is in women and contains twice as many cells in men (Swaab and Fliers 1985). In other words, like the rat SDN-POA, the human SDN-POA was found to be sexually dimorphic. It is important to note that no difference in SDN cell number was observed between homosexual and heterosexual men. This finding has been interpreted as refuting Dörner's hypothesis, which holds that male homosexuals have a female hypothalamus.

Nevertheless, the existence of sexual dimorphism in the SDN-POA is somewhat controversial, as two other groups of researchers have failed to confirm the initial report (Allen et al 1989, LeVay 1991). Swaab has tried to account for this apparent anomaly by pointing out that the subjects in their own study and that of Allen et al were drawn from two different age groups. He notes that while in Allen's study 70 percent of the adult subjects came from the age group in which SDN size difference is minimal (50 to 60 years), in their own study (Hofman and Swaab 1989) only 29 percent of the subjects came from that group. Unfortunately, this argument cannot be applied to LeVay's study, which also failed to find a sex difference in the volume of this nucleus in spite of the fact that his subjects belonged to the same age group as the subjects in Hofman *et al's* study.

Other regions of the brain that have been found to be sexually differentiated include the third and second interstitial nucleus of the anterior hypothalamus, corpus callosum, massa intermedia, amygdala, the bed nucleus of stria terminalis, the anteroventral periventricular nucleus and the anterior commissure. These findings have led some investigators to speculate that the same regions could also vary according to sexual orientation.

### ***6.3 The Suprachiasmatic Nucleus***

As already indicated, the brain structure hypothesis predicts that there should be differences in the size of certain nuclei in the brain of homosexual and heterosexual males. The first attempt to test this hypothesis was made by Swaab and Hofman (1990) and involved a region of the brain known as the suprachiasmatic nucleus, or SCN in short. The SCN acts as the body's internal clock by generating circadian rhythms. It regulates and coordinates the body's daily rhythms such as sleep, temperature, mental alertness, physical activity and the secretion of hormones.

Swaab and Hofman's study involved 34 postmortem subjects; 18 of whose sexual orientation was not known which also served as a control group, 10 homosexual men who had died of AIDS, 4 heterosexual males who had died of AIDS and 2 heterosexual women who had died of AIDS. The study reported that the SCN of homosexual men was larger in volume and number of neurons than that of heterosexual men. The SCN volume in homosexual men was 1.7 times as large and contained 2.1 times as many cells as the SCN in heterosexual men. Interestingly, the only difference that this study found between

heterosexual men and heterosexual women in this area was one of shape. In heterosexual men, this region was shaped like a sphere while in heterosexual women and homosexual men it was more elongated.

Since the SCN also acts as a biological clock, Swaab and Hofman have further hypothesized that sleep patterns of homosexual men should differ from those of heterosexual men. Some limited support for this prediction comes from Hall and Kimura's study, which found that homosexual men had a rise-and-retire pattern that was more like that of heterosexual women than of heterosexual men. On average, homosexual men tended to get up and go to bed earlier than heterosexual men just like heterosexual women (Hall and Kimura 1993). However, it is not clear why the sleeping patterns of homosexual men should resemble those of heterosexual women given that the size of the SCN itself was not found to vary according to sex.

This study can be criticized on both methodological and conceptual grounds. In the first place the researchers relied on hospital records to arrive at the sexual orientation of the experimental subjects. The investigators had no access to the subjects' own assessments of their sexual orientations or to the history of their same-sex or heterosexual contacts. As noted in chapter two, assessing an individual's sexual orientation is a complicated affair and different types of rating scales have been developed to deal with this. We don't know how the hospital workers assessed the sexual orientation of these subjects but it is unlikely that a sexual orientation scale was used. Since most of the experimental subjects had died of AIDS, the hospital records may only have indicated how the patients acquired



the virus e.g. through same-sex contact, heterosexual contact or intravenous drug use. This kind of information can only suggest a behavioral rather than a dispositional account of sexual orientation and is therefore not very helpful. Furthermore, as we saw in chapter two, evidence of sexual relations with members of the same gender is not a suitable criterion for assuming homosexuality. Some heterosexuals may engage in homosexual behavior due to situational unavailability of members of the opposite sex, as happens in monasteries, boarding schools and prisons. It would be wrong to classify such individuals as homosexual if by a homosexual we mean a person who has a sustained erotic attraction to people of the same gender. Indeed, as was pointed out in chapter one, it is logically possible for an individual to have a sexual orientation that is discordant with his or her sexual behavior.

Another major difficulty with this study is that although the homosexual and the heterosexual subjects died of opportunistic infections arising from AIDS, they were not matched for clinical diagnosis. In fact, only one set of subjects were diagnosed as suffering from the same type of illness i.e. cytomegalic infections. The rest were diagnosed as suffering from different combinations of illness. It is a well-known fact that many viruses that attack the brain target specific regions and this might have contributed to the SCN differences that Swaab et al reported (Rogers 2001: 65). It is also important to note that, although the SCN is located within the hypothalamus, which is intimately involved in sex hormones and sexual behavior, the SCN is not known to play any direct role in sexual behavior. It is therefore difficult to understand its relationship to sexual orientation or to see any significance in Swaab et al's findings.

Some critics have also suggested that homosexual behavior may actually have increased the neuronal number in the SCN of the brains of the homosexual men that Swaab et al studied. This hypothesis is not completely implausible. Laboratory experiments on rats have shown a close correlation between the size of the sexually dimorphic nucleus and the level of sexual activity. Unless and until brain tissue from homosexual men dying of other causes becomes available, this possibility cannot be completely ruled out. Also, at the moment, it is not possible to test whether measuring the SCN in life could allow one to predict future sexual orientation. Another important point to note is that the size of the SCN did not vary with sex. The cell number in the SCN of both heterosexual men and women was the same and this again contradicts Dörner's hypothesis that homosexuals have an intersexed brain.

#### ***6.4 LeVay and the Third Interstitial Nucleus of the Anterior Hypothalamus (INAH-3)***

Another attempt to test the brain structure hypothesis was carried out by Simon LeVay and focused on another part of the brain known as the third interstitial nucleus of the anterior commissure or INAH-3 in short. LeVay's research into the brain differences of homosexual and heterosexual men was motivated by the work of Laura Allen who had identified four small groups of neurons in the anterior portion of the hypothalamus, which she called the interstitial nuclei of the anterior hypothalamus (INAH) 1, 2, 3 and 4 (Allen 1989). This study had shown that INAH-3 and INAH-4 were sexually dimorphic in human beings. They were significantly larger in men than in women. LeVay's hypothesized that INAH-2 and/or INAH-3 were large in individuals sexually oriented

toward women (heterosexual men and homosexual women) and small in individuals sexually oriented toward men (heterosexual women and homosexual men). The study consisted of forty-one postmortem brains. Nineteen of these belonged to self described gay men, all of whom had died of AIDS; sixteen presumed heterosexual men, six of whom had died of AIDS and were intravenous drug users, and six presumed heterosexual women, one of whom had died of aids. It is important to note that there was no brain tissue from homosexual women available. LeVay reported that the INAH-3 was half the size in women and homosexual men as it is in heterosexual men. In other words, in addition to finding that INAH-3 was larger in heterosexual males than in heterosexual women, he also found that it was smaller in homosexual men than in heterosexual men. He could not find any differences between the INAH-1 of heterosexual and homosexual men.

Two recent studies have partly corroborated LeVay's findings by showing that INAH-3 occupied a significantly greater volume and contained significantly more neurons in males than in females (Byne 2000, Byne et al 2001). However, it is important to note that the size differential was not as large as that reported by LeVay in his 1991 paper. Like LeVay, Byne et al postulate that the sex differences in the human INAH-3 may partly depend on sex differences in developmental exposure to gonadal hormones but he also points out that early experience can influence brain structure and that major expansion of the human mind occurs postnatally. In the second study, Byne did not find any difference in the number of neurons within the INAH-3 based on sexual orientation

but the same nucleus was found to occupy a smaller volume in homosexual men than in heterosexual men (Byne 2001).

On the surface, LeVay's findings might appear to offer strong evidence in support of the biological research program. However, closer examination reveals that there are major conceptual and methodological flaws, which weaken the study's conclusions. As a number of critics have pointed out, subjects were drawn from a small, highly selected and unrepresentative sample consisting mainly of AIDS patients. A larger sample will be required for a correlation between INAH-3 and sexual orientation to be established.

Another problem with LeVay's study concerns the way he determined the sexual orientation of the deceased subjects whose brain tissues he was examining. Those subjects who did not die of AIDS were assumed (in the absence of any evidence to the contrary) to be heterosexual. This, obviously, was a major flaw in scientific method and a peculiarly heterosexist assumption for a gay researcher to make. It is also important to note that LeVay assumed that all the men who died from AIDS but whose sexual orientation was not indicated in the medical records were heterosexual. Again this was a wrong assumption to make given that when this study was carried out AIDS was confined to homosexual and bisexual men. These assumptions may have led LeVay to classify some of the heterosexual men as homosexual and vice versa. Furthermore, LeVay failed to take into consideration possibility that some of the subjects were bisexual who contracted AIDS through homosexual intercourse. With regard to the brain tissue of the 'homosexual' subjects, he relied on hospital records to establish the subject's sexual

orientation. He made no effort to find out how the sexual orientation of these subjects was determined by the hospital workers. And since all the brain tissues studied were obtained posthumously, there is no way that LeVay could have used any of the sexual orientation rating scales discussed in chapter 2 to determine the range or extent of the subjects' sexual orientation. Furthermore, by adopting a bipolar view of sexual orientation, LeVay eliminated the possibility of a person with a sexuality that is neither heterosexual nor homosexual.

More importantly, some of the individuals that LeVay identified as gay had an INAH-3 that was larger than the average size of the INAH-3 of the heterosexuals and some of the heterosexuals had an INAH-3 that was smaller than that of the gay men. In other words, the differences were statistical rather than absolute. What this in essence means is that although the two groups considered as groups showed some clear differences, one could not tell an individual's sexual orientation by simply looking at his INAH-3. Indeed, if all that we know about LeVay's subjects is INAH-3 size, we can't predict whether they are heterosexual or homosexual. LeVay also does not give a satisfactory explanation of why the only bisexual subject in the study had an INAH-3 that was the same size as that of heterosexual subjects. Another important criticism of LeVay's study is that the baseline species variability in regard to INAH-3 is not known. In a larger sample of both heterosexual and homosexual men, as philosopher Timothy Murphy rightly points out, "the differences reported might vanish given the broad range of INAH-3 size that occurs regardless of sexual orientation" (Murphy 1997: 27).

It is also noteworthy that one investigator carried out all the tissue processing as well as anatomical measurements and anatomical tests in this study. A double blind approach would have been more appropriate in order to minimize personal bias. This, as Byne says, 'is the standard practice even in animal work' (Byne 1994). Moreover, INAH-3 is quite small and it is questionable whether it can be accurately measured considering that it is made up of the same type of cells as the surrounding tissue. Indeed, scientists disagree on the question of whether this nucleus should be measured by its volume or by the number of neurons. Swaab, as quoted in Marshall (1992), argues that the results of LeVay's study could have been stronger had he counted the actual number of neurons within INAH-3 instead of just measuring the volume. This, he says, would have gone a long way in ruling out errors that may have been caused by swelling or shrinkage.

A more profound objection to the findings of LeVay's study is that all homosexual subjects had died from complications arising from AIDS, but most of the control group of heterosexual men had died of other causes. People with AIDS are known to suffer from testicular dysfunction and this may directly affect their brains (see Byne and Parsons 1993). A related point is that some of the drugs used to treat opportunistic infections associated with AIDS, such as *ketoconazole*, may have lowered the level of testosterone in the bloodstream of the study subjects and this could have had an effect on the size of the INAH3 (Croxson et al 1989, Burr 1996). What this means is that the differences in the size of INAH3 that LeVay observed may actually have been caused by endocrine imbalances associated with AIDS. Research by Deborah Commins and her co-workers, as reported by Byne (1995), has shown that the size of the SDN-POA of Mongolian

gerbils, which is thought to be analogous to INAH-3 in humans, varies with the level of the circulating testosterone (Commings et al 1984). It is also noteworthy that when this study was carried out, those who contracted AIDS through homosexual intercourse tended to receive better medical care than those that contracted the disease through other means such as intravenous drug use. What this in essence means is that the homosexual patients may have lived longer than non-homosexual patients. This may have affected the hypothalamic structures differentially.

LeVay has countered this objection by pointing out that: (i) The INAH-3 size difference was apparent even when comparing homosexual men with heterosexual AIDS patients; (ii) the volumes of the other nuclei (INAH 1, 2 and 4) were not affected by AIDS and (iii) there was no correlation between the volume of INAH3 and the length of survival from the time when the subjects were diagnosed with AIDS. (If AIDS had an effect on this nucleus, those who had suffered from the disease longest should have had a smaller INAH3 than those who did not). These may appear to be strong arguments in defense of the study. However, taking into account that the number of heterosexuals who died of AIDS was very small, it is still possible that the observed differences in the size of INAH-3 resulted from complications associated with AIDS. Furthermore, LeVay's findings are partly contradicted by William Byne's study, which found that AIDS significantly influenced the volume of INAH-1 in both heterosexual men and women (the nucleus was 8 percent larger in heterosexual men and women with AIDS relative to individuals who did not have AIDS) (Byne 2001). Interestingly, the other three INAH

were not influenced by the HIV status of the study subjects, which makes LeVay's findings difficult to interpret.

Some critics have gone on to postulate that the length of the time between death and autopsy may have affected the hypothalamic structures that LeVay studied. It is also important to note that LeVay based his study on the assumption that the human INAH-3 was essentially the same as the SDN-POA in rats yet, as mentioned previously, the SDN-POA does not play a critical role in male-typical behavior in rats although it is located in area that is associated with sexual behavior. It is not clear whether it is INAH-3 or INAH-2 that actually corresponds to the SDN-POA of the rat (Allen et al 1989: 501).

On a more theoretical level, one could argue that even if LeVay was able to establish a correlation between homosexuality and INAH-3, he did not establish a causal connection. It remains to be proven that the enlarged INAH-3 was the cause rather than the result of altered sexual orientation. Indeed, we do not have any proof that the size of INAH-3 has any causal effect on sexual orientation, heterosexual or homosexual. LeVay himself has admitted that the results of the study do not allow one to decide whether the size of the INAH-3 in an individual is the consequence or the cause of that individual's sexual orientation. It is possible that the enlarged INAH-3 that LeVay observed in the brains of homosexual men was in fact the result rather than the cause of homosexual behavior. As Harrison et al explain, 'the promiscuous behavior and associated lifestyle likely to have been common among the homosexual men who die of AIDS may have caused the shrinkage of the INAH-3' (Harrison et al 1994: 815). This possibility cannot be



completely ruled out. Brain's neural networks are known to reconfigure themselves in response to certain experiences. For example, research has shown that when blind people learn Braille, the area of the brain that controls their reading finger becomes more active and enlarged (Pascual-Leone et al 1993). As another example, Eleanor Maguire and her co-workers at the University College London have shown that the hippocampus (a region of the brain involved in navigation and memory) of licensed London taxi drivers is larger compared with that of non-taxi drivers (Maguire 2000). The effect of behavior on selected brain cells has also been demonstrated in studies of cichlid fish (Hofmann et al 2000). Research has shown that specific cells in the preoptic area of the brains a male cichlid fish become enlarged when it acquires territory after dominating others. However, these particular neurons shrink in size when the same male loses its territorial status. Thus it is possible that differences in brain structure between homosexuals and heterosexuals that LeVay observed were caused by the frequency of sexual activity. Indeed, a number of studies have shown that homosexual men are sexually more active than heterosexual men (Bell and Weinberg 1978, Symons 1979, Johnson et al., 1994).

A final point that is worth noting is that LeVay's INAH-3 paper was initially rejected and later accepted by the editors of *Science*, a journal that does not normally allow the resubmission of manuscripts publication. Why an exception was made in this particular case is not clear, but William Byne suspects that the paper was originally rejected because, in his own words, 'it did not meet the minimum standards to which animal research in this area is held' (Byne 1995: 334). Steen (1996) remarks that the poorly done comparison between homosexual and heterosexual men 'should have precluded

publication in a preeminent journal like *Science*', while Byne maintains that the editors of *Science* should have demanded that LeVay's measurements of the brain tissues be repeated and verified by independent investigators before the paper could be published. Unfortunately, Byne's request to *Science* that LeVay shares his materials with other anatomists was turned down. The editors of *Science* also rejected a technical comment by Byne himself arguing 'that considerable space had been devoted to LeVay's report' (Byne 1995: 335).

### ***6.5 The Anterior Commissure***

Shortly after the publication of LeVay's INAH-3 findings, Allen and Gorski (1991) reported another difference between the brains of homosexual and heterosexual men in another part of the brain known as the anterior commissure (AC). The anterior commissure is one of the two clusters of nerve fibers that connect the two hemispheres of the brain. It has been found to vary according to sex. The other commissure is known as the corpus callosum. The exact function of the AC is not known but it is unlikely to be directly involved in sexual behavior.

An earlier study by Allen and Gorski (1991) had shown that the anterior commissure is sexually dimorphic. This nucleus was found to be 12 percent or 1.17mm larger in females than in males. The results of this study led Allen and his team to hypothesize that the AC is also dimorphic according to sexual orientation. When Allen and Gorski compared the size of the structure in gay and straight men, they found that it was larger in the gay men than in heterosexual men. The size of AC of the homosexual men was found

to be 18 percent larger than in heterosexual men and 34 percent larger than in heterosexual women. This study supported the hypothesis that factors operating during the critical period of an individual's development 'differentiate sexually dimorphic structures and functions in a global fashion' (Allen et al.1992: 7202).

As LeVay has noted, this study seems to strengthen his earlier finding that the brains of homosexual and heterosexual men are in deed different. LeVay suspects that the size differences may have come about during the original sexual differentiation of the anterior commissure, either under the influence of gonadal hormones or as a consequence of developmental events in the cortical regions that it interconnects (LeVay 1994: 123).

This study suffers from many of the problems affecting LeVay's study. In the first place, the researchers relied on autopsied brains many of them from men who had died after a long period of being infected with AIDS. It is noteworthy that 24 out of the 30 homosexual subjects had AIDS while only 6 of the 30 heterosexuals died of AIDS. Although deliberate effort was made to exclude the brains of all persons who showed any evidence of pathology affecting the brain tissue, critics have pointed out that AIDS could cause subtle brain pathologies that might not be easily detected (Steen 1996). Moreover, as with LeVay's study, Allen did not obtain adequate information on the sexual background of his subjects. She relied on medical records to determine the sexual orientation of the subjects. We don't know how the health workers who were attending to these subjects as patients arrived at the conclusion that they were homosexual. Was it because they contracted AIDS through homosexual contact? How were they rated on the

Kinsey sexual orientation scale? It was not possible to verify the sexual orientation of these subjects since they were all dead. It is also noteworthy that the 'heterosexuals' were classified as heterosexual if the hospital records did not indicate otherwise. Again as with LeVay's study, given that homosexuality is a stigmatized trait, it is likely that some of the patients who were classified as heterosexual were in fact homosexual. Anticipating this criticism, Allen argues that erroneous classification is likely to have decreased the chances of observing significant differences rather than resulting in apparent non-existent differences. However, one could also argue that the significant size differences that were observed in spite of the misclassification may actually indicate that even within the two groups of subjects the variation in the size of the AC was very big. What this would imply is that the AC size might not be very helpful in distinguishing homosexuals from heterosexuals.

A related point is that male and female subjects were classified as heterosexual when the medical records did not indicate homosexual orientation. It is not clear whether those subjects that Allen et al classified as heterosexual (at least the ones who died of AIDS) were ever asked to state their sexual orientation. If this was done, why was the sexual orientation not stated in the medical records? Given that homosexuality is stigmatized in most societies, it is possible that some of the individuals who were classified as heterosexual were in fact homosexual.

As already pointed out, there is no proof as yet that the anterior commissure is directly involved in regulating sexual behavior. The only possible connection comes from the

observation that heterosexual men are more likely to be stutterers, left-handed or dyslexic than heterosexual men and women and these conditions are associated with the two brain hemispheres that are joined by the AC (Gotestam et al., 1992, Gotestam 2001, Larumiere 2002). Unfortunately, this possible connection is yet to be fully explored

It is also important to note that there was considerable overlap between the AC sizes of the two groups. The sizes of the AC in 27 of the 30 gay men in the study were within the range of sizes found among the 30 heterosexual men in the control group. This in made it difficult to determine whether a given brain specimen was from a homosexual or heterosexual male individual. Again, as with LeVay's study, the gay men in this particular study may have had a smaller anterior commissure as a result of years of action peculiar to a homosexual lifestyle, rather than the structure of the AC causing them to be homosexual. Another possibility is that there is no causal connection between sexual orientation and the size of the AC, but both co-vary under the influence of some third, unknown variable. Allen's hypothesis has been contradicted by two separate studies, the first by Demeter et al (1988) who found the AC to be larger in males than in females and a more recent one by Lasco et al (2002) who failed to detect any variation in the size of the AC with either sex or sexual orientation. Studies in rats have also produced discrepant results regarding possible sexual dimorphism of the AC (Bishops et al 1999, Jones et al 1997). The contradictory nature of these findings does not allow us to conclude that progress has been made in this particular subprogram.

## ***6.6 Conclusion***

In this chapter, we have seen that although an array of evidence has been adduced in support of the brain structure hypotheses, this evidence is riddled with inconsistencies and the studies designed to test this hypotheses suffer from methodological weaknesses that prevent us from arriving at a definite conclusion regarding the cause(s) of homosexuality. The findings are also open to different kind of interpretations. I contend that even if these studies are successfully replicated, it will not justify drawing extravagant conclusions. As already argued, finding a difference between the brain structures of homosexuals and heterosexuals is not the same as establishing a cause. The direction of causation may be difficult to establish, as behavior both affects and is affected by brain structure and function. In any case our current understanding of the brain is inadequate to explain how such quantitative differences could account for so complex a phenomenon as homosexuality. And as Marcia Barinaga comments 'it may be difficult ever to establish that INAH-3 or any other brain structure actually causes homosexuality, or to rule out the possibility that childhood or adolescent experience may have altered the size of INAH-3 in homosexuals' (Barinaga 1991: 957). Furthermore, the brain structure hypothesis is based on the questionable presumption that homosexual men more resemble females than males, and so one should expect to find a female brain in a male homosexual. This supposition, as a review of human sexual history reveals, is culture bound, inadequate and unsustainable. In some societies, those with predominantly same-sex desires were considered the 'most manly of men and womanly of women' (Byne 1994: 26). As we saw in chapter 2, among the Sambia of the highlands of Papua New Guinea and the ancient Greeks, for example, homosexual relations between men

was not only tolerated, but it was also regarded as perfectly compatible with masculinity. What this study has shown so far is that, like the environmentalist research program, the biological research sub-program has not made much progress. In fact, from the point of view of methodology of scientific research programs, the rise in popularity of biological explanations in the last two decades is not rationally justified as the available evidence is not convincing and not much has been achieved by way of predicting novel facts and accommodating anomalous data in a non-*ad hoc* way.

## **Chapter 7**

### **Beyond the Nature-Nurture Dichotomy**

#### **7.1 Introduction**

In the preceding chapters, we saw that there are basically two rival research programs for explaining human sexual orientations, namely, the biological and experiential research programs. I also pointed out that although a number of scholars have suggested an interactionist model, most of them continue to accept the language and the thinking of traditional dichotomies: nature/nurture, innate/learned, organism/environment. Indeed, as a number of commentators have pointed out, the etiology of sexual orientation debate constitutes yet another round in the old nature/nurture controversy and perhaps it is this dichotomization that has prevented researchers from arriving at a satisfactory explanation of the etiology of homosexual orientation. It would seem that nature and nurture interact in subtle ways that have not yet been deciphered by these researchers.

In this chapter I shall explore the broad nature-nurture controversy with a view to identifying a more acceptable conceptual framework for studying the genesis of human male homosexuality. To this end, I shall examine two main approaches to the study of human behavior, which explicitly reject the nurture-nature dichotomy. I have in mind evolutionary psychology as developed in *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (1992) by Jeremy Barkow, John Tooby and Leda Cosmides and the developmental systems theory advanced by Susan Oyama in her book *Evolution's Eye: A systems view of Biology-Culture Divide* (2000).



## **7.2 Nature-Nurture Controversy**

To what extent is human behavior the product of biology (genetic factors) and to what extent is it determined by events in the external environment? These questions have pre-occupied the minds of thinkers throughout the ages. The pendulum of both scientific and public opinion has swung back and forth -sometimes favoring nature and sometimes favoring nurture.

The formulation of Darwin's theory of evolution in the eighteenth century led many theorists to place a lot of emphasis on the role of nature (heredity) in human development. In *The Descent of Man* (1871), Darwin had said that in addition to special tastes and habits, general intelligence, courage, bad and good tempers were passed on from one generation to another. This was an important idea because it implied that one could change the traits of animals by selecting for both psychological and physical qualities. Today, natural selection and the heritability of traits remain the central tenets of the theory of evolution, since new traits must be inherited for evolution to occur. Darwin's emphasis on the importance of heredity in determining both physical and psychological traits was instrumental in persuading generations of scientists to see the influence of genetics in almost every human trait.

One of the first people to study the differences between individuals and to demonstrate the importance of their basis in heredity was Francis Galton, a cousin of Darwin. Galton conducted the first systematic family studies that sought to show that behavioral traits run in families (Galton 1869). He went on to suggest that people with inherited disorders

should be discouraged from siring children while those who were genetically fit should be encouraged. In fact it is Galton who coined the term 'eugenics' to describe such a program (see Cartwright 2000: 21). He strongly believed that science would one day be able to direct, with absolute precision, the development patterns of human evolution.

Amongst those who were influenced by Galton's work was the French diplomat and writer, J.A. Gobineau, who in his essay on the 'inequality of the human races', asserted that differences in the abilities of men were entirely innate. Gobineau's standpoint was later taken up by the English-German political thinker Houston Stewart Chamberlain. It was put into practice by racists in Southern United States, and in the most extreme form, by Adolf Hitler and his followers during the Second World War (Steen 1996).

However, with the rise of behaviorism in the nineteenth century, the environmentalist position once again gained dominance. Behaviorists John B. Watson and B.F. Skinner, for example, maintained that early training could turn a child into any kind of adult regardless of his or her heredity. This view was forcefully articulated by Watson when he wrote:

Give me a dozen healthy infants, well formed, and my own specified world to bring them up in, and I'll guarantee to make anyone at random and train him to be any type of specialist. I might select -doctor, lawyer, artist, merchant, and, yes, even beggar man and thief, regardless of his penchants, tendencies, abilities, vocations, and the race of his ancestors (Watson 1924: 104).

Watson's position was that whatever might be regarded as innate or inborn properties of the organism could be explained in terms of conditioning processes begun at an early age. For him, such qualities as talent, temperament and mental constitution were acquired not

inherited. He thus advocated experiential determinism, which left no room for the effects of genetic or biological factors.

Of late, the popularity of genetic explanations has been on the rise. Genetic predisposition to everything ranging from cancer and obesity to criminality and homosexuality are being reported on a regular basis in scientific journals as well as in the popular press.

### ***7.3 Interactionism***

A number of investigators today proclaim that both nature and nurture interact continuously to guide development. They argue that none of the characteristics that a human being displays could occur in the absence of either an appropriate heredity or an appropriate environment. For example, the development of personality traits such as sociability, temperament as well as intelligence appears to be equally influenced by heredity and environment. What this means is that the effects of hereditary and environmental factors are not additive or cumulative, but rather that the nature and extent of the influence of each type of factor depends upon the contribution of the other. Any one environmental factor will exert a different influence depending upon the specific hereditary material upon which it operates. In the same vein, any hereditary factor will operate differently under different environmental conditions.

A classic example that is frequently cited to illustrate the gene-environment interaction is phenylketonuria (PKU), a genetic condition that results in mental retardation in humans if left untreated. PKU results from the inability of the body to metabolize phenylalanine, an

amino acid found in proteins. A build-up of this acid in the body causes a host of phenotypic and behavioral effects including severe brain damage. Today this condition can be treated effectively by placing affected individuals on a diet with restricted phenylalanine intake. This treatment is widely used and has been successful in reducing the effects of this disease. A century ago, the explanation why some people ended up with PKU syndrome while others did not was entirely genetic. The reason for this was that almost everyone ate diets containing phenylalanine. Today we know that genes and environment make a difference; PKU is as much influenced by environmental factors as it is by genetic factors (Burian 1983).

Another example of the dynamic integration of genes and environment is that of the coral reef fish, *Anthias squamipinnis*. These fish are able to change their sex in response to the presence or absence of a male. As Gottlieb reports:

These fish live in spatially well-defined, social groups in which there are many females and a few males. When a female dies or is otherwise removed from the group, one of the females initiates a sex reversal over a period of about two days in which she develops the coloration, behavior, and gonadal physiology and anatomy of a fully functioning male... Such sex reversals keep the sex ratios about the same in social groups of coral reef fish. Apparently, it is the higher-ranking females that are the first to change their sex and that inhibits sex reversal in lower ranking females in the group (1991: 9).

The point that needs to be emphasized here is that the same genotype can give rise to a wide variety of phenotypes depending upon the environment in which it develops. In other words, an organism's genotype sets the limits for the development of characteristics; but

the environment, interacting within these limits, plays an essential role in determining what the phenotype will eventually be.

A number of scholars such as the English psychologist Anna Anastasi have argued that science should aim to discover how hereditary and environmental factors work together to produce behavior. In her famous paper, published in the *Psychological Review* (1958), Anastasi pointed out that the difficulties in the nature/nurture controversy stem from the fact that investigators have been asking the wrong questions. They could not therefore get the right answers. Does nature or nurture provide the determinant source of human behavior? This is the 'which one' question. Those who formulate the question in this way assume the independent, isolated action of one or the other in providing a source of behavior. But this question is illogical and does not make much sense. As Anastasi rightly pointed out, there would be no one in an environment without heredity, and there would be no place to see the effects of heredity without an environment. Sandra Scarr and Richard Weinberg [1980: 859] made a similar point when they wrote: 'One cannot assess the relative impact of heredity or environment on intelligent, per se, because each person must have both a viable gene complement and an environment in which the genes can be expressed. Thus, no genes, no organism; no environment, no organism'. From the foregoing, we can see that although nature and nurture are inextricably bound. It would therefore be inappropriate to ask 'which one?' because both are completely necessary for the existence of any kind of behavior.

Of course some psychologists had recognized the inappropriateness of the 'which one' question long before Anastasi's 1958 paper was published. Yet others had asked another question that Anastasi maintained was also inappropriate, because it too led to a conceptual dead end. This is the 'how much' question. The problem with this kind of question is that it assumes that heredity and environment are additive, separately acting causes whose contributions to any characteristic can be separated statistically. In other words, the question assumes that nature and nurture (genes and environment) are related to each other in such a way that the contribution of the one is added to the contribution of the other to produce a particular trait. The truth of the matter however is that we cannot answer the question, 'how much' because the contribution that the two factors make to biological traits are not made in a common currency (Ariew 1999: 125). This question does not seem to make sense when applied to an individual organism. Indeed, every developmental biologist knows that every aspect of an individual's phenotype is a joint product of the interaction between its genes and its environment. Experiments on animal development have shown that these factors are interdependent causes that render statistical separation invalid.

The right question to ask, according to Anastasi, is 'how', that is, 'how do nature and nurture interrelate to provide a basis for behavior?' She believes that this is the correct way to formulate the nature-nurture issue because it is based on the interactive, multiplicative-action assumption. This implies that both nature and nurture are involved in development and cannot function in isolation from one another. The question 'how' leads

the psychologist to a consideration of the interactive effects of nature and nurture in providing a source of development.

Nevertheless, Anastasi recognizes that the part played by hereditary factors might be more fundamental in some aspects of development than in others. She suggests that hereditary influences are best understood in terms of a continuum of indirectness. At one end of the continuum are the contributions of heredity that are most direct, such as physical characteristics like eye color and chromosomal disorders like Down's syndrome. Contributions of heredity that are quite indirect such as the social stereotypes that the members of a given society attach to various categories of skin color and hair texture fall at the other end of the continuum (Anastasi 1958: 198). However, as will become clear in our discussion of developmental systems theory, Anastasi's formulation risks perpetuating the very nature/nurture dichotomy it seeks to eliminate. As Oyama [2000: 54] aptly puts it, 'replacing the nature-nurture dichotomy with a continuum does not solve the problem'. Indeed, despite protestations to the contrary, the nature-nurture debates live on and the terms of its closure are still the subject of contentious arguments.

### ***7.5 Developmental Systems Theory***

Developmental systems theory (hereafter DST) promises to offer a powerful explanatory framework with which to resolve the nature-nurture dichotomy discussed above. It challenges development accounts that are centered around a dichotomy between genes on the one hand and environmental factors on the other. DST theorists maintain that biological variables both influence and, reciprocally, are influenced by contextual ones.

Accordingly, stances about nature-nurture that stress the primacy of either context in human development are explicitly rejected by developmental systems perspective (Lerner 1985). On this view, it is impossible to assign causal primacy to either genes or environment for a particular phenotypic outcome.

DST sees individual development as hierarchically organized into multiple levels such as genes, cells, organ, system, behavior and environment; that can mutually influence each other. The most important feature of the DST, as Gottlieb (1991: 5) notes, 'is the recognition that the genes are an integral part of the system and that their expression is affected by events at other levels of the system, including the environment of the organism'. It would therefore be wrong to think that the causal role of genes in producing a particular trait is different in kind from that of non-genetic factors.

One of the chief proponents of developmental systems theory is Susan Oyama. In her book, *Evolution's Eye: A Systems view of Biology-Culture Divide* (2000), she draws on psychology, biology and anthropology, as well as philosophy and history, to explore the many ways that the nature/nurture opposition is expressed and the reason it continues to have such a powerful influence on research, theory, and interpretation. Oyama explicitly rejects the determinism inherent in the nature/nurture debate. She maintains that human behavior cannot be reduced to distinct biological or environmental causes. But Oyama is also quick to point out that what is required is a radical reformulation of both nature and nurture and not 'conciliatory declarations that they are both important'. She urges that 'if development is to re-enter evolutionary theory, it is the development that integrates genes



into organisms, and organisms into the very many levels of environment that enter into their ontogenic construction' (Oyama 2000: 113).

The interrelationship between nature and nurture, organism and environment is dramatically emphasized when man is exposed to an alien context. As Keith Richardson reports, to be able to walk on the moon, astronauts must practice here on earth under man-made gravitational conditions similar to those of the moon, yet walking is commonly considered to be a genetically programmed trait. Richardson goes on to ask 'if we can be wrong about something as relatively simple as walking, can we rely upon the validity of the two central assumptions of which it is supposedly just an obvious example, that 'nature/nurture' dichotomy and causal change by formation constitute a valid basis for psychological theorizing?' (Richardson 2000: 2)

Oyama contends that nature and nurture are not alternative sources of form and causal power. Instead, she says, 'nature is the *product* of the *processes* that are the developmental interactions we call nurture' (Oyama 2000: 48). According to this view, ontogenetic information, whether about our body or behavior, does not exist in our genes or the environment but is constructed in a given developmental context. It is therefore impossible to assign causal primacy to either genes or environment for a particular phenotypic outcome. What this in essence means is that nature and nurture are mutually facilitating and mutually constraining in influencing behavior. However, these influences are flexible, not absolute. The gene should not therefore be viewed as a privileged source of information containing blue prints or programs for phenotypic variation. Thus Oyama

exhorts us to recognize the systemic nature of interaction and development in which the boundaries between dichotomous categories dissolve.

These systems include the genes and developmentally relevant aspects of the environment. Organisms, according to DST, are not designed to solve problems presented by an independent environment. Rather, organisms and environments are co-evolving and mutually defining. Development is therefore to be looked at as a construction and not as a printout out of preexisting code (Oyama 2000: 22). This constructivist view enables us to eliminate the nature-nurture distinction while retaining an evolutionary perspective.

#### ***7.4 Evolutionary Psychology***

Another approach to the study of human behavior that explicitly rejects the nature/nurture dichotomy and which might prove useful to the study of homosexual behavior is evolutionary psychology. Recent trends in this field of study suggest that enduring human traits that are well above the mutational equilibrium and which are maladaptive today may have served a useful purpose in the past (Barkow et al 1992). Indeed, the primary goal of evolutionary psychology is to show how psychological adaptation underlies much of human behavior. It has been described as a 'progressive program capable of providing us with new knowledge of how the mind works' (Ketelaar et al 2000: 1).

According to this new and exciting field of inquiry, the human mind was designed by natural selection to solve the problems that our ancestors constantly encountered during the hunter-gatherer era in the African Savannah (Symons 1992). This approach is already

changing the way we look at many aspects of human behavior, which had in the past proved difficult to explain. The mind, according to this view, is not a blank slate or *tabula rasa* as philosopher John Locke said, but a collection of tools each specialized for solving a different ancestral problem. Evolutionary psychologists have likened the mind to a Swiss army knife with lots of different gadgets (modules) each of which is designed for a specific task. The adaptive problems that our hunter-gatherer ancestors faced ranged from acquiring mates and forming social alliances to avoiding predators and inedible plants.

Barkow, Cosmides and Tooby, the three pioneers of this field, have outlined the intellectual framework of this new discipline and set out an agenda for future research in their book, *The Adapted Mind* (1992). Evolutionary psychology rests on the following assumptions:

1. The human mind is made up of information processing systems that are extraordinarily efficient in handling specific kinds of stimuli and responses to them.
2. Human evolution has not changed much since the Pleistocene hunter-gatherer phase.
3. Human information processing systems were evolved because they solved recurrent, universal problems of survival and propagation associated with Pleistocene hunter-gatherer environment and more efficiently than earlier systems.
4. These systems are 'content specific' and generate many invariant aspects of human culture.
5. Our modern skulls house a stone-age mind.

(Adapted from Cosmides and Tooby (2000: 3-11))

The basic idea here is that by looking at the adaptive problems that our hominid ancestors faced in the environment of evolutionary adaptedness (EEA), we can predict what kind of adaptive mental mechanisms evolved to solve those problems. However, it is important to emphasize here that these mental mechanisms will only apply to the way of life of Pleistocene hunter-gatherers, and not necessarily to modern circumstances.

Accepting the new paradigm, as Tooby and Cosmides (1992) have pointed out, demands that we abandon the old paradigm that has guided the social sciences for the last 100 years or so. This old paradigm, also called the standard social science model (SSSM), is to be replaced by an integrated causal model (ICM). Whereas the SSSM holds that the contents of the human mind are social constructions and that the social sciences are independent and disconnected from any evolutionary or psychological foundation, the ICM accepts and makes use of the natural connections that exist amongst all the branches of knowledge. It makes use of these connections to construct careful analyses of the causal interplay among all the factors that bear on a phenomenon. Indeed, evolutionary psychology should be viewed as a paradigm for integrating psychology with the rest of science.

According to the critics of the SSSM, this model rests on a misunderstanding of the nature/nurture issues. It fails to 'appreciate the role that the evolutionary process plays in organizing our species-universal genetic endowment, our evolved developmental processes, and the recurring features of developmental environments' (Tooby and Cosmides 1992: 33). It also assumes that the phenotype can be divided into genetically

determined and environmentally determined traits. As Cosmides and Tooby further explain:

The critique of the SSSM that has been emerging from the cognitive and evolutionary communities is not that traditional accounts have underestimated the importance of biological factors in human life. Instead, the target is the whole framework that assumes that 'biological factors' and 'environmental factors' refer to mutually exclusive sets of causes that exist in some kind of explanatory zero-sum relationship, so that the more one explains 'biologically', the less there is to explain 'socially' or 'environmentally'. On the contrary, as we will discuss, environmentalist claims necessarily require the existence of a rich, evolved cognitive architecture (Tooby and Cosmides 1992: 33-34).

Thus evolutionary psychologists are not concerned about the relative importance of nature and nurture or heredity and environment in the development of human behavior. On the contrary, like the developmental system theorists, evolutionary psychologists explicitly reject these dichotomies as ill conceived and unnecessary. They stress the importance of understanding how genetic and environmental factors interact, and point out that genes often build different minds in response to different environments. In other words, they maintain that the behavioral differences that we observe arise from identical psychological mechanisms encountering different developmental inputs.

Although evolutionary psychologists are yet to come up with a comprehensive theory of homosexuality their approach to the study of human behavior must be taken seriously by anyone seeking to explain the genesis of human sexual orientations, and especially homosexuality. Evolutionary psychologists have repeatedly pointed out that human behavior as we observe it today is a product of contemporary environmental influences

acting upon ancestrally designed mental hardware. Consequently, the behavior that results from such interaction may not be adaptive in contemporary context. Homosexuality could very well be one such behavior. It is possible that this trait was shaped for some adaptive purpose long ago but its adaptive significance may not at all be obvious today. This is precisely what Frank Muscarella recently proposed.

In a paper titled 'The Homoerotic Behavior that Never Evolved' (1999) Muscarella laments that despite its richness in heuristic value, evolutionary psychology has failed to address the phenomenon of homosexuality. Indeed, as he rightly points out, the general consensus among evolutionary psychologists is that homosexuality could not possibly have evolved since it does not have an adaptive value. Muscarella identifies and discusses a number of factors that may explain why there are no models in evolutionary psychology for explaining homosexual behavior. These include what he calls a false dichotomization of human sexuality, ambiguous definitions of the term 'homosexuality', and the negative attitude that most researchers have towards homosexuality.

Muscarella accuses evolutionary psychologists of making the erroneous assumption that humans can be categorized as either homosexual or heterosexual. This, he says, has led to the dichotomization of homosexual behavior itself, with some homosexual behavior being considered 'real' and some 'incidental'. Muscarella argues that by focusing solely on homosexual orientation (Kinsey 6) and dismissing incidental homosexual behavior, theorists are missing an evolutionarily significant behavior pattern in human sexuality. He suggests that if evolutionary psychology is to develop alternative models for

conceptualization of homosexuality, the focus of study should be behavior itself and not and not the 'unreliable' concept of homosexuality. The benefits of adopting such an approach are several. Muscarella says that it will increase estimates of homosexual incidence and provide support for its universality in humans. In addition, he says that implications of adaptive value will arise, and an understanding of the behavior's evolutionary history will be more compelling. Such an approach will also help to generate testable hypotheses. For example, Muscarella suggests that studies could be carried out to ascertain the high incidence of homosexual behavior in sex-segregated environments (such as prisons and boarding schools) hypothesizing a greater incidence of homosexuality in those environments that most closely resemble the environment of evolutionary adaptedness.

Another potent factor hindering attempts to formulate an evolutionary account of homosexual behavior is what Muscarella calls resistance to change. As he rightly points out, homosexuality has been stigmatized in most western cultures and this has contributed to its neglect in many universities. Muscarella calls for a paradigm shift in evolutionary theory and suggests that evolutionary psychologists should be urged to pay more attention to homosexual behavior in their study of human sexuality. Indeed, they should apply the same careful evolutionary analysis to homosexual behavior that is applied to other human behaviors. In addition, he suggests that primatologists, comparative psychologists as well as cultural anthropologists should be encouraged to theorize about the possible adaptive value of homosexual behavior.

Muscallela (2001) and Kirkpatrick (2000) have gone on to formulate an account of homosexual behavior that is based on evolutionary psychology. The two authors posit that humans evolved a disposition for homosexual behavior because it aided same-sex affiliation and alliance formation among hominid males. This, in turn, may have contributed directly to survival and indirectly to reproductive success.

But what adaptive problem(s) did our hunter-gatherer ancestors face to necessitate the emergence of homosexual behavior? Muscarella postulates that hominid adolescents, especially males, may have gone through a period of sex segregation and physical peripheralization, as happens with many non-human primates. This, he argues, resulted in aggressive and fatal inter-group and intra-sex encounters. This may have left them defenseless, with an increased chance of mortality and reduced reproductive survival. Muscarella further speculates that the capacity to engage in homosexual behavior may have served as a mechanism of affiliation among same-sex peripheralised hominids. Same-sex partners may in turn have helped each other survive and reproduce by providing access to food and protection from aggression. A similar hypothesis based on primate and anthropological record has been advanced by Kirkpatrick (2001). He argues that homosexual behavior is a consequence of individual selection for reciprocal altruism, which would have contributed to resource exchange and reduction in inter-male aggression.

Support for this explanation comes from the study of non-human primates such as chimpanzees and bonobos, which are man's closest relatives. Homosexual behaviors are



common among these primates and have been known to play an important role in reducing intra-sex aggression (Hambright 1995). Further support for this hypothesis comes from primate literature, which suggests that no non-human primate is exclusively homosexual although they do engage in homosexual behavior (Vasey 1995). These observations suggest that a capacity for at least some kinds of homosexual behaviors may be an ancestral feature of human sexuality.

## ***7.6 Conclusion***

In this chapter I have briefly reviewed the history of the nature/nurture debate. I have also described the two recent approaches to the study of human behavior that seek to transcend the nature/nurture dichotomy, namely, evolutionary psychology and developmental systems theory. A fruitful study of the genesis of sexual orientations, and human male homosexuality in particular, must seriously take into account these two approaches to the study of human behavior. As this study has shown, research into the etiology of homosexuality is polarized into biological and environmentalist research programs. We have seen that dichotomies such as nature versus nurture and psychological versus biological do not seem to make sense especially when complex human behaviors and traits are considered. Indeed, we must take Michael Ruse seriously when he urges us to 'shuck off the outmoded nature/nurture dichotomy which in the past has taken us nowhere' (Ruse 1985: 149). Taken separately, these approaches are nonviable. The ultimate challenge must therefore be to break away from these dualistic thought processes and to find out how biological factors interact with environmental factors to shape an individual's sexual orientation. Our aim must be find a middle ground between extreme

etiology of homosexuality is published in psychiatric journals which he believes are 'inappropriate' to a progressive *biological* research area" (Suppe 1994: 261).

We have seen that much of the available biological evidence has not been successfully replicated. Moreover, as with the experientialist program, workers in the biological program have not been able to adequately deal with the numerous anomalies besetting their program. This observation notwithstanding, the biological research program does appear to have a more powerful positive heuristic than the experientialist program, which explains why many scientists continue to invest their energies in it. But as Elie Zahar has rightly pointed out, no matter how successful in generating new hypotheses the positive heuristic of a research program is, it will not be considered progressive unless these hypotheses are corroborated by empirical facts (Zahar 1976).

Of course it would be wrong to conclude that experiential factors have no role to play in explaining why some people become homosexual while others become heterosexual just because the few experiential theories that have so far been advanced have been refuted. As we have already seen, even MZ twins who share the same genome are not always concordant for sexual orientation. In fact, if one twin is homosexual, the other has a 50 percent chance of being heterosexual. This observation alone would seem to require that non-genetic and perhaps even experiential variables be taken into account when explaining the genesis of homosexuality.

William Byne, a neuroanatomist and psychiatrist and one of the leading researchers in the area of sexual orientation, has summarized the current state of homosexual orientation research in the following words:

Recent studies postulate biologic factors as the primary basis for sexual orientation. However, there is no evidence at present to substantiate a biologic theory, just as there is no compelling evidence to support any singular psychosocial (read experiential) explanation. While all behavior must have an ultimate biologic substrate, the appeal to current biologic explanations may derive more from dissatisfaction with the present status of psychosocial explanations than from a substantiating body of experimental data (Byne 1993: 228).

Philosopher Frederick Suppe, too, is aware of the degenerating state of the two research programs. He notes:

The difficulties encountered by biological theories of homosexual etiology, the impressive refutation of extant social learning theories of etiology by Bell, Weinberg, and Hammersmith study and the manifest epistemic inadequacy of psychoanalytic theories means that after 1000 studies of homosexual etiology, we really haven't established much of anything positive about the possible causes of homosexuality (Suppe 1994: 257)

From these two quotations, it is clear that the current situation of the two major research programs for explaining homosexual orientation can only be described as one of stagnation. Although the two programs have made specific predictions, they cannot be said to be empirically progressive since many of these predictions have not been corroborated. Consequently, from the point of view of the methodology of scientific programs, the two programs have not contributed to the growth of knowledge.

But could the failure to explain the genesis of homosexuality scientifically be due to the fact that homosexuality is not a natural kind as social constructivists have claimed? Is

homosexuality an entirely cultural artifact? I answered these questions in the negative. Contrary to what the social constructivists would have us believe, I argued in chapter 2 that the etiology of homosexuality is a legitimate scientific research problem. There is strong evidence to suggest that homosexuality transcends cultures and historical epochs and that the homosexual is not merely a cultural artifact. Furthermore, despite definitional problems and difficulties in measurement, studies have shown that the incidence of male homosexuality (it is understood to be between 4 and 10 percent of the general population (Bower 1993)) has remained fairly constant and does not appear to change with new moral codes, social mores or the passage of time. This suggests that sexual orientation is a natural kind and therefore an appropriate candidate for scientific investigation. However, this should not be construed to mean that social constructivism is entirely false or that it has nothing to offer. On the contrary, the ways in which sexual orientations are expressed is dependent on history and social context and social constructivism might be able to offer useful insights into the interpretations of homosexuality that have been created by the dominant heterosexual world.

What does this episode in the history of science tell us about the descriptive adequacy and normative appropriateness of Lakatos' model? Before attempting to answer this question, it would be useful to distinguish between descriptive and normative philosophies of science. A philosophy of science is said to be normative if its main concern is the formulation of standards by which scientific theories are to be appraised. Such a philosophy sets forth and recommends a set of principles, application of which will contribute to the growth of scientific knowledge. A prescriptive philosophy of

science need not rest upon, or take account of the history of science. However, for it to be taken seriously, it must give some plausible reconstruction of the history of science. Indeed, if it departs too radically from the actual practice of science, it will be considered unacceptable.

Descriptive philosophy of science, on the other hand, is restricted to revealing the methodological standards and procedures that have informed scientific practice. On this view, the descriptive philosopher of science does not make recommendations on how science ought to be practiced. On the contrary, he merely displays the methodological standards and procedures that have been used during various episodes in history. The descriptive philosopher of science should be distinguished from the historian of science. While the historian will make a deliberate effort to be as impartial as possible, the philosopher will seek to analyze, generalize and theorize and not just remain on the level of recounting what the scientists do. But the distinction between descriptive philosophy of science and history of science is not that sharp, there is considerable overlap between the two. As John Losse has pointed out, 'whereas the philosopher must examine the individual evaluative decisions of scientists in order to identify the standards that underlie this practice', the 'historian must be cognizant of the pervasive influence of evaluative standards in order to create effective explanatory narratives' (Losse 1987: 143). However, it is worth mentioning that most philosophers of science today are of the opinion that philosophy of science should be both descriptive and prescriptive.

Returning to the question raised above concerning the normative appropriateness and the descriptive adequacy of Lakatos' model, there are four main possibilities:

One possibility is that the MSRP is descriptively adequate but normatively inappropriate. By this I mean that although the MSRP may be consonant with certain episodes in the history of science, it is not a methodology that scientists ought to follow. It is quite possible for an account of science to descriptively fit an episode in the history of science and at the same time fail to be normatively desirable especially if it was derived from one particular branch of science.

A second possibility is that the MSRP is normatively appropriate but descriptively inadequate. By this I mean that although the MSRP may be a good method for doing and evaluating science, it does not fit the actual history of science. Epistemological naturalists such as Quine (1969) and Laudan (1990) would definitely reject this possibility. According to this school of thought, our normative investigation about knowledge must be absorbed into a descriptive inquiry about what we actually know. In other words, one cannot work out the principles of scientific rationality a priori. A good theory of rationality, on this view, must be based on the actual scientific practice. As already mentioned, a normative philosophy of science that is not consonant with the actual scientific practice is likely to be challenged.

A third possibility is that the MSRP is both normatively appropriate and descriptively adequate. On this view, the MSRP not only captures the actual history of science but is also a normatively appropriate way of doing and appraising science.

The fourth possibility is that the MSRP is neither normatively appropriate nor is it consonant with the actual scientific practice. Given that Lakatos' model was derived from the actual history of science and considering that it was primarily designed to offer guidance to historians of science, it is unlikely that it would fail to at least fit some episodes in the history of science. As he himself puts it in the first part of his famous dictum, philosophy of science without history of science would be empty.

To a large extent, the history of etiology of homosexuality research fits the methodology of scientific research programs. Consistent with the teachings of Lakatos, this case study has shown that the story of homosexual orientation research can be understood in terms of two rival research programs each with its own hard core, a positive heuristic and a negative heuristic. Furthermore, there are clear institutional boundaries such as journals as well as academic departments that tend to keep the two research programs separate. From a Lakatosian perspective the two programs can also be said to have stagnated since they have failed to make any empirical progress by way of making successful predictions.

Frederick Suppe, in an examiner's report on an earlier version of this thesis, has challenged the account given of MSRP on the grounds that it neglects the notion of a

problem-shift as an individuating component of research programs. He contends that this omission undermines my pronouncements about the descriptive adequacy of MSRP.

My response to this challenge is that Suppe is attaching too much importance to the notion of a problem-shift while underemphasizing the notion of a hard core. In my view, the most important characteristic of a research program is the commitment to hard core assumptions. The fact that no significant problem-shift can be discerned in *some* of the subprograms discussed in this thesis actually means that these subprograms have stagnated i.e. they have neither been theoretically nor empirically progressive. I think that Lakatos' treatment of some other cases suggests that his judgment would accord with mine on these ones. Part of the point of analysis like Lakatos' is to enable us pronounce normatively on research programs, including those that are less sophisticated in their methodological sensitivity than the classic, great programs that rightly dominate the Lakatosian literature. We should not find ourselves unable to apply the critique because researchers are found to be a bit dull-minded and make no attempt to absorb anomalies. In any case, I have tried to show that in some of the subprograms discussed (especially the biological ones), attempts have been made to account for the anomalies by adjusting the protective belt of auxiliary hypotheses while retaining the hard core assumptions intact. This is precisely what Lakatos has in mind when he talks of a problem-shift. It is also important to note that the theories discussed in each of the two programs are not entirely unrelated. As LeVay and Hamer (1994) have pointed out, a 'gay gene' may make a brain that fails to take advantage of androgens circulating in the blood stream so that the individual (male) becomes homosexual.



If the only task of philosophy of science is to formulate objective standards for evaluating episodes in the history of science, then Lakatos' model has some merit. As already pointed out, using this methodology one can distinguish between progress and degeneration in a research program. However, if the task philosophy of science is also to give guidance to practicing scientists, Lakatos' model has some specific weaknesses. In fact, he gives the scientist no consistent standards to follow. (Of course Lakatos has repeatedly said that his methodology was not intended as a source of advice to scientists, but as I remarked earlier, it is logically impossible to separate appraisal from heuristic advice). As we saw in chapter one, Lakatos distinguishes between progress and degeneration, but then says that a degenerating program can make a come back. In another place he says that the final defeat of a research program can only be identified with hindsight, that is, long after the event. He contradicts himself further when he says that editors of scientific journals should reject papers submitted by workers in a degenerating research program. The question that immediately arises is this: what if a rejected paper is one that would have resuscitated the degenerating research program? It is precisely this failure to offer unequivocal criteria for the rejection of a research program, or for choosing between rival research programs that has prompted Paul Feyerabend to describe Lakatos as a 'friend and fellow-anarchist' and to dedicate his book *Against Method* to him. Feyerabend himself believes that the idea that science should be run according to fixed and universal rules is unrealistic and inimical to the growth of scientific knowledge (Feyerabend 1977). For him, 'anything goes' is the only principle that does not inhibit progress in science.

As I see it lack of progress in sexual orientation research has come about as a result of the two groups of researchers, the biologists and experientialists, holding the hard cores of their respective research programs too dogmatically. The two programs are too rigid in their hard-core structure as they admit of no fundamental changes. Recall that the central thesis (or, to use Lakatos' own terminology, the hard core) of the MSRP is the claim that in the face of anomalies, scientists actually hold on to the most basic assumption of a theory and instead of abandoning it they manipulate the more situational and peripheral theories associated with it. As a historical claim about what *some* scientists do, this thesis is to a large extent supported by the present study. However, as a piece of advice to practicing scientists, this view has obvious defects. In fact, it is not a rule that a practicing scientist ought to follow for it can be a hindrance to the growth of knowledge as the present study has shown. The application of Lakatos' model may in fact thwart progress in some cases. Contrary to Lakatos' claim that competition between research programs produces rational and objective advances in scientific knowledge; in this particular case there has been no noticeable progress. But this should come as no surprise for as geneticist Fausto-Sterling aptly puts it, 'partitioning nature from nurture, is a *scientific dead end* 'and a bad way of thinking about development of human behavior (Fausto-Sterling 1999). As I have indicated several times in this study, the polarization of sexual orientation research into biology versus environment has impeded rather than promoted progress in this area.

Another problem with Lakatos' model is that it seems to have been primarily tailored for the physical sciences. Indeed, like most philosophers of science of his time, Lakatos seems to have classical physics in mind when talking about science. Without even bothering to advance an argument, he assumes that all science should in some fundamental sense be similar to the physics of the last three centuries. In the physical sciences, some hypotheses take the form of axioms, which cannot be modified or given up without abandoning the research program in which they are embedded. The three axioms of motion, which form the backbone of the Newtonian research program, are a case in point. This should not however be construed to mean that physicists are always unwilling to question the basic assumptions of their programs. As a matter of fact, certain hard-core assumptions are being questioned in theoretical physics today. In the behavioral sciences only neo-classical economics, which was modeled on Newtonian physics, appears to offer the possibility of an easy fit with Lakatos' model. Other sciences dealing with human behavior cannot easily fit into the Procrustean bed of the MSRP. As this case study has shown, rigidly clinging to selected hypotheses of a research program can in fact retard rather than promote the growth of scientific knowledge.

As I argued in the last chapter, for there to be progress in the etiology of homosexuality research, scientists must go beyond the nature-nurture dualism. Workers on the two sides of the debate must shake off their hard-core positions and embrace a more acceptable theoretical framework. What is required is an interactionist program -one that takes seriously the mutual causal relationship between nature and nurture in shaping sexual orientation. The approach to understanding homosexual behavior should include

assessment of the interaction of biological and psychosocial factors. In fact, it may well be that a person's biological disposition is such that given certain environmental conditions he or she might experience sexual attractions to others of the same sex. Adopting such a program, as I have already pointed out, would imply abandoning the determinist positions (both biological and experiential) that have been taken by researchers on the two sides of the debate. Homosexual orientation is too complex to be described by one simple causal model or a single research discipline.

One way of overcoming this impasse is to adopt a developmental systems approach. This approach provides a powerful explanatory framework that helps to eliminate the nature-nurture dichotomy from our thinking. As we saw in the last chapter, developmental system theorists deny that there are fundamentally two kinds of processes: one guided by genes, hormones and brain cells, the other by environment, experience and learning. Indeed, DST opposes the idea that it is coherent to compare traits, homosexuality included, for the degree to which they are genetically as opposed to environmentally caused. Instead of pursuing sterile disputes about the degree of heritability of a trait, advocates of this view recommend that we adopt a more illuminating study of the dynamics of development. The biological and environmental factors in an organism's life influence each other. Indeed, they are interdependent causes that render statistical separation invalid. This approach undermines any causal distinction between mostly genetic and mostly environmental traits. Fortunately, scientists are beginning to take the nature-nurture interaction seriously. One such scientist is William Byne who suggests that 'genes or hormones do not specify sexual orientation per se, but instead bias

particular traits and thereby influence the manner in which the individual and his or her environment interact as sexual orientation and other personality characteristics unfold developmentally' (Byne 1993: 237). And as he further explains, this kind of mechanism allows for multiple developmental pathways leading to homosexuality. It also accounts for the high degree of concordance for homosexuality observed among MZ twins reared together as well as for the failure of those theories that focus exclusively on the experiential factors. In addition to DST, those researching into the etiology of homosexual orientation could benefit from recent trends in evolutionary psychology, which suggest that enduring traits usually have some adaptive advantage and are unlikely to be due to chance. Homosexuality, as was pointed out in the last chapter, could very well have been an adaptive trait during the Pleistocene era.

To sum up, this case study is one in a series designed test the applicability of Lakatos' methodology. The initial case studies were carried out by Lakatos' pupils and colleagues at the London School of Economics and focused exclusively on historical episodes in the physical sciences. As essays in Howson (1976) reveal, these early studies confirmed the applicability of the MSRP in that it was able (i.e. the MSRP) to explain the historical episodes in question without appealing to external factors. In the present case study, I have shown that, to a large extent, the history of homosexual etiology research descriptively fits Lakatos' model. Normatively, however, I have argued that this case study undermines the generalizability of Lakatos' model. Indeed, whereas this model may be normatively appropriate for sciences that are axiomatically structured, this study

has shown that the Lakatosian way of doing science may not be normatively appropriate for sciences that deal with human behavior.

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