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Models of care in diagnostic radiography.

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Models of Care for Diagnostic Radiography and their use in the education of undergraduate and postgraduate radiographers

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by

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Summary

This research set out to develop one or more conceptual models of diagnostic radiography based on the ways in which clinical radiographers themselves viewed their skills. The report analyses the historical relationship between radiographers and radiologists and the limited attempts at theory development prior to this research. This context is set against selected literature from nursing metatheory. This comparison is made since radiography had in part developed from the nursing profession and the historical and gendered background of both professions may be seen to be similar.

The methodology is largely qualitative and the use of computers for qualitative data analysis is discussed in some detail. The data collection was completed in three major phases- a diagnostic phase; a theory development phase and an applications phase, utilising several brainstorming groups and two questionnaires as well as action research in the third phase. In the diagnostic (first) phase of the research categories representing parts of the radiographic process were derived. Two models (or theoretical frameworks) were developed and their various concepts were explored and refined. In the second phase of theory development the research was extended to develop a statement of the role of the diagnostic radiographer and several concepts from the model were explored. In the final phase, the concept of holism was explored together with the relevance of the models for the education of student radiographers. In the final sections of the report there is a detailed evaluation of the potential impact of the models including a reflexive analysis. The conclusions are that the models provide a valid conceptual representation of the radiographic process and philosophy and that they have a role to play in education of student radiographers.

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In particular my thanks to John, who now has a model of radiography named after him.

This research is dedicated to the memory of my father.

Introduction

This report commences by outlining some of the historical development of diagnostic radiography following the discovery of x-rays by Roentgen in 1896. The power struggle that took place between radiologists and the emerging discipline of radiography is discussed, as is the unwillingness of the medical profession to relinquish control over the reading of films. The educational background of radiography from 1920-1990 is analysed and shown to be skill-oriented and based on the apprenticeship model. In 1990 the UK saw the rapid transfer of training schools into higher education resulting in an all-graduate entry to the radiography profession by 1995.

The first chapter then turns to an examination of the limited theory development which took place within the profession and examines a number of models which were proffered to explain certain parts of the radiographers' role. In chapter 2 we then set this context against the developments that occurred 20 years earlier in the nursing profession. This comparison is drawn since it may be argued that radiography and nursing are comparable because of their historically close relationship with the medical profession.

In chapter 3 the methodology of the project is presented and discussed, with the focus of the project being on the use of qualitative methods. The use of computers for qualitative data analysis is also discussed.

In chapter 4 the initial stages of the research are presented whereby categories representing parts of the radiographic process are derived from group work and questionnaires. In this stage of the research two models are derived and the various

concepts that made up the frameworks are explored and refined. In chapter 5 the research is extended to develop a statement of the role of the diagnostic radiographer (as a means of defining the boundaries of the profession). A questionnaire is used to analyse several concepts from the model, including, in particular, the skills which radiographers feel are required to be a good practitioner in the trauma situation.

Chapter 6 examines the potential applications of the models and begins with the examination of holism as a concept understood by radiographers. The chapter also examines the applicability of the models in educational practice and presents responses to the models from both educators and Final Year students.

In chapter 7 there is an attempt to critically analyse the models using a framework for analysis devised by Fawcett. The chapter also presents a reflexive analysis of the experiences of undertaking qualitative research and Chapter 8 summarises and presents the main conclusions of the research.

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Chapter One

-the Radiographic background and context

1.1 Historical background

Medical radiography consists of diagnostic radiography and radiotherapy. *Diagnostic radiography* uses x-rays and other imaging modalities for the investigation of diseases and trauma; *radiotherapy* is the use of radiation to treat cancer and certain other conditions. The two parts of the profession are relatively separate (as with general and mental health nursing). Throughout this report the term *Radiography* refers to diagnostic radiography. *Radiology* is the diagnosis of disease from the images produced and is a specialisation of the medical profession.

1.1.1 Early history and relationship with radiology

1995 was the centenary of the discovery of x-rays by Wilhelm Roentgen. Radiography (as a profession distinctive from Radiology) largely developed after extensive use in the 1st World War in which army medical technicians x-rayed injured troops.

> "...The social organisation of x-ray work hinged upon the dual process of the emergence of the radiologist as a specialist within the medical profession and the emergence of radiographers acting at the behest of radiologists in the capacity of technical aides close to but excluded from important diagnostic processes in modern medicine". (*Witz 1992 p171*)

The Society of Radiographers formed in 1920 directly from the desire of the medical profession to control the work of lay radiographers (*Larkin 1983 p69*). In the following five years the General Medical Council fought to ensure that reporting on radiographic images (films) was confined exclusively in the hands of medically qualified practitioners. In 1924 the Council of the Society of Radiographers passed a resolution that acknowledged that its members were not medically trained and that diagnosis must lie in the hands of a medical practitioner. Shortly after this the Society actively sought formal links with the

British Institute of Radiology, recognising that this was necessary at the time to assure their survival *(Moodie 1970 p23).*

Around this time radiologists also had to fight for their own professional recognition as a speciality within medicine (*Larkin 1983 pp79-80; Witz 1992 p173; Howell 1995 p158*) and increasingly attempted to subordinate radiographers by shedding the manual aspects of their own role (*Wightman 1978 p167*). Following this subjugation of radiographers by radiologists, the radiographer's role began to be viewed as being more appropriate for females *(Larkin 1983 p83).* Thus the sexual division of labour in x-ray technology began, with the radiographic predominance of females dating back as far as 1922 (*Witz 1992 pp174-176*). An article published in the Daily Telegraph in 1930 described ways in which radiography might be seen as particularly suitable for females;

> "So many women nowadays inevitably abandon their careers on marriage that women ... are compelled to look for vocations that will yield a quick return for time and money spent on training....they realise the importance of technical training in specialised work. Their need is the field where expert qualifications, entailing a small outlay, will yield a ready income.....These are duties calling for manual delicacy, care and method which suit them particularly to women" *(Moodie 1970 pp26-27)*

Many of these female radiographers came from the nursing profession whilst male radiographers tended to originate from the army and from groups such as the Institute of Electrical Engineers (*Moodie 1970 p23).* The male radiographers began to feel threatened by what they saw as feminisation and encroachment by the nursing profession. As late as the 1940's radiography was regarded by some as part of the nursing services *(Jordan 1995 p19).* Nursing qualifications and skills were denigrated by the male radiographers who made consistent attempts to elevate the technical status of radiography (*Witz 1992 p185*). As a result of this radiographers actively sought the patronage of the medical profession (i.e. radiologists) in direct preference to being managed by hospital matrons (*op cit p190; Wightman 1978 p168*). It is interesting to look at how the two key authors in this area of medical sociology describe such

tactics; Witz (a female writing from a feminist perspective) labels these moves as demarcationary whilst Larkin (a male sociologist) refers to this as 'occupational realism', arguing that radiographers were dependent upon external sources of legitimacy (*Witz 1992 p197; Larkin 1983 p91*). Interestingly Moodie (writing in 1970 before the Equal Opportunities legislation) saw radiography as "bringing emancipation into a world overloaded with male dominance" (*Moodie 1970 p28).* At that same point in time Jordan *(1995 p25)* notes that, although the Society of Radiographer's membership comprised 90% women, that only six out of 25 of its Council members were female.

During the Second World War there were further altercations for the Society of Radiographers which objected strongly to its male members being designated by the Army as tradesmen with sergeant as the highest rank attainable. To add insult to injury nurses were part of the commissioned ranks-this situation still exists today. Female radiographers maintained their importance, however, since they tended to staff the civilian hospitals even though radiography was eventually designated a reserved occupation *(op cit pp46-57).*

The period after the 2nd World War from 1948 onwards saw radiographers and other groups such as physiotherapists and chiropodists (which at the time were described as 'medical auxiliaries') move towards state registration (*Larkin 1983 p157*). Witz describes the pursuit of registration by nurses as a tactic of occupational closure in that the aim was to give nurses control over their own destiny and allow them to create occupational autonomy within the medical division of labour (*1992 p148*). It is interesting that nurse registration occurred as early as 1919, whilst that of radiographers and other paramedical professions did not come in until 1960. It is also notable that the concept of self-government for nurses was largely accepted, but was not granted to the same extent for the other professions. The radiography profession, for example, was

given only seven out of thirteen places on its own registration board. Even as late as 1960 doctors were bitterly asserting their rights to control over medical auxiliaries (*Larkin 1983 pp174-5*). Moodie *(1970 p70)*, however, felt that the 1960 Act represented the acknowledgement of full professional status for the radiographer, at least within the NHS.

1.1.2 Medical control over illness as deviance

Talcott Parsons and other medical sociologists have argued that illness may be viewed as a form of deviance, in that labels are ascribed to the patient that indicate a move outside boundaries of social values and normality (*Armstrong 1983 pp 58-9*). In this context, therefore, the doctor is seen as a powerful arbiter of social values and an agent of social control; the medical consultation becomes a situation in which 'the doctor evaluates problems against criteria of socially defined deviance' (*op cit p77*). This is possible because the labelling of an individual as being 'ill' allows that person to be excused from their normal social roles- the doctor legitimates the absence from the commitment to work (*op cit p81; Hart 1985 p97; Iphofen & Poland 1998 p47-48*).

The structural functionalist stance outlined above has fallen into some disrepute *(Lupton 1994 p7)* but has also been developed even further by certain Marxist writers who argue that 'medicine is depicted as a means of disguising the unacceptable face of patriarchal capitalism' (*Hart 1985 pp100 & 122*). Iphofen and Poland acknowledge that both health care and the role of the medical practitioner are highly institutionalised instruments of social control in Western societies *(Iphofen & Poland 1998 p51)*. Similarly other writers have observed the ways in which medicine draws power directly from the state and Larkin argues that it has done so for at least the last century (*Larkin 1983 p184; Davies 1995 chap 4*). Seen in this sociological context, it becomes somewhat more easy to understand the derivation of medical power and why doctors would be so enormously unwilling to relinquish even small parts of their role in society. This need to maintain power relationships is seen in the interactions of

medical practitioners with nursing and the paramedical professions *(see 1.1.1)*

1.2 Educational background

The first Radiography Diploma was set up in 1921(*Jordan 1994 p5; Larkin 1983 p68; Witz 1992 p172).* The education of radiography students, however, remained firmly fixed in an apprenticeship/skills teaching mode which was commonly referred to as 'Sitting with Nellie' *(Howard 1978; Wightman 1978).* Whilst other professions such as Physiotherapy became all-graduate during the 1970's & 80's, there was considerable resistance to this in the case of radiography. This resistance came from central government and from within the profession itself *(Watson 1983 p217),* but also from Radiologists who felt threatened by the prospect of graduate radiographers;-

> "Radiographic training has produced a technologist, highly trained in the principles of diagnostic imaging, but contributing little to the important social dimension of health. If radiographers wish to be regarded as true health professionals they must develop a wider appreciation of the concept of health, and not restrict themselves to purely technical skills. Professional development along this technical road is severely restricted by more highly qualified scientific and medical personnel...." *(Castle 1988 p25)*

It is interesting that one of the responses of radiologists in the 1950's to the trend towards state registration was an (unsuccessful) attempt by the Faculty of Radiologists to take control of radiographer training away from the Society of Radiographers (*Larkin 1983 p170*). There are echoes of this subordination of radiography to medicine in the comparative refusal of radiographers to voice for themselves the desire to become a graduate profession. At the time of writing, there is still anti-degree prejudice around in the profession (*see chap. 5*).

It has been stated that the nursing profession is characterised by 'vocabularies of complaint' (*Turner 1987 pp152-4*). We may postulate that this also exists in radiography. Turner argues that the vocabularies of complaint have a number of functions for the profession, including devaluing the role of the doctor, de-

legitimising authority structures in the workplace and deflating the idealism of students and new recruits. Turner argues that the vocabularies of complaint are 'distinctly feminist (in) character' and alleges that one basis for the vocabulary of complaint is the gender division of medical labour and that it voices the feelings of powerlessness felt by the occupational group (*Baird 1996 p122*). This is echoed by Davies (*1995 p2)* who also comments that nurses are perceived by those who deal with them (doctors, managers and politicians-all predominantly male groups) as being whinging and difficult and that nurses themselves assess their work from a standpoint of "confusion, resentment and exhaustion" *(ibid)*. Davies goes on to provide a critical and fundamental analysis of the discontents of nurses as a staff group, for which there are certain parallels in radiography (*op cit pp 2-14).* These professional parallels are discussed further in the next chapter, section 2.3.

Watson, in his presidential address of 1985, analyses the development of radiography as a profession at that time. Again echoing Witz's analysis of the gendered background of radiography, he cites "decades of loyalty to the medical profession" and comments that "the feminine image of nursing has brought its many diverse problems..." (*Watson 1985 p289*). He goes on to argue;

> "Human nature, however, tends to decry educational achievement and uses such statements as 'too clever by half' and 'the bigger they are the harder they fall'. But unforgivable is that label of us being merely a 'practical' profession...."
>
> (*op cit p291*)

Watson summarises the need for graduate status in terms of professionalisation *(see 1.3 below)*, citing aspirations of 'specialism' and greater autonomy (*op.cit. p297; Baird 1996 p134*).

1.2.1 The eventual move to graduate status

Educationalists within the profession had been calling for a move to all-graduate status since the early 1970's (*Bentley 1973 & 1977*). Half-hearted

moves in this direction were made in 1978 when A'levels were made the minimum academic entry requirement (despite opposition from the Department of Health) and in 1979 when the length of training was increased from two to three years *(Jordan 1995 p54)*. However any real movement towards an all-graduate profession did not come until the late 1980's when the College of Radiographers raised the entry qualifications for its Diploma to minimum University level standard (*Jordan 1994 p8*), although Watson argued that this move was half-hearted and insufficient,

> "...minimum qualifications will not produce the calibre of practitioner necessary to take the profession into the 21st century. It is also inadequate for us to merely seek graduate potential students without providing the promise of initially or later giving the opportunity to obtain a degree-and the meaningless term 'degree equivalent qualification' is no substitute." (*Watson 1985 p291*)

Despite the above criticism, Jordan comments that the proposal to raise entry qualifications was met with unprecedented opposition. This may be interpreted as resulting from the fact that the whole radiography educational system was very introverted and staid. This is discussed further in chapter 2 (*Hammick 1995 p136 and see also section 2.3*). Interestingly the College of Radiographers continued to use the phrase 'degree equivalent qualification' to refer to its Diploma (DCR) for almost 10 years after Watson's comments, and indeed based the whole of their postgraduate education strategy on that phrase.

The final change to a graduate-entry profession came as a result of the transfer of radiography education from the NHS into higher education, following the publication of Working Paper 10 (*Department of Health 1989*). Jordan (*1994 p6*) has stated that a major barrier to the development of degrees was the fact that, previously, virtually all radiography education in the United Kingdom had taken place in hospital settings. Even at this stage however, there were those who sought by political means to prevent radiography becoming a graduate profession. Jordan records that approval of individual degree courses was held up at the Privy Council by trivialities; he states that the College of Radiographers "believed that the Privy Council was being used as a tool of

individuals within the DoH" (*op.cit p10*). He also notes that there was a very real fear on the part of the Society of Radiographers that they would lose control of radiographer education and that there was "firm opposition from most radiographers" at the idea of moving training schools away from the hospitals *(Jordan 1995 p24).*

At the time of writing therefore, radiography had undergone a very swift transition from being largely a skill oriented profession with a Diploma as its pre-registration qualification taught mainly in a hospital setting, to one that was all-graduate and based in higher education (*Hammick 1995 p136-7*). Textbooks in the field have generally reflected that skills orientation. Texts have been descriptive, with few, if any, references and have 'emphasised the learning of numerous stylised postures and positions' (*Larkin 1983 p87; Chesney & Chesney 1986*).

1.3 The trend to professionalisation

1.3.1 Role extension

The moves to all-graduate status have been followed rapidly by increasing professionalisation. Professionalisation is defined as the attempt to take on characteristics which enhance the social status of the occupation in question. The aim is to increase the power of the group and enable greater control over the workplace *(Friedson 1994 in Iphofen & Poland 1998 p97).* In Radiography this stemmed, partly from the research ethos beginning to pervade the profession as a result of the move into higher education, but also from pressure for radiographers to develop themselves to take over some of the tasks traditionally seen as part of the radiologist's role. This initiative for role extension came from within the radiography profession (*Paterson 1995*) but also from the Government, as part of its reviews of skill mix, particularly in radiology departments (*Dept. of Health/College of Radiographers 1993*). The transfer of tasks from the medical profession to the allied health professions is

not, however, a new phenomenon; American authors in particular have commented on this trend in the United States, dating it initially back to the early part of the century and later to the impact of two World Wars (*Henderson 1987 p11*). Interestingly Howell (*1995 pp158-161*) alleges that the x-ray image was initially used by medical practitioners in the USA to increase their status by claiming special expertise and that "the x-ray image was seen as one more marker of a new, scientific medicine". This was echoed by Moodie *(1970 p28)* who commented that radiography brought "a precise science into what was the comfortable healing art of medicine". We shall return to consider this further at the beginning of chapter 2.

The attempt by a small group of educationalists to develop the theoretical underpinnings of radiography is therefore set within the context of a recent move into higher education, the attainment of graduate status and developments in the professional role of radiographers- that is, a context of professionalisation (*Hammick 1995 p139; Baird 1996*). Chinn & Kramer indicate the importance of theory development from a nursing perspective;-

> "Professional identity that evolves out of theory provides a basis from which nurses can control the aspects of their practice. Nursing practice has traditionally been controlled by others, and what nurses do is often invisible....Theory that guides practice provides a language for talking about the nature of nursing practice and demonstrating its effectiveness...When its effectiveness can be shown, it can be deliberately shaped or controlled by those who practice it."
> (*Chinn & Kramer 1991 pp22-23*)

1.4 Theory development in radiography

Castle *(1988)* set the scene for theory development in radiography with his discussion of the development of the radiography profession. He attempted to position radiography along a continuum between the medical model and the (psycho)social model of health. His research indicated that those radiographers questioned felt that the profession was operating towards the medical model end of the continuum and there was a strong feeling amongst respondents that the profession should move towards the psychosocial end of the continuum.

The very nature of diagnostic radiography is towards reductionism and the medical model *(see section 2.1)*, since the diagnostic radiographer is continually presented with requests from practitioners to radiograph body parts. Thus, even from the earliest stages of training, students will tend to say 'I've just x-rayed a hand' or 'There's a chest in the cubicle'(*Culmer 1995 p1).* Howell (*1995 p157*) argues, in his insightful analysis of the introduction of x-ray technology in the United States, that the availability of radiography actually contributed towards making medicine reductionist in character. One of the key aims of this research, therefore, is to develop a conceptual model for teaching purposes that will encourage students to view patients holistically, rather than in terms of their constituent anatomy.

It is interesting however that Castle found that there was a dichotomy in his results. One the one hand there were radiographers with a desire for more social science and, alternately, a greater number of respondents who felt that there should be more biological science included in the education of student radiographers. Castle felt that this latter aim reflected a desire to move into diagnosis and 'gain some degree of parity with their medical colleagues' (*op.cit p27*). Castle pointed out that this route had been severely restricted (as has been shown in earlier sections), although pressure from central government via the Audit Commission has forced some movement in this direction. the disparity in Castle's results is, arguably, reflected in the current disparities between degree curricula between different universities; whilst there is acknowledged to be a certain 'core' curriculum, the balance between science and social science in the overall programme may vary quite considerably.

1.4.1 Technology vs. caring

Castle concludes his research by stating that;

> "It may be that the role of the medical technician is all that is required by the health service, and if radiographers are happy about this then there is little left to say"
>
> (*Castle 1988 p28*)

In this context one may postulate that radiographers are developing as a sort of physicians' assistant (to use an American model). Dowd, an American educator, echoes Castle's cynicism;-

> "Radiographers often buy into the dysfunctional view of the health care bureaucracy that they are 'button pushers' and minimise their own importance to the health care team" *(Dowd 1992 p242)*

Dowd, like Castle, argued that there was a need for the radiographer's role to develop from being oriented towards science and technology to placing more emphasis on the caring role and cited the ability of nurses to "balance art with science in care" (*Dowd op.cit.p241; Barnum 1994 pp59-68; Watson 1985 p291*). Witz (*1992 p189*) comments that this 'tension between "technology" and "caring" skills' arose directly from the debate about the skill and gender-mix within the profession in the 1930's, and is being raised again as the numbers of male radiographers are rising once more. She alleges that male radiographers in the 1930's "appeared to be engaged in an attempt to reassert the sole value of technical skills, whilst completely denying the legitimacy of nursing skills in radiography work" (*Witz 1992 p183*). This 'touch or technology' dichotomy has also been raised in nursing itself (*Barnum 1994 pp59-68*) and Dowd acknowledges that there is a 'balancing act' to maintain the roles of both scientist and humanist (or professional carer) in radiography. We thus have a profession that has existed for the best part of 100 years in legal subjugation to a branch of medicine and which is seeking to redefine itself for the new millennium.

Fox & Forman *(1992)* postulated a number of nursing frameworks that might have commonality with radiographic knowledge and thus suggested that nursing models might prove to be of use to radiography education. The arguments they present are confusing and superficial, but it was these very criticisms that helped to prompt the current research. There are cursory attempts to look at commonalties by taking two or three selected course aims and suggesting that these constitute an analysis of the core of radiographic

knowledge. This article, despite its faults, is however a key piece of literature in that it was the first to suggest that radiographers might use models of care to guide their practice.

In a later article (*Forman & Fox 1995*) the authors attempt to examine commonality between the concepts of accountability and empowerment for nursing and radiography. They cite the work of Leddy & Pepper (*1993 pp 272-287*) who argue that an increased concern with accountability is a hallmark of a developing profession. Leddy & Pepper comment that one of the factors in the development of a profession is the growth of theory and the dissemination of research to its practitioners (*op.cit p279*). They criticise nursing, however, for not doing this quickly enough, and this has been even more true of radiography. However, it is interesting to note that current role extension initiatives are marked by vocal concerns on the part of radiographers as to who will be accountable for their diagnoses in the event of litigation.

1.5 The first model of Radiography

Bowman *(1993)* was the first to develop a conceptual framework explicitly for radiography and it was the publication of his model that prompted the start of this research. Bowman describes two sections to his model; the first part he refers to as 'patient and radiographer learning'(which corresponds to the process of the radiography examination) and the second he terms 'the patient/radiographer relationship'. This research stems directly from fundamental objections to each part of the Bowman model; the first section of the Bowman model defines the beginning and end of the radiographic examination as 'input and output'.To liken the radiographic examination of a patient to an industrial system can only compound the reductionism already inherent in diagnostic radiography. In the second part of his model, Bowman falls into exactly the syndrome that Castle and Dowd complain of, namely he

separates the technical and the patient-centred aspects of the role away from one another.

The main criticism to be levelled at the Bowman model however is that it is not research-based, and even Bowman's later work (*1995*) advocating the teaching of decision-making theory was based on reflective thinking by the author rather than actual research (despite its claim to be a piece of research using participant observation). Bowman claims that professional decisions may be either analytical or intuitive and are based on a body of knowledge, autonomy and patient care (*Bowman 1995 p6*). Whilst the discussion that follows this statement is a useful one, the research needs to be repeated and expanded using a number of respondents in order to substantiate its claims. The current research therefore is based on a rejection of Bowman's work for a number of reasons;

- the use of the terms *input* and *output* which are felt to be anathema to the provision of quality patient care;
- the fact that the technical and patient care aspects of Bowman's model are separate, which again is felt to militate against patient care;
- the model is not research based and is therefore not necessarily representative of the views of clinical radiographers.

The research presented nin this report is therefore based on original research. It should be stressed that it does not represent any attempt to develop the work of Bowman for the reasons stated above.

1.5.1 A subsidiary model for Radiography of the elderly

Dowd & Durick *(1995)* urge that " health professionals must adopt a holistic, evaluative approach to the elderly patient population.." and rightly note that this is an area of patient care which has tended to be rather neglected. They propose a radiographic model of care of the elderly patient that differentiates between the approach to the well elderly *(gerontologic)* and to the frail elderly *(geriatric)*. They state that the gerontologic approach requires few

modifications of technique, since those adopting this model would view these patients as relatively healthy, requiring only minor changes to accommodate such conditions as osteoporosis, for example. The model recognises that as ageing advances, a greater number of adaptations are required until the patient reaches the opposite extreme of the continuum where the geriatric approach is taken. This approach recognises that many adaptations of technique are required to take account of the needs of the patient (*Dowd & Durick 1995*). The authors lament the rather negative, disease-oriented attitudes to elderly patients which many students tend to acquire when placed in acute hospitals. They also point out that moves towards patient -focused care both here and in the United States will require a rather less reductionist approach on the part of radiographers who, they feel, have tended to opt out of their role as patient educators, leaving this to nursing staff (*Carney in Paterson & Price 1995*).

1.6 The clinical context

Current educational developments and moves towards role extension in radiography need to be set against a climate of growing consumerism in the NHS. As Baggott *(1994 p38)* comments, patients in this country have tended to be more passive than elsewhere in the world but this is changing.

> **"..the past decade has seen a number of health care reforms such as internal markets, the patient's charter and greater access to medical records, which have attempted to instil a consumerist philosophy into British health care"** *(ibid)*

Radiographers, whilst needing to take account of the needs of patients as consumers, are in turn pressurised by initiatives such as those to publish and reduce waiting times in departments. On the one hand, therefore, consumerism and the Patients' Charter (and the more recent moves towards clinical governance) require departments to address issues of quality of care; on the other hand, the waiting times initiative tends to reinforce the drive to optimise throughput, and in turn the tendency of radiographers towards reductionism.

1.7 Research aims

This research aims to discover how radiographers themselves conceptualise their practice and from this, to develop a model (or models) of the process of radiography, which could then be used for the teaching of undergraduates. The research developed from an initial premise that it is easy to teach students to undertake the radiography of extremities on ambulant adult patients (particularly with the textbooks available at the time which were very oriented towards skills teaching). However it was further postulated that as training progresses and examinations develop in their complexity, a simple skills method of clinical teaching can no longer be sufficient. Without the availability of models of practice, radiographers can only fall back on the 'well, this is how I'd do it' type of approach. This point is echoed by Baird in her discussion of the need for what she terms a 'clinical practicum' (*Baird 1996 pp125-126*). The research thus aims to develop a conceptual model that could improve teaching of radiography, particularly for complex examinations, and hopefully in turn improve practice by developing a tool for a systematic and reflective approach to patient care.

These aims can be identified in the writings of the early nursing theorists. Marriner-Tomey and her collaborators (*1994 pp 97,109,188*) show how early theorists such as Wiedenbach, Henderson and Orem had exactly these aims in mind when attempting to document the underlying knowledge base of the nursing profession. It can be seen from the nursing literature that radiography appears to be going through the same phases of professional development that occurred in nursing around 20 years ago and hence we will explore this in the next chapter. The justification for the development of conceptual thinking can be taken from one particular influential article;

> " But what of emerging disciplines? In the professional field there typically is an evolutionary process that occurs as the field moves from a vocational level, in which the art and technology are pre-eminent, to the rationalisation of practice and the establishment of a cognitive base for professional practice. It is important to

recognise that a discipline emerges as a result of creative thinking related to significant issues" *(Donaldson & Crowley 1978 p115)*

This report will therefore outline research that has been undertaken to fulfil the following aims;

1. To form a conceptual model of the way(s) in which (expert) radiographers approach the examination of a trauma patient

2. To use the model to facilitate the clinical education of student radiographers (particularly in trauma techniques).

It is useful at this point to provide some definitions;

-What is a concept?.... "..labels, categories, or selected properties of objects to be studied; they are the bricks from which theories are constructed

-What is a model?..... a simple representation of a theory or of certain complex events, structures or systems. Constructing a model forces us to specify steps in the process" (of radiography in this case.)

-What is a theory?..... theories utilise concepts as building blocks to develop a language by which the world can be explained"

(Hardy 1974 in Nicoll 1992 p378)

Fawcett *(1989 pp20-21)* points out that models and theories are both formed from concepts and propositions but differentiates between the two by highlighting the fact that theories should have far greater specificity and be more concrete, such that they can be empirically tested. She categorises theories into descriptive, explanatory or predictive and states that they are 'developed by means of research'. This then is the aim of this research project; to use research to develop explanatory theories of the radiographic process as applied to trauma.

1.7.1 Research objectives

1. to develop a definition of the role of the diagnostic radiographer
2. to produce one or more models of radiographic practice, based on the views of practising (expert) radiographers
3. to attempt to elaborate on some of the concepts within the model(s)
4. to determine the extent to which the development of such models could aid and inform the education of student radiographers, particularly in the later stages of their course(s)
5. to set the research within the context of professional developments, both current and historical

1.8 Summary

This chapter has examined the radiographic context, including some of the historical development of the profession and its educational background. We have also looked at the radiographic literature that currently exists on models of care for the profession and have attempted to show the climate in which this research has been developed, from the educational, professional and consumer perspectives. This chapter concludes with an overview of the aims and objectives of the research. Reference has been made throughout this chapter to nursing and the next chapter reviews some of the parallels between nursing and radiography. The chapter also outlines two of the major models of health care and also attempts to review and evaluate the literature on nursing metatheory.

Chapter Two

Literature Review

-models of health care and nursing.

2.1 The Medical Model

The medical model (or biomedical framework, as it is sometimes referred to) encourages practitioners to regard *health* quite simply as being 'the absence of disease'.The model has a number of underpinning assumptions as follows;

- "The body can be understood as a complex machine-with parts & processes that can malfunction;
- health & disease are contrasting states of the body machine with health defined as the machine in good working order and with disease representing a deviation from normal biological functioning;
- illness is typically generated by assault from pathogens.....although malfunctions may also be inherent in the body machinery (e.g. from 'faulty' genes);
- effective treatment for disease rectifies physiological functioning (usually by chemical means) or eliminates faulty body parts by surgery or radiation"

(Reynolds in Aitken & Jellicoe 1996 p4)

The medical model is said to have been influenced by the dualism of Rene Descartes, who separated the functions of the mind and the body (*Sheridan & Radmacher 1991 p3*). The biomedical model is thus said to be *reductionist*; i.e. the practitioner reduces the patient down to their component parts instead of regarding them as a whole person and this tendency in radiography has been identified in chapter 1 *(Culmer 1995 p1)*. The biomedical model ignores social, behavioural and psychological factors and concentrates on the mechanisms of the disease process. In chapter 1 we also discussed the fact that this has progressed to such an extent that any illness may be labelled as deviance (*1.1.2*). Sheridan, Radmacher and other writers argue that it is this adhesion to the medical model that in turn fuels what they refer to as *medical imperialism*- the refusal of the medical profession to relinquish control to others (*op cit p12; Wright 1990 p7*). They argue that medical imperialism has been fuelled by twentieth century technological developments (such as the discovery of x-rays) but that technology is now being overused, sometimes to the detriment of the

patient. The relationship of health professionals to technological developments is explored further in the next section. The temptation to 'throw' medical technology at the patient in the hope that something will work has been termed *heroic medicine* (and the masculine overtones of the term are noted). In the 1990's however there is beginning to be a backlash against the indiscriminate introduction of technology which has not been evaluated (including imaging modalities such as ultrasound) and the NHS is pushing a lot of research funding into health technology assessment (*Goodman 1992; Sheridan & Radmacher 1991 p14; Donabedian 1988; Stocking & Morrison 1978*).

2.2 The biopsychosocial model of health

The biopsychosocial model does not disregard disease processes or biological factors. It is said to be based on systems theory whereby there is a recognition that the psychological aspects form a link with the biological factors. The model is said to require doctors to look at a global (or *holistic*) view of their work (*op cit pp5 & 33*). However, whilst this model is gaining acceptance within medicine it is not, as yet, wholly accepted as can be seen by the cynicism that is shown towards illnesses that appear to have a psychological basis to them; for example post-traumatic stress disorder or myalgic encephalitis. Turner *(1987 pp14-15)* cites, for example, the case of repetitive strain injury (RSI) which he comments that some believe is a form of 'occupational neurosis'. In addition, there have been fears expressed that role development in professions such as nursing and radiography will push practitioners back into a technological model of health; "In other words they will start to follow the same biomedical philosophy as the medical profession.." (*Hunt & Wainwright 1994 p29*).

2.3 'High tech; high touch'

> "In their daily walk through arms, legs, kidneys, livers, hearts, faces and other live or manufactured parts of human bodies, it is important for health professionals to remember that ideas count; that wellness, health and disease are relative terms that are subject to debate; that bodies and souls have a symbiotic relationship; that reductionistic views of the body militate against the human spirit and that modern

> medical technology has engendered great moral, psychological, and ethical dilemmas for allied health professionals and patients alike"
>
> *(Thompson 1993 p133)*

Thompson proceeds from the above statement to take various bodily parts in turn (the navel, the breast, the hand) and to look at their symbolism in literature and mythology and then at their depersonalisation or what he terms the 'rampant reductionist approach' by the medical profession (*op cit p144*). In discussing the hand for example Thompson laments the absence of touch in health care and also comments on the "rising tide of complaints from patients about the...lack of compassion of allied health practitioners"(*see also Fisher 1990*). This is borne out by McKenna-Adler (*1990*) and also by Naisbitt (*1984*) who maintains that technology will be rejected unless it is accompanied by 'a counterbalancing human response'. Interestingly Kenny (*1994*) also discusses the symbolism of the hand in nursing care in her exploration of the potential for a language of intuitive practice.

Thompson makes the point that technology has extended the bounds of the possible such that the expectations of medical care are almost limitless, but that "the inevitable failures and shortcomings bring disillusionment...for patients and professionals alike". This frustration and mismatch between expectations and actuality are seen in the increasing propensity for litigation, when the hoped-for miracle is not forthcoming (*Thompson 1993 p155; McKenna-Adler 1990 p479*). Smoyak (*1986*) thus makes the point that the introduction of high technology can act as a stressor and cites the case of renal dialysis with its very high costs, but questionable quality of life for patients.

McKenna-Adler laments the fact that "Nowhere else is high technology as prevalent as it is in the radiology department. Our image among the lay person is one of equipment and technology rather than compassion and caring" (*op cit p481*). The extent to which radiographers themselves characterise their image in this way has been explored in the previous chapter. There has been some attempt to advocate the use of touch in radiography as a means of reorienting

the profession towards patient care and away from its obsession with technology but this has not been entirely successful (*Fisher 1990; DeCann 1990; Dowd 1991; DeCann & Hegarty 1993*). Dowd makes the point that magnetic resonance scanners can be so off-putting for the patient that an even higher level of patient care is needed to ensure a successful outcome.

DeCann (*1990*) included touch within a study of anxiety reduction techniques used during barium examinations. Questionnaires were sent to 42 randomly selected hospitals throughout the UK and 102 respondents completed a self-report form about the anxiety reduction techniques they used. Only ten respondents mentioned the use of touch and deep breathing (a standard relaxation technique) was listed by only one of the respondents. DeCann followed this self-reporting technique up with an observational study which attempted to verify the results obtained from the questionnaires (*DeCann & Hegarty 1993*). In the observational study it was found that touch was actually used on 73.3% of occasions observed, rating it much higher than the self-report study had done. "This touching and stroking included holding the patient's hands and putting an arm around or physically stroking the patient" (*op cit p15*). Deep breathing is not mentioned in the second study. The failure to report the use of touch in the first study could be attributed to an attitude on the part of radiographers whereby they devalue, or even fail to recognise, skills linked directly to patient care. This, however, is only speculation and DeCann himself does not really explain this in his article, suggesting that there is more work to be done here.

2.4 Radiography/Nursing parallels

Theory development in the field of nursing has been regarded as underpinning this research since there are many comparisons which may be drawn between nursing and radiography. Theory development in the nursing profession arose out of a desire to establish a professional identity separate from that of medicine (*Kobert & Folan 1990 p308*). Both radiography and nursing are

professions which are female dominated, and both are professions which work closely with medicine, particularly in the diagnostic phase of treatment. We may postulate therefore that professions such as physiotherapy and occupational therapy have been less influenced by the medical model because they have been able to exercise more autonomy in the therapeutic phase of a patient's treatment. Interestingly, nursing has had degree programmes in the United Kingdom since the early 1970's, but is not yet an all-graduate profession. There are, at the time of writing, moves to make nursing graduate-entry, but this is being resisted politically in similar ways to the establishment of radiography degrees (*Jordan 1994*); in this case the much greater numbers of people in the nursing profession have actually worked against them. This has already been analysed in terms of the move towards Project 2000 (*Davies 1995*).

There are however other, more sociological, parallels between nursing and radiography. The previous chapter demonstrated that radiography, to some extent, developed directly from the nursing profession *(see p2)*. We should not therefore be surprised if critical analysis uncovers similarities between the two professions. In a recent evaluation of the current position of nursing research in the United Kingdom, Lahiff *(in Smith 1995 pp38-40)* cites a study of the nursing profession undertaken 35 years earlier. Normally the historical nature of such a paper would lead to it being discounted as irrelevant to current practice but the study by Menzies *(1960)* has much relevance for nursing today, and indeed for the radiography profession.

Menzies was a researcher studying training needs in a particular London teaching hospital, but as an incidental finding she discovered high levels of tension and anxiety amongst the nurses with whom she was working. She comments that "We found it hard to understand how nurses could tolerate so much anxiety, and, indeed, we found much evidence that they could not" *(op cit p97)*. Menzies argues, quite rightly, that the anxiety emanates from the

nature of the "constant contact with people who are physically ill or injured, often seriously" *(ibid)*. Whilst the nature of the role varies, the basic premise of both radiography and nursing requires that contact and thus radiographers will suffer anxiety levels in the same way as nurses do. Diagnostic radiographers are 'front-line' hospital workers, in that they often attend the trauma resuscitation room, intensive care unit or operating theatre. In all of these locations, and others, they are confronted by serious illness and injury and the constant reminder of the frailty of the human body in a way that has direct parallels with general nursing. Menzies describes the discovery of a set of defensive techniques developed by the nurses as a group and summarised by Lahiff as follows;

- the attempt to eliminate decisions by ritualised task-performance
- reducing the weight of responsibility in decision making by checks and counter-checks
- purposeful obscurity in the formal distribution of responsibility
- the reduction of the impact of responsibility by delegation to superiors
- idealisation and underestimation of personal development opportunities
- avoidance of change *(Lahiff in Smith 1995 p38; Menzies 1960)*

Some of these defensive techniques have already been touched on with reference to radiography in the previous chapter. Menzies refers to the prescription of lists of tasks and ritualisation via standardisation *(op cit p101)*. We have already commented that, prior to the move into higher education, radiography was locked into a skills-teaching mode with textbooks which tended also to resemble task lists *(see 1.2 pp5 & 8)*. Menzies argues that the breakdown of the workload into tasks protects the nurse psychologically from the totality of the patient and their illness. Menzies also refers to 'depersonalisation' of the patient, commenting that "Nurses ..deprecate this practice but it persists". We have already acknowledged that reductionism is rife in radiography *(see 2.1 above)*. Menzies also comments on the use of such techniques as repression and denial of feelings, all of which can be seen in radiography. Diagnostic radiographers often state that they 'could never have done therapy radiography' because dealing with cancer patients is viewed as requiring far more emotional commitment.

Menzies goes on to analyse the defence mechanisms inherent in the ways in which nurses deal with responsibility. The formal taking of responsibility for actions is diffused in the social structure, whilst there is a tendency to view one's juniors as irresponsible *(op cit pp104-5)*. Almost 40 years after the publication of Menzies' paper, this is occurring in radiography at the present time. Staff are vocal about students' abilities and will often verbally attack them; as Menzies states "..students are singled out by staff almost solely for reprimand or criticism" *(op cit p113)*. The move to graduate education in radiography is the excuse for this. Staff will often argue vociferously that the degree is not as good as the diploma (DCR) and that the students are not as good clinically as they used to be. This type of reaction, according to Menzies, is not surprising because the social system operates as a defence mechanism. Anxieties are aired and more intense as the defences to the change are restructured. However, in contrast, radiographers are very unwilling to put criticism of individual students in writing, as they do not wish to take responsibility for what might be the decision to terminate a student's training.

Menzies also noted "the low level of tasks carried out by...staff and students in relation to their personal ability, skill and position in the hierarchy"*(op cit p106)*. Whilst this has certainly been the case in radiography, role extension is now becoming more commonplace. It has not always been welcomed by staff however, and in certain departments, there has been resistance to such moves based on the reluctance of individuals to take on decision-making responsibility. To Lahiff this is entirely understandable and she argues that those

> "...who were conditioned early in their work to obey doctors and seniors, to play a game with doctors which denied their own contribution to patient care, and which disseminated responsibility away from themselves, were likely to have difficulty with the notion of professional responsibility.." *(Lahiff in Smith 1995 p41)*

Both nursing and radiography have arguably been subject to the art vs science/caring vs technology debates;

> "What types of knowledge should nursing use? How much of the knowledge base of nursing should be scientific, or can be scientific? These are the kinds of question which have exercised the minds of the nursing leadership for at least two or three decades.....a major thrust within the nursing educational system for the last 20 years has been the message that nursing is, or needs to become, a science."
>
> (*Robinson & Vaughn 1992 p201*)

There are parallels here with the debate about medical vs biopsychosocial models of health care. There has been a feeling prevalent in nursing that, in order to gain credibility as a profession, nursing theory had to be based around the scientific method (ie an adoption of the medical model). This led to the preoccupation with nursing science which we shall return to later in this chapter.

Nursing dates its theory development right back to Florence Nightingale, but the bulk of the work in this area has been done in the United States since the 1950's (*Hunink 1995*). The volume of writings in Nursing theory and metatheory at this time is so large that it is only possible to give an overview in this chapter.

2.5 Overview of theory development in nursing

In reviewing the nursing literature on theory development, the format used by Walker and Avant in their book 'Strategies for Theory Construction in Nursing'(*1988*) will be adopted in part. Their practical guide to theory development offers steps and strategies which have helped to guide this research and their work has been extensively cited in the nursing literature on metatheory.

Theory development in nursing arose in the 1950's as a direct result of appraisals of the position occupied by nursing as a profession (*Bixler & Bixler 1945 & 1959*). Bixler & Bixler use seven criteria to analyse the professionalisation of nursing. The first two are the most relevant to us here;

> "CRITERION ONE...A profession utilises in its practice a well-defined and well-organised body of specialised knowledge which is on the intellectual level of the higher learning.
> CRITERION TWO...A profession constantly enlarges the body of knowledge it uses

> and improves its techniques of education and service by the use of the scientific method." (*Bixler & Bixler 1959 pp1142-3*)

Bixler & Bixler thus recognised that the development of theory constitutes the underpinnings of a profession and, as such, has an intrinsic value (*Walker & Avant 1988 p4*). Forty years after their articles, however, the content and form of that body of knowledge in nursing are still a matter for debate (*Kobert & Folan 1990; Kenny 1994*); in particular the fact that most theory has been developed in the United States has meant that British nurses have been slow to accept its relevance *(Tierney 1998)*. Wright (*1990 p4*) points out that the gap between the Nightingale model and the Roper, Logan & Tierney model of 1981 is over 100 years, and implies that the prolonged adherence to the Nightingale system of values in the United Kingdom has contributed in no small part to the lack of theory development in this country. The majority of the literature that we shall examine therefore is American. Whilst there may be reservations in this country about its applicability, the volume of writings is too large and too important to omit or to gloss over. There are those (*Parse 1995 p51*) who believe that the volume of theory is not, as yet, sufficient to ensure that nursing is fully differentiated from other professions;

> **"Without a growing unique science, how will nurses be educated to provide health care alongside others in the health professions who are pursuing with alacrity the study of phenomena that reside in their realms of knowledge? Without a concerted effort to expand the realm of nursing knowledge, how will nurses join the interdisciplinary team as respected members with a unique perspective to offer?"**

Nicoll (*1992 p1*) comments that the period from the beginning of the 1960's to about 1978 was exceptionally prolific in terms of nursing theory development. Several influential and seminal papers were written during this period. Dickoff & James (*1968*), for example, postulated their 'Theory of Theories' in which they established a position for the profession "first, on the issue of what a theory is; then, on the issue of what a nursing theory should be";

> **"The position taken can be seen in outline through four theses:**
> 1. Theory is a conceptual system or framework invented to some purpose; and as the purpose varies so too must vary the structure & complexity of the system.
> 2. Professional purpose requires a commitment beyond mere understanding or describing.

> 3. Significant nursing theory must be theory at the highest level- namely, so-called situation producing theory.
> 4. A profession or practice discipline has built in advantages that facilitate theory development for that discipline. *(Dickoff & James 1968 p198)*

In their commentary to the main paper (in *Nicholl 1992 pp108-111*) Dickoff & James noted that there were already a lot of writings in existence at that time which purported to be theories of nursing but in fact were borrowed from other disciplines such as social science; Dickoff & James maintain that their theory was one of the first that really attempted to explore the deeper concepts of the practice discipline of Nursing and in the original article they explicitly warn against the lure of accepting the theory of other disciplines as this is to "sell your birthright as a nurse" (*op cit p200*). This stance is the crux of the fundamental objection to the Fox & Forman paper expressed in Chapter 1 (see *1.4.1)*. Whilst it may be useful to explore the Nursing experience of building theory, the adoption of actual nursing theory directly into Radiography denies the uniqueness of the skill of the Radiographer *(Culmer 1997)*.

Another strong call to define Nursing's body of knowledge came from Dorothea Johnson in 1974. In a statement which is similar to Castle's later summation of the state of the Radiography profession (see *1.2*), she maintains;

> " Nursing stands today as a field of practice without a scientific heritage- an occupation created by society long ago to offer a distinctive service, but one still ill-defined in practical terms, a profession without the theoretical base it seems to require" *(Johnson 1974 p373)*

Johnson argues persuasively for the distinctiveness of nursing practice and the need for nurses to become reflective and self-aware, rather than slavishly adopting the theories of others. In a paper written four years later Hardy (*1978*) describes nursing theory as still being at the 'preparadigm stage' despite the explosion in theory writings which appeared during the preceding decade and a half. She uses the writings of Thomas Kuhn and others to support her outline of scientific and theory development.

2.6 The Scandinavian viewpoint

We will return to the topic of nursing science later in this chapter but it is

noteworthy that in the late 1980's there began to appear some very critical papers about the way that nursing theory had developed up to that point. Many nurses in Scandinavia have embraced the nursing process and have generally been supporters of theory development; however Lundh, Soder & Waerness (*1988*) expounded the Scandinavian viewpoint that, by the end of the 1980's, American nursing theorists had begun to lose sight of the realities of patient care. They wished to see the concept of *self-care* as expounded by Orem and others, replaced by *caring* as a central concept, which would then begin to take account of some of the growing feminist literature analysing womens' place in health care and society generally(*op cit p40*). Burnard (*1994*) in a forceful piece criticises both the view of the Scandinavians and other theorists;

> "..Others have developed grand, even grandiose theories encompassing the whole of human nature. Yet others have wanted to suggest that nursing should reclaim 'caring', as though, historically nurses did not care....More than anything else, nursing has been made a complicated activity. It has been overlaid with a huge amount of theory. So much, one might argue, that the very thing that nursing is, has been obscured." (*Burnard 1994 p50*)

This criticism by Burnard is in direct contradiction to a view expressed by Donaldson & Crowley many years earlier. They argued in 1978 that authors were emphasising the 'nature of nursing rather than explicating the structure of the body of knowledge that constitutes the discipline of nursing' (*Donaldson & Crowley 1978 p113).* Burnard appears to feel that the pendulum has now swung too far in the opposite direction. Donaldson & Crowley lamented the lack of work at the time relating one study to another which they argued would have led to the development of a wider frame of reference; something which may be argued is missing from radiography at present. In particular they ask "How can we justify doctoral programs in nursing if the discipline is not defined?" (*op cit p114).* This again is true of radiography;-postgraduate courses are mushrooming throughout the country at the time of writing, yet there is little underpinning theory available and a number of courses are seemingly 'mini-radiology' seminars as the trend for radiographer reporting grows.

2.7 Approaches to theory development

Walker & Avant state that there are three basic approaches and three elements

to theory building; the approaches are analysis, synthesis and derivation and the elements are concepts, statements and theories (*Walker & Avant 1988 p19*). They use the structure outlined by Hardy (*1974*) in her examination of the components and structure of theories. They suggest that the development of theory begins at the level of concept and statement construction which are then linked into theories that can be tested. Hardy actually proposes an interim stage between statement construction and development of theory;

> "..the relationship between variables may best be expressed in terms of a model. That is, an investigator may formulate a theory, identify its postulates, identify or derive the remaining propositions, and then decide that the problem of relationships is best represented by a model. A model is a simplified representation of a theory or of certain complex events , structures or systems. Constructing a model forces the theorist to specify the precise relationship between components."
> (*Hardy 1974 in Nicholl 1992 p378*)

In terms of approaches to theory building, Walker & Avant define analysis as the taking apart of theory; the dissection into component parts and examination of interrelationships. Synthesis is the combination of isolated pieces of information and the identification of linkages not previously made. Derivation is the transposition of concepts from one context to another (*Walker & Avant 1988 pp24-25*). They then combine the three elements and approaches into a matrix giving nine strategies for theory construction; some of these nine strategies are used as headings for the analysis which follows.

Meleis, while acknowledging the contribution of Walker & Avant to the literature on theory development, takes a radically different approach by deriving strategies from the nursing theories already in existence; she thus sets out 5 strategies of theory development which are rooted back in clinical practice and its 'central domain concepts';

-theory-practice -theory
-practice-theory
-research-theory
-theory-research-theory
& practice-theory-research-theory (*Meleis 1991 p185*)

Meleis also sets out a number of stages in theorisation;

> " The stages are: (1) taking in, (2) description of phenomenon, (3) labelling, (4) concept development, (5) statement development, (6) explicating assumptions and (7) sharing and communicating. Although these stages are presented here linearly and consequentially , they could occur simultaneously out of sequence, or in conjunction with other yet undelineated stages". (*Meleis 1991 p197*)

Suppe & Jacox *(1985 p262)* advocate both the development of multiple theories and multiple approaches to theory writing and testing, and this is entirely appropriate. For any profession to develop there has to be room for a variety of models and theories, but as Meleis indicates, these models must be seen to be rooted in, and relevant to, clinical practice.

2.8 Concept development & analysis

Why are we seeking to develop a conceptual model for Radiography if the introduction of models into the field of nursing has been so contentious?

> " A conceptual model provides a distinct frame of reference for its adherents, telling them what to look at and speculate about.....The utility of conceptual models comes from the organization they provide for thinking, for observations, and for interpreting what is seen. Conceptual models also provide a systematic structure and a rationale for activities."
> (*Fawcett 1989 p3*)

Wright (*1990 pp5-7*) uses a number of arguments to decry the development and common usage of models but then concedes almost in the next breath that nurses 'tend to think in terms of " conceptual packages"'.

In nursing, however, initially the framework of the organisation of practice is derived from the *Nursing Process.* This systematic approach to care was first advocated by writers in the early to mid 1960's and is characterised in its simplest form by four stages;

- -assessment
- -planning
- -intervention (delivery of care)
- -evaluation (formative & summative)

(*Aggleton & Chalmers 1986 pp2-3*)

Other writers would argue that to reduce the nursing process to only four stages is an oversimplification (*Barnum 1994 pp151-2; Leddy & Pepper 1993 p 293*). Barnum urges us to;

> "Notice that the process is highly logistic. The format is a series of discrete components related to each other in unvaried sequence, prescribed and inflexible.....the very nature of the process forces the user to think in terms of interrelated components. Completeness means doing all the parts."
>
> (*Barnum 1994 p152*)

Leddy & Pepper (*1993 p292*) argue that whilst the Nursing Process may indeed be an orderly one, Barnum's description of it as 'prescribed and inflexible' is far from the truth. They argue that those who describe it as such (*Barnum op cit; Kobert & Folan 1990 p309)* are confusing the process of care delivery with the conceptual basis of nursing. They go on to point out that the Nursing Process is both quantitative and qualitative, and that it can be regarded as normative (ie setting out the way nursing ought to be done) rather than prescriptive. They make the point that 'the implementation of each stage of the process is focused according to the theory believed to be the knowledge or content basis of nursing practice' (*Leddy & Pepper 1993 p293*).

Some rather negative attitudes towards the use of conceptual models are expressed in an editorial by Hardy (*1986 p103*) where he argues that those who develop models are presenting a subjective viewpoint; that models tend to promote rigidity and even unethical behaviour. More seriously still, Hardy argues that the language of conceptual modelling is exclusionist, endowing nursing care with unrealistic mystique and thus creating a barrier between the carer and the client.

Let us deal with each of these criticisms in turn. Yes, it is probably true to say that those who present a model of care are presenting a subjective viewpoint; they are presenting a view of nursing (or radiography) practice which is influenced by their personal standpoint on how that care is delivered, but they are presenting that view as practitioners of the particular discipline. Donaldson & Crowley (*1978 p115*) make the point that 'a discipline emerges as a result of creative thinking related to significant issues'. It is not necessarily axiomatic that, because a view is subjective that it is, (as Hardy claims), biased. As stated above, authors such as Suppe & Jacox make the point that a developed

discipline is one that has room for a multiplicity of different theories and models. There are many theories and models written about in nursing; some have been widely accepted (eg Orem's self-care theory) and some are regarded as more peripheral or avant garde, such as Parse's theory of human-becoming (*Parse 1998; Marriner-Tomey 1994; Fawcett 1989).*

The point about rigidity which Hardy makes was discussed earlier in relation to the Nursing Process. Hardy's charge that models may produce unethical behaviour is a very contentious one. He argues that 'holistic approaches may promise more than can be delivered. What is the point of uncovering multiple problems in the consumer when few will be dealt with?' (*op cit p103*). This stance would seem to be completely antithetical to the view of the nurse as an independent autonomous practitioner. The point is surely that made by Leddy & Pepper above; that models such as the Nursing Process present a *normative* approach to the profession. In other words, something to strive for, otherwise the standards of care will never be improved. Hardy in turn argues that patient and client may be using different models and this may mean that the relationship turns into a power struggle. His argument does not really hold water here. He depicts the patient as 'an engineer, using a systems model', but much of the psychological research into patients' reactions to coming into the healthcare scenario suggests that they do not react as they would in their everyday profession (*eg Sheridan & Radmacher 1991*).

Hardy finally makes the point that models tend to be exclusionist, since they use specialist concepts and jargon that are not available to the consumer. This argument is difficult to follow, since much of the theory that has been developed is aimed at improving the care that the patient receives and at making the patient more able to determine the course of their care for themselves. It is difficult to see how this has the effect of widening the gap between the carer and the client, since models force the carer to pay attention to the needs of the patient (*op cit p5*).

Rodgers (*1989 p331*) echoes some of Hardy's criticisms about rigidity and inflexibility of concepts and argues that this rigidity arises directly from what she considers to be the positivistic approach to concept analysis advocated by such authors as Walker & Avant. She makes the point that at the time of writing the positivist viewpoint was in demise and that theorists had come to recognise that concepts can both change with time and with context.

2.9 Concept Mapping

A concept map is 'a concise, two-dimensional, schematic representation of...concepts and linking relationships in a ...knowledge set'(*Passmore 1995 p51).* Conceptual mapping was advocated by Artinian (*1982*) as an aid to research design, both qualitative and quantitative. She points out that conceptual mapping has been used in the teaching of both undergraduate and graduate students on research courses and that schemata can be useful both to map out the initial research design (by drawing out the knowledge about a phenomenon prior to investigation) but also to track the elements of a developing theory as research progresses (*op cit pp389-390*).

Other writers more recently have advocated conceptual mapping as one of a number of strategies to encourage deeper, more meaningful learning. Chalmers & Fuller suggest that conceptual mapping should be taught in the classroom as a valuable tool for the student, which can help them to organise information, and for the teacher, who gains feedback on the level of understanding and analytical abilities of the students (*Chalmers & Fuller 1996 pp83-86*). Passmore has recommended the use of this technique in radiographic education (*Passmore 1995*). He argues that 'the current health care environment, with its emphasis on multi-modality trained personnel, will require the technologist to learn with more understanding and utility than in the past' (*op cit p50*). Passmore used concept maps as part of his teaching strategies during a course on radiation physics and nuclear medicine technology. He tested two matched groups; one with the concept mapping training and one without. The study

showed that the use of conceptual mapping can have a positive effect on learning, although Passmore did find some resistance to the techniques, both from high performing students who could see that their existing study skills paid off and who therefore had little incentive to change, and from low scoring students who were more concerned about struggling to stay on the program (*op cit pp57-58*).

Walker & Avant refer to Visintainer's work on perceptual maps as a means of opening up broader perspectives in nursing (*Visintainer 1986 in Walker & Avant 1988 pp211-212).* They acknowledge the fact that various routes to knowledge-generation may usefully co-exist within a discipline and indeed are to be encouraged. Radiography has not reached this stage as yet; there is a reluctance, even amongst some educators, to acknowledge the need for theory generation and multiple perspectives in order to advance the profession.

2.10 Theory analysis & derivation

So much has been written in nursing about evaluation of theory that it is only possible to sample the literature here. As early as 1968, Ellis tried to determine what characterised significant theory in nursing. Ellis maintained that significant theories had up to seven characteristics; they had scope and complexity and were useful for clinical practice. They were clearly recognisable as being tentative (and thus testable); they were capable of generating new information and they had implicit values. Finally they were couched in terminology that could be seen to have value for nursing, rather than being borrowed from psychology or similar (*Ellis 1968 pp219-221*). Ellis concluded by stating that 'the holistic view seems most suitable for the function of nursing..' This was a clear move away from the medical model.

In 1974 Duffey & Muhlenkamp presented a framework for theory examination, using the theories of Rogers and Peplau as examples. They developed four key

questions to ask about any theory including the origins of the problems; the methods used; the character of the subject matter addressed and the outcomes of testing which might be expected (*Duffey & Muhlenkamp 1974 pp570-571*). The authors maintain that for a theory to be useful it should be capable of generating hypotheses and, like Ellis, they believed that any theory for nursing should have an impact on nursing practice. They differentiate between practical knowledge, which they feel implies change and choices, and substantive knowledge, which they appear to characterise as being more fixed and/or long-term in nature.

Also writing in 1974, Hardy urges nurses to undertake critical analysis of the theories upon which nursing and health care practice is based. The article is a useful one initially, since it provides definitions of what is meant by terms such as *concepts* and *theories.* Hardy then however launches into a rather positivistic exposition of how to analyse relational statements and the impact of the article is then a little lost. For all that however, the article is seen as a key one in the area of metatheory and is cited in texts on the subject (*eg Meleis 1991; Nicoll 1992*).

Donaldson & Crowley urge nurses to render explicit the knowledge that is unique to nursing. They lament the continued use of tacit knowledge and make the statement that 'the very survival of the profession may be at risk unless the discipline is defined' (*Donaldson & Crowley 1978 p114*). They make fairly controversial statements about the links between the body of knowledge of the discipline in which they point out that this is not linked with practice;- in other words that there can be a scientific basis for a discipline which stands apart from day-to-day practice. They argue that this failure to establish nursing as an academic discipline has led to its continued image as vocational rather than a profession. Twenty years on we may comment that nursing is still wrestling with this problem (*Davies 1995; Leddy & Pepper 1993 p83; Robinson &*

Vaughan 1992 pp15-16). Radiography has not yet really begun to address the issue of its place as an academic discipline.

In the 1980's there tended to be a shift in emphasis in the nursing literature from the advocacy of nursing theory *per se* to articles which debated the type of theory that was appropriate for the profession.

> " The nature of nursing and of nursing activities and roles ...have been questioned by the community of nurses and society as a whole in recent years.....Theory is one means to validate nursing actions. A structure, as defined by a theory, provides a frame of reference for the nurse in deciding among nursing activities..."
>
> (*Nicoll 1992 p461*)

2.11 Perspectives on Nursing Science

Keck (*in Marriner-Tomey 1994 p17*) defines nursing science as "that knowledge germane to the discipline of nursing, plus the processes and methodologies used to gain that knowledge". This definition was echoed in part by Walker & Avant who cite knowledge generation and refinement as the bases of a scientific discipline, which may be achieved by research and theory construction (*Walker & Avant 1988 p210*). There has been a significant debate however over the years as to whether nursing constituted a scientific discipline. Donaldson & Crowley (*1978 p115*) made the point that nursing science was only one part of the discipline of nursing, and yet it is clear that many nursing writers still tend to believe that theory development equates to scientific knowledge and that this in turn dictates the use of positivistic research methods (*Bishop in Marriner-Tomey 1994 p34; Moody 1990 p15).*

Bishop points out the tendency of nurses to relegate attempts at nursing theory to the status merely of conceptual models, whereas frameworks from other disciplines are not downgraded in this way (*op cit p54*). In this sense nurses are their own worst enemies (and radiographers are no different). They feel that their own discipline does not measure up to those which are already recognised as sciences eg. medicine, psychology. In 1986 however the American Academy

of Nursing called for nurses to match the scholarly activities of the profession with the professed philosophy of holism (*Sorenson 1986 in Moody 1990 p17*). Moody attempts to present science as being humanistic and personal, whilst still using words such as 'rational...logical...precise' (*op cit pp18-19*). Later in the same chapter she contrasts the received view of science (positivism/logical empiricism) with the perceived view (historicism/qualitative methods). These contrasting views are presented as 'hard science versus soft science' and Moody tries to argue that both are relevant to nursing. However, the theory building process is still depicted at the end of the same chapter in positivistic form, suggesting that her heart is not quite in it somehow (*op cit pp28-29 &41).*

Moody's views however were very much in tune with those of nursing writers throughout the 'eighties who tended to equate nursing theory with nursing science and espouse positivistic methodologies (*Gortner 1980 & 1983; Watson 1981; Silva & Rothbart 1984).* Gortner, in her 1980 article, laments the failure of nursing to fully address the issue of the credibility of the nursing profession amongst the general community of academics. Meleis (*1991 p116*) defines scholarship as the degree to which the discipline's mission "is well articulated and based on excellent research and theory". Meleis outlines four characteristics of the stages of development of scholarliness within a profession;

1. Relationships between theory, research, practice and philosophy become more apparent.
2. Pluralism in paradigms is encouraged.
3. Boundaries of the domain become more defined.
4. Domain guides nursing practice, research and theory. (*op cit p117*)

Meleis argues that nursing in the 1980's and 90's began to be characterised by scholarliness-a process that began in the 1950's and 60's. We have argued elsewhere that Radiography is about 20 years behind the nursing profession in this respect, in that the relationships between theory, research and practice are only just being explored and, indeed, the search for a philosophy of radiography is further still behind. There are very few graduate or doctoral programmes in existence, a factor that has been seen as crucial in promoting

nursing as a scholarly profession (*Gortner 1980; Meleis 1991; Johnson et al 1992; Gray & Pratt 1995).* As has been stated "The excellence of doctoral preparation is the main line of defence against ignorance and intellectual fallacy..." (*Downs 1986 p18*).

Whilst there are still those nursing scholars who espouse nursing science as 'the one best way' there are also those writers who recognise that nursing needs to widen its horizons somewhat and go forward in a spirit of 'co-operation and collaboration' (*Meleis 1991 p123; Gortner 1980 p182; Hogan & DeSantis 1991*). Gortner in her 1983 article looks at the way in which collaboration with other disciplines reoriented nurses to take more of a focus on health rather than disease, but also exhorts nurses not to abandon scientific techniques 'because of fears of dehumanisation' (*Gortner 1983 p6*). In another article written five years later she is still referring to nursing science and to phenomenology as a form of scientific enquiry (*Gortner & Schulz 1988 p22).*

This apparent inability to 'let go' of the scientific method has led to a backlash from what are termed 'postmodernist' nursing scholars, many of whom see nursing science as having gross overtones of gender, androcentrism and 'metanarratives of sexism' (*Holmes in Gray & Pratt 1995 p363*). Holmes sums this backlash up as follows;

> " Increasing dissatisfaction with conventional epistemologies, and the science founded upon them, is leading nurse theorists ever nearer to a postmodernist 'antiphilosophical' position. Indeed, the whole notion of 'nursing theories' is being called into question, and postmodernists would regard them as outmoded and unproductive because of their divorce from the vagaries of the real situation , in which individuals are confronted by phenomena which do not conform to neat and tidy theories". (*op cit p360)*

Holmes points out that the fluidity and pluralism of the postmodernists make many uncomfortable, and that critics of postmodernism will point to the unitary approaches of other disciplines. What has not really been addressed by such critics however, is the difference between the pure sciences such as Biology and Physics, with their emphasis on experimentation, and applied sciences such as nursing and radiography where confounding variables such as the vicissitudes of human nature cannot be excluded. The insistence of writers such as Gortner & Schulz (*1988*) in referring to these as 'human sciences' is at best

artificial, and is the very thing which tends to inflame the postmodernists. In addition Holmes points the finger at educationalists in particular and accuses them of being 'xenophobic' and of clinging to unidisciplinarity at all costs (*op cit p363*). It is felt that this position is overstated despite calls within this report to maintain disciplinary boundaries! Whilst one may wish to preserve the boundaries of a profession, this is done with an eye to what is happening elsewhere at the same time.

2.12 Holism and the feminist perspective

Kobert and Folan (*1990 p309*) point out that the appearance of the concept of holism in nursing literature coincided with the upsurge of feminism in the 1970's. Kenny (*1994*) also approaches intuition from a feminist epistemological perspective. Barnum makes the point that feminist theorists "take a highly active stance. The feminist perspective starts with a notion that things are wrong and they need changing" (*Barnum 1994 p195*).
Kobert and Folan, for example, argue very forcefully that nurses should assert the identity of the profession in a gendered form. They maintain that those who advocate the development of 'nursing science' merely reshape nursing in the image of medicine and ask the question;

> "..as nursing comes of age in a modern culture in which feminine ways of knowing and being are increasingly being defined and accepted, should nursing, with its predominance of female members and emphasis on caring, opt for the feminine world view that is reflective, relational and organismic?"
>
> (*Kobert & Folan 1990 p311)*

Kobert and Folan argue that nursing process and holism are totally incompatible since they are based on completely opposite philosophical stances. They regard the nursing process as reductionist in its philosophy and argue that even nursing theorists who profess to take the holistic stance (such as Roy, Johnson, Neumann and Orem) are actually reductionists (*op.cit.p309*). Barnum, however, makes the point that the majority of feminist theorists are seeing holism in its macroscopic sense, rather than as a philosophy of one-to-one care; ie. They wish to right society's wrongs and feel that all else will follow on from this (*Barnum 1994 pp196-7*).

Other writers have argued that nursing's adherence to the process model has arisen from a need for certainty arising out of the close relationship with the medical profession (*Barnum 1994 p153; Holden 1990 p230; Henderson 1987 p13).* Nursing as a profession has long felt the need to free itself of Nightingale's insistence on the obedience of nurses to the authority of doctors and the gendered nature of this relationship has also been pointed out (*Godden in Gray & Pratt 1995 p249; Doering 1992 p29; Keddy et al 1992 pp748-9).* The development of theory was a direct response to the perceived need to assert the basis of nursing as an independent profession in its own right. We have already discussed the gendered history of radiography in the first chapter and the reluctance of radiologists to relinquish their power hold over medical imaging. Radiography remains to this day a female dominated specialism and the current debates on role extension for radiographers reflect the same struggle to assert professional independence.

2.13 Summary

In this chapter we moved from the examination of Diagnostic Radiography as a profession, to examine the nursing literature on metatheory on the premise that many of the issues which prompted the development of theory in nursing are now surfacing in radiography as the profession seeks to find a separate identity. The chapter firstly looked at the biomedical and biopsychosocial models of medical care and then moved on to an examination of theory development in nursing, using the outline of the text by Walker & Avant (*1988*) to give structure to that critique. An analysis of the extent to which nursing has moved away from the biomedical model and the scientific method (and hence begun a true differentiation from the medical profession) was initiated and this theme will be continued throughout subsequent chapters.

In the next chapter the methodology of the research is outlined and justified (particularly in the light of the above discussion) and then the results of the research are presented in chapters 4, 5 and 6. Having looked throughout this

chapter at the work of Walker & Avant, perhaps it is fitting to close this review of nursing theory by using a paragraph from the final chapter of their book to illustrate the philosophy of this report;

> " It seems to us that the ways of knowing and the proposed ways of generating and developing knowledge are like the warp and woof in weaving. Without both, the weaver's fabric is incomplete and full of holes. With both on the loom the fabric is strong and the patterns and colors are clear and beautiful. But the patterns and colors on the fabric will be different depending on the perspective of the individual weaver. In the same way the ways of knowing and the different methods of generating and developing knowledge used together will provide a strong base fabric of knowledge ....The differing perspectives of different scientists will provide richness and depth to the patterns that are identified. .....Finally it is important that we keep in mind that in a practice discipline.....knowledge for knowledge's sake is useful, but knowledge for practice is paramount" *(Walker & Avant 1988 pp214-215)*

Chapter Three

Methodology

3.1 Research design

3.1.1 Introduction

The overall research aims were stated as;

1. to form a conceptual model of the way(s) in which (expert) radiographers approach the examination of a trauma patient

2. to use the model to facilitate the clinical education of student radiographers (particularly in trauma techniques).

The previous chapters have illustrated that Radiography is far behind Nursing in theory development and that there is very little theory in existence in Radiography at present. Theory has, however, been said to be 'the ultimate goal of science' and the theoretical process to be part of the advancement of scientific knowledge (*Polit & Hungler 1991 p113).*The overall approach adopted is therefore that of descriptive research. Burns & Grove (*1993 pp293-4*) indicate that a descriptive research design is appropriate for theory development and outline 4 stages in a descriptive study design;

1. Clarification of the phenomena of interest
2. Measurement of variables
3. Description of the variables
4. Interpretation of meaning.

These four stages are very similar to the four cognitive processes that are said to be integral to all qualitative methods; *comprehending, synthesising, theorising* and *recontextualising* (*Morse 1994 p25*).

The design was developed in three phases; a *diagnostic phase*, in which the primary aim was to build one or more models (frameworks) for testing. This phase lasted around 15-18 months and the results are presented in chapter 4. The research then moved into a second (or *theory development*) phase in which

there was an attempt to elaborate on theory underpinning the frameworks which had been developed. These results are presented in Chapter 5. Finally there was an attempt in phase three of the research to apply the models in an educational setting (*application phase*) and the results of this phase of the research are presented in chapter 6.

3.1.2 Phase 1 (diagnostic)Development of the frameworks (n=174)

Stage 1-facilitated brainstorming group (n=75)

Comprising qualified radiographers of all grades & specialities (n=65) plus student radiographers (n=10).

Stage 2-questionnaire 1 (n=99; see Appendix IV)

Sent to 3 groups of staff/students;

1. Pilot group (n=11)
2. North West group (n=54)
3. Trent group (n=34)

3.1.3 Phase 2 (theory development) Elaboration of concepts (n=167)

Stage 3-brainstorming groups (n= 63)

Group 1; students (n=22)

Group 2; " (n=18)

Group 3; Clinical education specialists (n=23)

Stage 4-Questionnaire 2 (n=104; see Appendix VI)

Sent to each of 45 different general hospitals to be filled in by 10 qualified radiographers in each department who were regularly working with trauma patients (no grades specified).

3.1.4 Phase 3-Theory application

Consisted of action research with groups of educators (*n approx.=40)* and with the researcher's own students (*n=16).*

3.2 Discussion & justification of overall methodology

The project was designed as a descriptive, exploratory study using interpretative analysis with the intention of theory development (*Burns & Grove 1993 p27; Field & Morse 1985 p14*). The overall approach taken was broadly qualitative, using various forms of questionnaires throughout (both self-completion and researcher facilitated) and using both structured and unstructured format questions at different stages to fulfil the developing aims as the research progressed. A combination of inductive and deductive methodology was therefore used which is appropriate in descriptive research (*Tripp-Reimer 1983 in Leininger 1985 pp179-180*). The purpose of this project was to generate theory from empirical data using thematic analysis (*Streubert & Carpenter 1995 p180*). Although questionnaires were the primary instrument used, the overall research methodology is qualitative, rather than that of a survey, since the survey method presumes hypotheses to be tested, rather than the openness of approach required for theory generation (*Field & Morse 1985 p15*).

Another factor in the choice of a predominantly qualitative approach was the recognition that radiography, despite its preoccupation with technology, is at its heart a human, practically oriented profession which requires openness in its methodology, rather than the positivistic approach of quantitative methods; cultural and humanistic perspectives are not amenable to measurement techniques (*Hammick 1995 p141; Streubert & Carpenter 1995 p1).* Streubert & Carpenter point out that qualitative research values the perspective of the subject and the context in which they operate; is open to multiple realities and takes an interpretative stance (*op cit p12*).

Stern (*1980*) uses grounded theory methodology as an example of research which can be both inductive and deductive, and outlines five ways in which grounded theory differs from other methodologies. Although this project does not use pure grounded theory methodology, there are aspects in common (for example the use of the constant comparative method in data analysis) and it is useful to consider Stern's points in the context of this project. Her points of difference are given in italics at the beginning of each succeeding paragraph.

The conceptual framework is generated from the data rather than from previous studies;- the aim of the research is to generate theory from the data. As stated in Chapter 1 there has been very little written in the radiography literature about conceptual modelling and what does exist is not research based. The aims, as characterised by Mays & Pope (*1996 p3*), included 'hypothesising inductively from data, notably using subjects' own categories, concepts etc'. Nursing studies were not looked at until after the research had commenced (*Burns & Grove 1993 p142-143; Morse 1994 pp26-27*), and the literature explored has predominantly related to meta-theory and to the analysis of specific concepts, rather than the examination of specific theories and models. Morse makes the point that in qualitative research the literature must not be allowed to 'contaminate' the initial comprehension of the setting and its participants (*op cit*).

The researcher attempts to discover dominant processes in the social scene rather than describing the unit under study;- the social scene in this context is the x-ray department and the processes are the radiographers' conceptualisations of their interactions with the patients (and others in the health care team) during the examination.

Every piece of data is compared with every other piece of data;- The research has used both data and methodological triangulation (*Janesick in Denzin & Lincoln 1994 pp214-215; Burns & Grove 1993 p32)* in the development and

testing of the conceptual frameworks. Data triangulation uses multiple sources of data in the same study whilst methodological triangulation uses different instruments and designs in the same study (see below). It is also recognised that triangulation "might be used to overcome the philosophical differences between quantitative and qualitative research" (*Porter 1989 in Burns & Grove 1993 p32*).

In addition to the use of data triangulation, relational computer databases have been used to undertake qualitative content analysis (both manifest and latent) and thematic analysis both within data sets and between different sets of data where relevant.

The collection of data may be modified according to the advancing theory;- subsequent chapters will discuss the ways in which data collection was modified as the theory advanced.

Rather than following a series of linear steps, the investigator works within a matrix in which several research processes are in operation at once. In other words the investigator examines data as they arrive and begins to code, categorise, conceptualise and to write the first few thoughts concerning the research almost from the beginning of the study;- the research design outlined in 3.1 was not fully arrived at before the study commenced but is rather the outcome of the very processes described here and in (4) above. Stern herself comments that this 'makes the system so difficult to describe'(*Stern 1980 p21; Streubert & Carpenter 1995 p147; Wiseman 1974*) since the design and development of the study are continually evolving with the development of theory.

3.2.1 The approach; group administered and postal questionnaires

Questionnaires tend to be associated with a high degree of structure to the questions asked. Field and Morse, however, indicate that open questions are appropriate provided the respondents are capable of expressing themselves in

writing. Since Radiography requires A-levels or equivalent for entry to training, we may assume that this is the case (*Field & Morse 1985 pp74-75*). The authors also indicate that open questions avoid the trap of forcing one's own viewpoint onto others; they allow for freedom of responses.

The first three stages of the research used group administered questionnaires. The use of groups is said to have some advantages in that it may encourage certain participants who may ordinarily feel that they have nothing to offer or who may feel intimidated by being singled out (*Kitzinger in Mays & Pope 1996 p41*). Also the presence of the researcher encourages a high response rate and also allows for clarification of points which might otherwise have resulted in omitted questions or a nil return from that participant (*Clifford & Gough 1990 pp82-3; Polit & Hungler 1991 p292)*. This method has been used in a related study (*Von Post & Andersson 1996)*. Group administered questionnaires are also acknowledged to be the least time-consuming and expensive of any self-report research method (*Polit & Hungler 1991 p293)*. This was an important consideration and allowed the collection of a large volume of data that might not have otherwise been available. The implications of the results of this methodology are considered in chapter seven.

3.2.2 Triangulation

Triangulation is the use of multiple methods of data collection (including the use of both qualitative and quantitative methods) in order to increase confidence in the results obtained; what Denzin refers to as *sophisticated rigor* (*Denzin 1989 p234; Cohen & Mannion 1989 p269; Field & Morse 1985 p16; Streubert & Carpenter 1995 p318*). Streubert & Carpenter see triangulation as being appropriate to the complex, multifaceted nature of nursing phenomena (*op cit p244*). Polit & Hungler support this and argue that triangulation of methods can provide a much stronger theoretical framework and thus a better

contextual basis for clinical practice in the health professions (*Polit & Hungler 1991 p522).*

Whilst the standard definition of triangulation refers to multiple methods of research, Denzin points out that there are numerous types of triangulation; including investigator and data triangulation and the use of multiple perspectives (*op cit p237*). He also points out the possibility of triangulation by data sources. As can be seen from the research design this method of triangulation has been used in this study, with the use of multiple groups throughout the various stages of the research. Many theorists would regard this as a sampling decision, but Denzin argues that, as a form of triangulation, this allows for 'maximum theoretical advantage' (*ibid*).

3.3 Sampling

It was felt that there should be reasonable sample sizes in order to be able to justify the models as being research-based and a product of a reasonable consensus among practising radiographers (*see 3.7.2 below*). It was recognised however, that in making the decision to use descriptive/inductive methodology, the derivation of a statistically representative sample would be difficult. Theory development is essentially holistic in nature and thus an inductive approach may be seen as more in tune with holism, in that induction commences from the overview and then progressively focuses as theory develops (*Burns & Grove 1993 p28; Streubert & Carpenter 1995 p247*).

It was decided therefore to use naturally occurring groups (*Mays & Pope 1996 pp39-40*) to develop the early frameworks (referred to as the *diagnostic phase*). Radiographers gathered together at various national conferences participated in facilitated brainstorming sessions and responded to the first questionnaire. Whilst being an opportunistic method of sampling, the groups contained radiographers and students of all levels of experience and all grades. These

could therefore be said to be representative of the makeup of the profession, whilst being broadly theoretical, rather than statistically significant, samples. Morse refers to this as 'maximum variety sampling' and comments that it can be useful when attempting to analyse concepts and in identifying patterns of commonality across deliberately heterogeneous groups (*Morse in Denzin & Lincoln 1994 p229*). This issue is considered further in chapter 9. The sampling may have been said to have been purposive, however, since these groups were actively sought as being potentially helpful respondents (*Field & Morse 1985 p95*). For example three groups were approached to complete the first questionnaire *(see Appendix IV)*; a small pilot group (n=11) followed by two conference groups meeting in Trent (n=34) and the North West (n=54) respectively. The Trent meeting consisted of radiographers specifically interested in trauma radiography, whilst the group in the North West were radiographers who were not specifically involved in trauma radiography; although a proportion may well have been (*Mays & Pope 1996 pp46-57*).

For the second questionnaire (*see Appendix VI*) a more statistically representative sample was sought (in an attempt to blend qualitative and quantitative methodology, and to increase the potential for generalisability) but this was not very successful. Using national information, including the radiography press, 45 hospitals located across the whole of the United Kingdom were selected which were known to have Accident and Emergency departments (including one hospital which had been designated as the first trauma centre in the country); 10 questionnaires were sent to each department with a request that they be distributed to radiographers who were regularly working with trauma patients (of any grade) making a sample size of 450 in total.

3.4 Theory writing

A research diary was kept to record various steps in the theory development process, aided by memo writing throughout which helped to advance the conceptual development of the frameworks (*Bright in Streubert & Carpenter 1995 pp180-185; Burns & Grove 1993 p571*). Data were revisited constantly as the analytical methods were refined and developed throughout the project to allow for constant sampling and reduction of data (*Stern 1980 p22*).

Theory writing has been characterised as a puzzle; a board game and a murder mystery (*Morse 1994 p32; Wiseman 1974 in Bynner & Stribley 1978 p113*). Both authors emphasise the almost mystical process of speculation and conjecture, of visiting and revisiting the data; the researcher is characterised as a type of intellectual 'Miss Marple' who "develops hunches...looks for evidence pro and con...-until finally the unknown is known" (*Wiseman op cit*). The major cognitive process throughout this descriptive study has been, even where the process was quantitative, exploring patterns in data; looking for the interpretations that would unlock the theory underpinning the profession of radiography. Baird (*1996 p124-125*) makes the point that professional practice is driven by an innate form of conceptual knowledge that is complex in form and 'is inseparable from action'. Baird proposes that this innate conceptual framework is built upon other forms of knowledge which are interdependent. If we accept this premise then the theory that is presented is not new, merely the codification of that 'procedural' or 'indeterminate' knowledge by which the radiographer, as distinct from other professionals, practices.

3.5 Validity & reliability

3.5.1 Validity

Leininger defines validity in qualitative research as;

> "gaining knowledge and understanding of the true nature, essence, meanings, attributes, and characteristics of a particular phenomenon under study. Measurement is not the goal; rather knowing and understanding the phenomenon is the goal.

> Qualitative validity is concerned with confirming the truth or understandings associated with phenomena". (*Leininger 1985 p68*)

Various authors have maintained that validity in qualitative research is high (possibly higher than that of quantitative methodology) since theories are clearly derived from the data (*Mays & Pope 1996 p4-5; Stern in Leininger 1985 p150*). In addition section *3.2* above has discussed the use of triangulation in the study which is said to increase validity of results (*Mays & Pope 1996 p64-65).* Janesick (*in Denzin & Lincoln 1994 p216*) comments that the credibility of postulated theory can be judged by the laying of audit trails (*see 3.8.3 below*).

3.5.2 Issues of reliability

Field & Morse (*1985 p116*) state categorically that qualitative research is not replicable since the research instrument is, in effect, the researcher. Stern also maintains that qualitative studies are not reproducible, but argues that since the aim of such research processes is discovery, then this is not necessarily a problem (*op cit p150).* She does however make the point that reliability can be improved by referring back to respondents to check the emerging interpretations. Reliability can be further improved by the use of computer-aided analysis;

> **"First, easy and quick retrievals helped to explore the data more fully than would have been possible by manual means.....Second, the facility to have easy access to all of the collected data increased our confidence that interpretations were not based on one or two highly untypical cases".** (*Kelle 1995 p27)*

3.5.3 The decision trail

Throughout the analytical chapters that follow, there has been a careful attempt to document the decision trail of the developing theory; this is said to improve the replicability of a qualitative study (*Burns & Grove 1993 p565; Morse 1994 p24*). Morse argues that qualitative researchers have been somewhat lazy in documenting the cognitive processes involved in data analysis and that this oversight has led to the denigration of qualitative research as being something

of a 'soft option'(*op cit*). Huberman and Miles (*in Denzin & Lincoln 1994 p440)* also warn however about the development of excessively mechanistic approaches to data analysis (*Burns & Grove 1993 p565*).

3.6 Qualitative data analysis & the use of computers

Data analysis was undertaken with the aid of computer programs and was both quantitative (for the structured responses) using SPSS and qualitative (for the unstructured data) using the relational databases Microsoft Access and Key DatabasePlus. A number of authors have outlined the use of computing software for the analysis of qualitative responses and/or the development of conceptual models (*Padilla 1991; Richards & Richards in Denzin & Lincoln 1994; Hamill & McAleer 1996*). Leininger (*1985 p66*) fears that such methods can be reductionist (and ,as such, the antithesis of qualitative analysis) but this was not felt to be the case, although there was a tendency be somewhat quantitative in that it was possible to quantify the numbers of responses under particular categories. Polit & Hungler point out that quantification of qualitative data may mask subjectivity, disguising potential bias (*Polit & Hungler 1991 p500)*. It is hoped that this has been balanced by the use of actual responses as illustrative material throughout the analysis. Hickey & Kipping (*1996 p81*) make the point that it is crucial to maintain the diversity and subtlety of responses when using a quantifying approach. The authors demonstrate that there is room for a quantitative aspect to qualitative data analysis so that the two methods complement each other, rather than being seen as opposing methodologies (*Polit & Hungler 1991 p519)*.

3.6.1 Coding

Each textual response to an open question was examined and segmented for coding as it was entered into the computer.

> " Coding, as a central process, helps the researcher sort the data and uncover underlying meanings in the text and metaphorical references, and brings both the central and peripheral referents to the researcher's attention. Intraparticipant microanalysis, or line-by-line (and sometimes word-by-word) analysis of an

> interview transcript from one participant is the primary mechanism by which understanding is achieved." (*Morse 1994 p29*)

The ease of use of modern Windows databases allowed for immersion in the data, which sometimes cannot be achieved with paper methods. Numerical and alphabetical sorting can be achieved on all 3 fields allowing constant checking and recoding of data as the analysis proceeds. This has been identified as a problem in qualitative research, even with more sophisticated dedicated software packages (*Richards & Richards 1991*). Overview of the data by means of graphical, tabular displays is a feature that can only be achieved manually by many hours of hard work, but are available instantly once the data have been entered into the computer (*Wiseman 1974 in Bynner & Stribley 1979 pp116-117*). It has also been pointed out that data are less likely to be lost or misplaced if computing methods are used (*Field & Morse 1985 p102; Hamill & McAleer 1996 p78)*. The databases had the advantage that information could be imported into the word processing package, and also into a spreadsheet which allowed for better formatting of tables and also graphical displays where desired. The facility to import data into other software packages is not always either available or easy with specialised qualitative data analysis packages (*Burns & Grove 1993 p564; Hamill & McAleer 1996 p72).*

Sets of assertions for each open question were developed as described by Padilla and were then analysed as separate databases. For example the first open question asked what the respondents felt were the skills required of a good A&E radiographer. The responses to this question were segmented by the researcher as they were entered into the database; thus from the 104 respondents to this questionnaire were generated 613 assertions. Each segment of the response was labelled with the respondent number. This is analogous to the process as described by Hamill & McAleer in their study using Ethnograph software (*1996 p74*). Each separate segment was initially coded using the 24 codes derived from the diagnostic phase.

3.6.2 Concept derivation-collapsing of categories

Work then began on collapsing the codes down using both manifest and latent content analysis. This process is again echoed by Hamill & McAleer who point out that 'immersion in the data and reflection upon it often reveals more appropriate coding' (*op cit*). The process requires the researcher to reflect upon the concept labels generated and to utilise the 'constant comparative method' whereby every label is compared with every other. The process of collapsing categories is thus the grouping together of concept labels which may be said to mean the same thing, especially where one or both grouping contain very few responses. At various stages in the subsequent chapters, thematic frequencies of concept categories are tabulated to allow the reader to follow the author's decision trail. Polit & Hungler refer to this as 'quasi-statistics' (*Polit & Hungler 1991 p505).* Such tables act as useful signposts through the volume of data generated and allow the reader to see where concepts have been collapsed and recoded. Where this has occurred there will appear to be gaps in the lists of codings; this indicates that an intervening category has been collapsed into another and it is hoped that the maintenance of such gaps will aid in clarity with regard to the research process (or decision trail). The tables also allow the researcher to weave together the themes as the data unfolds into an integrated theory (*ibid).*

3.7 Diagnostic phase methodology

3.7.1 Stage 1

Purpose	To elicit from radiographers their underlying conceptualisations of the radiographic process
Method	Facilitated brainstorming in a large group.

This first session was undertaken with a group of 75 radiographers of all grades (including 10 students) at a conference held in Swansea, using facilitated brainstorming methodology as being suitable for this type of exploratory research (*Fontana & Frey in Denzin & Lincoln 1994 p365*). The

participants were asked to visualise being required to undertake multiple projections on a patient on a trolley who had been in a road traffic accident. They were then asked to take a piece of paper, to brainstorm and write down words and phrases that would describe the process of radiographing such a patient. Having done so, the respondents were then asked to use those words and phrases to draw a diagram of that process on the same sheet of paper. In one or two cases, this produced 'stick-men' pictures of radiographers around a table, but the majority of the respondents produced diagrams (as conceptual maps) which represented the examination as roughly linear or roughly circular (see Chapter 4).The brainstormed words and phrases were subjected to manifest content analysis, initially by hand but subsequently the data were entered into a relational database and subjected to further analysis. This analysis was then used to draw up a list of 24 categories (codes) which were used in the subsequent questionnaire (see Chapter 4).

As indicated above each word and phrase (or string) was broken down into its constituent parts and each section of the response assigned individual single codes *(see Appendix I)*. This was very time-consuming to enter, but saved time at a later stage in that it reduced the number of analytical steps which would have been required if responses had been entered as a whole string. Thus from 75 participants a database of 305 responses was generated. Each database entry bore the identity code of the respondent plus the assigned response code. Subsequent databases from later stages of the research were also coded in this manner. In very few cases were there segments which could not be coded; some analysts may be critical of this, but as Wiseman states;

> "There is usually nothing that people will tell you or that you will see (if it is within the research topic) that is truly irrelevant to your study. It probably belongs under another code heading, and is either background or foreground"
>
> (*Wiseman 1974 in Bynner & Stribley 1979 p119*)

3.7.2 Stage 2

Purpose	To determine the validity of the concept categories and frameworks generated from stage 1.
Method	The categories were incorporated into a rating scale

questionnaire which was then administered to groups of radiographers of differing grades, experience & seniority.

Once the initial conceptual frameworks had been produced, an attempt was then made to test them further to see if they appeared to have meaning for other groups of radiographers. As stated above a checklist of 24 key words was derived from the responses of the initial brainstorming session and used to compile a questionnaire (*see Appendix IV*).

The questionnaire asked respondents to rate each term on the checklist as being *very important*, *relevant* or *not important at all* to the process of trauma radiography. In addition, each respondent was asked to select the three MOST important terms from the list and to write them in three boxes at the bottom of the page.

Respondents to this questionnaire were also asked to choose between the two diagrams of the radiographic process which had been produced from the first stage of the research and, if they wished, to devise a model of their own if they felt it better fitted the circumstances. The same proportions of respondents made their selections of the two frameworks as in the first study group;- that is, approximately 60% selected the linear model and around 40% opted for the circular model. Only 12 respondents (12.1%) attempted to draw their own versions, but these, when analysed, actually represented modifications of the models offered, rather than new conceptualisations.

This structured questionnaire was administered to two groups of qualified radiographers (like the first group, these were of mixed grades and specialities) at study days in Nottingham and Manchester, and also to students in the researcher's own classes. Ninety-nine respondents completed this questionnaire and the results were analysed using SPSS statistical software (*see chapter 5).*

The conceptual maps were modified slightly as a result into the form shown in Chapter 4.

Shortly after this section of the research, the models were first published and an invited conference paper was also given outlining the work that had taken place so far. This is discussed further in Chapter 4. At this stage also, the models began to be used in teaching, first with final year undergraduates and subsequently with first and second year students in order to test and develop the models and some of their underlying concepts. They were found to be useful tools in the discussion of clinical cases with students, who felt able to opt for one or other of the frameworks to guide their analysis of case histories.

3.8 Theory development phase methodology

3.8.1 Stage 3

Purpose	To develop a statement to define the profession of diagnostic radiography.
Method	Facilitated brainstorming groups

Brainstorming groups were used to develop statements regarding the profession of diagnostic radiography in an attempt to analyse professional boundaries and the ways in which that made the developing frameworks unique to radiography. Three groups (one of staff, two of students) totalling 63 respondents in all were asked to write unstructured responses to the following open questions;

'What is unique about diagnostic radiography?'

'How is it different from other professions such as nursing?'

The responses were again subject to manifest content analysis and a statement defining the profession of diagnostic radiography was eventually derived. This process is discussed in more detail in Chapter 5.

3.8.2 Stage 4

Purpose	Elaboration of concepts and theory development
Method	Semi-structured questionnaire sent to purposive sample of radiographers working with trauma patients.

The purpose of the second questionnaire was to attempt to further test the frameworks that had been developed and to begin to analyse certain concepts which had begun to emerge. Information was also elicited which attempted to test the developing hypothesis that selection of a particular framework could be linked to the number of years of clinical experience a respondent had. The questionnaire consisted of open questions, supplemented by a few structured ones to elicit particular pieces of information.

3.8.3 Questionnaire 2-structure

A copy of this questionnaire is included as Appendix VI.

Question 1 "What are the skills that make a **good** A&E radiographer?

The aim of this question was to determine what radiographers themselves felt constituted an expert in this area of trauma radiography. The responses were also used as a back-check to find out whether the same skills that were valued in the trauma radiography expert were also those identified as being part of the radiographic process.

Question 2 "What do you understand by the term **holistic**?"

In this question the aim was to test whether radiographers actually understood the term 'holism'. Having accused radiographers of being reductionist in their outlook, there was interest in finding out whether those in the profession actually had an understanding of what holism was. It would be reasonable to hypothesise that if the general understanding of the term was shown to be poor, then it might also be expected that there might be a greater preference expressed for the linear model, rather than the circular one. The aim of these first two questions was to get respondents to think for themselves about skills and meanings before addressing the actual models (which were printed on the next/back page of the questionnaire).

Question 3-Model selection

In this question the respondents were presented with the two models side by side and asked to select the one 'which you feel best typifies the way in which you would approach the radiography of a patient with multiple injuries'. In the first questionnaire the linear model was presented first (above the circular model). In this questionnaire an attempt was made to eliminate order bias by presenting the circular model first.

Q.4 "What are the skills used by a radiographer in patient assessment?

In the final two questions an attempt was made to develop the concepts of *assessment* and *evaluation.* Both these concepts appear in the Nursing Process and it was felt it would be interesting to see how they were viewed by radiographers and whether it would be possible from the responses to further differentiate radiography from other professions. Concept analysis has been defined as 'a process of determining similarities and differences between concepts' (*McCormack 1992 p339*). In this case concept analysis was also being used to further delineate the professional boundaries of diagnostic radiography and to attempt to determine its essential skills.

Question 5. "What are the skills used by a radiographer in evaluation?"

This final question was asked to enable a determination of the skills the radiographers saw as being necessary, not only for the evaluation of the images but also for the evaluation of the examination as a whole.

3.9 Theory application phase-Action research

Purpose To determine the applicability of the models to education of student radiographers

Method Action research, including the use of focus groups

Once the models had been developed to a reasonable stage then the methodology shifted into one of action research as the applicability of the models for use in education was tested. Action research has been defined as 'interacting with or participating in a system for the dual purposes of learning about the system and effecting a change in the system' *(Lewin 1946 in Streubert & Carpenter 1995 p255).* It is acknowledged that the perspectives gained through action research may have been difficult to obtain by other means and this is certainly true of both parts of this study. The data could have been obtained by alternate means but would have been unlikely to have been of the same quality.

3.9.1 Focus groups of international educators

The first part of this action research came with the opportunity to present a paper at an international Radiography Teachers' Conference organised by the International Society of Radiographers and Radiologic Technologists (ISRRT) in Nottingham in July 1995. The researcher proffered a paper which was accepted and was then asked to run workshops in which groups of educators considered specific questions arising from the paper. There were five groups, each consisting of about 8 educators, which is said to be within the ideal size range for focus groups *(Kitzinger in Mays & Pope 1996 p41).* The sample was essentially naturally occurring or self-selecting comprising those who were attending the conference and those who chose to attend the workshops. The researcher played no part in the groups, which each elected their own chair and scribe; the researcher facilitated the feedback session at the end in which the group responses to each of the questions set were received and outlined. The groups of educators thus acted as focus groups. The opportunity afforded by this conference was important in that the international origin of the participants was a good test of the likely applicability of the models across cultural boundaries. This has been cited as a strength of the focus group technique *(Kitzinger in Mays & Pope 1996 p37).*

3.10 Summary

This chapter has explored in detail the rationale behind the selection of methods for this descriptive research study. Methods of sampling and of data analysis, including the use of computer software, have also been discussed. Issues of validity and reliability have been referred to, with discussion of how the construction of the report to include an audit or decision trail can help to signpost the various stages in decision-making throughout the project and thus improve both validity and reproducibility. An outline of the methodology used in each of the three phases of the research has been given, and this will now be discussed in more detail in the next three chapters as the results of the research are highlighted and discussed.

Chapter Four

Results part 1; Diagnostic phase

4.1 Results from the first brainstorming session

As stated in the previous chapter, the first content analysis yielded 24 categories, which were subsequently used in a rating scale that formed the main part of the first questionnaire. Subsequent computer analyses allowed for the collapsing of certain code sets. The initial 24 categories and any subsequent recodes and/or retitling of concepts are outlined in table 4.1 to try to illustrate the researcher's thinking processes (the decision trail). The raw data are included in Appendix I. The analysis of the coding database is given in section 4.3 below, in which the models are outlined.

Table 4.1 Categorisation of the skills used in trauma radiography

CODE NO	SKILL	RECODE	RETITLE
AE1	ADAPTATION		
AE2	ARTEFACTS	AS APPROPRIATE	
AE3	ASSESS		
AE4	CALM/PATIENCE	CARE (AE6)	
AE5	CAPABILITY	SKILL (AE22)	
AE6	CARE		
AE7	COMFORT	CARE (AE6)	
AE8	COMMUNICATION		
AE9	CO-OPERATION	ASSESSNT. (AE3)	
AE10	DECISIONS	PLAN (AE16)	
AE11	EFFICIENCY	SKILL (AE22)	
AE12	EXPLANATION	CARE (AE6)	
AE13	INFORMATION	ASSESSNT. (AE3)	
AE14	METHODICAL	SKILL (AE22)	
AE15	MODIFY	ADAPT (AE1)	
AE16	ORGANISE		PLAN
AE17	PREPARATION	PLAN (AE16)	
AE18	PRIORITISE		
AE19	QUALITY		EVALUATION
AE20	PROFESSIONSM.	SKILL (AE22)	
AE21	SEQUENCE		
AE22	SKILL		
AE23	SPEED	SKILL (AE22)	
AE24	TEAMWORK	COMMUNICATN.	(AE08)

This exercise resulted in a reduction from 24 categories to nine by virtue of the collapsing and recoding process *(see table 4.1)*; in turn these concepts were then divided into major and minor concepts by virtue of the number of responses each received. If we categorise major concepts as those receiving 21 or more responses and minor concepts as getting 1-20 responses then the results divide quite clearly as shown in table 4.2;

Table 4.2 Division into major and minor concepts following the recoding process

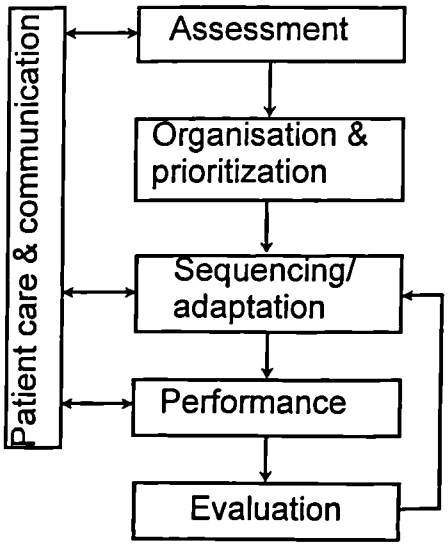
	CONCEPT	CODE	NO. OF RESP.	%
MAJOR	Assesst.	AE03	82	26.88
	Skill	AE22	57	18.68
	Care	AE06	44	14.42
	Plan	AE16	40	13.11
MINOR	Adaptn.	AE01	20	6.55
	Prioritise	AE18	18	5.90
	Sequence	AE21	18	5.90
	Communic	AE08	15	4.91
	Evaluatn.	AE19	11	3.60
			n=305	

4.1.1 The production of diagrams by individuals

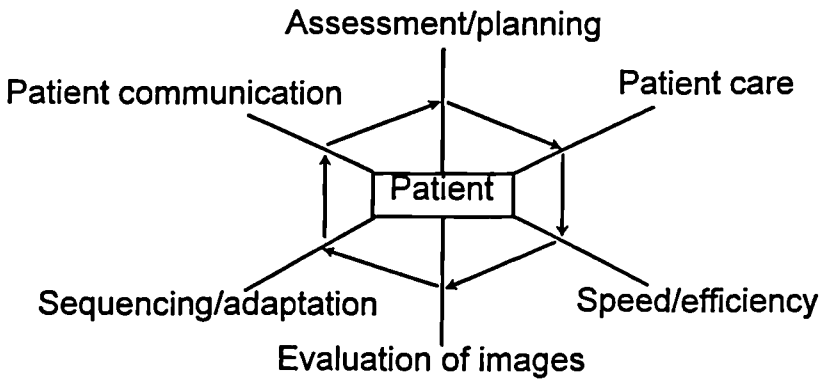
As stated above, for the second part of the exercise the respondents were invited to use the words and phrases they had written down to draw a diagram of the process of radiography of a patient with multiple injuries. This proved to be very productive. Forty-three of the 75 respondents drew diagrams; of those 28 (65%) produced diagrams that were sequential and linear and 15 (35%) produced circular diagrams. The linear diagrams were then amalgamated by the researcher, followed by the circular diagrams, to form the basic shapes for the two initial models; the words/concepts outlined on the diagrams were taken from the first stage content analysis *(see tables 4.1 & 4.2)*. The initial diagrams produced from this stage are shown in appendix II. The stages of *performance* and *evaluation* were added to the diagrams by the researcher for completeness. Consideration of detailed responses from this group is undertaken in

section 4.4 below which looks at the structure of the models in more detail. Subsequent analysis produced the versions which are shown overleaf. Richards & Richards (*1991 p254*) warn researchers, however, of the dangers of what may be seen as simplistic maps, and against the fact that what are constructed as mere analytical devices may be taken as 'accurate portraits (what did that double headed arrow mean?)'. This literal interpretation has been encountered during the research process and has caused problems in trying to explain the research to those who, perhaps, have been a little sceptical of its purpose. What the frameworks represent are conceptual maps/ analytical devices which allow us to access the underpinnings of professional practice in radiography. It is important not to be hung up on structure to the detriment of theoretical analysis.

Linear Model of the Radiographic Process



Subsidiary (Holistic) Model of the Radiographic Process



Figures 4.1 & 4.2 The Models as derived from the first stages of the research

4.2 Student group work

Figures 4.1 and 4.2 above show the models after some modification following the results of the first questionnaire (*see section 4.3 below*). Subsequent to the first stage the same exercise was repeated with three cohorts of radiography students in different

northern universities to see whether the same or similar patterns, words and phrases arose in diagrams produced by the students. The students' diagrams tended to be more complex, as they had longer time available to them to produce the work, but they did in essence correspond to the type of diagrams produced by the original group. Every diagram except one was linear in form; the remaining one was essentially a conceptual map (*see section 2.7*).

The component phrases from each student group's diagrams were entered as before into the database for analysis and, in order to maintain the comparison with the first group, were initially coded using the list of 24 skills as shown in table 4.1. The database from the three student cohorts consisted of 206 assertions and is shown in Appendix III. The coding frame is shown below with the results of the 'first pass' (*ie the initial coding using the 24 code list from the first stage)* and subsequent recodes as table 4.3 overleaf. Arrows are used within the table to indicate the decision trail of collapsed categories. The coding/recoding of this database left 10 categories, compared with nine in the first phase. In order to maintain comparison with the first stage, these have also been divided into major and minor concepts by splitting the set and categorising those with more than 20 assertions as major concepts; those with less than 20 responses as minor concepts. The results are shown in table 4.4 and may be compared with table 4.2 from the earlier phase of this exercise.

Table 4.3 Coding of student responses from group sessions

CODE NO	SKILL	1st pass codings	RECODES
AE1	ADAPTATION		Methodic.-ae14
AE2	ARTEFACTS		Quality-ae19
AE3	ASSESS		
AE4	CALM/PATIENCE	No allocation	X
AE5	CAPABILITY	No allocation	X
AE6	CARE		
AE7	COMFORT		Care- ae06
AE8	COMMUNICATION		
AE9	CO-OPERATION	No allocation	X
AE10	DECISIONS		Preparation-ae17
AE11	EFFICIENCY		
AE12	EXPLANATION		Communic-ae08
AE13	INFORMATION		
AE14	METHODICAL		
AE15	MODIFY	1 assertion only	-> ae21->ae18
AE16	ORGANISE		-> ae10->ae17
AE17	PREPARATION		
AE18	PRIORITISE		
AE19	QUALITY		
AE20	PROFESSIONALISM	1 assertion only	Care-ae06
AE21	SEQUENCE		Priorit.-ae18
AE22	SKILL		
AE23	SPEED		Efficiency-ae11
AE24	TEAMWORK		Communic.ae08

	CONCEPT	CODE	RESPS.	%
MAJOR	Assesst.	AE03	29	14.07
	Care	AE06	25	12.13
	Communic	AE08	25	12.13
	Preparation.	AE17	25	12.13
	Informatn.	AE13	23	11.16
	Skill	AE22	21	10.19
MINOR	Methodic.	AE14	18	8.73
	Prioritise	AE18	17	8.25
	Efficiency	AE11	12	5.82
	Evaluation	AE19	11	5.33

Table 4.4 Division into major and minor concept categories

Concept type	Group 1	Student groups	Code	Common concepts
MAJOR	Assessment	Assessment	AE03	X
	Care	Care	AE06	X
	Plan	Preparation	AE17	(X)
		Information	AE13	
	Skill	Skill	AE22	X
		Communication	AE08	
MINOR	Communication		"	(X)
		Methodical	AE14	
		Prioritise	AE18	
		Efficiency	AE11	
	Evaluation	Evaluation	AE19	X
	Adaptation		AE01	
	Prioritise		AE18	
	Sequence		AE21	

Table 4.5 Comparison of concepts across the two phases (as illustrated initially in table 4.2 and 4.4)

Table 4.5 compares tables 4.2 and 4.4 ie.the response categories from group 1 and from the student cohorts. It will be noted that certain concepts are common to both groups; major concepts in common are *AE03 assessment*; *AE06 care* and *AE22 skill;* minor concepts in common are *AE18 prioritise* and *AE19 evaluation* whilst *AE18 communication* was classed by the student cohorts as a major concept, but a minor one by the first group. Responses in three of the above categories include;

Care;- 'minimise distress', 'do not leave patient alone'

'make sure patient is as comfortable as possible'

'reassurance; empathy; explanation'

'try to move as little as possible in order to maximise patient care'.

Communication refers not just to the patient but to others as well;-

'level of communication- co-operation of patient' '..verbally/ visually'

'..explain delays to other patients'

'..teamwork (nurses, doctors, radiographers)...'.

The *Skill* category shows the student preoccupation with things which may form part of the college curriculum;-

'patient protection-radiation/ infection/ movement..'

'..protect yourself and patient; gloves etc'

'..staff protection; hygiene and radiation', 'care of O2/drips/blood/gloves...'.

It is noteworthy that *assessment* was rated the highest concept by both groups and *evaluation* the lowest by both groups, even though the spread of percentage responses is more even in the student cohort database. Responses in these two concept categories included;

Assessment;- 'assess request form' for 'projections requested'

'..assess injuries' 'consciousness, assess level of co-operation'

'...assess patient condition; vital signs'. Responses here were similar to the first group, although there was less emphasis on aspects of mobility.

Evaluation;- ' check film' for 'name, marker' 'artefacts'

'..show doctor films to minimise repeats' and 'further projections only if requested'.

It should also be noted that in the first database *AE17 preparation* was recoded into *AE16 organise/plan* whereas in the student cohort the opposite occurred, suggesting the two concepts are very closely linked; in each case the category which remained was rated as a major concept by the group in question, with very similar percentages;- in group 1 *AE16 plan/organise* gained 13.11% of the total assertions whilst in the student group *AE17 preparation* received 12.13% of the responses. The responses covered the whole preparation phase;

'...select room', 'preparation of room'

'..ensure room has all equipment that may be needed including emergency equipment and films'

'..patient preparation i.e. removal of clothes', '..identification'.

There are other similarities in the choice of concepts; The first group retained both *prioritise* and *sequencing* as discrete concepts whilst the student cohorts retained *prioritise* but also identified *efficiency* and *methodical* as categories in themselves. We may postulate that the two concepts retained by the first group (who were mainly qualified, experienced clinicians) are slightly higher-order versions of the concepts identified by the students i.e. the concern initially is with being methodical and efficient, and once the radiographer gains experience and confidence then it becomes easier to prioritise and sequence the tasks in hand and the order of complex examinations. Responses in these concept groups included;

Methodical;- '...process after each exposure to minimise repeats/further projections'

'...work quickly, methodically, systematically, carefully'

'...room left tidy, clean & hygienic'

Efficiency;- 'observe patient at all times'

'...minimum waiting time'

'...work quickly & efficiently', '...maintain efficiency & speed throughout'.

Prioritise;- 'work in logical manner' establishing 'priority of projections'

'e.g. neck first'; 'categorise importance-> spine, skull, chest..' then

'x-ray less life threatening injuries'.

The other category that the student groups identified as a major concept was that of *information* which constituted 11.16% of the total assertions. Responses here stated that the radiographer should 'read x-ray request card' for 'clinical details'/ 'clinical history'

'request card- views; technique adaptation'

'?HIV', 'pregnancy check'

'is patient accompanied? Doctor or nurse?'.

One reason for pursuing the student group work was an initial hypothesis that, since the undergraduate curriculum included behavioural science which had not been part of the syllabus for the old Diploma, there might be differences

between the responses between the two groups in the concept of *care*. In fact this was not the case. The decision trail for both groups was the same in that for both groups the *comfort* category did not survive as a discrete concept and was collapsed into *care*. In the first group there was a greater percentage of responses in this category (14.42% as opposed to 12.13% for the student groups) and there were no discernible differences in the quality of the responses in the two different databases. This hypothesis was therefore abandoned.

4.3 Results from questionnaire 1

As stated in chapter 3 the initial list of 24 codes was used to devise a rating scale which formed the major part of the first questionnaire(*n=99*). A copy of this is included as Appendix IV. The 24 categories were listed in random order and respondents were asked to rate each concept on a three point scale as either *very important/ relevant/not important at all.* They were then asked to select the 3 most important from the list and write those down. The results were entered into SPSS in two data sets; the first dataset involved giving a score of 3, 2 or 1 to each of the points on the above rating scale. The second set of data was entered as either 1 or 0, depending on which three concepts had been selected. Both sets of results are combined in table 4.6 overleaf. Columns 1-6 (Mean -> Rank order 1) show the results of the rating scale ranked in reverse order from 24-1. The final two columns show the results of the selections of the most important three concepts, and the rank order based on the results of that selection.

Table 4.6 Ratings from questionnaire 1

Code no	Variable Label	Mean	Std Dev	Min.	Max.	Sum	Rank order	123 Value	123 rank
AE2	ARTEFACT	2.08	.51	.00	3.00	206.00	24	0	24
AE7	COMFORT	2.21	.54	1.00	3.00	219.00	23	2	=21
AE9	COOPN	2.39	.49	2.00	3.00	237.00	22	3	=19
AE13	INFORMATN	2.44	.54	1.00	3.00	242.00	=21	1	=23
AE12	EXPLANAT	2.44	.61	.00	3.00	242.00	=21	4	=17
AE21	SEQUEN	2.46	.61	.00	3.00	244.00	19	5	15
AE14	METHODIC	2.49	.54	1.00	3.00	246.50	18	2	=21
AE23	SPEED	2.51	.52	1.00	3.00	248.50	17	12	=11
AE20	PROFESS	2.54	.59	.00	3.00	251.00	16	4	=17
AE19	QUALITY	2.57	.49	2.00	3.00	254.50	15	8	=14
AE17	PREPN	2.58	.52	1.00	3.00	255.00	14	8	=14
AE4	CALM	2.64	.50	1.00	3.00	261.00	13	9	12
AE5	CAPABIL	2.65	.50	1.00	3.00	262.50	12	3	=19
AE6	CARE	2.66	.50	1.00	3.00	263.00	=11	13	9
AE10	DECISN	2.66	.54	.00	3.00	263.00	=11	1	=23
AE15	MODIFY	2.73	.44	2.00	3.00	270.50	9	12	=11
AE22	SKILL	2.74	.44	2.00	3.00	271.50	8	19	8
AE8	COMMUNIC	2.79	.41	2.00	3.00	276.00	7	27	=3
AE16	ORGANISE	2.81	.40	2.00	3.00	278.00	=6	27	=3
AE11	EFFICIEN	2.81	.40	2.00	3.00	278.00	=6	24	=5
AE24	TEAMWK	2.82	.39	2.00	3.00	279.00	=4	24	=5
AE1	ADAPTN	2.82	.39	2.00	3.00	279.00	=4	20	=7
AE3	ASSESS	2.85	.36	2.00	3.00	282.00	2	20	=7
AE18	PRIORIT	2.92	.37	.00	3.00	289.00	1	46	1

It can be seen that there are some comparisons between rankings for the two stages. A minimum of .00 on the rating scale means that certain respondents did not make a selection for that concept. It can be seen that four of the five concepts rated 21st to 24th on the rating scale had also been recoded in the first group phases, including the concepts *comfort* and *co-operation.* Both these categories gained relatively few responses in the initial group stages and were either lost immediately or recoded into the general concept of *care.* The concepts *information* (which was retained by the student cohorts as a major concept) and *co-operation* re-emerged briefly in the second stage, but were again collapsed into other categories (*see section 5.5*). It could be argued that the loss of such concepts reflects the lack of patient orientation in radiography

at the time of writing. Such a lack results in concepts such as patient comfort and co-operation being lost whilst others such as organisation and efficiency score very highly.

The categories rated 17-19 on the rating scale (*sequencing/ methodical/ speed*) show some disparity between their ranking on the rating scales and the 123 rank order. The next 4 categories however show reasonably good correlation between the two rankings (*professionalism/ quality/ preparation/ calm*). *Sequencing* (ranked 19th & 15th above) and *evaluation* (or quality; ranked 15th and equal 14th above) had both appeared as minor concepts in one or both of the original lists of categories emerging from the first stage groups, but were rated much lower by the questionnaire respondents.

The next 3 categories show mixed levels of response, especially *ae05 capability* and *ae06 decisions. Care,* the intervening category, showed reasonably comparable rating on both scales. *Capability*, however, ranked 12th on the rating scale but only 19th on the 123 scale and similarly *decisions* ranked =11th on the rating scale but a lowly 23rd on the 123 scale. Again, both of these categories were collapsed in the first group stages; *capability* being lost from the student group or collapsed into *skill* and *decisions* merging into the categories *plan (organise)* or *preparation* (already identified above as linked concepts). Two of the three resulting categories (*care* and *skill)* were rated as major concepts in the first phases of the research.

All of the remaining nine categories are listed in table 4.7 in reverse order. Alongside the concept label has been added the fate of the category in the first phase of the research; (->) indicates a category which had been collapsed into another. Most of the placings on the two scales were within 2-3 places (especially allowing for joint rankings) except for *assessment* which was placed second highest on the rating scale but only =7th on the 123 scale. *Prioritise* came out top on both scales, but interestingly had only been classified as a

minor concept in the first phase, with *assessment* being the highest scoring concept at that time.

Table 4.7 Comparison of concept categories with the group phase

CODE	CONCEPT	GROUP 1	GROUP 2
AE15	MODIFY	->adaptn.	->prioritise
AE22	SKILL	Major	Major
AE8	COMMUNIC	Minor	Major
AE16	ORGANISE	Major	->preparation
AE11	EFFICIEN	->skill	Minor
AE24	TEAMWK	->communicn.	->communicn.
AE1	ADAPTN	Minor	->methodical
AE3	ASSESS	Major (no 1)	Major (no 1)
AE18	PRIORIT	Minor	Minor

4.4 Description and explanation-the linear model

4.4.1 Assessment At this point I shall attempt to outline some of the thinking behind the models for those readers who may not be diagnostic radiographers and to describe the various stages in the radiographic examination as they correspond to the stages in the models as they appear above. The model presumes an initial *assessment* of the patient based on the clinical details on the imaging request form and which may start before the patient comes down to the department (*Culmer 1995 pp 4-7*). Typical responses from the initial group phase (*see section 4.*1) in this category included;

'..assess how much patient can co-operate'

'..assess films as you go along'

'..assess the extent of injuries'

'..determine if request is realistic'

A recent article advocating more structured patient assessment in radiography makes the point that in America this "is an intrinsic component of the

radiologic technologist's professional fiduciary responsibility" (*Cain 1996 p68).* Cain makes the point that formalising the assessment process reduces the risk of repeat films (and thus reduces dose) and also helps to improve customer relations and patient satisfaction. He argues that the assessment process helps provide a wealth of information which can contribute directly to the quality of the examination that the patient receives and ensure patient safety. Cain provides the following list of aspects which the radiographer must consider;

- "general physical condition
- any restrictions on movement
- apparent strength or endurance
- ability to maintain balance....
- emotional status
- medication history...
- ability to understand questions, explanations or directions
- clothing, a prosthesis... or other radiopaque articles that will cause artefacts"

(*Cain 1996 pp71-72)*

This concept gained the highest number of responses in both groups in the first phase and was ranked the 3rd highest on the rating scales questionnaire. This concept was investigated further in stage 2 of the research and is elaborated in Chapter 5.

4.4.2 Organisation and prioritisation

This stage refers to the various decisions and preparation that the radiographer makes prior to the commencement of the examination. This is the stage of independent professional decision-making and does not involve *care and communication*, hence the arrows for this only lead to stages before and after. Organisation (planning) was nominated by 40 respondents in the first group phase and was the second rated concept overall in the rating scales. Prioritisation was only classed as a minor concept by the two initial groups, but was rated 1st choice on the rating scale questionnaire, with 141 respondents rating it as important. Although the two concepts were separately identified in the diagnostic stage, the decision was taken to link them as one stage in the

model as we have already identified above that in reality it is difficult to clearly distinguish the two concepts. Typical responses from the group phase were as follows;

Planning (organisation)'..what films/projections to take'

'..organisation of equipment'

'..decision-making; what needs to be done'

Prioritisation '..maximum information first'

'..identify critical/life threatening..'

'..what can be done with/without help'.

4.4.3 Care & communication

In the group sessions, *care* was rated as a major concept by both students and qualified radiographers but was only rated 10th on the questionnaire. *Communication* was asserted by 15 radiographers in the first group and was rated by the students as a major concept and also rated higher than patient care (=4th) on the questionnaire. Again, the decision was taken to link them (but NOT to collapse the two categories) for the sake of the model. Typical responses include;

Care '..minimum distress to patient'

'..gain patient's confidence'

'..carefully/slowly'

Communication '..reassurance', 'listen to what patient is saying'.

4.4.4 Sequencing & adaptation

Once the patient is taken into the x-ray room the radiographer is then able to make a more detailed assessment of the patient and, from this, the *sequencing* of the examination (ie the order of the projections) may need to be changed and other *adaptations* (for example the use of seated (rather than standing) erect projections) made to accommodate the patient's condition and ability to co-operate. Again the two concepts were linked together in the model. In the first

phase of the research *adaptation* was asserted 20 times by the group of qualified staff, whilst *sequencing* was mentioned 18 times. Neither concept was highly rated by the student groups and both were collapsed into other categories. In the rating scales however, *adaptation* emerged as a major concept with over 100 respondents rating it in one of the important categories, whilst *sequencing* was rated as equivocal. Typical responses from the first stage include;

Adaptation '..working around the patient'

'..angulation of tube to compensate for lack of movement'

'..lots of pads/grids'

Sequencing '..arrange which projections in which order'

'..life threatening projections first'

'..do all AP's then turn & do all laterals'.

4.4.5 Evaluation

Evaluation refers not only to the images produced but also to the evaluation of the patient's condition. This concept is elaborated further in Chapter 5. This category was originally labelled *quality* but was retitled during analysis. It gained the lowest number of responses in each of the group exercises (although each group felt that it should be retained as a minor concept) and was fairly equivocal in the rating scales. Its retention in the models can be justified on the grounds of completeness; in other words if the concept was omitted the radiographic process would be seen as incomplete. It is interesting that it is here that much of the role extension in radiography is taking place, by virtue of radiographers going beyond mere evaluation of film quality to offer some form of report. It is perhaps surprising that this concept was therefore rated as low as it was. It might be interesting to repeat the rating scale exercise at some later stage to see if the further permeation of role extension changes these results. Responses from the group phase under this heading include;

'..to check quality'

'..diagnostic films-no repeats'

'..need for accurate diagnosis'

'..get it right first time' *(see 5.1.3)*

4.5 The circular model

This model is referred to as the holistic model in figure 4.2 above as it shows the patient in the centre of the process and the various features of the examination revolving around them. Although the diagram uses arrows, they are not intended to imply a sequence of events, merely the theory of the stages revolving around the patient at the centre. It is important to remember that this shape of diagram arose from the writings of radiographers themselves (35% of respondents at stage 1) NOT from any models previously published. In questionnaire 1 an attempt was made to see if this second diagram could be eliminated from consideration; respondents were presented with the two models side by side (with the circular diagram on the left of the two) and asked to choose which of the two they felt best represented the process of trauma radiography. Of the 99 respondents, 90 selected one or other of the models. Fifty-two (52.5%) selected the linear model and 38 (38.3%) selected the circular model. The percentage selecting the holistic model was thus sufficiently high to justify its retention at the end of phase one of the research.

4.6 Summary

This chapter has outlined and discussed the results of the first phase of the research, referred to as *the diagnostic phase.* Facilitated group brainstorming was used with both qualified radiographers and various student cohorts in order to elicit concept categories and initial frameworks (or concept maps) which represented the ways in which people conceptualised the radiographic process. These were subsequently tested on groups of radiographers via a rating scale questionnaire, which asked respondents to rate the 24 concepts initially generated as to whether they felt them to be *very important/ relevant* or *not important at all* and to select the three concepts from the list which they felt to

be the most significant. Respondents were also asked to select the model which, for them, was the best representation of the way in which they personally would approach trauma radiography. Having identified important concepts and developed two models, the next stage of the research then moved on to begin to outline the theory behind these initial frameworks and this is outlined in the next two chapters.

Chapter Five

Results phase 2; Theory development

The emergence of the Radiographic Process

5.1 Results from the theory development phase

5.1.1 The second phase of brainstorming; the professional identity

In the second phase of the research attention turned to analysing the composition of the models which had been developed in more depth. It was noticed for example that the linear framework bore certain resemblances to the Nursing Process (*Barnum 1994 p152*) and this itself has been criticised, in that when divorced from specific content, the process could equally apply to any discipline (*op.cit pp9-11*). Barnum makes the point very strongly that the boundaries need to be drawn around a profession-that is the profession needs to be able to differentiate itself from other disciplines. Barnum proffers this as one criterion for the evaluation of theory- that is, to what extent does the theory differentiate the profession from any other (*op cit pp12 & 189*).

It was decided, therefore, to devise a statement defining the role of the diagnostic radiographer. Much work has been done in nursing to define its boundaries, but there is no formal definition of what constitutes diagnostic radiography. Two groups of respondents were asked to act as focus groups and were asked the following unstructured questions;

-'*What is unique about radiography?*'

-'*How is radiography different from other professions such as nursing?*'

One of the two groups consisted of clinical educators and the other group were student radiographers. There were 63 respondents in total. The written responses were initially subjected to manual manifest content analysis and from this stage the following statement was produced by the researcher from the analysis of the written responses;

The role of the diagnostic radiographer is a technical one, aiding the

diagnosis of disease. It is a specialised role, offering both responsibility (in the in use of radiation) and variety.

It is a caring role, but tends to be characterised by less time or close involvement with patients, when compared to other professions.

The responses were then entered into the Access database for the purposes of more detailed analysis, coding and cross checking. They were split down into separate assertions as described previously to form a table of 259 assertions which is included as Appendix V. The codings initially generated are listed in table 5.1 below, together with subsequent recodes as categories were collapsed (it should be noted that the database printout in Appendix V reflects the recoding process as summarised in the table). As it turned out this part of the analysis did not require the professional definition initially developed to be changed.

Table 5.1 The role of the Diagnostic Radiographer

CODE	DESCRIPT	RECODE
RAD01	TECHNICAL ROLE	
RAD02	AIDS DIAGNOSIS	
RAD03	SPECIALISED	
RAD04	USE OF RADIATION	
RAD05	VARIETY	
RAD06	CARING/PATIENT CARE	
RAD07	TIME RESTRICTIONS	
RAD08	LESS INVOLVED	
RAD09	RESPONSIBILITY	RAD10
RAD10	PROFESSIONAL	
RAD11	SAFETY/HAZARDS	RAD01
RAD12	HOLISTIC	RAD06
RAD13	TEAMWORK/LIAISON	RAD05
RAD14	KNOWL/PRACTICAL SKILL	as applic.

5.1.2 Analysis of the database

The definition above has since been used in teaching with both senior and first

year students and has proved to be useful. It is important however to look beyond the mere derivation of a statement of what the role is, to what the actual composition of this database tells us about how radiographers view their own role. Table 5.2 below shows the total number of assertions for each of the code groups;

Table 5.2 Responses to role categorisation following recoding

CODE	TOTALS	CONCEPT LABEL
RAD01	48	Technical role
RAD02	30	Aids diagnosis
RAD03	29	Specialised
RAD04	18	Use of radiation
RAD05	24	Variety
RAD06	38	Caring
RAD07	24	Time restrictions
RAD08	25	Less involvement
RAD10	23	Professional

Concept 1 *(technical role)* was the largest category with 48 responses. Examples include;

'..technology oriented job'

'..operate costliest machinery in NHS'

'..technical application of theory into practice'

'..we're conditioned to be technicians rather than carers'

This last statement is probably reflective of the profession as a whole. Concepts 2, 3 and 4 are also technically oriented and thus the grouped responses from these four categories greatly outnumber those which labelled the role as directly one of patient care (125:38 or 3.28:1; 48.26% of responses fell in these 4 categories). Whilst examination of responses from each category will find regular reference to patients, generally it would be true to say that the profession as a whole would categorise itself as technical rather than primarily concerned with patient care. Let us look at concepts 2, 3 and 4 in turn.

Concept 2 is labelled *aids diagnosis*. Typical responses include;
'..a health profession helping diagnose illnesses with use of x-rays'
'..1st line diagnostic tool in trauma cases'
'..a diagnostic profession as opposed to a profession aimed at curing patients'.

Concept 3 is labelled *specialised.* The responses here displayed both pride and cynicism;
'..radiography has a wider knowledge of others than they do of us!'
'..speak a language understood by very few'
'..one of the most important parts of the emergency team but never recognised for this'
'..requires skill to produce accurate images....'

Concept 4 was the smallest category (only 18 responses or 6.94%), relating directly to the *use of radiation.* There was almost a sense that respondents took this aspect for granted in the failure to mention it specifically in responses. The diagnostic radiographer's role consists of;
'..delivering high energy radiation to human beings'. It was acknowledged that its use was 'risky' and 'hazardous'.
'..working with radiation is unique as other health professionals do not 'manage' it on a day-to-day basis'.

Whilst all of the above concepts relate in some way to technical skill Concepts 5 and 10 can be linked together as being related to the role of the health care professional (47 responses in total or 18.14%). **Concept 5** acknowledged *variety* in the role and **concept 10** related to *professional responsibility.* Typical responses included;
Variety- '..more variety/options available than in other health care fields'
'..challenging; varying'
'..part of a team; doctors, nurses, patients'
'..handle greater numbers of patients than any other hospital department'

Professional responsibility

'..responsibility ie. not working under a doctor constantly; left to make own decisions'

'..last PAM[1] to achieve degree status'

'..manage a daily work schedule to provide a public service'

'..radiographers undermine their profession (most are not proud of it)'

Again there is both pride and cynicism evident in these and other responses.

5.1.3 Radiography patient care and the restrictions upon it

Concepts 6, 7 and 8 all dealt with aspects of the patient care provided by radiographers. The three categories together total 87 responses or 33.59% of the total. **Concept 6** acknowledged that the role involved the *care of patients;*

'..we integrate the caring (nursing) & scientific disciplines'

'..patient centred?'

'..it is a practical job' involving 'dealing with the patients when they are feeling vulnerable'

'..we have to compromise between giving good holistic care & carrying out the procedures efficiently and properly'.

This aspect of compromise became clearly evident in the next two categories.

Concept 7 was labelled *time restrictions* and the following responses are typical;

'..not much time to form a bond with patient'

'..brief relationship with patient -nursing/physio often much longer'

'..radiographers do not have the time to listen and reassure patients'.

Concept 8 was labelled *less involved* and respondents pointed out the key differences with other professions;

'..other professions are with the patient through much of the course of their recovery' whilst radiography was defined as the 'only profession in hospital where if you don't like your patient you don't ever have to see them again'.

[1] Profession Allied to Medicine

Radiography was described by one respondent as 'best suited to people who don't wish to get very involved with patients but at the same time wish to contribute to health care'. The tendency to reductionism was also acknowledged;

'..often the patients are looked upon as 'a chest x-ray'...rather than a whole human being'.

Concept 10 is referred to earlier *(see 5.1.2)*. Forty-nine statements (18.91%) were listed in concepts 7 and 8 together. These categories tend to deal with restrictions to patient care, but even if we group them together with concept 6, the percentage response (33.59%) is still less than that for the concepts 1-4 that dealt with the technical aspects of the role. However the two concepts 7 and 8 are fairly critical ones in that they contribute a great deal to our understanding of what differentiates diagnostic radiography from other professions. During a discussion of this dataset with a Professor of Nursing, the phrase ***hit & run carer*** was devised to describe the nature of the radiographer-patient relationship. The Nursing Professor commented that, even if patient care episodes go badly in nursing, there is virtually always the opportunity to rebuild the relationship with the patient; yet several radiographers pointed out that this was not the case in diagnostic radiography;

'..we have a limited amount of feedback about the patients after they have left x-ray'

'..usually just x-rays the patient and may never see them again'.

Couple this lack of follow-up contact with the very short initial contact; 'not much time to form a bond with patient'

'..an x-ray only takes 5 minutes and then our patient is gone'

'..the radiographer only meets the patient on single isolated occasions'.

Comments such as these relate back to phrases such as 'speed and efficiency' which arose in the very first stage of data collection and which were incorporated into the circular model. Admittedly in the first phase of theory development, the *speed/efficiency* concept was not given a great deal of

importance. It was regarded as just one of those things that radiographers say that didn't necessarily mean a great deal. Another example would be 'always getting things right first time' ie not having to do repeat radiographs; this statement tends to be used frequently by students in written answers to examination questions. Educators tend to disregard the statement because it is something that should always be borne in mind because of the need to minimise radiation dose to the patient. When we actually reflect upon the statement however, it may be seen that the statement actually reflects one of the central, underpinning tenets of the profession (encapsulated in radiation regulations by the ALARA[2] principle). As the second phase of the research progressed however, other aspects of the *speed/ efficiency* (or *hit & run carer*) concept began to emerge from the data and this category also began to be clearly recognised as a core concept; although some may regard the phrase 'hit and run' as derogatory, it is not used in this report in that sense- rather it is intended to describe the actual performance and realities of the role of the radiographer, especially as it differs from the roles of other health care professionals.

5.2 Intuition in clinical practice

Having begun to define what differentiated radiography from other professions, attention then returned to the question of why the research had come up with two frameworks and why subsequently it had proved difficult to eliminate either the linear or circular models. The percentage of respondents who selected the circular model on forced choice was too high to allow its elimination from consideration. What, then, might lead respondents to select one framework over another?

Literature review at this time was centring on theory and concept analysis and one particular article opened up a whole new area of analysis. McCormack (*1992 & 1993*) subjects the concept of *intuition* to formal concept analysis and discusses the role of intuitive thinking and its application in teaching. In a key

[2] That radiation dose should be *As Low As Reasonably Achievable*

section, McCormack throws potential light on the reason for the coexistence of the linear and circular model forms in the current research;

> "In an attempt to build a 'scientific' body of nursing knowledge which legitimises professional practice, nurses have adopted a linear model of analysis (nursing process) as a superior model. However, more recent work suggests that decision making in nursing does not necessarily adhere to a linear model but instead incorporates a more intuitive, holistic mode of thinking.....adherence to formal linear models of teaching further devalues intuition and fails to recognise holistic modes of thinking.....It is not the purpose of this analysis to discredit decision making through the linear analysis mode, but to demonstrate the complementary nature of both models." (*McCormack 1992 p340*)

The seminal work on intuition in nursing practice was Patricia Benner's *From Novice to Expert (1984)* in which she documents extensive research with nurses aimed at discovering and describing the knowledge embedded within nursing clinical practice (*Alexander & Keller in Marriner-Tomey 1994 p164*). Using the Dreyfus model, Benner charts the movement of nurses through the five levels of skill acquisition from novice to expert practitioner. Benner and other researchers have used the phenomenologic perspective of the philosopher Heidegger to develop theories about intuition and its place in clinical decision-making (*Heidegger 1962; Benner 1984, Leonard 1989; Kenny 1994*).

> "Clinical intuition is defined as a process whereby the nurse knows something about a patient that cannot be verbalized...or for which the source of knowledge cannot be determined". (*Young 1987 p54*)

Intuitive decision making is said to be the hallmark of the expert practitioner (*Benner 1984, McCormack 1992, Paul & Peaslip 1995*) but is not mutually exclusive from analytical reasoning (*Benner & Tanner 1987, Paul & Peaslip 1995).* McCormack tends to equate linear thinking with reductionism and intuition with holism (*1993* p12) and he comments that "nurses place little credibility in their feelings and beliefs-the 'soft stuff' of nursing". McCormack alleges that the participants in his study found difficulties in describing intuitive thoughts via a linear process since the process made them feel that intuitive knowledge could not be "documented safely" (*op.cit. p13*). It has been argued that;

> "...professions have overemphasized the importance of science and technology which has consequently hampered their expression of caring, resulting in

> professionals who do not have a consensus about what they stand for and are unable to care about the people they serve. Professionals appear unable to identify caring as their reason for being."
>
> (*Hawthorne & Yurkovich 1995 p1087*)

The opinion expressed by Hawthorne & Yurkovich is reflected in the way radiographers characterise their own roles. It was demonstrated earlier that there were more than three times the responses of a technical nature than there were to do with direct patient care. This reluctance to acknowledge the caring role is characterised by Barnum as a dichotomy; the 'touch or technology' dichotomy first postulated by Naisbitt (*Naisbitt 1984; Barnum 1994 pp59-68*). As stated above, this dichotomy is reflected currently in diagnostic radiography and thus it is useful to explore the literature. Naisbitt argued that the increasing encroachment of high technology into healthcare (as characterised by intensive care technology in nursing or computed tomography in radiography) required offsetting by what he termed 'human ballast'; in his view this was why the advent of high technology into health care also sparked off the parallel hospice movement. Naisbitt therefore argued for balance; ie the greater the technology the greater the need for compensating high touch or caring *(see section 2.3)*. This balance, Barnum argues, is not currently being addressed in the literature, which tends to regard the two as somewhat mutually exclusive (*Barnum 1994 p61*). This argument is echoed in the radiographic literature (*Fisher 1990; Dowd 1991*); Fisher points out that in the early days of radiography, the lack of time for patients was a direct function of the need to maintain primitive equipment. However she argues that as equipment has become more sophisticated (even though there are now engineers who undertake the maintenance) that radiographers have found other things to fill the time rather than improving patient care, such as quality assurance for example (*Fisher 1990 p143*).

5.3 The second questionnaire

5.3.1 Aims and initial hypothesis

At this stage, and based on the reading of the literature outlined in the previous section, the decision was taken to send out another questionnaire *(see Appendix VI)*. As a result of reviewing the literature about intuition it was decided to investigate whether the circular model was more likely to be selected by those who might be deemed expert practitioners. Benner had suggested that the expert practitioner tends not to reason via logical, analytical steps, and it was felt that the lack of progressive steps in the circular model might stem from the fact that it was a model based on intuition (*Marriner-Tomey 1994 p168*). An hypothesis was formed as follows;

H1= the circular model is underpinned by intuitive thinking and in a forced choice is more likely to be selected by those radiographers who have longer clinical experience (ie those who are nearer to being expert practitioners)

H0=in a forced choice there will be no difference in clinical experience between those who select the linear or the circular frameworks.

5.3.2 Sampling & response rate

An attempt was made to obtain a representative sample for this questionnaire survey. The original premise of the research revolved around trauma radiography and it was decided to send out a questionnaire to radiographers working in large general hospitals around the UK that had Accident & Emergency departments. These were selected from personal knowledge and from scanning advertisements in the professional journals. A list of 45 hospitals throughout the United Kingdom was compiled and the aim was to select a sample of 10 radiographers in each x-ray department who were specifically involved with casualty radiography or who participated in the 'on-call' rota. A copy of the questionnaire is enclosed in Appendix VI.

The response rate from this questionnaire was very low-only 104 replied from 450 questionnaires sent out (23.1%). It took two follow-up letters *(see Appendix XI)* to even elicit this response and it was apparent from the later

returns that people had found the conceptual questions which made up a large part of the questionnaire difficult to understand. Indeed one or two of those who did participate were openly hostile in their replies. For example;

> "..yet again we are sent another questionnaire by theoretical radiographers who have very little concept of what is required of working staff. Get out of your Ivory Tower" (Resp. No 61)

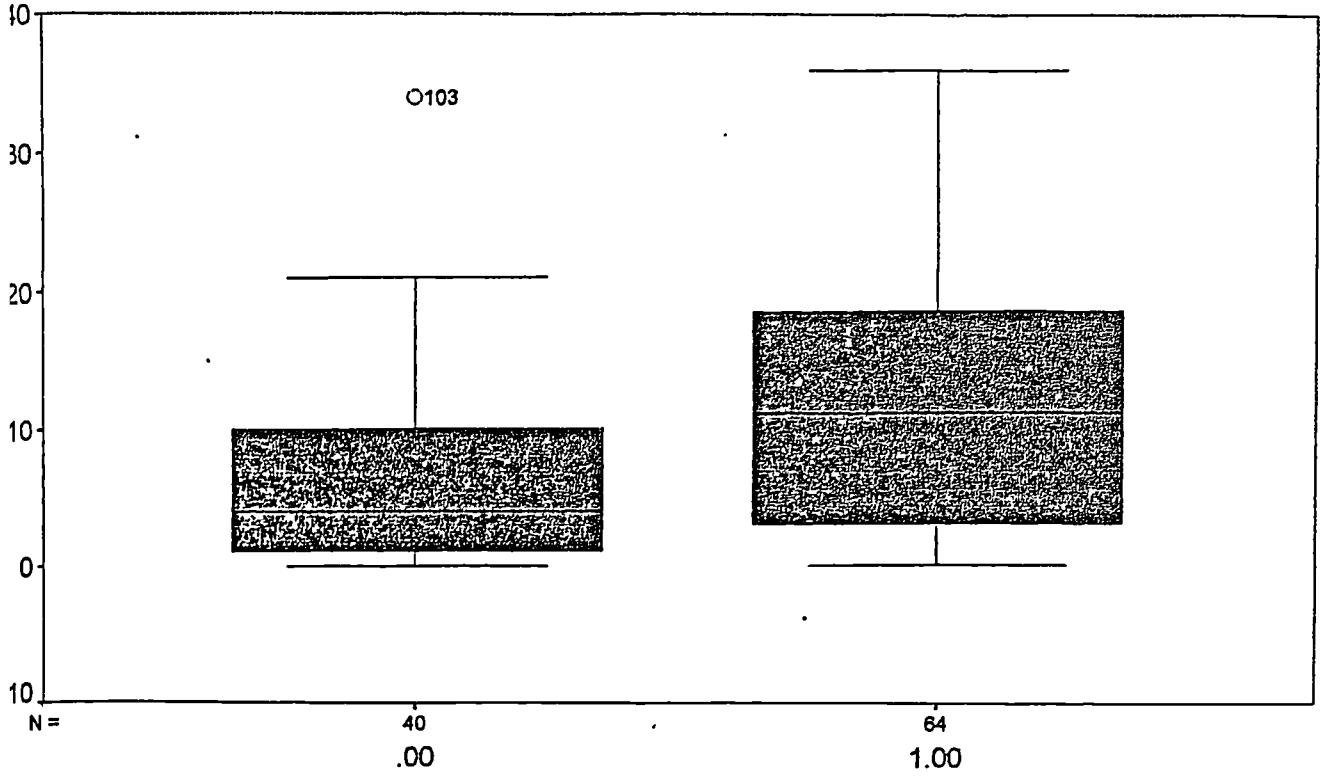
In an attempt to test H1 above, the questionnaire first asked for the respondent's grade and the number of years they had been qualified. They were also asked to select whether they preferred either model 1 (circular/holistic model) or model 2 (linear framework). They were asked for departmental identification and their names should they wish to give them, to allow for the potential to follow up individuals should this seem appropriate. This was not undertaken, however, as, even given the low response rate, a considerable volume of data was generated and found to be more than adequate.

5.3.3 Results

The responses to the two conceptual questions about *assessment & evaluation* are stated and discussed in section 5.5 below, and those for the question on the meaning of *holism* in Chapter 6.

Responses to the question of number of years qualified and selection of one model or the other were coded and analysed using SPSS software. A boxplot of the results is shown as figure 5.1 below. The use of the boxplot and other descriptive statistics such as the stem & leaf plot allows us to examine patterns in the data in a similar way to qualitative textual analysis (*Burns & Grove 1993 p488*).

Figure 5.1 Boxplot of selection of models categorised by years of clinical radiographic experience.



MOD.ONE

Selection .00 is model 2 (linear model/radiographic process). Sixty-four respondents (61.53%) selected model 1 (Circular/holistic) as opposed to 34 respondents (38.46%) selecting the linear model (note; only 98/104 respondents made a selection; SPSS groups these 6 missing cases with selection .00 on each of the boxplots). This is a complete reversal of the figures obtained in stage 1 where the majority selected model 2. The line across the box represents the median value. It can be seen that the median for those selecting holistic model 1 is higher (11 years) than that for linear model 2 (4 years). The means are closer but also widely apart at 6.5961 for model 2 and 11.9075 for model 1. The box represents the spread of cases from the 25th to the 75th percentile (*Kinnear & Gray 1994 p64*). The median (50th percentile) for model 1 actually lies above the 75th percentile of those selecting model 2. The extensions (or whiskers) show the spread of experience in each group. Any values outside this and more than 1.5 box lengths away are shown as outliers and it can be seen that there is one outlying value at 34 years for selection of model 2. Analyses of the descriptive statistics for the two groups of respondents also provide interesting results *(see Appendix VII)*. The ranges of experience for the two groups of respondents are very similar; 0-36 years for model 1; 0-34 years for

model 2. The curve for model 2 is more positively skewed than model 1 however (1.8628; 0.5534)-indicating a greater concentration of respondents at the lower end of the model 2 group than for model 1. The stem & leaf plot also bears this out, indicating a tendency to a bipolar distribution for model 1, whilst the plot for model 2 indicates the same positive skew. Both groups of respondents have similar numbers of respondents with less than 10 years experience (30 in the model 1 group; 24 in the other) but the proportions these represent of the group as a whole are quite different. In the first group the proportion with less than 10 years experience is 46.87% whilst the proportion of the model 2 group is 70.58%. Also the model 1 group has a secondary peak of 12 respondents in the 15-19 years experience range. It seems reasonable therefore to accept the hypothesis H1 that the circular model is more likely to be selected by those radiographers who have longer clinical experience. This is borne out by the results of the t-test *(see Appendix VII)* indicating that the difference between the means is significant *(Kinnear & Gray 1997 p135)*.

5.3.4 Radiographic skills

Responses to the question about the skills that make a good A & E (trauma) radiographer were entered into the relational database and the responses were coded using the original list of 24 skills which were developed for the first questionnaire *(see table 4.1)*. This is a departure from inductive methodology, which would require the researcher to analyse the assertions without any preconceived interpretations. However since, at this stage, the emphasis was on testing the models and therefore there was a deliberate attempt to compare the contents of this data set with the database of responses from the first questionnaire; thus testing the models as they had originally been conceived. The database responses are printed in full as Appendix VIII. One hundred and four respondents generated a database of 613 assertions in answer to this question making this the largest response set of the project.

5.3.5 Coding frame & emergent concepts

The coding frame for this database was shown in Chapter 4 (table 4.1). The codes that emerged however were not the same ones that remained in the first database. Concepts ae01 and 03 (*adaptation* and *assessment*) were retained in both databases. In the first phase however, ae04 (*calm/ patience*) was collapsed into ae06 (*care*), but in this database it was retained as a separate concept. Similarly concepts ae10 (*decisions*, which had been recoded into *planning* originally) and ae11 (*efficiency*) were retained as separate categories in this database. Two concepts that were in the first phase database did not withstand analysis in the second however; these were ae19 (*evaluation,* recoded as *decisions*) and ae21 (*sequencing,* recoded in this database as *adaptation*). Other codes retained from the first database coding frame were ae06 (*care*), ae08 (*communication*), ae16 (*plan*), ae18 (*prioritise*) and ae22 (*skill*). Two final concepts were included which in the first phase analysis had been collapsed; these were ae23 (*speed*) and ae24 (*teamwork*).

The conceptual categories derived from this analysis are shown in table 5.3. Each concept will be analysed in turn, using sample responses from the database.

Table 5.3 Skills that make a good A&E radiographer

CODE	Concept	Responses	% of total
AE01	Adaptatn.	90	14.68
AE03	Assessnt.	38	6.19
AE04	Calm	77	12.56
AE06	Care	44	7.17
AE08	Communic	85	13.86
AE10	Decisions	27	4.40
AE11	Efficiency	40	6.52
AE16	Plan	24	3.91
AE18	Prioritise	12	1.95
AE22	Skill	101	16.47
AE23	Speed	47	7.66
AE24	Teamwork	28	4.56

5.3.6 Adaptation (ae01) and assessment (ae03)

The concept *adaptation* gained 90 responses which was the second highest

number (14.68%) . The responses included;

'..good adaptive technique'

'..being able to think on your feet'

'..need a flexible approach'

'..to adapt to long shifts and unsocial hours'

Assessment as a concept did not score as highly on this questionnaire as it had in the first stages of the research receiving only 38 assertions or 6.19% of the total. The second part of the questionnaire asked respondents to elaborate on the concept and this is examined in 5.5 below. Responses from this dataset included;

'..good understanding of injuries and medical conditions'

'..understand the clinical question being asked'

'..awareness of the needs of patients'. This requirement is mentioned in the article by Cain (*1996 p71*) who points out that trauma patients have emotional reactions to deal with in addition to their injuries and that the radiographer needs to assess carefully the ability of the patient to cooperate in their examination.

5.3.7 Calm (ae04)

As stated above, this concept category had not survived database analysis in the first group stage of research, and even in the rating scales it was only ranked 11th (at the bottom of those rated as important overall rather than equivocal). In this, the largest dataset so far, however it gained the 4th largest number of assertions (77) with a fairly large gap between that category and the next rated one. Typical responses include;

'..not easily harassed and worried'

'..able to work under pressure'

'..calm- can cope under stress'

'..patience- sense of humour'.

5.3.8 Care and Communication (ae 06 & 08)

In the database from the first group stage *Care* had rated more responses than *communication.* Here they were reversed with *communication* gaining almost double the number of responses (85 as opposed to 44). The type of responses include the following;

'..excellent patient care'

'..kind and caring'

'..sympathy', 'empathy'.

Compared to the first database *(see Appendix I)* the assertions in the *care* category were 'warmer' or 'softer' in this dataset. There were numerous references to the need for empathy and/or sympathy, and more references to kindness and caring. When viewed again, the responses in Appendix I seem more clinical and objective than this group.

Responses in the *communication* category included;

'..assertiveness'

'..communication (verbal/non-verbal) skills'

'..assured approach'

'..ability to provide input when asked about radiology of films'.

Again the character of the assertions differed from the original dataset. At that time respondents had merely pointed out the need to communicate. In this later dataset, there was much more emphasis on the nature of the communication; with the majority of the respondents stressing good, skilled communication, with other responses such as the need for assurance or assertiveness being stated. Also there was more consideration given to the different groups with whom the radiographer needed to communicate; 'different disciplines of staff', 'doctors/nurses' and 'drunk, rude patients'.

5.3.9 Decisions, planning & prioritisation (ae 10, 16 & 18)

None of these categories scored very highly in terms of numbers of responses separately, however the three concepts together totalled 63 responses (10.27%). As all require slightly different skills the decision was taken not to collapse

them together; there was a temptation to collapse the *decisions* category as had been the case with the original dataset, but it emerged from this data as a discrete concept, actually receiving a greater number of responses than either *planning* or *prioritisation* (27 or 4.4%). In the rating scales in phase 1 *decisions* was a relatively equivocal category.

Responses from this dataset in this concept group include;

'..to make decisions quickly & safely'

'..problem solving/ decision making skills'

'..ability to evaluate films'.

In the case of the concepts *planning* and *prioritisation* the responses to these concepts were very similar within each category; in the first category the respondents (24) fell into three groups who specifically mentioned one of three words; plan, organise or time-management. Similarly in the case of the *prioritisation* category every respondent (12 in all) specifically mentioned the verb in some form in their assertion.

5.3.10 Speed & efficiency (ae23 & ae11)

As with the last two categories the assertions for both of these concepts centred on the terms efficiency and speed (or 'quick'). There was very little variation in the ways in which the concepts were expressed. In the database derived from the first group stage, both concepts had been sufficiently weak that they were collapsed into the category of *skill*. Here however they were strong enough to stand by themselves and together gained 87 assertions (14.19% of the total). In the results of the rating scale questionnaire, *efficiency* was rated equal 4th in importance, although *speed* was relatively equivocal. In this questionnaire however, *speed* gained a greater number of assertions (47 as opposed to 40 for *efficiency*).

5.3.11 Skill (ae22)

The labelling of this category could be seen as a tautology; in answer to the

question 'What are the skills that make a good A & E radiographer?' we have a concept labelled *skill.* Radiographers were saying that in order to be good at Casualty (or trauma) radiography the individual needs to be a good (skilled) radiographer and/or to have a certain amount of experience. Responses in this category were varied and could be grouped under a range of subheadings; the number of responses in each case are included in brackets.

Experience was asserted by 11 respondents; two suggested a need for 'inventiveness' or to be a 'master of make-shift'. Two respondents stated the need for radiographers to be 'energetic' and seven others mentioned similar needs such as 'fitness', 'good health' and 'stamina'. Attributes such as assertiveness (2), confidence (10), accuracy (12) and good radiographic technique/ skill (17) were also listed. This category was by far the largest with 101 responses, indicating the importance which clinical radiographers attached to this category.

5.3.12 Teamwork

28 respondents (4.56%) specifically mentioned the need for radiographers 'to be able to work effectively as part of a team' and the need for 'awareness of roles of other staff'. Trauma radiography is one of the key areas of diagnostic radiography where teamwork is essential. In other parts of an imaging department radiographers may simply be accepting referrals from other departments and working comparatively independently, but for many radiographers the attraction of trauma work is the feeling of 'team spirit' and the 'relationship with a/e team'.

5.4 New perspectives on the linear framework

It was stated in section 5.2 that certain elements of McCormack's statement about the role of intuition (*1992 p340*) had been missed in analysis. The questionnaire sent out (referred to as *Questionnaire* 2) had still failed to

eliminate one of the two frameworks *(see section 5.3.3)*, but had not been overwhelmingly conclusive about the link between the circular form and greater length of clinical experience ie. the possibility that the circular form was more intuitive in character.

McCormack stresses that linear and holistic models are complementary and also states that the nursing process is a linear model of analysis. The likeness of the linear framework to the nursing process was commented on earlier in the research and the conclusion was finally reached at this stage of the analysis that what the linear framework represented was the **Radiographic Process** itself, and that the circular model was exactly that-a model or philosophy of patient care in radiography. This conclusion finally made sense of the inability to exclude one of the frameworks from the research, and also of certain similarities of the frameworks with the nursing process. (*see Chapters 1 & 6*). For the remainder of the report the linear framework will be referred to as the *Radiographic Process* and the circular diagram as the *Culmer model.* It is useful here to look at a definition of theory vs. process;

> "*Theory* is knowledge used for practice, while *process* is the method used to apply theory. *Theory* is the content; *process* is the way of using that content...."
>
> (*Torres 1986 p33*-my emphases)

If we accept the linear framework as a representation of the overall radiographic process, then it may also be seen that any individual may use the radiographic process alongside their own personal philosophy of radiographic care-be that the Culmer, Bowman or other philosophical model.

The circular (Culmer) model has been criticised as being merely the linear model turned on its side; however if we regard the Culmer model as holistic (as opposed to the linear model of process) then the concept of 'the patient at the centre' becomes a teaching device; or indeed it may be regarded as a moral imperative when compared with Bowman's overt systems model (*Morse et al 1991 p123; Basford & Slevin 1995 p106*).The Culmer model may therefore be viewed as an holistic, patient centred model of care in radiography and the Bowman model as a positivist model based on systems/decision-making

theory. Both models can be analysed in terms of their relationship to the Radiographic Process, in the way that Aggleton & Chalmers do with nursing (*Aggleton & Chalmers 1986*), and indeed this premise is largely accepted in nursing.

5.5 Development of conceptual components

As stated in Chapter 4, questionnaire 2 aimed to flesh out some of the key concepts which appeared in both the radiographic process and the Culmer model. *Assessment,* for example, is a much different process in nursing to that in radiography, mainly due to the different amounts of time available to the professional in each case. Open questions were used to attempt to ascertain the key skills used in assessment in radiography. The one thing that could be said at this stage was that it was apparent that assessment took place very fast and therefore it could be a very interesting concept to explore, since it might hold one of the keys to further differentiation of radiography as a profession from others.

5.5.1 Content analysis

The responses to the question asking about the skills used in *patient assessment* were entered as before into a relational database. A table of 247 assertions was derived and is included as Appendix IX. The codings are summarised in table 5.4 below. A tag (a or b) was added to each code to indicate whether the respondent had selected model 1 (circular) or 2 (linear); this was in an attempt to see whether some codes were more likely to be asserted by respondents who had selected one model over another. Model 1 was selected by a larger number in every case and the results of this coding tag were not found to be particularly helpful in improving the depth of analysis.

Table 5.4 The skills of patient assessment

CODE	DESCRIPT	RECODES	RESPS.	%
ASS1	KNOWLEDGE	ASS8	--	N/A
ASS2	EXPERIENCE		33	13.36
ASS3	COMMUNICATION		67	27.12
ASS4	OBSERVATION		33	13.36
ASS5	CO-OPERATION	ASS8	--	N/A
ASS6	PSYCHOSOCIAL NEEDS	ASS9	--	N/A
ASS7	PLANNING	ASS8	--	N/A
ASS8	DECISION-MAKING		52	21.05
ASS9	PATIENT AWARENESS		21	8.50
ASS10	TECHNICAL ASPECTS		41	16.59
ASS11	INFORMATION	ASS1 (>8)	--	N/A
ASS12	SPEED	ASS2	--	N/A
ASS13	INTUITION	ASS9	--	N/A

The table therefore shows us that the respondents felt there were six core skills in radiographic assessment. In rank order these were;

1. Communication
2. Decision-making
3. Technical aspects
4. Experience
5. Observation
6. Patient awareness

It is interesting that *speed* is not retained here as a discrete concept and that even the concept (experience) into which it was collapsed only ranks 4th. *Communication* gained twice as many assertions (67) as *experience* and *observation* together (33 each). Cain acknowledges that communication is important but would probably rate observation higher than the respondents. He makes much in his article of the skills of visual scanning of the patient and for him the decisions about technical aspects would follow on from this *(1996 p70)*. It is also noteworthy that *patient awareness* is rated last, whilst the *decision-making* and *technical aspects* are rated 2nd and 3rd (both with double the number of assertions received for *patient awareness*); again Cain would

probably argue with the emphasis here, although his article is not research-based.

The responses to the *communication* category were oriented towards both communication with the patient and liaison with the staff. Responses about patient communication included;

'...communication is important'

'...what language does the patient speak?'

'...talk to patient; will show level of consciousness'

'...communication skills-verbal/non verbal'.

Cain in his article on patient assessment makes a very important point about the value of non-verbal cues;

> "The face ...provides significant clues as to the emotional status of the patient. Social psychologists have reported that there are six universal facial expressions that cross all cultural barriers: fear, anger, disgust, surprise, sadness and happiness. These expressions are recognised and reported accurately regardless of a person's culture, race or ethnicity.." *(Cain 1996 p70)*

The responses for the *decision-making* and *technical aspects* categories were quite varied and include the following;

Decision-making; '..speed of thought'

'..what are the obvious injuries? Can patient move? Cooperate?'

'..hands on assessment-are standard views feasible?'

'..deductive skills'.

Technical aspects; '..severity & type of injuries'

'..gleaning information from patient's notes'

'..excellent technique, including adaptation'.

The concepts *experience* and *observation* can be similarly linked and are usefully examined together. Nineteen respondents specifically mentioned *experience* in their answers; as one respondent stated, the skill is in 'using experience to assess the severity of condition' or as another put it 'experience and common-sense'.

The terms *observation* or *visual assessment* appeared in the majority of responses in the *observation* category; or as one respondent put it 'have a good look before you start' by 'noticing the patient's demeanour, nervousness etc'.

The final category was that of *patient awareness* which was the smallest group containing only 21 assertions. A number of respondents listed skills that the radiographer needed including 'intuitive skills', 'calmness', 'empathy', 'friendliness; approachable; affability' and that the radiographer needed to be 'sympathetic/ firm' to 'give the patient reassurance while assessing'.

5.6 The concept of Evaluation

The results from this final question on the second questionnaire were entered into the relational database and a table of 195 assertions was drawn up for analysis (*see Appendix X).* The coding frame used initially was the same as for the concept *assessment (see table 5.4)* but various categories were collapsed or concepts added slightly differently. The response summary for this coding frame is given in table 5.5.

Evaluation is taken to mean evaluation of the image at the end of the examination and hence the appearance of categories such as *quality* and *pattern recognition.* It is this area which is one of the main parts of the role extension initiative for qualified radiographers and therefore the responses are of interest as radiographers try to identify the skills involved. Indeed *quality* was the largest category with 41 assertions. This concept was originally titled *evaluation* but was renamed to avoid another tautology and in an attempt to get at the real meaning of the responses given. Typical responses included;

'Are the films diagnostic?'

'Image evaluation regarding film quality/ exposure/ pathology'

'Knowing when a less than perfect film is diagnostically acceptable'

'Do they show the injury; would it be better to repeat to gain more information?'.

Table 5.5 Evaluation skills

CODE	CONCEPT	RECODE	RESPS.
ASS01	KNOWLEDGE		15
ASS02	EXPERIENCE		31
ASS03	COMMUNICATION		14
ASS04	OBSERVATION	> ASS13	X
ASS05	REFLECTION		15
ASS06	PSYCHOSOCIAL	>ASS09	X
ASS07	PLANNING	>02 OR 08	X
ASS08	DECISN.MAKING		24
ASS09	PT. AWARENESS		13
ASS10	TECH. ASPECTS		14
ASS11	EVALUATN/QUALITY		41
ASS12	SPEED/EFFICIENCY		10
ASS13	PATTERN RECOGN.		18
		TOTAL =	195

Once again *experience* was an important concept; it gained the second highest number of assertions for this question (31). Fourteen people actually used this particular term; others included adaptation (8), accuracy (3), assertiveness (1) and common-sense(3).

The next most popular category was *decision-making* (24). There was certainly some evidence on the questionnaires that respondents could not differentiate between *assessment* and *evaluation* as concepts; despite the fact that the model diagrams were included on the questionnaire. This is evident from a number of responses in this category- indeed it is doubtful whether this concept might have survived if these responses had not been part of the data set;

'decide priority order of x-rays'

'to attempt conventional views or improvise'

'what and how many films to do; what projections?'.

More appropriate to evaluation were the following;

'Can the views taken help visualise the problem?'
'deciding where alternative/ further views may be required'.

The concept of *pattern recognition* is part of film evaluation and is said to be the method of inductive reasoning upon which diagnosis is based (*Higgs & Jones 1995 p13)*. Pattern recognition was said by respondents to include 'identification of abnormalities' and the 'need to recognise anatomy, pathology, artefacts etc.'. As well as using the term *pattern recognition*, respondents also labelled this 'visual acuity', visual assessment' and 'spatial cognition'. Pattern recognition has also been identified as being 'intuitive' (*Cox 1988 in Higgs & Jones 1995 p11*) and also as a 'process characterised by *speed and efficiency'* (*ibid*-my emphasis).
The ability to recognise patterns requires *knowledge* and experience (*op cit p13)* . This category was one of a group of 5 concepts all with 13-15 assertions each. Respondents mentioned knowledge of;
'...clinical evidence and management of trauma patients'
'...anatomy & radiographic practice in relation to information required by the Medical Officer'.

Communication -both with the patients and with other staff in the Accident & Emergency Department -was mentioned by 14 respondents. *Patient awareness* in terms of patient condition and their needs was asserted by 13 people. *Technical aspects* such as equipment, exposure and radiographic technique were mentioned in 14 responses. *Speed/ efficiency* again appeared in 10 responses, although this was the smallest category. The final concept in this group was *reflection;* responses here included;
'subjective analysis' 'awareness skills'
'ability to learn from what has taken place'
'ability to think from an early reporting level'.
The inclusion of even a small number of responses in this category is very

encouraging; as stated earlier, this is an area where there is role extension with radiographers beginning to undertake reporting of radiographs which has previously been the exclusive privilege of radiologists *(see Chapter 1).* If a profession is to develop it must be with understanding and the ability to reflect on performance. Thus even though this was only a small category it was felt to be an important one.

5.7 Summary

This chapter has examined in some detail the major part of the second stage of the research whereby the original models and concepts were developed, such that the underlying meanings for radiographers were discovered. The chapter commenced by outlining a statement which defined the boundaries of diagnostic radiography and went on to analyse the features of the role of the radiographer, whilst also looking at some of the issues constraining patient care in radiography; in particular the time constraints which radiographers work under. This led to the coining of the phrase 'hit-&-run carer' to describe the uniqueness of the patient care episode. There followed a preliminary discussion about the concept of intuition and the hypothesis that this underpinned the circular model. We then examined the skills that make a good radiographer in the trauma situation (which we might suggest requires the greatest level of skill in the Department) and attempted to elaborate the concepts of *assessment* and *evaluation* in the context of diagnostic radiography. We differentiated clearly between models and process, emphasising that any model or philosophy can be utilised alongside the radiographic process. In the next chapter the concept of holism is examined, as is the application of the models that have been developed in the third and final section of the results.

Chapter Six

Results Part 3; Application phase

6.1 'What is holism?'- questionnaire responses

In this chapter we shall begin to examine various aspects of the potential development and applications of the radiographic process and/or the Culmer (holistic) model. One aspect that was of interest to this researcher was whether radiographers understood the concept of holism; ie. if an holistic model was proposed, would it have the potential to be accepted by practising radiographers? Knowledge of the meaning of holism was seen as a precondition for acceptance of any model which might be proffered. As part of questionnaire 2, respondents were asked to state what they understood by the term *holism.* The results were entered into the database and were coded as shown in the table below. A table of 199 separate assertions was generated and is shown in full in Appendix XII. Table 6.1 below summarises the responses, including two categories which were recoded since they were felt to have similar meanings to other concepts.

Table 6.1 Categorisation of responses of Radiographers' understanding of the concept of *holism*

CONCEPT	CODE	Recode	Responses
WHOLE	HL01		80
PT'S NEEDS	HL02		40
INTEGRATED	HL03		39
MIND/SPIRIT	HL04		12
ALTERNATIVE	HL05	>HL04	
SPURIOUS	HL06		4
ENVIRONMENT	HL07	>HL03	
NOT REDUCTIONIST	HL08		24

6.1.1 HL01 Whole

The term *holistic* comes from the Greek *holos* and thus the first category was labelled *whole*, since this was nearest to the actual definition of the term. In fact this was by far the largest category with 80 responses (double the number of the next largest category). Any response that contained the word 'whole' was placed in this concept category. Responses included the following:

'..taking the whole person into account' 'thus the effect on the patient as a whole is greater than the sum of the individual components of the treatment if identified separately'

'..all encompassing'

'..looking at their needs as a whole person' 'eg in homeopathy where the whole body is treated'

'..taking the whole examination (eg major trauma series) and organising the work from the beginning'

'.. a method of addressing health care as a whole'.

6.1.2 HL02 Patient's needs

Thirty respondents generated 40 database assertions between them. Responses in this concept group could be said to be in tune with the Culmer model in that respondents appeared to equate holism with patients' needs. The percentage of respondents who also selected model 1 on forced choice was 60%; this was comparable with the 61.5% of respondents from the overall questionnaire who chose model 1. Responses included;

'..treating the patient according to their needs'

'to see the patient as an individual whose needs may extend beyond the presenting injury'

'holistic medicine takes all the patient's needs into account'

'..not just doing radiography but caring for the needs of the patient'

'..look out for the patient's well-being, both physical and mental'.

6.1.3 HL03 Integrated

The concept *integrated* referred to the idea of 'bringing things together' rather than viewing as a whole from the start. There were 39 responses in this

category, which made it significant in its own right (19.59% of the total response set), although it could arguably have been grouped with HL01. The author would assert however that the sense of the two concepts is different. Integration is defined in the dictionary as making a whole out of parts (my emphasis). Responses in this concept group included;
'eg holistic patient care involves the input of many disciplines'
'bringing together all the skills required to give a final objective' 'which may be greater than the sum of its parts'
'the complete radiographic process'
'we must be clinically, ethically & legally responsible for this patient'.

6.1.4 HL04 Mind/ Spirit

Leaving aside the spurious responses for the time being, this was the smallest group with only 12 assertions (6.03%). These respondents introduced a spiritual aspect into the concept groups and it was decided to retain this as a separate concept because of its 'higher order' nature. Respondents stated that radiographers should 'take into account the mind and spirit as well as the body' 'which includes attention to psychological, social and spiritual welfare as well as physical welfare'.

6.1.5 HL08 Not reductionist

It has been pointed out in an earlier chapter that diagnostic radiography has a tendency to the reductionist; since the request card will require the radiographer to focus on one bodily part. As outlined in Chapter 5, however, in order to assess the patient's capacity fully the radiographer will need to pay attention to other cues such as ability to communicate and the patient's potential for mobility (*Cain 1996*); this process of rapidly taking in multiple cues is by its nature holistic. One of the categories was therefore labelled *not reductionist* to indicate when a response specified that a holistic approach should be taken. This category generated 24 responses indicating that *holism* was;

'not doing one view and then considering which or what to do next'. That it was considering the patient as a whole and not just;-

- "in terms of their complaint
- their illness
- consideration of the 'parts' to be examined
- as eg an elbow x-ray"

6.1.6 HL05/6/7

Categories HL05 and 07 generated only a very few responses and these were recoded as shown on the table. There were 4 spurious responses that appeared to be deliberately facetious or argumentative (with probably one exception). These were as follows;

a grossly misquoted term especially in management techniques & by managers
is it something to do with the science fiction program 'red Dwarf'?
keen on holidays
Is it a nursing thing?

The first statement came from Respondent 61 whose aggressive reply to another question on the same sheet was reported in Chapter 5 *(page 89).*

6.1.7 Conclusions about the concept of holism

From the responses received it seems reasonable to conclude that practising clinical radiographers do have an understanding of the meaning of holism and that, in terms of the applications of the Culmer model, that the presentation of an holistic model of radiographic practice to the existing profession has, at least, the potential to be well received.

6.2 Responses from lecturers to issues of concept analysis

As stated above, the overall aim of the third phase of the research was to explore potential applications of the model. To this point we have largely concentrated on the first research aim which was- *to form a conceptual model of the way(s) in which (expert) radiographers approach the examination of a*

trauma patient. The section above looks at the potential for clinical application of the holistic model in particular. In the following sections the educational applications, as encapsulated in the second research aim, will be discussed. That is;

- to use the model(s) to facilitate the clinical education of student radiographers (particularly in trauma techniques).

A paper was given about the research at an international Radiography Teachers' Conference at Nottingham University in July 1995. This was a keynote paper, to be followed by workshops organised by the researcher at which participants considered questions arising from the paper in five groups and then reported back. Each group consisted of about eight radiography lecturers from around the world including the UK, USA, Asia, Australia, South Africa and Scandinavia. The paper was very well received and the group discussions are summarised in the following sections, using the researcher's own notes and feedback sheets which were handed in to the conference facilitators at the end of the session. The questions for the discussion groups were devised by the researcher and were specifically intended to explore the potential for educational use of the models. Some of the questions were deliberately controversial and this is indicated in the discussion below.

6.2.1 Group 1

"Do we give sufficient time in the curriculum to communication skills? What about body language (non-verbal communication?) What strategies might be used to improve a student's ability in communication?"

This group felt that there is a role in the curriculum for communication theory, including meta-cognition (ie enabling students to become self aware; to know WHAT they know). Students should not only develop self-perception but should also be able to ascertain the perceptions of patients and staff. They should be aware that there is an etiquette to naturalised communication and the

group felt that this was actually a first-post competency.

With regard to body language, the group felt that students needed to become aware of cultural significances of aspects such as eye contact and touch, and aware that body language can both act as a substitute and an accompaniment for language problems. The group felt that students needed to become aware of the powerful impact that body language can have.

With regard to teaching strategies, the group recommended experiential learning techniques including role play, simulations and video and were adamant that the teaching of communication theory and skills should permeate the curriculum *(Culmer 1996 p191)*.

6.2.2 Group 2

" If *speed & efficiency* are key concepts, what are the implications of this for clinical education?

What action should be taken about a student who radiographers constantly complain is 'too slow'? Should constant complaints of this nature about an individual give grounds for termination of training?"

The group felt that the concept of *speed* was relativistic which made quantification difficult and meant that it could have very negative connotations. They did however feel that the concept had certain implications for clinical practice in that;

- the student must be adequately prepared using such devices as simulation
- there must be a period of induction into the clinical department
- there should be training workshops available for qualified staff to induct them into the needs of the students
- departments should be informed about the stage of training of the student and their clinical objectives
- a feedback system should be established.

With regard to a situation where there were constant complaints about a student being slow, the group pointed out that the complaint needed

investigation and that it was important that such comments were documented, for example in the student's personal progress forms. Remedies might include transfer to another placement, but the group were reluctant to recommend that this should be grounds for termination of training *(Culmer 1996 p190)*.

6.2.3 Group 3

"Should curricula include time spent on discussing *philosophies of radiography*?

Is holism an appropriate aim for radiography patient care? How might we encourage our students to see patients as individuals rather than anatomical parts?"

This group spent some time developing a group statement of their philosophy of radiography and this is given in full;

'We have the fundamental right to believe that human life is a precious commodity and is worth saving and that the condition of our fellow human beings are worth alleviating; to produce optimal radiographs and implement the ALARA *principle and to offer total care to the radiography patient and their* family'.[1]

The group felt that *holism* is an appropriate concept for radiography and felt that this was to be encouraged by focusing on the patient throughout the curriculum, including the teaching of behavioural science. The group felt that the teaching of the holistic approach must be appropriate to the cultural context. An holistic approach could also be fostered from the teaching of skills of non-verbal communication *(ibid)*.

6.2.4 Group 4

"Should curricula include time spent on discussing *philosophies of radiography*?

How might we devise strategies to encourage students to adopt or develop

[1] * ALARA = 'as low as reasonably achievable' and refers to the radiation dose to the patient

their own model (or philosophy) of radiography?"

This group felt strongly that curricula should include philosophies of radiography and a colleague from Denmark described techniques used in Scandinavia where the Nursing Process is used. Students are taught the basics of the Process initially and are encouraged to use it as a tool for clinical reflection in small groups after each period of clinical practice. The use of the Nursing Process is then taken to a more complex level at a later stage of the course when it is compared with other theories such as holism, positivism and others *(op cit p191)*.

6.2.5 Group 5

"If *speed & efficiency* are key concepts, what are the implications of this for the selection process?

Are there ways in which we can specifically select students who are *faster* than others? What would we be looking for?"

This question was fairly provocative (and the wording could have been taken as facetious although it wasn't meant in that way) and the group gave it a broadly cynical treatment. They were very sceptical that *speed & efficiency* could be seen as a transferable skill, in which case they felt there were NO implications for the selection process. They felt that behaviours can be learnt and that selection procedures are not always reliable; they were also concerned about issues of access and equity. They also felt that the linking of speed and efficiency together may have created a flawed concept and suggested that it should be *quality & efficiency*. The group were informed however that this concept and its linkage had come out of the research *(op cit p190)*.

6.3 Use of the models for the development of critical analysis

At the end of the 1995-6 teaching year the researcher set a written question on the relevant examination paper asking students to undertake a comparative analysis of the Bowman and Culmer models and discuss their relevance for trauma radiography. In chapter one the basis of the Bowman model was

outlined as being systems-oriented in its emphasis on input and output. The researcher indicated that philosophically she was opposed to the Bowman model but it was felt to be a useful comparison with the holistic stance of the Culmer model. There is no intention to rule out certain models or philosophies from the teaching, despite the fact that the lecturer themselves may be opposed to them. The aim of a degree programme is to develop reflective and analytical thinking not impart dogma.

The aim was to attempt to find out how much of the models the students had taken on board and to make some assessment of their abilities to apply critical thinking and analysis to the models (this was a final year Honours paper). Alexander & Giguere (*1996 p16*) state that ;

> "Critical thinking may be conceptualised as an analytic process addressing not only problem solving but also the ability to raise pertinent questions and critique solutions.....Faculty have defined critical thinking to mean an intellectually disciplined process of conceptualising, applying, analysing, synthesising, and/ or evaluating information gathered from or generated by observation, experience, reflection or communication..."

Alexander & Giguere argue that the different forces affecting health care, such as the explosion of technology and the changing social climate, require nurses to constantly acquire new advanced skills and that the skill of critical thinking is central to the ability to do so (*op cit p17*). These forces also affect radiography, which is even more technology driven and therefore such skills are also required by radiographers. We have examined the 'touch vs. technology' dichotomy above. Greathouse & Dowd (*1995 p435*) argue for the use of critical thinking to teach empathy to student radiographers; ie. to encourage them to place themselves in the patient's shoes and imagine how technology such as the MRI scanners must appear. The authors comment that radiographers are often criticised for lack of compassion and argue that this attitude may worsen in climates where resource issues predominate.

By taking each examination answer in turn and looking at key paragraphs we may form an assessment of how well the students actually proved that they were able to apply critical analysis to the question set. As set out earlier, the aim in these subsequent paragraphs is not to show one model in a better light to another, but merely to illustrate the students' comparative analyses of the two models. The examination responses from 16 candidates were analysed and extracts from each are given below.

6.3.1 Respondent no.1

"The Culmer model is a 'patient focused' model. The Bowman model differs in that it is broken down and shows the order of the procedure. It does not include or mention the patient or communication to the patient. It includes terms such as input and output that are very technical when dealing with people. The model reminds me of a conveyer belt.....there seems to be no involvement or relationship between the radiographer/patient. However this may be the way things are turning in the NHS with the introduction of patients having to be seen before a time eg 30 minutes (Patients' Charter)"

" The models of care may be incorporated in any situation within the imaging department. The advantages of them are;

1) they help in structuring examinations

2) they ensure patient care & communication is delivered

3) they aid in a patient/radiographer relationship which is important because radiographers only spend short times with patients."

6.3.2 Respondent no.2

"The Culmer model (holistic) shows the radiographic process as a continuous process- no individual factor being more critical than the rest. It shows that whilst the radiographer is assessing and planning the procedure patient care is also taking place.....The Bowman's model has a unique feature ...and that is the process of the learning experience. The experience gained by

the radiographer in dealing with different situations helps to improve their knowledge and therefore subsequent examinations. Bowman also stated in his article that this learning experience was a two -way process. The patient learnt from their experience with the radiographer and takes that knowledge into their next...encounter. This learning process is especially important in paediatric radiography."

6.3.3 Respondent no.3

"..one of the main areas that differs is that patient care and communication in the holistic model occurs continuously throughout the whole process but seems 'added-on' or sequenced in both the other models.....It is important that the continuous patient care and communication of the 'holistic' model takes place to obtain trust and as much co-operation from the patient that may be possible"

6.3.4 Respondent no.4

"It has been thought and illustrated that health care to the patient can be assessed on a continuum scale with patient care and promotion at one end and technical diagnosis/ strategy at the other. In the past radiographers have been placed more towards the technical end, this is probably because the contact time between patient and radiographer is short therefore a close rapport is not achieved...."

"The use of the Bowman or Culmer model is very much dependent on personality of the radiographer/student and the situation of the examination. With a movement now in Radiography training involving psychology and sociology, radiography in the future may move away from 'the hand' or the 'barium enema' and move more towards a wholistic style, thereby adhering more closely to the style of the Culmer model."

6.3.5 Respondent no.5

"The Bowman model..does appear a linear model dealing with 'inputs' and 'outputs' rather like the 'conveyer belt' style that appears in a few radiographic journals about patient care.....Both models agree that in radiography the assessment of the patient takes place over a very short time period....Bowman states that there are many types of personalities and the radiographer as well as the patient both assess each others' traits in a few seconds.

The 'conveyer belt' attitude is no longer accepted by many patients. The patient or relations and friends of that patient expect a treatment that is effective as well as pleasant. Therefore the input should not depend on the time of day or appearance of that patient."

6.3.6 Respondent no.6

"Bowman states that the patient/radiographer relationship is an extremely complex one although it can be very short. It is the fact that it is so short that makes it all the more important..the delivery of care doesn't start when assessment stops but it blends in....The phrase *speed and efficiency* appears in the Culmer model. This reflects the resource pressure put on the modern imaging department although this mustn't affect the patient care."

6.3.7 Respondent no.7

"A patient in ICU would not be able to move and be helpful to the radiographer; everything would have to be done around the patient. This is what is shown in the holistic Culmer model. Sequencing/adaptation are mentioned in both Culmer models. This is of great importance when imaging a patient on ICU. Techniques have to be adapted to suit the patient. This is not mentioned in the Bowman model."

6.3.8 Respondent no.8

"In my opinion the Bowman model is doing nothing to help radiographers take a more holistic approach to their patients but treating the patients as an in-out part of a procedure. This model shows radiography as being part of the medical end of the health continuum rather than the nursing end."

6.3.9 Respondent no.9

"In the brief time we have with patients we must;

1. gain their trust
2. assess them-plan process
3. evaluate.

This is where a model of care or radiographic process can come into its own.

Bowman's interactive model is somewhat more technologically orientated than the Culmer model with clearly defined steps....This model can sometimes be quicker and more efficient but can tend to place the patient in second place to the examination, concentrating more on technological needs."

6.3.10 Respondent no.10

"The Culmer model takes a more holistic approach to the radiographic process, putting the patient at the centre of all decisions made. This model breaks down the radiographic process further and includes speed/efficiency to account for pressures imposed by NHS reforms."

6.3.11 Respondent no.11

"The radiographic process is the method by which all radiographic procedures are undertaken. It is a methodical, logical progression from the reception of the patient to the end of the examination... The Culmer model puts the patient at the centre of the whole process...the introduction of speed /efficiency demonstrates the need for consistent decision making and

application of skills.....the continuous nature of the model allows the radiographer to alter their procedures according to any new factors...also constant communication places the patient at the centre of the examination process where they should be."

6.3.12 Respondent no.12

"The circular Culmer model was preferred by many student radiographer that suggests a more holistic (approach) by student to health care than previous. The models compare in that they can all be used in a similar situation. They are useful as guidance and aid in the learning process as they are diagrams that can be kept in the memory and referred to on occasions. They are especially useful for student to help them consider all the aspects to be considered when a patient is radiographed. The Culmer model may be considered more useful by student as it is more specific and guides the radiographer more."

6.3.13 Respondent no 13

"The patient/ radiographer relationship is the foundation to radiographic clinical practice and is of fundamental importance....the Culmer model is a patient focussed model giving a more holistic approach to the way radiography deals with patients and the Bowman model is a systems model, giving a more methodical approach to the way radiography deals with patients.

..As we approach the end of the century we as a health service are moving towards a more patient focused care system and as technology increases there is more of a need than ever to feel connected to other human beings, hence the well known high tech/high touch dichotomy.....both the Bowman and Culmer models provide conceptual frameworks for further discussion and research"

6.3.14 Respondent no.14

"The...Bowman model appears to lack in patient care and communication and instead focused on every examination being a learning process. This model is more methodical than the Culmer model but its lack of patient care is worrying for today's radiographer as equipment is becoming easier so there is no need/ room for us to expand our role into that area of radiography so we must now turn to patient care.

The Culmer model would allow for elements like 'touch therapy'. Dowd (*1991*) has recently investigated the use of touch therapy in patient care and states that it improves patient care significantly yet few radiographers actually practise this. ....yet Bowman states that some radiographers are probably not comfortable with touch , but a more likely reason is that in the assessment radiographers decide to use it selectively."

6.3.15 Respondent no.15

"...the Culmer model is more effective at emphasising the importance of speed in a critical situation such as radiography of a severely injured patient on ICU while maintaining constant communication and patient care."

6.3.16 Respondent no.16

"(Bowman) does not mention the patient as a separate or key factor in the process. The model dwells on the radiographic process as a technical and clinical 'job', towards the medical end of the continuum. It seems to apply to the ideal patient who does not have to be constantly assessed, evaluated throughout the examination, as in the trauma situation.....speed and adaptation are very important as this patient is not an 'ideal' or typical patient coming to the department for an x-ray".

6.3.17 Educational applications- discussion

It is noteworthy that despite previous findings that students preferred the linear

model, the answers above appear to favour the holistic model. This could be attributable to various factors; we may argue that the responses reflect the nature of the teaching that the students received (which stresses the holistic approach) whereas the earlier student respondents had largely not been taught from this viewpoint. One may also argue that the overt attempt to develop critical and conceptual thinking in degree programmes makes the choice of the holistic/ intuitive model more likely. Alongside this it can be argued that these students are about to qualify and thus are demonstrating their move from student to qualified person or (and this is the cynical viewpoint but perhaps more likely) the fact that students knew who would be marking the examination scripts may have influenced their answers to attempt to 'please' the researcher. Whilst there may be some element of this in the responses, the type of comments made appear generally to be the result of critical analysis, although it is difficult to provide a conclusive response to this debate.

Each of the educational phases of the research, with the lecturers and with students, effectively used action research as in both cases the results from the exercises were fed back into the research process, especially into the development of theoretical underpinnings as the report was being written.

6.4 Summary

This chapter has explored the concept of *holism* as perceived by clinical radiographers, as a precondition for potential clinical application of the Culmer model. The chapter then moved on to examine the second research aim; the educational applications of the frameworks. Group work at an international conference was reported, as were responses to the models from honours level student radiographers.

Chapter Seven

Discussion

7.1 The models; discussion & comparative analysis

As mentioned in chapter two, there are those who regard the Nursing Process as reductionist (*Barnum 1994; Kobert & Folan 1990*). These writers also refer to the Process as being 'unalterable', 'unvaried'. Leddy & Pepper argue that this is not the case and that one should not confuse process with the conceptual basis of care; they define process as the 'method or operational procedure.. (used)..to accomplish the specific result of maximal client well being' (*Leddy & Pepper 1993 pp292-293*). More importantly they maintain that one can sustain both the use of the nursing process and a holistic view of patient care. This is echoed by McCormack (*1992 p340)* and this viewpoint is important; if accepted, it means that the stance taken throughout the research in its early stages *that the Radiographic process and the Culmer model were mutually exclusive* can be seen as incorrect; that the process is merely the means by which the radiographic examination is implemented, and that separate from this, the radiographer may hold their own view (or model) of the way that care should be implemented (*see also Chapter 5).*

What then of the hypothesis that those who had been qualified longer would be more likely to select the Culmer model? This viewpoint does not necessarily make the previous research invalid; it merely gives us a different perspective on the comparative usefulness of the models to radiographers at various stages in their career. Another of the overall research aims regarded the potential use of conceptual models (including the Radiographic Process) in education of student radiographers; however it has been pointed out that novices find fairly controlled, linear systems helpful in the early stages of skill acquisition and that the greater the degree of expertise, the less likely the practitioner is to rely on 'rules or analytic principles' (*Barnum 1994 p154; Benner 1984 p37*).

The role of pattern recognition as a method of clinical reasoning specific to radiography was discussed briefly in Chapter 5. Higgs & Jones characterise

pattern recognition as an inductive process, which requires experience and a store of previous knowledge. They also describe the process as intuitive (*Higgs & Jones 1995 p11; Easen & Wilcockson 1996 pp670-671)* and as speedy, efficient and spontaneous. The type of clinical reasoning evident in pattern recognition has been described as particularly appropriate to radiology and other specialities in medicine with a visual focus (*op cit p52*). Any differences between novices and experts are said to be explained in terms of the greater store of knowledge that the expert practitioner holds.

> "The intuiter perceives the situation in a holistic way because of his or her deep involvement in the problem.....There are several elements fundamental to intuition. Of primary importance is a sound, relevant knowledge base and the ability to recognise patterns in the presenting problem. Such pattern recognition is rooted in past decision-making and experience is essential for this linking of similar past events to the present"
>
> (*Easen & Wilcockson 1996 p672)*

If we accept this statement, then it is reasonable to concur also that radiography practitioners are capable of utilising an holistic model of care and that such a model has a basis in intuition. Indeed, we may argue that role extension into the area of diagnosis increases the likelihood of acceptance of an holistic model or philosophy of care, since the radiographer is becoming responsible for a greater proportion of the radiographic process-ie rather than just undertaking film evaluation and then handing over to the radiologist, the radiographer is increasingly likely to undertake a diagnostic evaluation (using pattern recognition skills) and to provide a report, either in the form of a red dot, or an actual written statement.

The role of subjective judgement was acknowledged by Carper (*1978*) in her paper setting out 'nursing's patterns of knowing'. Pattern and similarity recognition are part of the aesthetic knowledge of radiography (*Benner & Tanner 1987 in Leddy & Pepper 1993 p102*). It is interesting to note that Carper attributes the failure of her profession to give credence to the 'art' of nursing to its educational history;

> "Perhaps this reluctance to acknowledge the aesthetic component....originates in the vigorous efforts made in the not-so-distant past to exorcise the image of the apprentice-type educational system. Within the apprentice system the art of nursing

> was closely associated with an imitative learning style and the acquisition of knowledge by accumulation of unrationalized experience".
> *(Carper 1978 in Nicholls 1992 p218)*

It is this aspect of 'unrationalized experience' that is the key to the position in radiography at present; the failure and/or unwillingness of radiographers themselves to recognise the skilled aspects of the profession as being the manifestation of expert practice. Davies *(1995 p2)* has commented on this as a negative aspect of the nursing profession, and attributes it in no small part to the gendered context of a female dominated profession. Such attitudes may be viewed in radiography in a similar way, especially when we consider that the subordination of radiographers by the radiology profession goes back around 80 years *(Witz 1992)*. Such a mind-set is no easy thing to break out of, but it is a requirement if either profession is to move forward into full autonomy.

Carper *(op cit)* and Chinn & Kramer *(1995 pp10-11)* tend to characterise aesthetic knowledge for nursing in terms of empathetic engagement on a person-to person basis with the patient; there is much in common in this interpretation with the work of Benner (on intuition-see above) and Parse (*see chapter 8*). Schon *(1987 pp13-14)* refers to artistry as the manifestation of professional expertise and cites the arts of "problem-framing..implementation and ..improvisation- all necessary to mediate the use in practice of applied science and technique" *(ibid)*. Schon argues that professionalisation in the recent past has equated to the replacement of artistry with scientific and technical rationality, but that recognition of the need for artistry is gradually coming back as the need for a professional practicum alongside the research-based curriculum is acknowledged.

Aesthetics in radiography can, however, take on a more significant artistic meaning with respect to the fact that evaluation is of an actual image. Radiographers generally take pride in the quality of the images they produce, especially under difficult circumstances. The use of pattern and similarity recognition when evaluating the image to determine the completeness of the

examination may be likened to an artistic assessment, such that it assumes a greater importance, possibly, than other forms of knowledge for this profession.

7.2 Bowman vs Culmer; systems vs intuition

The main radiographic model in existence prior to this research was that developed by Scott Bowman (*see chapter 1)*. It is the intention at this point to return to the Bowman model and its underlying premises and to attempt to set the models developed here in the context of this previously published research. Bowman presents his model in a very systems-oriented fashion but acknowledges that the process is dynamic and complex; he presents the radiographic process as 'inputs and outputs' but also states that "a more holistic approach needs to be taken" (*Bowman 1993 p18).* There are therefore some fundamental contradictions in Bowman's presentation of the model and it is to be lamented that he has not developed the theory further.

Barnum (*1994 p168)* comments that systems theorists;

> describe input from the environment into the system as well as output from the system back to the environment.....
>
> identify the goals toward which the system strives and that dictate the nature of what happens in the system.....
>
> identify feedback or cybernetic components, allowing output and goal to be compared....
>
> explain the given system ...as consisting of smaller subsystems.....

There are other features in Barnum's list of criteria but a fairly cursory examination of the Bowman model demonstrates that systems theory is the underlying premise. We have already identified that Bowman links his model to the environment with the terms *input* and *output.* He sets the goal of the encounter as *a two-way positive learning experience (op cit p18).* He shows feedback loops between evaluation and both assessment and delivery of care and shows the patient/ radiographer relationship as a smaller subsystem, which is further split into patient-centred and technical aspects. It is the view of this researcher that systems models are fundamentally incompatible with holism,

yet Bowman's linking of his model to holistic values and patient-centredness is echoed in nursing for example in the work of Betty Neuman *(Marriner-Tomey 1994 p271).* Systems theory has been defined as "a whole with interrelated parts, in which the parts have a function and the system as a totality has a function" *(Auger 1976 in Leddy & Pepper 1993 p146).* This is quite clearly a reductionist, not holist, viewpoint.

7.3 Use of the models in teaching and learning

Since the beginning of the Autumn term 1994, the models have been used in the teaching and learning process with undergraduates on the BSc (Hons) Radiography & Diagnostic Imaging at the University of Wales, Bangor, initially with third year students and also latterly with students in the first and second years. It was a major aim of this research that the models should be able to be used as curriculum tools and equally it is an aim of the undergraduate course that students should develop as reflective practitioners. This was difficult previously on the old diploma courses where the curriculum was based solely on skills teaching and an apprenticeship model *(Leddy & Pepper 1993 p462).* As Kristjanson et al pointed out;

> "..one of the original purposes of theory development in the profession was to define the unique qualities and perspectives of the nurse and nursing. This provided the means whereby nursing schools could organise courses and clinical experiences, with a framework that would reflect the essence of the profession"
> *(Kristjanson, Tamblyn & Kuypers 1987 p524)*

At the time of writing students are introduced to the models in the first year and are also introduced to models of health including the biomedical and biopsychosocial models. The models are then reintroduced in the final (honours) year as part of a module in trauma radiography; students also undertake a clinical assessment in trauma/ mobile radiography followed by an oral discussion element for which the radiographic process is used as a structure. It has been found that, given the choice, students will tend to favour the linear process over the circular (holistic) model. McCormack, however, argues strongly for the need to combine the two approaches. He equates the linear process with 'knowledgeable doing' and argues the need to teach

intuitive problem solving as a means of 'educating for expertise' (*McCormack 1993 p14*).

7.4 Reflective practice and theory building

Walker & Avant state that there are three approaches to theory building; analysis, synthesis and derivation (*Walker & Avant 1988 p19*). They define the three approaches as follows;

- *Analysis-* clarification, refining or sharpening of concepts etc. Dissection of a whole into its component parts.

- *Synthesis-* combination of theoretically unconnected pieces of information to form a new whole.

- *Derivation-* transposition and redefinition of a concept or statement from one context to another using analogy or metaphor. (*op cit pp24-25*)

These skills, as defined above, are also skills said to be characteristic of the graduate; *analysis* and *synthesis* in particular are skills sought in level 3 (honours) assessments on an undergraduate programme whilst *derivation* would be a skill which one would look for in a postgraduate candidate. This would suggest that the use of models and theory building (as has already been recognised in the nursing profession) will help to develop the very skills that we are seeking in our graduates and postgraduate candidates. Higgs & Jones (*1995 p3*) argue that the development of higher order cognitive skills is a crucial factor in professional autonomy and that such skills are the key to the development of clinical reasoning and true reflective practice. The process of clinical reasoning is outlined as follows (*op cit p7*);

> " Throughout the reasoning process the core elements of knowledge, cognition and metacognition interact. That is, cognitive or thinking skills (such as analysis, synthesis and evaluation of data collected) are utilized to process clinical data against the clinician's existing discipline-specific and personal knowledge base. At the same time metacognition is employed to monitor the clinician's thinking processes and conclusions, in order to detect links or inconsistencies between clinical data and existing clinical patterns or expectations based upon prior learning, to reflect on the soundness (accuracy, reliability, validity) of observations and conclusions and to critique the reasoning process itself (for logic, scope, efficiency, creativity etc)."

We may thus take the view that the use of models and theories of radiographic practice not only assist the development of higher order cognitive skills but also provide a structure to aid the process of metacognition.

7.5 Fawcett's Framework for Analysis & Evaluation

In chapter 2 we examined various writings in the field of nursing meta-theory, including some strategies for theory development postulated by Meleis and by Walker & Avant. Equally however, various writers have generated frameworks for the evaluation and analysis of theories once they have been developed (*Fawcett 1989; Barnum 1994; Marriner-Tomey 1994; Chinn & Kramer 1991 & 1995).* The framework developed by Fawcett is perhaps the best known of these and can be applied apart from the nursing context. It is the intention therefore to use some of the questions from Fawcett's analytical framework to discuss the models developed for this research.

7.5.1 Analysis of the models

In terms of analysis of the models developed, Fawcett's framework poses questions about three aspects; the development of the model, its content and what she terms 'its areas of concern' (*Fawcett 1989 pp44-45).* With regard to the development of the model, the analytical framework asks the following questions;

- What is the historical evolution of the conceptual model?
- What approach to development of (radiography) knowledge does the model exemplify?
- Upon what assumptions was the conceptual model based?

7.5.2 Historical background

The historical background to the evolution of the model was set out in chapter 1. The development of the radiography profession in the early years of this century was summarised, particularly with relevance to the relationship with the medical profession and radiologists in particular. The educational

background of radiography was also discussed, concerning the apprenticeship model in use until around 1990, with a knowledge based diploma as the basic qualification. This model had been in place for over 30 years and then within a five year period all training schools transferred from the monotechnic NHS environment into higher education, and the entry into the profession moved from diploma to degree in the same period. It was therefore shown that there had been little impetus to develop radiographic theory, as education had largely been skills and knowledge based. The evolution of this model was set against early attempts by other educators to look at the issue of theory development in radiography, and a certain discontent with the form and methodology behind those attempts.

7.5.3 Theoretical approach

The approaches to the development of the model have been inductive, allowing the frameworks to grow out of the findings of the research, which in turn resulted from a major criticism of the Bowman model. The theoretical framework has also been influenced by holism and by Patricia Benner's work on intuition as a key component of expert practice. Differentiation between the two models, and the move to accept the linear model as the overall radiographic process, was influenced by writings about the Nursing Process (*see Chapters 5 & 6).*

7.5.4 Underlying assumptions

This was found to be quite a difficult question to answer; Fawcett poses it for those who are seeking to evaluate the research of another- it can be more difficult to look into one's own experiences and unconscious at the assumptions which one has made. Certainly, coming from a background of social science at both undergraduate and postgraduate levels, the research is underpinned by a belief in the value of qualitative research methods and the importance of the search for deeper, humanistic meanings. Much of the stress placed throughout

this report on the importance of the discipline of radiography stems from this belief, and linked to this is the strong feeling that there should not be a move to adopt the scientific method wholesale from the radiologists- that radiographic research, like that of nursing, has room for more than one methodology, especially where the research relates to patient care and to clinical practice.

7.5.5 Content of the model

Fawcett's questions regarding the content of the model do not easily translate into radiographic terms, largely because radiography is in a much earlier stage of theoretical development than nursing was at the time Fawcett developed her analytical framework. The questions that she poses throw radiography's lack of philosophical development into sharp perspective;

- How is person defined and described?
- How is environment defined and described?
- How is health defined? How are wellness and illness differentiated?
- How is (Radiography) defined? What is the goal of (Radiography)? How is the (Radiographic) process defined?

Note that *person, environment, health* and *nursing* are accepted as being the four concepts of the nursing metaparadigm (*Fawcett 1989 p46*). Radiography is not at the stage of having debated this as yet, so while we may take the four concepts, merely substituting radiography for nursing, the appropriateness or otherwise of these concepts for radiography may become clear in the paragraphs that follow.

7.5.6 Definition & description of person.

For the purposes of the models in this report the 'person' is an individual who presents for an x-ray examination. In Chapter 1 we stated that the initial research aims were based on the radiography of a traumatised patient, but as the research has progressed it has become increasingly clear that both frameworks could be applied to any patient for any radiographic examination.

It must also be noted that the patient may not necessarily be ill; like nursing, an increasing part of the radiographer's work may be with well-women, who are

being screened (eg for breast cancer) or who are pregnant (*McLellan 1990).* Screening may also extend to include males in the future. In situations such as this, although the client does not present with an illness, the fear of what may be found is extremely stressful and patient care is paramount in order to ensure reattendance at subsequent recalls (*Marshall 1993 p18).* In referring to the person the aim of the models is to take an holistic approach; the tendency of the profession to reductionism is noted and is to be avoided.

7.5.7 Definition & description of environment

Again, the environment in which radiography operates is changing. In most cases at present the examination will take place within a radiography department (including scanning suites). Alternatively, it may take place within a breast screening centre (usually sited away from the main imaging departments), on a maternity unit or ward, in the operating theatre or casualty resuscitation room. Increasingly, radiography is also being taken out into the community- at present this tends to be in the form of mobile units eg breast screening vans or magnetic resonance imaging vans. However, with the move to fund-holding GP practices it is anticipated that in the future there will be more basic radiographic units located in health centres, with radiographers working single-handed as part of a multidisciplinary team, and that referrals to hospital departments will increasingly for more specialised examinations only. Again, moves in the UK to introduce patient-focused care will again challenge the traditional view of the place of radiography and will fragment the profession. The concept of *environment* in radiography is therefore a fluid one and is changing (*Cherryman 1994).*

7.5.8 What is 'health'?

The concept of health has not been adequately explored in the radiography context and work remains to be done in this area (*see chapter 8).* Castle defined health as being placed on a 'wellness continuum' and moving between

wellness and *illness* at different times in the life of the individual (*Castle 1988 in Culmer 1995 p1),* and this is largely the approach that has been adopted in this research. It is recognised however that the concept of health is a changing one and that Government policy, for example, has shifted the focus towards health education and disease prevention rather than treatment of existing illness (*see below).* Castle has since attempted to advocate a role for radiographers in health promotion, but this has not been enthusiastically received by the profession. Research is ongoing into the reasons why this might be (*Castle 1996).* Again, the concepts of *wellness* and *illness* have not been differentiated properly in the radiographic context and there is room for further work to determine what the perceptions of radiographers are of these concepts, and of their role as professionals.

7.5.9 Definition and goal of Radiography

In section *5.1.3* we proffered the following definition of the role of the radiographer;

The role of the diagnostic radiographer is a technical one, aiding the diagnosis of disease. It is a specialised role, offering both responsibility (in the in use of radiation) and variety.

It is a caring role, but tends to be characterised by less time or close involvement with patients, when compared to other professions.

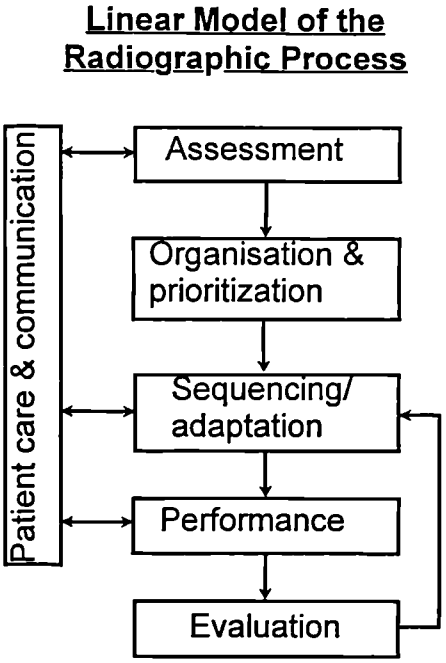
The goal of diagnostic radiography may therefore be said to be;

-the use of radiation to aid in the diagnosis of disease.

7.5.10 Description of the Radiographic Process

In chapter 5 we accepted the work of Torres (*1986)* and McCormack (*1992)* and ended the attempts to eliminate one of the two frameworks which had been developed. The radiographic process was presented as being complementary to the holistic Culmer model in that it is a way of using radiographic knowledge in the examination of patients.

Figure7.1



The radiographic process is a tool to give structure to the examination; the Culmer model is a philosophy of patient care. The radiographic process could thus coexist with any model of care (eg Bowman's model or Dowd & Durick's model of elder care).

7.5.11 Areas of concern

This again is quite a difficult thing to analyse in terms of one's own research. The main area of concern of the model is that of maintaining the patient as the central focus of care in a highly pressurised environment. The radiographer is caught, like many other health care professionals in a 'catch-22' situation, largely brought about by the advent of the Patient's Charter. On the one hand there is the pressure on Trusts and departments to bring down waiting times within specified targets; on the other hand there is the increasing focus on quality of care and a positive encouragement to the patient to complain if this is not perceived to be satisfactory. The radiographer is thus under pressure to maintain throughput of patients, but is then open to criticisms of neglecting patient care in the process. This can be very stressful for the radiographer and

can also lead to emotional distancing from the patient which can further exacerbate accusations of lack of care. There are also issues of professional culture to overcome, such as the tendency to reductionism and the antitheoretical stance of some radiographers which acts as a kind of inverted snobbery whereby they insist that the profession is about little more than 'wiping backsides' (*see chapter 5*).

7.6 Evaluation of the models

Fawcett poses numerous questions to help evaluate the usefulness of models and their contribution to knowledge. Initially the questions asked appear merely to repeat those used for analysis but those that differ are outlined below (*Fawcett 1989 pp47-48).* The test of logical congruence concerns itself with the world view as expressed in the model and its internal consistency;

- Is the internal structure of the conceptual model logically congruent?
- Does the model reflect more than one contrasting world view?
- Does the model reflect characteristics of more than one category of models?
- Do the components of the model reflect logical translation of diverse perspectives?

7.6.1 Logical congruence

Fawcett defines logical congruence as the logic of the internal structures of the models. She further states that 'contrasting world views obviously are not logically congruent'. She outlines these four world views as *mechanism versus organicism* and *change versus persistence*. The elements of these four world views are summarised below;

Table 7.1 Elements of the Four world Views (Fawcett 1989 pp10 & 12)

Mechanism	Organicism	Change	Persistence
Metaphor is the machine	Metaphor is the living organism	Metaphor is growth	Metaphor is stability
Human being is reactive	Human being is active	Change is inherent & natural	Stability is natural & normal
Behaviour is a predictable linear chain	Behaviour is probabilistic	Change is continuous	Change occurs only for survival
Elementarism & reductionism assumed-focus on parts	Holism & expansionism assumed-focus on wholes	Intraindividual variance	Intraindividual invariance
Change is quantitative	Change is qualitative & quantitative	Progress valued	Conservation & retrenchment emphasised
		Realisation of potential emphasised	Solidarity valued

Thus radiography may be said to have come from a climate of mechanism and persistence, in that there has been a tendency to revere the medical model and the worldview presented in that model. Allied to this there has been a reluctance to embrace change; a desire for stability and tendency to conservatism within the radiography profession. This is probably understandable given the major changes that have taken place in healthcare in the UK since 1990 with the moves to Trust status and the internal market, as well as the wholesale transfer of radiography training into higher education. The world views expressed in the models presented in this research, however, are those of organicism and change. Whilst change is permeating through both education and health care, the combination of the two perspectives may help to indicate why the models have created some dissonance amongst clinical radiographers (ie. those who came up through the apprenticeship model and whose received world view is thus challenged). In discussing organicism Fawcett refers to the work of Parse and her description of the simultaneity paradigm (*ibid)*; whilst recognising that Parse's work does not translate easily into the radiography context, the influence of her work on this research is acknowledged here. Parse states categorically that 'health is a lived experience' and that nursing must break away from the medical model and accept that it is a human, rather than a natural, science (*Parse in Marriner-Tomey 1994 p448*). These assertions have been controversial in nursing and it is accepted that this will also be the case in the radiography profession. However, if the world view of change is promulgated then this assumes a commitment to continue the research and to communicate its findings in the hope of stimulating further change.

7.6.2 Generation & testing of theory

- Does the conceptual model generate empirically testable theories?
- Do tests of derived theories yield evidence in support of the model?

(op cit p49)

The questions posed here tend to reflect Fawcett's positivistic leanings, but it is hoped that the decision trail that has been laid throughout the report would enable any researcher to develop theories from the research which could in turn be tested. Some areas where this might be applicable are indicated in chapter 10. It would be anathema to this particular researcher however if the pressure for the generation of testable hypotheses became such that "the wonderful, inconceivably intricate tapestry is being pulled out, torn up and analysed; and at the end even the memory of the design is lost and can no longer be recalled" *(Chargaff 1978 in Munhall 1982 p181)*.

7.6.3 Social considerations

Fawcett points out that conceptual models need to be translated into knowledge systems which are then used to guide research, education and clinical practice.

- Does the conceptual model ....lead to (radiographic) activities that meet society's expectations, or do the expectations created by the conceptual model require societal changes? *(the test of social congruence)*

- Does the conceptual model ....lead to (radiographic) actions that make important differences in the person's health status? *(the test of social significance)*

- Does the conceptual model include explicit rules for research, practice, education and administration? *(the test of social utility)*

(op cit pp50-51)

The model exhibits social congruence since the framework documents a process that is already in use; any changes that are required are modifications to the thinking of radiographers themselves (eg the shift to a more holistic perspective) rather than societal changes. This would not rule out a shift in practice in the future which may require societal change in thinking about radiography practice *(see chapter 9)*.

The test of social significance is a difficult one to assess; in terms of trauma radiography, use of the radiographic process may mean a better quality of examination for the trauma patient, including a fractionally faster examination

which may mean quicker diagnosis and treatment; it may also mean a less painful examination. The adoption of the Culmer model, with its patient-oriented focus, may mean a subjectively better examination for the patient, in terms of quality of care and communication.

7.6.4 The test(s) of social utility

Johnson (*1987 in Fawcett 1989 p51)* determines social utility by asking to what extent the 'rules' for various professional activities are made explicit within the model. Taken in turn the questions relating to each activity are as follows;

- **Research-** Is the investigator given sufficient direction about what to study and what questions to ask?
- **Clinical practice-** Is the practitioner able to make pertinent observations, decide that a ...problem exists, and prescribe and execute a course of action that achieves the goal specified?
- **Education-** Does the educator have sufficient guidelines to construct a curriculum, and a reasonable understanding of what knowledge and skills are needed?
- **Administration-** Does the administrator have sufficient guidelines to organise and deliver (radiographic/imaging) services?

(ibid)

It is recognised that in this area the research needs to progress further in order to clarify some of the guidelines which another practitioner may take away from the research. As mentioned above there has been a conscious attempt throughout the project report to mark the decision trail (*see chapter 3)* so that anyone reading the report may have an understanding of the process followed throughout the project. It is felt that certain areas need further clarity or more depth of investigation and these are indicated in the final chapter.

7.6.5 Overall assessment of the models

Fawcett's final evaluative question requires us to assess the 'overall contribution of the conceptual model to (radiographic) knowledge' (*op cit p52*). She quite rightly points out that use of a model makes the building of a knowledge base more systematic and this documentation of working practices was a stated aim of the research, as was the systematisation of the teaching of more advanced radiographic skills to student radiographers. The model has in

fact progressed beyond the original remit of trauma radiography to provide a model of both the overall radiographic process and of one approach to patient care. This model represents the first research based documentation of radiographic practice and therefore, it is humbly believed, it is a significant advance in radiographic theory *(Culmer 1996).*

7.7 Why reflect?

Reflexive analysis is a recognised stage in qualitative research arising from the traditions of ethnography whereby the researcher "conceptualises....what is going on in themselves, and how a sense of self-consciousness can be put to analytic use" *(Aamodt in Morse 1991 p48).* Since the researcher is so close to the data and the subjects in a qualitative study he or she is mandated to examine critically the effects of their own involvement;

> "During this process the researcher explores personal feelings and experiences that may influence the study and integrates this understanding into the study. the process requires a conscious awareness of self" *(Burns & Grove 1993 p567)*

Various nursing writers have commented that this allows the researcher to 'capitalise on the data' by providing a theoretical explanation of the research process *(Streubert & Carpenter 1995 p92; Morse 1994 p166).*

Fieldwork is not merely a component of ethnographic style research; it is a critical part of the education of health practitioners. More commonly referred to as clinical education or clinical placement in nursing and radiography, nevertheless reflection is as important in the development of the graduate practitioner as it is in the qualitative researcher. "Reflection is a valuable catalyst for developing clinical reasoning" *(Ryan in Higgs & Jones 1995 p251).* The analysis undertaken in this chapter and at other stages throughout the report is thus attempted not only as a researcher, but also as a radiographer and educator.

7.8 Methodological reflections

As stated in chapter 3, the approach to the research was broadly inductive using a combination of qualitative and quantitative analysis. Purists reading this report may feel the need to criticise this mix of qualitative and quantitative approaches; however Polit & Hungler list numerous reasons why the two approaches may be integrated within a study;

> - complementarity; to provide a more rounded study, by using the two methodologies to compensate for weaknesses in the opposite approach.
> -enhanced insights;
> -incrementality, particularly in a developing area, via the use of 'multiple feedback loops'.
> -enhanced validity;
> -creating new frontiers, where contradictions exist between the two sets of methodological data. *(Polit & Hungler 1991 pp518-520)*

The use of triangulation of methods was discussed in chapter 3.

7.8.1 Sampling

One way in which the study could be criticised is in the manner of the sampling. The groups of qualified staff used were essentially self-selecting in that they were attending study days or conferences out of individual interest; therefore the respondents may have been said to be more motivated than other radiographers and hence more likely to participate in the research. In choosing this method of sampling however, any bias within particular groups was then outside the researcher's control *(Polit & Hungler 1991 pp241 & 257)*. We may argue, however, that the groups chosen were relatively homogenous and that the repetition of methods with more than one group increases the generalisability of the results. Polit & Hungler argue that some segment of the population is likely to be systematically under-represented in nonprobability sampling *(op cit p260)*. This is possible, but the researcher has sufficient confidence in the representation of clinical radiographers within the groups selected. In addition the use of a survey in the later stages of the research helps to overcome this concern, although it must be acknowledged that the response

rate was low. The reasons cited for the use of non-probability samples are 'practicality and economy' (*ibid),* but there is no guarantee that, even if probability sampling had been used throughout the project, that the response rate would not have been equally low. It is acknowledged that results must be conservatively interpreted (*ibid)*, however it has also been commented that group administered questionnaires can help maximise return rates which in turn serves to reduce the risk of serious response bias (*op cit p292).*

In addition to this there could also be some reservation about the use of student groups; as a Head of School it could be said that the students may have felt more pressured than usual to take part in the research. It would be easy simply to state that this was not apparent; it is less easy to assess to what extent this was actually the case. Within the student groups there was no one individual who did not participate, indeed the students gave full and frank written responses which were often more valuable than those of the clinical radiographers. Their greater objectivity, resulting from their incomplete socialisation into the professional culture, made their responses an important part of the research. It could be presumed that, for those external courses which were visited, that students who were not interested in participating would have absented themselves from the session.

7.8.2 Issues of data analysis

There was some initial concern as to whether the qualitative analysis was being 'contaminated' by the process of counting. The use of the database for analysis actually facilitated this. Burns & Grove (*1993 p573)* however confirm that even in qualitative analysis "counting can help researchers 'see' what they have; it can help verify a hypothesis; and it can help keep one intellectually honest". Those who are committed to qualitative methodology may equally take issue with the use of databases for analysis instead of the more dedicated software which is available, such as QSR-nudist. I did not become aware of the existence

of such packages until the analysis was at a fairly advanced stage and have commented in chapter 3 that the use of Microsoft Access permitted easy transfer between word-processing and spreadsheets for data presentation and manipulation. There is also a slight concern that the imposition of concepts by packages such as 'QSR-Nudist' may actually subconsciously restrict the researcher to the acceptance of those concepts rather than continually seeking to further apply the researcher's OWN analysis to the data presented *(Agar 1991 in Kelle 1995 p5)*. However, if the research is developed further one of these packages would be very valuable and, indeed, for any researcher starting out at this time, their use would seem to be almost mandatory.

7.9 The outcomes; critical analysis

Earlier we analysed the validity of the research using a framework developed by a leading metatheorist in nursing. It has not, as yet, been possible to analyse the impact of the research from a radiographic perspective (other than the personal one of the researcher).The frameworks were published as part of a book chapter that also reviewed the overall development of theory in radiography (*Culmer in Paterson & Price 1997*). That same chapter included a review commentary by one of the editors (*op cit pp93-95)*. The commentary includes discussion of the contribution of the research to the profession of radiography as well as specific criticisms of the stance taken in the chapter. Whilst the chapter only provided a 'snapshot' of the research overall it is pertinent to discuss the points raised by Price in the commentary as they are directly relevant to this report and will help the reader to assess the contribution of this research to original knowledge.

Price argues that "...inevitably there is going to be reassessment of practice. The multi-skilled health professional will become commonplace" (*op cit p94)*. On the one hand Price challenges "the necessity to define professional boundaries" as having protectionist connotations but then equally he states that

the move towards multiskilling strengthens the argument for the development of models of practice, since multiskilling threatens to shift imaging towards being task oriented and indeed task driven. It is unclear what the thrust of Price's argument is here. It is also by no means clear that the political arguments for the multiskilled practitioner have, as yet, prevailed. Even if we consider the introduction of helper grades in hospitals , where it was assumed that multiskilling would be the norm, the 'generic helper' is still not commonplace. If however Price's prediction comes true then the model as presented may no longer fit the test of *social congruence* as outlined in the previous chapter.

Price, not surprisingly, does pick up on a point that was deliberately controversial. He argues that "the notion that conceptual thinking will differentiate the graduate radiographer from those who trained before 1990. This is both questionable and controversial" *(ibid).* That the statement is controversial is acknowledged but the researcher would argue that, academically, it is not questionable. As stated earlier it is indeed the case that conceptual thinking is one of the hallmarks of the graduate practitioner. We have argued from the beginning that the previous Diploma qualification did not provide other than knowledge and application. It did not require the preparation of a research project, nor did the final examinations progress much beyond the regurgitation of rote learned knowledge and procedures.

Price does acknowledge that this research has contributed towards the original knowledge of the profession by stating that it

> "...has done a useful service in progressing the debate, or maybe for some by introducing the subject of conceptual models as a basis for developing and analysing practice.....It is time to debate professional philosophies that give rise to the beliefs and values from which practice goals can be determined. Without that debate, it is difficult to envisage how practice can advance on a strong footing" *(op cit pp93 & 95)*

7.10 Summary

In this chapter reference is made to the earlier background and literature chapters in order to set the research in context. Fawcett's analytical and evaluative framework is used to critically analyse the importance of the model and its potential impact on radiographic practice.

There has also been an attempt to return methodological issues by means of reflexive analysis of the experience of undertaking this piece of largely qualitative research, and evaluation of the extent to which the position and stance of the researcher may have affected the data obtained. Other issues relating to methodology are also evaluated such as the use of counting techniques and computer analysis relating to qualitative data.

In the next chapter the recommendations of the research are outlined, with some discussion of where the research might develop in the future.

Chapter eight-

Conclusions & recommendations for further research

8.1 Conclusions

In section 1.7 the **research aims** were stated as follows;

1. To form a conceptual model of the way(s) in which (expert) radiographers approach the examination of a trauma patient.
2. To use the model to facilitate the clinical education of student radiographers (particularly in trauma techniques).

The **research objectives** were;

1. To develop a definition of the role of the diagnostic radiographer.
2. To produce one or more models of radiographic practice, based on the views of practising (expert) radiographers.
3. To attempt to elaborate on certain individual concepts within the models produced.
4. To determine the extent to which the development of such models could aid and inform the education of student radiographers, particularly in the later stages of their course(s).
5. To set the research within the context of professional developments, both current and historical.

8.1.1 To develop a definition of the role of the diagnostic radiographer.

The report presents a definition of the role of the diagnostic radiographer's role and has identified ways in which radiography practice is distinct from that of other professions. In particular the research has labelled radiographers *hit-and-run carers.* This is done not in a denigrative fashion but as a means of encapsulating the real skill of radiography which is characterised by time-limited interventions with little likelihood of follow-up. Such time-limited episodes of patient care require that the radiographer has excellent communication skills and a perceptive eye to be able to undertake patient assessments in a matter of minutes such that, often complicated and

painful, examinations can be carried out satisfactorily for both the patient and the radiographer.

At the time of writing this was the first piece of research in this country to present such a formal definition; other researchers have made similar attempts since the data collection was carried out.

8.1.2 To produce one or more models of radiographic practice, based on the views of practising (expert) radiographers.

It is clear that the research has achieved this objective; models have indeed been produced and tested. From the data gathered it seems reasonable to conclude that the *radiographic process* is applicable to any radiographic or imaging examination and stands up as a model which describes the actual practice of diagnostic radiography. We may also conclude that, if this is the case, conceptual models that describe an individual's philosophy of radiographic practice may sit alongside the *radiographic process* and that the process is not mutually incompatible with, for example, the Culmer model which presents a holistic model of practice. It may also be concluded that, despite the reductionism that is inherent in diagnostic radiography because of its close reliance on the medical profession and hence the medical model, that radiographers do understand the concept of *holism* and that the Culmer model can therefore be seen as having validity for radiographic practice. An hypothesis was presented in chapter 5 that the Culmer model was intuitive in nature and therefore was more likely to be accepted by those who were expert practitioners; this hypothesis was proven.

Not only has the research succeeded in producing models of radiographic practice, it may be seen to have achieved something further in that the report presents a very clear picture of a profession at a particular point in its development; not only has historical and sociological literature been used to provide an analysis of the characteristics of the profession and its development but the data collected present the views of clinical radiographers as to the skills encapsulated within the role of the radiographer,

particularly in the trauma context. At a time when the profession stands on the brink of great change, precipitated by the national shortfalls in numbers of radiologists, this makes the report important, not least because such an analysis has not previously been carried out by a radiographer in this sort of depth.

8.1.3 To attempt to elaborate on certain individual concepts within the models produced.

Major concepts specifically investigated in the second questionnaire were patient assessment and evaluation (see chapter 5) which were broken down into constituent skills. The concept of holism (see chapter 6) was also investigated and a database of alternative meanings was generated.

Qualitative responses were also presented throughout the results chapters 4,5 and 6 to illustrate different interpretations of the meanings of component skills. The research presents seven separate databases of responses in the Appendices, each full of data strings describing the work of diagnostic radiographers and their perceptions of its meaning and value. This again makes this an important piece of work and contributes to the picture of the profession in the late 1990's.

8.1.4 To determine the extent to which the development of such models could aid and inform the education of student radiographers, particularly in the later stages of their course(s).

The report has further shown that the frameworks presented can be of value in the education of student radiographers. This value lies especially in the final stages of training since the models present a means of evaluating actual practice and of encouraging students to reflect on their relationship with patients and upon their personal and fundamental philosophies of patient care. The *radiographic process* stands on its own as a representation of practice, as does the *nursing process.* Alongside this the practitioner may have their own personal philosophy of care, which may be represented by the Culmer (holistic) model, but could equally be the Bowman or other model of radiographic care.

In addition, the research has demonstrated that the development of conceptual and theoretical thinking can also develop the third level educational/academic objectives of critical analysis and evaluation. Both of these aspects contribute to the aim of the development of the graduate practitioner.

8.1.5 To set the research within the context of professional developments, both current and historical.

As mentioned in 8.1.2 above, the research has looked at the historical development of radiography and its origins and relationship with radiology. Examination of sociological literature has aided an analysis as to why radiographers may have been particularly slow to embrace change and mention has been made throughout the report about the current moves towards role extension into film reporting. The work forms an original contribution to knowledge because it is one of the few studies that actually demonstrates the practitioners' view of the radiographic profession and also presents models that are research-based, which had not been the case previously.

8.2 Areas for future research

In chapter 7 the proposition was advanced that the models formulated would be applicable to any radiographic examination (rather than just trauma which was the starting point of the research). In this project the concentration has been on general radiography, but there is important work to be done to critically analyse the extent to which theory developed may be applicable to the newer imaging modalities. There is a need also to assess to what real extent there is commonality between general radiography and scanning techniques. Many general radiographers feel that the newer imaging modalities take the radiographer further away from patient care and more towards the technologist end of the continuum. Is this perception well founded?

There is a need to do further work on some of the concepts within the models; in particular it would be appropriate to undertake research into image evaluation and the level of skill required to do this on a daily basis. How do radiographers differentiate

between what is qualitatively a reject film and what is acceptable? There has been research done into the spatial abilities of recruits into the profession but not on the utilisation of those abilities by qualified staff. A colleague has suggested that visually radiographers can resolve rotational differences of less than 2mm but this has yet to be researched.

In chapter 7 it was also pointed out that the concept of *health* has not been adequately explored in the radiography context. This is an area in which postdoctoral work is likely to proceed; we have talked elsewhere about the tendency of the radiography profession to reductionism- it would be very interesting to see if this is reflected in radiographers' perceptions of the concept of health. Do radiographers see *health* as little more than the mending of body parts that are 'broken'? This may be the reason why researchers such as Castle have had little success in encouraging radiographers to take up a health promotion role (*Castle 1996).* A detailed examination of the meaning of *health* in the radiographic context and the mind of the radiographer would be a very valuable contribution to radiographic theory.

This research has concentrated on the perspective of the radiographer, but it would be important for any future research to also encapsulate the viewpoint of the patient as the consumer. The question has been raised informally elsewhere as to whether patients always want an holistic approach or indeed whether, in fact, in the case of certain procedures such as the barium enema patients actually would prefer a more distant (reductionist) approach because of the embarrassing nature of the investigation. This an interesting area and could well prove fruitful in further research.

Also in chapter 7 we mentioned the other metaparadigm concepts that make up nursing; *person, environment* and *nursing* itself. Fawcett (*1995*) and others have proposed that these four global concepts are common to all nursing theories and that it is possible to analyse the relative contribution of such theories by what they contribute to knowledge in each of the metaparadigmatic conceptual areas. Further analysis of each of the existing models, and of others as they emerge, may give us further insights

into the fundamental metaparadigm of radiography. Kim (*1989 in Fawcett 1995 p6)* states that "the functions of a metaparadigm are to summarise the intellectual and social missions of a discipline and place a boundary on the subject matter of that discipline".

If we are serious about wanting radiography to emerge as a full profession then the identification of the metaparadigm(s) are of fundamental importance (*Paterson & Price 1997 p93)* and it would be wise to keep in mind the words of a nursing scholar;

> "I know of no other way to accomplish this than to be humble in the questions we ask, courageous about the intellectual initiatives we take, sceptical of the answers we obtain (displaying them for others to review) and devoted to and in love with our work"
>
> (*Gortner & Neusner 1977 in Gortner 1980 p183)*

8.3 Summary

8.3.1 Conclusions

- two frameworks have been presented; these are the *radiographic process* and the *Culmer (or holistic) model.*
- both frameworks are valid representations of radiographic practice as perceived by clinical radiographers
- the research has developed a formal definition of the role of the diagnostic radiographer
- the frameworks and the definition are useful in the education of student radiographers, especially in aiding them in the development of higher order reflective skills.

8.3.2 Recommendations for further research

- the applicability of the models to imaging modalities e.g. computed tomography

- further research into the concepts within the models e.g. image evaluation
- Radiographers' understanding of concepts such as *health*
- further development of the radiography metaparadigm by comparative analysis of existing models

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Appendix I

Database of responses from group 1 (diagnostic phase)

RESPONSE	COMMENT	CODE
5	adapt	ae01
5	compromise	ae01
9	working around the patient	ae01
16	lat beam so that pt is not moved	ae01
26	pt must be kept immobile	ae01
28	work around pt	ae01
31	adapt your technique	ae01
31	use all available aids	ae01
32	lots of pads/grids	ae01
35	repeats if necessary	ae01
37	angulation of tube to compensate for lack of movement	ae01
40	adapt technique as appropriate	ae01
41	modify as necessary	ae01
43	modify techniques accordingly	ae01
52	need to work around the pt	ae01
54	high priority films without hindrance to other staff	ae01
64	adapt technique	ae01
65	adapt techniques	ae01
69	work around the pt	ae01
71	modified techniques	ae01
1	establish patients capabilities	ae03
2	condition assessment of patient	ae03
2	level of consciousness of pt	ae03
3	assess	ae03
4	assess injuries	ae03
7	assess pt	ae03
9	keeping a check on the pt	ae03
10	assess how much pt can cooperate	ae03
10	assess radiographs as you go along	ae03
10	assess injuries	ae03
10	read x-ray form carefully	ae03
11	conscious unconscious pt?	ae03
12	assess injuries	ae03
13	assess the pts needs	ae03
14	assess pts condition	ae03
15	evaluation of condition	ae03
17	determine if request is realistic	ae03
17	examine pt	ae03
17	look at request	ae03
18	look-assess situation	ae03
21	provide necessary info for clinicians	ae03
23	mobility conscious	ae03
24	allow them to help where possible	ae03
27	condition/obstacles complexity	ae03
30	mobile	ae03
33	assess injuries	ae03
33	find out mobility of pt	ae03
34	pt condition	ae03
34	pt cooperation	ae03
35	assess films	ae03
35	look at request form	ae03
36	patient cooperation	ae03
36	ascertain the necessity of each item requested	ae03
38	assess what x-rays can be done easily first	ae03
39	assess	ae03
41	read the form	ae03
42	assess pt condition	ae03
42	ability to cooperate	ae03
43	assess pts condition	ae03
43	check what information is required	ae03
44	assessment	ae03
45	assess the extent of injuries	ae03
45	capabilities of movement of patient	ae03
46	assess	ae03
47	assess pts ability/injuries	ae03

RESPONSE	COMMENT	CODE
48	find out injuries	ae03
49	assess what can be done	ae03
50	evaluate/assess	ae03
50	find out more if required	ae03
51	assessment of pts condition/injuries	ae03
51	ease of examinations for radiog/pt	ae03
52	observation of pts condition	ae03
53	assess the situation (mobile/immobile)	ae03
54	assess request	ae03
55	assess situation	ae03
56	assess pt injuries	ae03
57	assess injuries	ae03
58	observe/assess situation	ae03
59	can you move?	ae03
60	assess situation + patient	ae03
61	assess pt condition	ae03
62	check if pt is conscious	ae03
63	assess state of patient	ae03
66	assess level of consciousness	ae03
66	examination required	ae03
67	assess the situation	ae03
68	assess the pt	ae03
68	cooperation of pt	ae03
69	assessment	ae03
70	assess condition	ae03
70	look at request form & note which areas need to be x-ra	ae03
71	assess the s tuation	ae03
71	can the patient move	ae03
72	x-ray request	ae03
72	what's known about the s tuation?	ae03
72	ask advice about moving	ae03
73	assess nformat on	ae03
73	assess njuries	ae03
73	request form	ae03
74	assess pt condition (consc ousness)	ae03
75	assess injuries-physical	ae03
75	assess mental trauma shock?	ae03
1	calm patient down	ae06
1	make sure pt is comfortab e afterwards	ae06
1	explain what is go ng to happen to pt	ae06
5	ga n pts confidence	ae06
7	care in movement	ae06
8	with care not to cause more injuries	ae06
10	talk to pt	ae06
11	care	ae06
12	min movement of pt for max info	ae06
16	immobilisation	ae06
17	ensure that they understand	ae06
20	try not to hurt pt	ae06
20	make pt comfortable	ae06
20	explain to pt what I'm going to do	ae06
21	prevent further injury	ae06
21	reassure	ae06
22	with great care to pt	ae06
24	explain procedure to pt	ae06
25	reassure	ae06
25	explain whats going to happen	ae06
28	minimum distress to pt	ae06
31	don't rush	ae06
37	explain the procedure	ae06
40	carefully	ae06
44	care	ae06
45	proceed with care	ae06
46	remain calm	ae06
46	take time	ae06

RESPONSE	COMMENT	CODE
50	explain if possible	ae06
55	care of patient	ae06
59	tell pt what you are about to do	ae06
60	no panic	ae06
61	least discomfort for pt	ae06
61	reassure & tell pt whilst x-raying them	ae06
62	make pt comfortable	ae06
64	gain pts confidence	ae06
65	minimise discomfort	ae06
66	with least disturbance to patient	ae06
68	care	ae06
69	patience	ae06
69	carefully/slowly	ae06
74	care needed	ae06
75	calm-assure even if unconscious	ae06
75	make comfortable	ae06
12	identify pt & reassure	ae08
13	ability to communicate	ae08
14	communication	ae08
17	speak to pt	ae08
18	talk to pt if poss ble	ae08
21	communicate	ae08
31	communicate with the pt	ae08
44	report back	ae08
62	reassurance	ae08
64	reassure	ae08
66	communicating with person as much as possible	ae08
66	reassurance	ae08
69	listen to what pt is saying	ae08
73	talk to pt if poss ble	ae08
75	keep communication going	ae08
3	prepare	ae16
4	? need help	ae16
4	get equipment ready	ae16
12	complete examination	ae16
15	decision making-what needs to be done	ae16
15	preparation	ae16
18	to ascertain problems	ae16
21	organization of equipment	ae16
25	take x-rays process/check	ae16
25	prepare trolley.room	ae16
34	examinations to be done	ae16
36	prepare room	ae16
37	removal of artefacts if possible	ae16
38	how many films needed	ae16
39	reassess > results	ae16
40	evaluate radiographs	ae16
41	how to achieve them	ae16
43	what films/projections to take	ae16
44	organization	ae16
44	equipment	ae16
45	decide on views that are possible	ae16
47	plan examination	ae16
49	gather together what will be needed	ae16
50	plan	ae16
51	plan of views required	ae16
55	equipment required	ae16
56	plan method of examination	ae16
57	decide on projections required	ae16
59	introduction ie radiographer going to x-ray	ae16
60	what films are required	ae16
61	decide what & how to do other films	ae16
61	collect material required	ae16
64	think quickly	ae16
67	determine the patient's needs	ae16

RESPONSE	COMMENT	CODE
67	planning of work to be undertaken & views	ae16
68	relevant views	ae16
71	which projections to undertake?	ae16
74	planning of technique	ae16
75	organize	ae16
75	what equipment?	ae16
4	do important injuries first	ae18
5	urgent	ae18
11	primary vs secondary views	ae18
14	visible bleeding/responses	ae18
19	cover vital areas first to rule out life threatening	ae18
21	identify critical/life threatening	ae18
30	basic views	ae18
33	find out most serious injuries	ae18
38	what can be done with, without help	ae18
44	prioritise	ae18
46	prioritise	ae18
53	deal with immediate needs problems	ae18
54	maximum info. first	ae18
58	prioritize	ae18
61	do initial views not requiring movement	ae18
66	easiest way to fulfill requirements	ae18
70	commence the most important views	ae18
73	prioritise	ae18
10	to check quality	ae19
22	diagnostic films-no repeats	ae19
29	get best possible views	ae19
35	films correct/high standard	ae19
42	good quality radiographs	ae19
46	get it right first time	ae19
47	need for accurate diagnosis	ae19
52	limit films to accurately demonstrate area of trauma	ae19
53	ensure has been carried out to best of your ability	ae19
61	best possible x-rays	ae19
63	accuracy	ae19
11	sorting a sequence	ae21
12	arrange which projections in which order	ae21
12	life threatening projections first	ae21
19	review & proceed to other areas	ae21
20	do all the AP work first	ae21
24	views that require movement of pt carried out towards	ae21
32	order of films	ae21
34	order of examinations	ae21
35	decide which area to radiograph first	ae21
35	do all AP's then turn & do all lats	ae21
36	if c-spine is requested do lat first	ae21
41	plan a sequence of films	ae21
45	be prepared to change as this progresses	ae21
51	best way/order of performing the examinations	ae21
57	start off with examining major injuries	ae21
58	procedure/order	ae21
60	undertake in a logical sequence	ae21
63	formulate order of examination	ae21
1	carry out examination	ae22
2	assertiveness	ae22
2	quick/speed	ae22
3	check pt details, injuries	ae22
3	recheck	ae22
3	perform examinations	ae22
5	complete quickly	ae22
6	carefully	ae22
6	confidently	ae22
6	quickly	ae22
7	short exp times	ae22
9	speed	ae22

RESPONSE	COMMENT	CODE
10	systematic approach	ae22
10	pt identification important	ae22
10	look after yourself.eg blood, wear gloves	ae22
11	dispatch	ae22
12	max info from minimum exposures	ae22
13	mobility of limbs etc	ae22
18	treat carefully-cautiously to avoid pain	ae22
19	without moving the subject	ae22
21	minimal movement	ae22
22	speedily	ae22
24	minimize movement of pt	ae22
26	use experience to produce diagnostic radiographs	ae22
28	but efficient	ae22
28	dont move pt	ae22
28	be quick	ae22
29	little movement of pt as possible	ae22
30	little movement of pt	ae22
31	don't move pt	ae22
35	don't move pt	ae22
35	be quick	ae22
37	minimal movement	ae22
40	skillfully	ae22
40	as quickly as possible	ae22
42	efficiency	ae22
42	minimum movement	ae22
42	speed	ae22
44	effic ency	ae22
44	professionalism	ae22
46	methodical approach	ae22
50	execute > evaluate	ae22
52	rad ation protect on if appl cable etc	ae22
52	don t move pt	ae22
53	systemat cally work	ae22
55	think logically & methodically	ae22
58	act with system/control	ae22
60	speed	ae22
63	safety equipment availab e	ae22
63	speed	ae22
65	speed	ae22
68	method of work	ae22
69	minimise movement	ae22
70	check/continue	ae22
74	efficiency	ae22
74	speed	ae22
75	start procedure	ae22

Appendix II

Initial diagrams produced after session with group 1 (diagnostic phase)

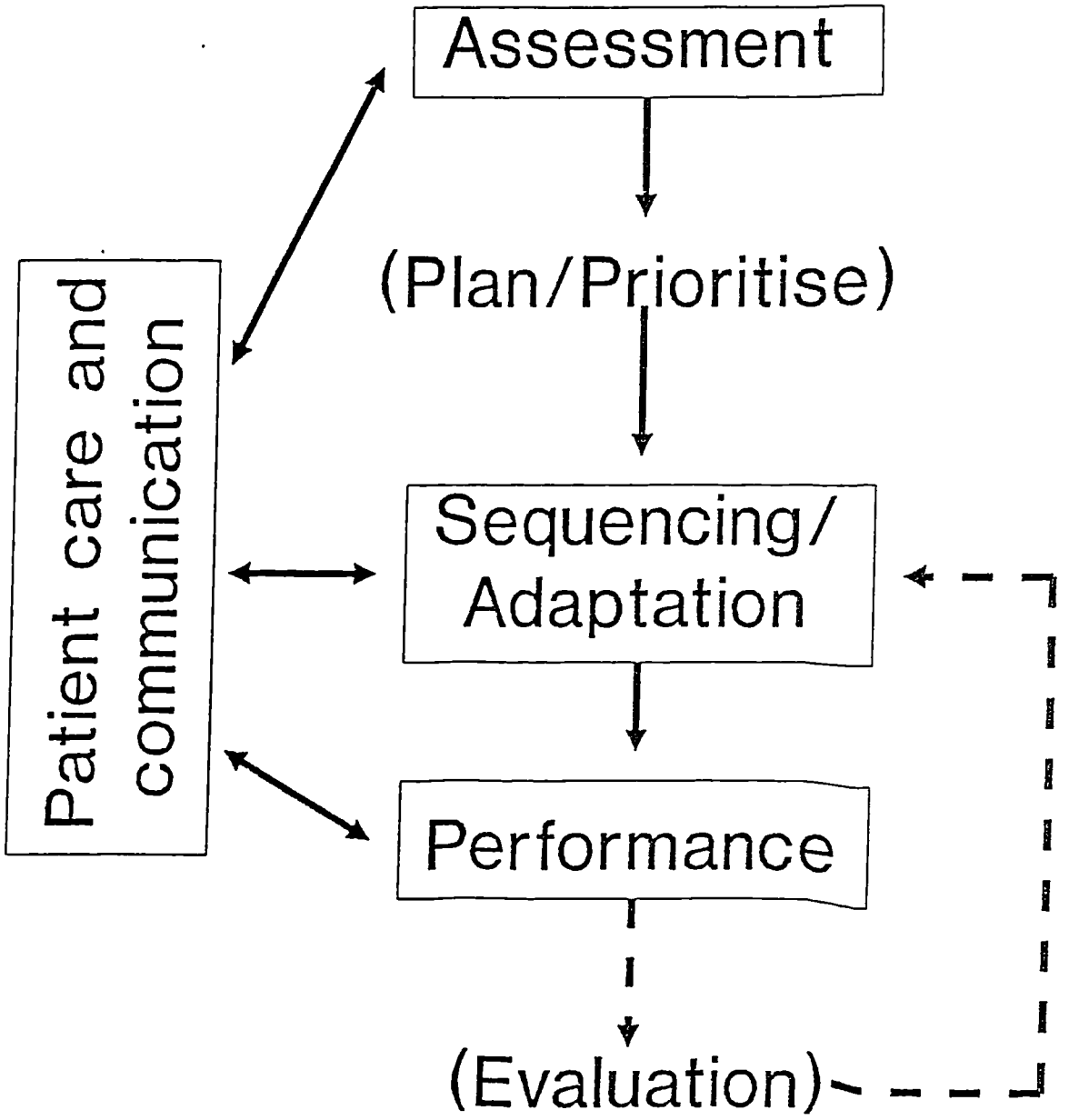
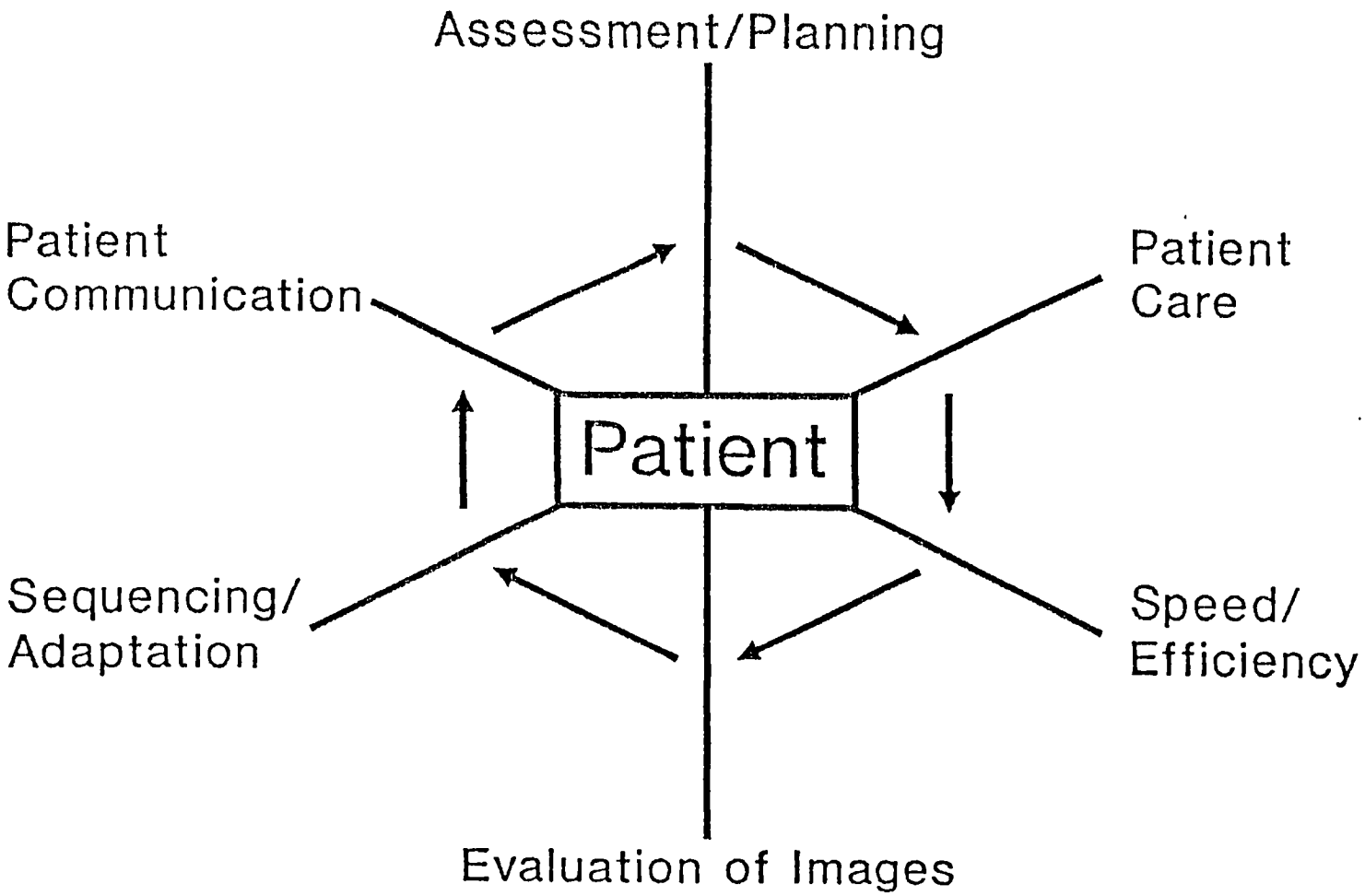


Figure - Alternative modification of linear model of the radiographic process (Following work with student groups)


Assessment/Planning
Patient Communication
Patient Care
Patient
Sequencing/ Adaptation
Speed/ Efficiency
Evaluation of Images

Appendix III

Database of responses from student groups (diagnostic phase)

ID	group	statement
1	sheff1	book pt in
2	sheff 1	minimum waiting time
3	sheff 1	identification
4	sheff 1	clinical history
5	sheff 1	assess situation
6	sheff 1	observations
7	sheff 1	level of consciousness
8	sheff1	select room
9	sheff 1	& acquire assistance
10	sheff 1	infection control (ie gloves, apron etc)
11	sheff 1	removal of clothes (ie zips ,chains etc)
12	sheff 1	assess condition
13	sheff 1	reassure pt
14	sheff1	injuries
15	sheff 1	no unnecessary movement
16	sheff 1	made to feel comfortable
17	sheff 1	immobilisation devices
18	sheff 1	& radiation protection
19	sheff 1	adaptation of technique for standard positioning
20	sheff 1	selection of exposure factors
21	sheff 1	Aftercare
22	sheff1	check film
23	sheff1	name, marker
24	sheff1	anatomical marker
25	sheff1	area of interest shown
26	sheff1	further projections
27	sheff1	pt made to feel comfortable
28	sheff1	& reassured while waiting
29	sheff1	minimum waiting time
30	sheff1	arrange for pt & films to go back to casualty
31	sheff2	help? Nurse?
32	sheff2	injuries-caution
33	sheff2	additional information
34	sheff2	clear, empathy
35	sheff2	gloves, clinically clean
36	sheff2	care of movement
37	sheff2	eg neck first
38	sheff2	skull unit
39	sheff2	pt identification
40	sheff2	assess the situation
41	sheff2	clinical history
42	sheff2	communications
43	sheff2	infection control
44	sheff2	handling
45	sheff2	adapting procedure to fit situation
46	sheff2	equipment
47	sheff3	request form & report
48	sheff3	organisation
49	sheff3	infection control
50	sheff3	communication
51	sheff3	technique
52	sheff3	monitor the pt
53	sheff3	aftercare of pt
54	salf1	pt;RTA; phone call
55	salf 1	preparation eg equipment, foam pads
56	salf1	request card-views, technique adaptation
57	salf1	assessment of pt eg check with casualty staff extent of injuries
58	salf1	consciousness; assess level of cooperation
59	salf1	patient care
60	salf1	reassurance; explanation to pt.
61	salf1	technique
62	salf1	work quickly, methodically, systematically; carefully
63	salf1	efficiently;professionally
64	salf1	try to move as little as possible in order to maximise pt care
65	salf1	post examination; clean room, cassetttes

code
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ID	group	statement
66	salf1	general tidying up
67	salf2	assess situation;assistance required?
68	salf2	doctor's request?
69	salf2	observe patient's condition
70	salf2	do not leave pt alone
71	salf2	communicate throughout
72	salf2	don't move pt
73	salf2	work quickly & efficiently
74	salf2	+ hygiene
75	salf2	work in logical manner
76	salf2	patient comfort
77	salf3	preparation;assistance;room
78	salf3	assess pt condition; vital signs
79	salf3	where do you start?
80	salf3	check request card
81	salf3	protect yourself & pt; gloves etc
82	salf3	adapt technique
83	salf3	work quickly & efficiently
84	salf3	DO NOT LEAVE PATIENT alone at any time
85	salf3	pt comfort & needs are met
86	salf4	read xray request card
87	salf4	assess pt
88	salf4	staff protection; hygiene & radiation
89	salf4	clean films
90	salf4	prioritise the work
91	salf4	resuscitation unit available
92	salf4	move pt (if necessary) onto the table
93	salf4	modify tech
94	salf4	teamwork (nurses, doctors ,radiographers)
95	salf4	communication with pt/relatives
96	salf4	logical sequence of projections
97	salf4	explain delays to other pts
98	salf4	communicate with other depts eg CT
99	salf4	maintain efficiency & speed throughout
100	salf5	assess pt
101	salf5	reassurance; empathy;explanation
102	salf5	level of communication-cooperation of pt
103	salf5	preparation; films;ffd;time;pads
104	salf5	artefacts
105	salf5	exposures-movement;ffd
106	salf5	plan examination technique
107	salf5	care of O2 strips blood/gloves
108	salf5	modify
109	salf5	categorise importance-> spine, skull, chest
110	salf5	develop films
111	salf5	explanation to pt
112	salf5	pt care-nurse
113	salf5	name films
114	salf5	assess results-further films
115	salf5	examination complete-pt to a&e
116	salf6	preparation
117	salf6	talk to pt
118	salf6	assess pt
119	salf6	help?
120	salf6	make pt as comfortable as poss.
121	salf6	explanation
122	salf6	adapt technique?
123	salf6	order of examinations?
124	salf6	observe pt condition at all times
125	salf6	during (talk to pt)
126	salf6	minimize distress
127	salf6	efficient examination
128	salf6	comfort if possible
129	salf6	don't leave pt unattended
130	salf6	after examination

code
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ID	group	statement
131	salf6	explain to pt what is going to happen next
132	salf6	make sure pt is as comfortable as possible
133	wrex1	request form
134	wrex1	Dr's signature
135	wrex1	appropriate projections
136	wrex1	clinical details
137	wrex1	?HIV
138	wrex1	emergency equipment
139	wrex1	preparation of room
140	wrex1	personal equipment/protection
141	wrex1	pt identification
142	wrex1	pregnancy check
143	wrex1	removal of artefacts
144	wrex1	quickly& carefully
145	wrex1	good technique
146	wrex1	priority of projections
147	wrex1	immobilisation lead protection
148	wrex1	dispatch pt with films
149	wrex1	efficiency
150	wrex1	room left tidy, clean & hygienic
151	wrex2	consciousness
152	wrex2	clinical history
153	wrex2	bleeding
154	wrex2	assess pt
155	wrex2	verbally/visually
156	wrex2	nursing staff
157	wrex2	mobility
158	wrex2	evaluate priorities
159	wrex2	take prioritised radiographs
160	wrex2	assess request form
161	wrex2	projections requested
162	wrex2	patient id.
163	wrex2	clinical history
164	wrex2	assess radiographs
165	wrex2	take further necessary projections
166	wrex2	return pt to A&E
167	wrex3	prepare the xray room
168	wrex3	emergency equipment/films/immobilisation protection
169	wrex3	send for pt-ensure room 'free'
170	wrex3	enter details on the computer
171	wrex3	pt arrives
172	wrex3	explain to pt
173	wrex3	check id & preparation
174	wrex3	protection to staff
175	wrex3	preparation procedure
176	wrex3	assess injuries
177	wrex3	clinical information from staff
178	wrex3	decide the order of examination
179	wrex3	xray essential injuries
180	wrex3	check films before moving
181	wrex3	xray less life threatening injuries
182	wrex3	check films
183	wrex3	assess for further injuries
184	wrex3	if serious...call medical staff to view films in xray dept
185	wrex3	pt escorted back to A&E together with trained staff & films
186	wrex3	tidy room
187	wrex4	trauma care; never move a pt without a doctor present
188	wrex4	give priority
189	wrex4	explain rpiority to waiting pts
190	wrex4	ensure room is available
191	wrex4	ensure room has all equipment that may be needed including emergency equipment & fil
192	wrex4	assess pt-movement/state of mind/& physical condition
193	wrex4	assist pt into room
194	wrex4	check pt id.
195	wrex4	is pt accompanied? Doctor or nurse?

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ID	group	statement
196	wrex4	pt preparation ie removal of clothes
197	wrex4	protection-staff-gloves/gowns/radiation
198	wrex4	patient protection-radiation/infection/movement
199	wrex4	assess order & importance of projections ie laterals first
200	wrex4	explanation to nurse, patient & doctor
201	wrex4	radiographs taken
202	wrex4	process after each exposure to minimise repeats/further projections
203	wrex4	show doctor films to minimise repeats
204	wrex4	further projections only if necessary
205	wrex4	ensure pt's comfort
206	wrex4	assist pt from room-ensure safe transit back to A&E

code
AE17
AE22
AE22
AE03
AE08
AE14
AE14
AE19
AE19
AE06
AE22

Appendix IV

Questionnaire 1-diagnostic phase

THE PROCESS OF TRAUMA RADIOGRAPHY

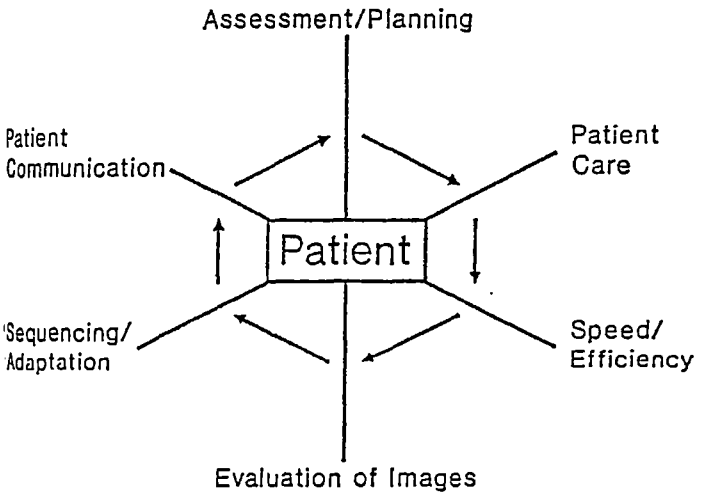
This research seeks to document the process by which staff carry out an examination on a patient with multiple injuries.
The following words have been suggested as part of the process. Please rate them by ticking ONE box for EACH word.

Word	Very Important	Relevant	Not Important at all
Organise			
Calm			
Communication			
Comfort			
Assess			
Sequence			
Prioritize			
Preparation			
Artefacts			
Explanation			
Speed			
Adaptation			
Skill			
Modify			
Cooperation			
Care			
Efficiency			
Quality			
Information			
Professionalism			
Capability			
Decisions			
Teamwork			
Methodical			
SELECT THE THREE MOST IMPORTANT FROM THE LIST AND WRITE THEM IN BOXES 1, 2, 3.	1.	2.	3.

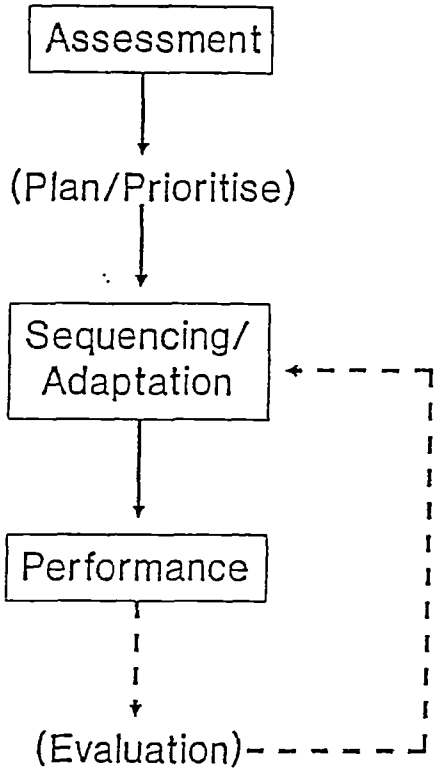
The following are two models of the process which have been suggested by radiographers. Please select the one which you feel gives the best representation of the process:

Model One		Model Two	

Model 1



Model 2



Can you draw an alternative (better) representation of the process?

Thank you for your cooperation. Please return the questionnaire to the box on the front bench.

Appendix V

Database of definitions of diagnostic radiography (theory development phase)

RESP	COMMENT	CODE
02	more technical equipment-many different areas eg CT	RAD01
03	relatively technical	RAD01
05	technical. Physics	RAD01
06	technology oriented job-	RAD01
07	radiography uses much more advanced & much more equipment than nurses etc would use	RAD01
08	risky	RAD04
11	not specified in dealing with the pt that much more on taking the x rays & sending the pt back to where they came fro	RAD01
12	technical	RAD01
12	more technical	RAD01
12	combination of technology & care	RAD01
13	more technical	RAD01
14	..the carrying out of radiological procedures both in & out of the dept	RAD01
16	more technical than nursing	RAD01
17	24 hr service of x-ray imaging	RAD01
17	working knowledge/use of various equipment	RAD01
18	...to fuse together highly technical skills...(all components) with those required for patient care	RAD01
22	high levels of technology combined with basic pt care	RAD01
22	technical & social skills	RAD01
23	decisions as to most appropriate orientation of equipment & subject..	RAD01
25	technology & patient care interlinked	RAD01
28	use x-rays to produce standardised images of body parts	RAD01
28	operate costliest machinery in HS	RAD01
30	the wide range of skills & knowledge required	RAD01
30	technical artistry necassary to produce good radiographs	RAD01
32	actually perform the technical part of the examination	RAD01
34	use of exposure factors/imaging methods to produce diagnostic image	RAD01
34	technical application of theory into practice	RAD01
34	interpretation of positioning to demonstrate body best	RAD01
37	safety parameters	RAD01
38	technical skills in imaging & instrumentation	RAD01
38	science of imaging & pattern recognition taught & assessed	RAD01
40	high technical input/high patient contact	RAD01
42	combines technological knowledge as well as the knowledge of a person in a caring profession	RAD01
42	have to have thorough understanding of equipment and of radiation protection laws	RAD01
44	involves technicalities not in most other professions	RAD01
46	..combine a high level of scientific knowledge with a high level of patient care skills	RAD01
46	our scientific knowledge is probably greater than nursing	RAD01
48	so as to be able to position patients & equipment	RAD01
49	it is the radiographers' duty to produce good images...also to practice patient care	RAD01
49	technicians as well as members of the caring profession	RAD01
52	technical side to radiography	RAD01
57	using machinery + people + radiation	RAD01

RESP	COMMENT	CODE
57	it's either right or wrong	RAD01
57	we're conditioned to be technicians rather than carers (mixed)	RAD01
62	it is a technical yet caring profession	RAD01
63	the use of technical equipment is used more than other areas of the health service	RAD01
02	more concerned with diagnosis than treatment	RAD02
03	enables patient's problems to be diagnosed (where relevant)	RAD02
04	radiation treatment	RAD04
04	a pictorial aid to diagnosis	RAD02
06	production of diagnostic images	RAD02
07	medical imaging to help diagnose diseases & abnormalities	RAD02
08	diagnosis	RAD02
09	taking x-ray images to help in diagnosis of any pathologies	RAD02
10	a diagnostic profession as opposed to a profession aimed at curing patients	RAD02
12	definite results	RAD02
12	diagnostic	RAD02
12	finding problems, not treating them	RAD02
13	diagnostic; technical	RAD02
16	diagnostic imaging	RAD02
19	able to produce an image from which a diagnosis may be made	RAD02
26	1st line diagnostic tool in trauma cases	RAD02
27	& manipulation to achieve diagnostic images	RAD02
29	production of diagnostic radiographs	RAD02
29	instant feedback on effectiveness eg film's acceptability	RAD02
32	provide the materials for diagnosis eg images	RAD02
34	implementation of x-rays-control of path/amount etc to get final diagnostic image	RAD02
36	formation & evaluation of images	RAD02
41	a health profession helping diagnose illnesses with use of x-rays	RAD02
42	they must be able to diagnose from the x-rays that they produce	RAD02
43	a health care profession that can discover illnesses & fractures of patients..	RAD02
45	produce the radiographs which enable the doctor to make a more accurate diagnosis	RAD02
47	the first step after casualty in finding out what's wrong with the patient	RAD02
48	to provide visual dagnostic evidence to other health care professionals of a patient's specific condition	RAD02
48	used to diagnose only	RAD02
53	solely based on the diagnosis of pts	RAD02
55	allows us to see if a pt is injured badly quickly, efficiently & without too much moving of the pt	RAD02
01	higher status	RAD03
03	study of internal anatomy	RAD03
04	nuclear medicine	RAD03
05	Different branches-CT, MRI ,RNI etc	RAD03
06	specialised health care profession	RAD03
06	unique because you're specialising in a particular health field	RAD03
08	better paid than nursing	RAD03

RESP	COMMENT	CODE
10	..using specialised equipment	RAD03
11	trained to work in imaging dept only + portables	RAD03
11	not qualified to work outside dept except on portables	RAD03
16	the study & practice of x-rays, u/s, MRI, RNI	RAD03
16	more specialised than general nursing	RAD03
23	selection of most appropriate projection to demonstrate a partic area or condition	RAD03
25	radiography has a wider knowledge of others than they do of us!	RAD03
28	speak a language understood by very few	RAD03
32	are able to do others jobs but others can't do ours	RAD03
37	only profession that are hospital centred employing radiation as a tool	RAD03
40	only profession to have clinical tutors	RAD03
43	..through many different techniques such as CT, U/S fluoroscopy etc	RAD03
47	no other medical profession is capable of producing images of the inside of the patient	RAD03
51	there are many different fields within radiography to branch into if qualified	RAD03
52	work by other professions can be seen more clearly ie a physio helping someone to walk again	RAD03
53	not totally different from physio, but totally different from nursing, porters	RAD03
62	one of the most important parts of the emergency team but never recognosed for this	RAD03
63	radiographers are qualified to use this equipment & no other member of hosp staff could or can..	RAD03
63	..whereas if it came to it a radiographer could nurse perhaps without too much preparation	RAD03
04	radiation exposures	RAD04
04	hazardous	RAD04
19	limit the radiation dose given to pt during a procedure	RAD04
20	controlling /administering diagnostic doses of radiation	RAD04
21	dispense ionising radiation ALARA while ensuring that pt's condition is not aggravated	RAD04
23	decisions regarding amount/quality of radiation administered to give a desired diagnostic result	RAD04
25	delivering high energy radiation to human beings	RAD04
30	the use of ionising radiation to diagnose	RAD04
33	using ionising radiation to image body parts	RAD04
35	medical use of radiation	RAD04
37	employs ionising radiation as a diagnostic service for skeletal & minor procedures	RAD04
40	involves ionising radiation	RAD04
55	..the only health care based profession which uses radiation to get an insight of what is going on inside the body	RAD04
58	...the only branch of the medical profession to deal directly with radiation gives radiography its uniqueness	RAD04
60	working with radiation	RAD04
61	working with radiation is unique as other health professionals do not 'manage' it on a day-to-day basis	RAD04
01	lots of different techniques	RAD05
02	variation-many different areas	RAD05
04	mobile	RAD05
04	available to any part of body on any patient (even coma victims)	RAD05
05	challenging, varying	RAD05
06	more variety/options available than in other health care fields	RAD05
09	interesting both work wise & to meeting people	RAD05

RESP	COMMENT	CODE
28	handle greater nos. of pts than any other hosp dept	RAD05
41	interesting, non-routine, can be mentally challenging	RAD05
42	radiographers have to have a whole range of abilities	RAD05
50	deals with a wide variety of different types of people on a daily basis	RAD05
50	you always have to adapt to people's needs and capabilities	RAD05
51	see a large number of different patients everyday	RAD05
54	contains several aspects of health care;technician; carer;diagnosing	RAD05
54	..into one area where other areas may have just one of these aspects	RAD05
60	wide range of procedures	RAD05
05	capable of putting pts at ease or making them into nervous wrecks	RAD06
05	patient centred?	RAD06
06	+ patient care job	RAD06
08	care	RAD06
09	whilst taking due care & attention to the patient	RAD06
09	feeling of helping somebody-even though the pt might not agree at that moment in time	RAD06
09	but this doesn't mean you care for them less whilst they are with you & in your dept.	RAD06
10	helping an ill person using the minimum amount of pain	RAD06
12	helping-patients & doctors	RAD06
12	caring? reassuring	RAD06
13	caring	RAD06
13	reassuring, calming worried pts	RAD06
13	communicating with pts on a different level	RAD06
14	& dealing with the pts when they are feeling vulnerable..	RAD06
14	..in the most holistic manner possible under the circumstances	RAD06
14	it is somewhat more difficult to give as much holistic care as nurses do..	RAD06
14	We have to compromise between giving good holistic care & carrying out the procedures efficiently & properly	RAD06
20	trained to deal with ALL the pt's requirements from entering to leaving the dept	RAD06
27	requires continuous & comprehensive but brief pt care	RAD06
31	scientific approach to patient care	RAD06
36	patient/technology interface	RAD06
36	models of processes carried out	RAD06
38	patient handling actually taught & assessed	RAD06
39	understanding of all aspects of examinations we perform-preparation-process-end product	RAD06
39	observation of pts' whole experience in imaging	RAD06
42	have to be sympathetic with pts yet produce diagnostic x-rays of high qulaity	RAD06
44	a career in the caring profession	RAD06
45	at the same time we are caring for the patient while they are in our department	RAD06
56	..although it is a caring profession..	RAD06
59	we integrate the caring (nursing) & scientific disciplines	RAD06
60	radiography is a caring profession	RAD06
60	dealing with a wide range of patients	RAD06
01	not much time to form a bond with patient	RAD07

RESP	COMMENT	CODE
02	brief relationship with patient-nursing/physio. often much longer	RAD07
03	radiographers are usually in a rush...nurses have much more time	RAD07
04	relatively short examinations (mostly)	RAD07
07	you deal with many more pts but only for a short period of time	RAD07
07	radiographers do not have the time to listen & reassure pts.	RAD07
09	spend less time with patient..	RAD07
14	you deal with a lot more pts for a shorter time (than nursing)	RAD07
14	..due to the length of time radiographers are in contact with the pt	RAD07
15	deal with the pt for a short period of time	RAD07
16	lack of time with patients	RAD07
44	patient -carer relationship is brief	RAD07
45	despite the fact that we spend less time with the patient...	RAD07
45	other professions spend more time with the patient	RAD07
47	there is a brief encounter with the patient	RAD07
48	very short time of patient contact relative to other professions	RAD07
50	it also deals with people for short periods of time	RAD07
50	you only have a short period of time whereas other professionals have longer periods of time with patients	RAD07
52	normally do not come into long term contact with the pt compared to ..eg nurses	RAD07
54	..in many cases limited time is spent with the patient, minimizing any carer/patient relationship	RAD07
55	...radiographers do not spend much time with their patient	RAD07
56	..the radiographer spends very little time, relatively, with each individual patienbt	RAD07
56	..whereas the radiographer only meets the patient on single isolated occasions	RAD07
59	we don't have a very long relationship with our patients-an x-ray only takes 5 minutes & then our pt is gone	RAD07
01	most of time unemotional	RAD08
03	no time to allow a patient bond to be built	RAD08
03	far less time to spend in contact with patient	RAD08
03	often the pts.are looked upon as 'a chest x-ray' or a KUB rather than a whole human being	RAD08
05	less caring?	RAD08
09	....cannot tell the pt any diagnosis, which is sometimes a good thing, but sometime ..bad	RAD08
11	not as caring as the nursing profession as no relationships formed	RAD08
12	not as involved with pts	RAD08
12	less caring involved?	RAD08
12	less direct contact with really ill folk	RAD08
13	not getting too involved with pts	RAD08
15	no time to form a relationship/emotional bond	RAD08
41	minimal bond forming with patients-don't get involved emotionally	RAD08
43	you don't get to see your patients a lot	RAD08
44	best suited to people who don't wish to get very involved with pts but at the same time wish to contribute to health c	RAD08
44	other professions have a deeper relationship with their patients	RAD08
46	we have a limited amount of feedback about the patients after they have left x-ray	RAD08
51	does not have intimate contact with any of the patients on an ongoing basis	RAD08
51	usually just x-rays the patient and may never see them again	RAD08

RESP	COMMENT	CODE
16	it's not so 'dirty' as nursing	RAD06
27	requires an ability to visualise in 3 dimensions the internal arrangement of a body in order to project an area of interest	RAD01
38	accredited courses in UK now at degree level	RAD10
39	produce precise 2-d images of 3-d body structures blind (radiologists screen for position!)	RAD01
48	it requires knowledge of anatomy & pathology	RAD03
49	it is a practical job	RAD06
51	requires skill to produce accurate images of the body under examination	RAD03

Appendix VI

Questionnaire 2 sent to radiographers working with trauma patients

Questionnaire

The Radiographic Process in Trauma

Your assistance in completing the questions below would be greatly appreciated.

Name (optional) .....

Department .....

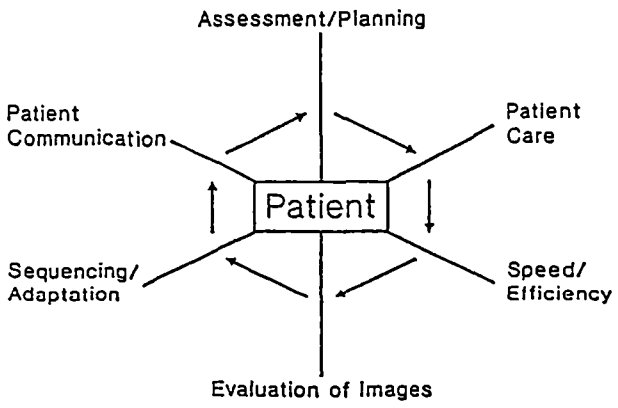
No. of years qualified .....

Grade .....

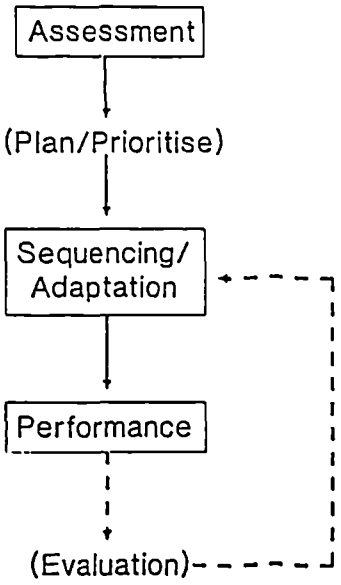
What are the skills that make a good A & E radiographer?

What do you understand by the term holistic?

Select the model below which you feel best typifies the way in which you would approach the radiography of a patient with multiple injuries (tick box).



Model 1 ☐



Model 2 ☐

Reference: Culmer P. (1995) "Chesney's Care of the Patient in Diagnostic Radiography" Pub. Blackwell Science Ltd.

From the models above, what are the skills used by a radiographer in:

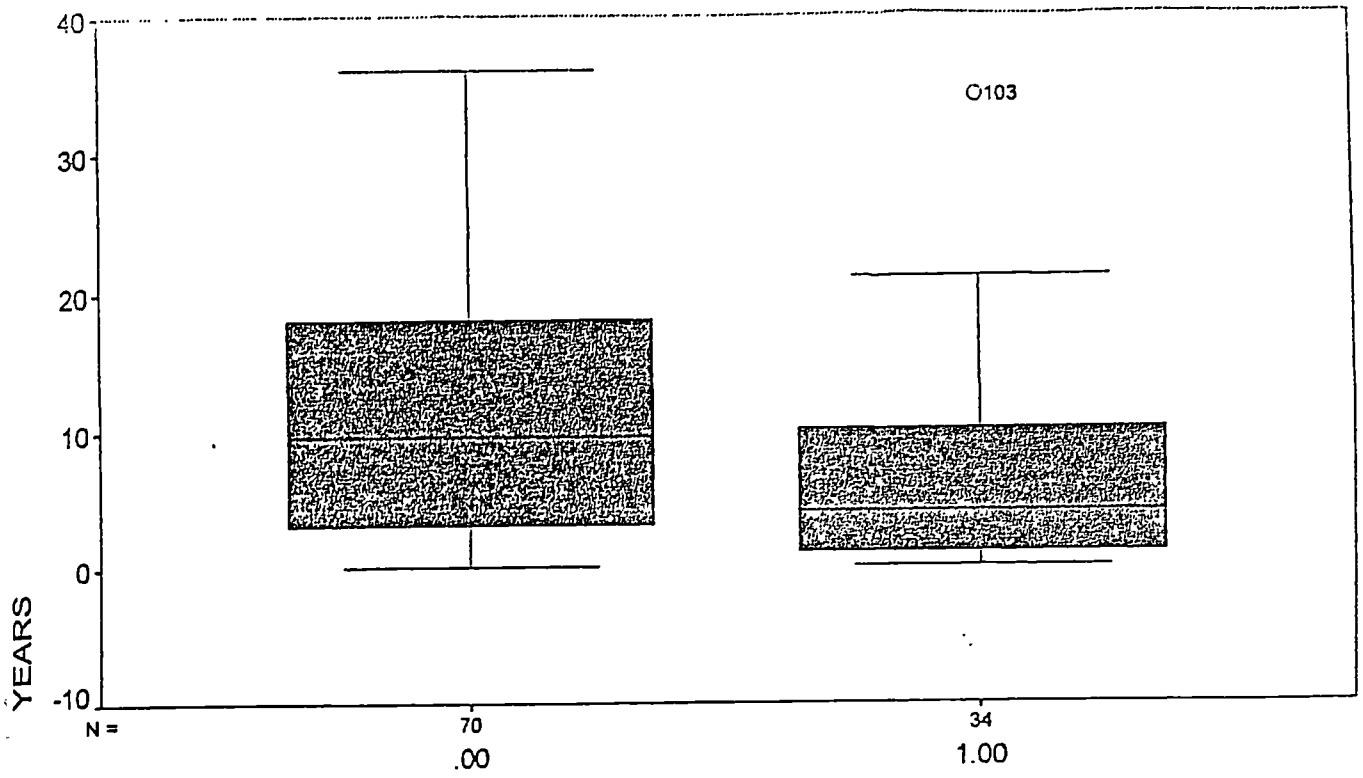
1) patient assessment;

2) evaluation?

Thank you very much for your cooperation.

Appendix VII

SPSS analysis of selection of models


40
30
20
10
0
-10
YEARS
O103
N =
70
34
.00
1.00
MOD.TWO

YEARS
By MOD.ONE .00

Valid cases: 40.0 Missing cases: .0 Percent missing: .0

Mean	6.4067	Std Err	1.1585	Min	.0000	Skewness	1.8628
Median	4.0000	Variance	53.6819	Max	34.0000	S E Skew	.3738
5% Trim	5.5908	Std Dev	7.3268	Range	34.0000	Kurtosis	4.1035
95% CI for Mean (4.0635, 8.7499)				IQR	8.9600	S E Kurt	.7326

Frequency	Stem &	Leaf
23.00	0 *	00000000111122223344444
6.00	0 .	556677
5.00	1 *	00023
3.00	1 .	558
2.00	2 *	01
1.00 Extremes		(34)

Stem width: 10.00
Each leaf: 1 case(s)

YEARS
By MOD.ONE 1.00

Valid cases: 64.0 Missing cases: .0 Percent missing: .0

Mean	11.9075	Std Err	1.2008	Min	.0000	Skewness	.5534
Median	11.0000	Variance	92.2766	Max	36.0000	S E Skew	.2993
5% Trim	11.4582	Std Dev	9.6061	Range	36.0000	Kurtosis	-.6509
95% CI for Mean (9.5080, 14.3070)				IQR	15.7500	S E Kurt	.5905

Frequency	Stem &	Leaf
21.00	0 *	000000001122222333344
9.00	0 .	555677889
8.00	1 *	01122244
12.00	1 .	556777778899
7.00	2 *	0001234
2.00	2 .	69
4.00	3 *	0000
1.00	3 .	6

Stem width: 10.00
Each leaf: 1 case(s)

Hi-Res Chart # 1:Boxplot of years by mod.one

YEARS
By MOD.TWO .00

Valid cases: 70.0 Missing cases: .0 Percent missing: .0

Mean	11.3440	Std Err	1.1232	Min	.0000	Skewness	.6785
Median	9.5000	Variance	88.3167	Max	36.0000	S E Skew	.2868
5% Trim	10.8408	Std Dev	9.3977	Range	36.0000	Kurtosis	-.4734
95% CI for Mean (9.1032, 13.5848)				IQR	15.0000	S E Kurt	.5663

Frequency	Stem &	Leaf
24.00	0 *	000000001122222233333444
11.00	0 .	55566777889
9.00	1 *	001122244
12.00	1 .	556777778899
7.00	2 *	0001234
2.00	2 .	69
4.00	3 *	0000
1.00	3 .	6

Stem width: 10.00
Each leaf: 1 case(s)

YEARS
By MOD.TWO 1.00

Valid cases: 34.0 Missing cases: .0 Percent missing: .0

Mean	6.5961	Std Err	1.3491	Min	.0000	Skewness	1.7247
Median	4.0000	Variance	61.8826	Max	34.0000	S E Skew	.4031
5% Trim	5.7375	Std Dev	7.8665	Range	34.0000	Kurtosis	3.2296
95% CI for Mean (3.8514, 9.3409)				IQR	9.5850	S E Kurt	.7879

Frequency	Stem &	Leaf
20.00	0 *	00000000111122234444
4.00	0 .	5567
4.00	1 *	0023
3.00	1 .	558
2.00	2 *	01
1.00 Extremes		(34)

Stem width: 10.00
Each leaf: 1 case(s)

Hi-Res Chart # 2:Boxplot of years by mod.two

Group Statistics

	model chosen	N	Mean	Std. Deviation	Std. Error Mean
YEARS	Model 1	64	11.9075	9.6061	1.2008
	Model 2	34	6.5961	7.8665	1.3491

Independent Samples Test

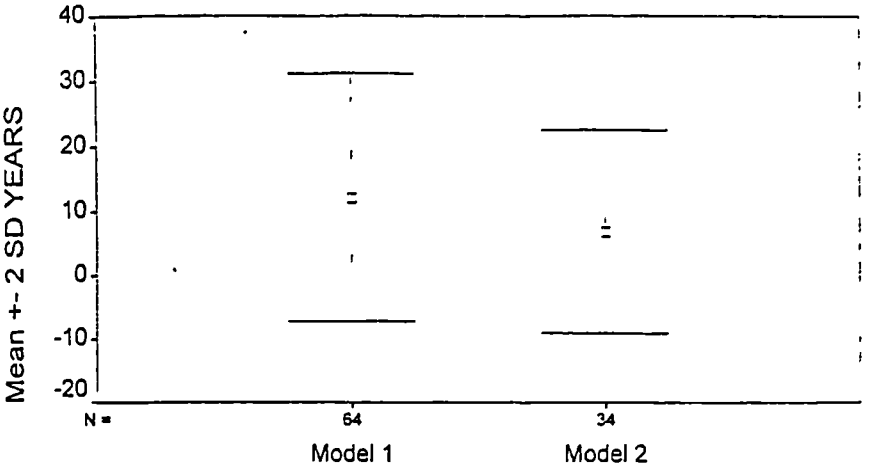
		Levene's Test for Equality of Variances	
		F	Sig.
YEARS	Equal variances assumed	4.158	.044
	Equal variances not assumed		

Independent Samples Test

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Mean	
							Lower	Upper
YEARS	Equal variances assumed	2.767	96	.007	5.3114	1.9197	1.5008	9.1220
	Equal variances not assumed	2.941	79.771	.004	5 3114	1.8061	1.7170	8.9057

Group Means of Years Post Qualification

By Choice of Model.



model chosen

Bars represent one standard deviation.

Appendix VIII

"What makes a good A&E (trauma) radiographer?" -database of responses

RESPONSE	COMMENT	CODE
1	good adaptive technique	ae01
2	being able to think on your feet	ae01
2	adapt tech	ae01
3	able to adapt tech to accomodate injuries	ae01
5	ability to adapt tech	ae01
7	adaptability	ae01
8	being able to adapt tech	ae01
9	experience dealing with exams that require tech adaptation	ae01
10	ability to adapt tech to situations	ae01
11	able to adapt to new situations	ae01
14	ability to adapt tech	ae01
15	ability to adapt	ae01
16	versatility	ae01
19	overall flexibility	ae01
20	adapting technique	ae01
22	need a flexible approach	ae01
22	sequential	ae01
24	being able to adapt technique skills to...varying situations	ae01
25	adaptation of tech to suit pt /injuries	ae01
27	adaptability	ae01
28	adaptability	ae01
29	flexibility/adaptable	ae01
30	able to adapt techs to coincide with condition of pt	ae01
31	adaptability is essential	ae01
32	abi ity to adapt techs styles	ae01
33	adaptability	ae01
34	adaptability	ae01
35	to modify techs	ae01
36	to adapt	ae01
37	..able to adapt techs to fit a situation	ae01
40	ability to adapt	ae01
41	able to adapt	ae01
42	adaptability	ae01
43	adaptation of radiographic tech	ae01
44	adapt techs	ae01
45	able to adapt	ae01
45	think quickly & adapt techs	ae01
46	versatile,easily adapting tech to suit pts	ae01
47	ability to adapt tech	ae01
48	to adapt tech to suit the condition	ae01
49	adaptability/versatility	ae01
50	ability to adapt techs	ae01
51	adapting tech	ae01
52	able to adapt techs	ae01
52	versatility	ae01
57	adaptability	ae01
59	adaptability	ae01
60	adaptability	ae01
61	good tech adaptation	ae01
62	ability to adapt tech to circumstance	ae01
63	adaptability	ae01
63	adaptability	ae01
64	improvisational ability	ae01
65	ability to adapt tech to suit injuries	ae01
66	adaptability	ae01
67	adaptability	ae01
68	adaptability	ae01
69	adaptable	ae01
70	versatile	ae01
70	adaptable	ae01
71	modify techs to accomodate injuries	ae01

RESPONSE	COMMENT	CODE
72	easily adaptable for different techs	ae01
73	adaptable	ae01
74	adaptability	ae01
77	adaptability	ae01
78	adaptability	ae01
79	adaptation of skills learnt	ae01
81	adaptability	ae01
82	flexible/adaptable	ae01
82	able to improvise	ae01
83	adaptability	ae01
86	can adapt tech	ae01
87	adapt techs to suit condition of pt	ae01
88	flexibility	ae01
88	improvisation	ae01
89	ab lity to ..adapt	ae01
89	to adapt to long shifts & unsocial hours	ae01
90	able to improvise tech	ae01
91	ability to improvise	ae01
92	ability to adapt tech	ae01
93	versatility	ae01
93	adaptability of tech	ae01
94	to adapt your tech	ae01
95	ability to adapt the tech	ae01
96	adapt tech to suit clinical situations	ae01
100	adapting tech	ae01
101	ability to adapt	ae01
102	ab lity to adapt tech	ae01
103	abi ty to adapt tech	ae01
104	to adapt tech	ae01
2	be ng able to assess each patient individually	ae03
3	good understanding of injuries & medical conditions	ae03
6	correct assessment of the technical needs	ae03
9	the ability to assess pt condition	ae03
25	good assessment	ae03
29	good all round radiographic knowledge	ae03
35	need to have understanding of what the doctor wants	ae03
36	the ab lity to assess	ae03
37	ability to assess a situation	ae03
39	know ATLS protocols	ae03
39	know resuscitation techs	ae03
40	good knowledge of radiography	ae03
41	knowledgeable in radiographic techs	ae03
42	traumatology knowledge	ae03
44	to assess the patient	ae03
47	good basic knowledge of technique/anatomy	ae03
48	understand the clinical question being asked	ae03
51	cooperation	ae03
62	knowledge	ae03
65	quick assessment of pts needs	ae03 23
66	cooperation	ae03
71	quickly evaluate the situation	ae03
74	clear understanding of exposure/equipment	ae03
80	good knowledge	ae03
87	awareness of the needs of the pts	ae03
87	in depth knowledge	ae03
87	understanding cross infection etc	ae03
87	understanding.....training	ae03
88	good knowledge of alternative techs	ae03
90	confidence in resuscitation procedures	ae03
95	continually assess needs of pt	ae03
95	good cooperation	ae03

RESPONSE	COMMENT	CODE
96	good pattern recognition	ae03
97	assessment	ae03
100	assessing pt condition	ae03
101	knowledge of different techs	ae03
102	to assess pt	ae03
104	ability to assess	ae03
1	patience	ae04
2	not easily harassed & worried	ae04
3	able to work under pressure & stress	ae04
5	patience	ae04
7	patience	ae04
8	be patient	ae04
11	patience	ae04
13	sobriety/politeness	ae04
14	calm under pressure	ae04
14	patience	ae04
16	patience	ae04
20	manage stress	ae04
21	ability to work under pressure	ae04
22	calm	ae04
24	extremely patient manner	ae04
24	not easily harrassed	ae04
25	no fussing!	ae04
27	patience	ae04
28	calm	ae04
30	pat'ence	ae04
31	able to work under pressure	ae04
32	to rema'n calm	ae04
33	calmness	ae04
35	ab lity to work under pressure	ae04
39	calmly	ae04
40	patience	ae04
41	able to work under pressure	ae04
42	calming approach to pt	ae04
44	to be calm	ae04
45	evel headed.Not likely to panic	ae04
51	pat ence	ae04
51	calm	ae04
52	pat ence	ae04
54	patience	ae04
55	patience	ae04
57	patience	ae04
59	patience	ae04
62	calm-can cope under stress	ae04
64	ability to work well under pressure	ae04
64	patience/sense of humour	ae04
66	patience	ae04
66	ability to work under pressure	ae04
66	sense of humour	ae04
67	patience	ae04
68	ability to work under pressure	ae04
68	patience/sense of humour	ae04
73	able to cope in stressful situations	ae04
74	patience	ae04
76	calm in a crisis	ae04
77	ability to remain calm	ae04
79	being able to work under pressure	ae04
80	patience	ae04
80	ability to remain calm in stressful situations	ae04
82	able to cope under pressure	ae04
83	patience	ae04

RESPONSE	COMMENT	CODE
84	ability to stay calm in a crisis	ae04
84	patience/sense of humour	ae04
86	can work under pressure	ae04
87	calmness	ae04
89	ability to work ..under pressure	ae04
89	patience	ae04
90	calm approach to pts in pain	ae04
93	patience	ae04
94	a calm..mind	ae04
94	sense of humour	ae04
95	cope well under stress	ae04
95	calm	ae04
98	calm	ae04
98	sense of humour	ae04
98	practical/level headed	ae04 22
99	works calmly	ae04
101	patience	ae04
102	patience	ae04
4	pt care	ae06
5	empathy	ae06
6	psychosocial needs of the patient	ae06
8	empathy	ae06
12	nursing skills	ae06
12	patient care	ae06
17	caring	ae06
19	excellent patient care	ae06
21	be able to show care & consideration to patients	ae06
22	responsive to individual requirements	ae06
25	patient care	ae06
30	total patient care s adhered to	ae06
31	maintaining the care of the patient	ae06
36	without compromising patient care	ae06
38	with min amount of trauma to the pt	ae06
40	care	ae06
40	compassion	ae06
44	good patient care	ae06
45	sympathetic to pt conditions & feelings	ae06
46	to min mise pt discomfort	ae06
50	empathy	ae06
51	reassuring	ae06
51	sympathy	ae06
52	sympathy	ae06
54	care	ae06
55	good patient care	ae06
56	empathy	ae06
56	tolerance	ae22
60	approachable	ae06
61	sympathy/empathy	ae06
64	empathy	ae06
65	to put them at their ease in difficult/distressing situations	ae06
67	care	ae06
75	patient care	ae06
76	enthusiastic	ae06
80	empathy	ae06
83	considerate	ae06
86	good pt care	ae06
93	understanding	ae06
94	sympathetic to others needs & feelings	ae06
95	caring attitude	ae06
97	put them at ease	ae06
99	kind and caring	ae06

RESPONSE	COMMENT	CODE
101	care & understanding	ae06
102	care of the patient	ae06
1	good communicator	ae08
1	ability to deal with anxious/aggressive patients	ae08
3	good communication skills	ae08
3	assertive but not aggressive	ae08
4	communication	ae08
5	good communication skills	ae08
7	good communication	ae08
8	to communicate	ae08
8	deal with many people	ae08
9	ability to communicate well	ae08
10	ability to communicate well with patients & staff	ae08
11	assertiveness	ae08
12	communication	ae08
13	communication skills	ae08
13	re ating to drunken patients	ae08
17	good communicator	ae08
17	being able to liaise with other depts	ae08
18	good communicator	ae08
19	communication skills	ae08
20	communication	ae08
22	good communicator	ae08
23	to have good communication skills with both staff & patients	ae08
24	.deal with drunk, rude patients in a professional manner	ae08
25	assertion	ae08
26	communication (verbal nonverbal) skills	ae08
28	assured approach	ae08
29	good interpersonal sk lls with patients etc	ae08
30	being able to communicate	ae08
30	communication to put pts at their ease	ae08
32	abil ty to communicate	ae08
33	communication	ae08
34	good communication skills	ae08
34	ao lity to deal with awkward patients	ae08
37	good patient communicat on skills	ae08
38	good communication	ae08
39	good nterpersonal skills	ae08
41	communication	ae08
42	good communicative approach	ae08
43	d'plomatic conversation	ae08
44	lia'se with doctors/nurses	ae08
44	give instructions clearly & concisely	ae08
45	good communicator with ..staff & pts	ae08
46	to liaise with other members of staff	ae08
48	to communicate well	ae08
50	good communication skills	ae08
51	communication skills	ae08
52	good communication skills	ae08
52	being able to take charge of a situation	ae08
53	good communication	ae08
54	communication skills	ae08
55	communicating skills	ae08
55	counselling	ae08
58	communication skills	ae08
58	dealing with different disciplines of staff	ae08
59	communication skills	ae08
63	good communication skills	ae08
64	ability to communicate	ae08
64	ability to provide input when asked about radiology of films	ae08
65	ability to get on with people	ae08

RESPONSE	COMMENT	CODE
66	communication with other staff	ae08
67	good communication skills	ae08
68	good communicative skill	ae08
71	good communication skills	ae08
72	good communication	ae08
75	communication skills	ae08
76	good communication skills	ae08
77	good communication skills	ae08
78	liaise	ae08
79	communication	ae08
80	communication skills	ae08
81	communication	ae08
81	liaison	ae08
83	good communication skills	ae08
84	communicating effectively with all levels of staff	ae08
87	communication skills	ae08
89	good communicator	ae08
92	tactful with difficult pts	ae08
95	communication with all staff	ae08
96	good communication skills	ae08
97	able to communicate well	ae08
98	good rapport	ae08
101	communication skills good	ae08
102	good communication	ae08
103	good communication skills	ae08
104	good communication skills	ae08
5	confidence (mobile work-able to say if extremities necessary)	ae10
8	to think quickly	ae10
20	manage work oad	ae10
25	planning skills	ae10
26	planning skills	ae10
35	need to think laterally	ae10
44	choosing the easiest way to x-ray the patient	ae10
45	think quickly	ae10
46	to make decisions quickly & safely	ae10
48	interpret the images produced	ae10
51	selecting exposure factors	ae10
53	autocratic-decisive	ae10
68	resourcefulness	ae10
70	quick thinking	ae10
71	ability to make decisions	ae10
73	quick thinking	ae10
80	problem solving/decision making skills	ae10
84	nt ative	ae10
85	init at ve to do correct views even if not as requested	ae10
87	being able to think	ae10
88	ability to implement & consider inv square law	ae10
92	quick thinking -to make immediate decisions	ae10
93	determination	ae10
95	evaluating films	ae10
99	evaluate the work	ae10
102	evaluation of films	ae10
104	ability to evaluate films	ae10
1	efficient	ae11
5	ability to work under pressure	ae04
6	ability to work under pressure	ae04
8	wk under stress/pressure	ae04
9	the ability to work efficiently	ae11
10	ability to work under pressure	ae04
12	efficiency	ae11
17	work with precision	ae11

RESPONSE	COMMENT	CODE
18	efficient	ae11
19	efficiency	ae11
20	efficiency	ae11
23	efficiently under pressure	ae11
25	efficiency	ae11
27	efficiency	ae11
30	efficiency	ae11
32	efficiency	ae11
38	efficiently	ae11
44	efficient	ae11
45	efficient	ae11
47	to work efficiently	ae11
49	efficiency	ae11
50	efficiency	ae11
51	efficiency	ae11
53	efficiency	ae11
54	efficiency	ae11
55	efficiency in stressful situations	ae11
58	efficiency in dealing with pts	ae11
60	efficiency	ae11
68	efficiency	ae11
69	efficient	ae11
71	efficiently	ae11
75	efficiency	ae11
83	efficient	ae11
84	efficiency	ae11
89	efficient	ae11
92	& efficiently	ae11
94	efficiently	ae11
96	efficiency	ae11
99	efficiently	ae11
100	efficient	ae11
101	efficient	ae11
102	efficiency	ae11
103	efficiency	ae11
104	efficiently	ae11
16	organizational ability	ae16
17	organized	ae16
22	organized	ae16
25	organizational skills	ae16
26	organizational skills	ae16
39	able to direct other members	ae16
41	organization	ae16
47	preparation	ae16
49	planning	ae16
51	good organization	ae16
52	good organizational skills	ae16
54	good organizational skills	ae16
56	organization	ae16
57	well organized	ae16
76	time management skills	ae16
78	organize	ae16
80	time management/planning skills	ae16
83	able to organize oneself	ae16
87	plan on the move	ae16
87	planning	ae16
96	ability to plan approach	ae16
99	able to plan	ae16
104	plan	ae16
8	time management	ae16
9	the ability to prioritise wkload	ae18

RESPONSE	COMMENT	CODE
38	the ability to prioritise work	ae18
42	prioritisation skills	ae18
43	prioritizing of patients	ae18
45	able to prioritize	ae18
46	prioritising pts	ae18
69	being able to prioritize	ae18
72	prioritize work	ae18
74	good prioritizer	ae18
78	prioritise	ae18
87	prioritising	ae18
104	priorities	ae18
1	good technical ability	ae22
5	good radiographic tech	ae22
6	technical competence	ae22
7	technical ability	ae22
12	radiographic skills	ae22
13	reading illegible writing	ae22
13	hauling heavy weights	ae22
16	consistency with uncooperative & immobile patients	ae22
18	good technique	ae22
19	lots of patients	ae22
19	stamina	ae22
19	good technique	ae22
22	experienced	ae22
23	ability to work well	ae22
26	technical skills	ae22
28	reliability	ae22
28	inventiveness	ae22
30	to produce good diagnostic images	ae22
30	in no matter what situation	ae22
31	to work under any condition one is faced with	ae22
32	in control	ae22
34	confidence	ae22
38	practical skills	ae22
39	accurate administration	ae22
39	high level of technical ability	ae22
40	accurate	ae22
42	familiarity with equipment	ae22
42	confidence	ae22
46	not to worsen the injury	ae22
47	nothing can better experience	ae22
48	the confidence to report findings	ae22
49	common sense	ae22
50	confident	ae22
51	good radiographic skills	ae22
53	strong stomach	ae22
54	experience	ae22
55	aiming for perfection	ae22
55	experience	ae22
56	accuracy	ae22
57	fitness	ae22
57	stamina	ae22
57	experience	ae22
58	high standards	ae22
58	experience	ae22
59	good health & stamina	ae22
59	tolerance	ae22
59	experience	ae22
61	accurate radiography	ae22
61	assertiveness	ae22
62	physically fit	ae22

RESPONSE	COMMENT	CODE
65	ability to produce good quality films	ae22
66	ability to cope	ae22
66	good all round radiographic skills	ae22
67	impartiality for conflicts	ae22
67	experience	ae22
68	practical	ae22
68	tact/sound common sense	ae22
68	open minded	ae22
70	energetic	ae22
71	confidently	ae22
71	ability not to worsen the pts injury	ae22
73	energetic	ae22
74	good radiographic tech	ae22
75	accuracy	ae22
76	high standards	ae22
76	well motivated	ae22
76	experience	ae22
76	good radiographic tech	ae22
77	accuracy	ae22
79	confidence to work as an individual	ae22
80	confidence	ae22
80	physical stamina	ae22
80	assertiveness	ae22
81	technical ability	ae22
83	accurate	ae22
84	experience	ae22
85	accuracy	ae22
86	can work by yourse f	ae22
86	good tech	ae22
87	accuracy	ae22
87	confidence	ae22
87	using skills effectively	ae22
88	experience	ae22
89	good tempered	ae22
90	basic self defence against aggressive pts	ae22
91	unlimited stamina	ae22
91	master of make-shift	ae22
92	good quality radiographs	ae22
93	professionalism	ae22
93	experience	ae22
94	confidence in your ability	ae22
94	logical	ae22
95	accuracy	ae22
95	confidence	ae22
95	experience	ae22
96	consistent standard of image quality	ae22
97	accurate	ae22
100	accurate	ae22
101	experience	ae22
103	accuracy	ae22
1	speedy working practice	ae23
4	speed	ae23
12	speed	ae23
16	speed under pressure	ae23
18	speed	ae23
19	speed	ae23
20	speed	ae23
25	speed	ae23
27	speed	ae23
28	speed	ae23
29	speed	ae23

RESPONSE	COMMENT	CODE
30	..to work with speed	ae23
32	speed	ae23
34	speed	ae23
35	ability to work quickly	ae23
38	deal with situations quickly	ae23
39	able to act & react quickly	ae23
40	to be quick	ae23
44	quickly	ae23
45	ability to be fast	ae23
49	speed	ae23
50	speed	ae23
52	speed	ae23
54	speed	ae23
56	speed	ae23
57	speed	ae23
61	quick	ae23
65	fairly quickly	ae23
68	speedy worker	ae23
71	be able to work quickly	ae23
72	quick	ae23
74	speed	ae23
75	speed	ae23
77	speed	ae23
78	speed	ae23
83	speedy	ae23
85	speed	ae23
87	speed	ae23
88	speed	ae23
92	produced quickly	ae23
94	to work quickly	ae23
95	speed	ae23
96	speed	ae23
97	speedy	ae23
100	fast	ae23
103	speed	ae23
104	to work speedily	ae23
4	teamwork	ae24
7	work part of a team	ae24
9	with staff in a team	ae24
17	good teamwork	ae24
21	ability to work as a team	ae24
23	to be able to work effectively as part of a team	ae24
25	team coordination	ae24
33	teamwork	ae24
39	..members of the team	ae24
47	relationship with a/e team	ae24
51	willingness to be part of a team	ae24
55	teamwork	ae24
56	teamwork	ae24
57	teamwork	ae24
58	teamwork	ae24
59	team spirit	ae24
64	as part of a multidisciplinary team	ae24
70	to be able to work as a team member	ae24
75	good teamwork	ae24
79	work as part of a team	ae24
83	work as a team member	ae24
84	work as a member of a team	ae24
86	as part of a team	ae24
87	awareness..of roles of other staff	ae24
87	group dynamics with ability to work in ..teams	ae24

RESPONSE	COMMENT	CODE
89	ability to work within a team	ae24
94	able to work as part of a team	ae24
96	team effort	ae24

Appendix IX

The skills of patient assessment- database of responses

RESPON	COMMENT	CODE
34	clinical knowledge	ass10a
39	clinical knowledge	ass10a
80	reference to knowledge base .	ass10a
85	gather information from pt & staff	ass10a
87	prior knowledge	ass10a
87	gleaning information from the pt's a/e notes	ass10a
93	intake of information provided	ass10a
94	knowledge of terminology of the trauma assessment form	ass10a
95	knowledge of terminology	ass10a
100	previous knowledge	ass10a
1	knowledge of pathology to assess capability of movement for various project	ass10b
22	knowledge of pt's condition & their ability to help you	ass10b
29	anatomy/physiology	ass10b
40	knowledge of anatomy; which areas life threatening	ass10b
78	understanding the nature of pt's condition	ass10b
10	experience is the most important	ass02a
18	experience in same situation	ass02a
20	speed	ass02a
33	experience	ass02a
38	previous experience of the clinical situation	ass02a
52	speed	ass02a
53	experience	ass02a
56	experience	ass02a
57	experience + +	ass02a
59	experience	ass02a
63	experience	ass02a
64	experience	ass02a
67	experience	ass02a
73	experience	ass02a
75	speed efficiency	ass02a
80	assertiveness confidence	ass02a
87	understanding the extent & implications of an injury	ass02a
93	using past experience to assess severity of condition	ass02a
94	experience	ass02a
96	speed efficiency	ass02a
96	experience of pt's condition which dictates how you approach the examinatio	ass02a
100	experience	ass02a
103	speed efficiency	ass02a
1	relying on experience in a e radiography	ass02b
32	experience & common sense	ass02b
41	experience	ass02b
54	experience	ass02b
71	experience	ass02b
77	speed & efficiency	ass02b
79	experience is main skill	ass02b
83	speed	ass02b
83	recognition of pt's condition/safety/mobility	ass02b
99	speed efficiency	ass02b
35	communication	ass03
36	communication	ass03
50	pt communication	ass03
92	communication with trauma team leader/other staff	ass03
5	communication-talk to pt; will show level of consciousness	ass03a
8	communication	ass03a
20	patient communication	ass03a
23	communication with medical staff & pt	ass03a
24	communication skills-verbal & physical	ass03a
26	communication skills-verbal/non-verbal	ass03a
27	communication-pt/staff	ass03a
28	communication with pt/doctor	ass03a
33	communication-staff/pt	ass03a
34	communication skills	ass03a
37	pt communication	ass03a
38	communication with pt/staff	ass03a
39	pt communication to aid efficiency	ass03a

RESPON	COMMENT	CODE
49	communication	ass03a
51	communication/discussion with pt, guardian or MO	ass03a
52	communication	ass03a
53	communication	ass03a
55	communication	ass03a
55	pt's experience	ass03a
56	communication	ass03a
58	communication	ass03a
59	communication;listening	ass03a
64	communication with pt	ass03a
66	communication	ass03a
67	communication	ass03a
68	pt communication	ass03a
75	communication at all times	ass03a
75	written assessment from pt history & clinical details	ass03a
76	communication with pt/staff	ass03a
80	communication	ass03a
82	pt 's assessed by trauma team leader who gives radiography directions as to	ass03a
85	communication is important	ass03a
87	communication	ass03a
89	communication	ass03a
90	orders are followed from the trauma team leader	ass03a
91	governed by the trauma team leader	ass03a
95	communicat on with doctor nurse pt	ass03a
96	good communication skills to put pt at ease	ass03a
101	pt communication	ass03a
103	commun cation	ass03a
9	commun cation skills	ass03b
12	commun cation	ass03b
12	ta king to nurse/other relatives	ass03b
12	reading deta ls on card	ass03b
15	communicat on	ass03b
19	commun cat on	ass03b
25	pt communication	ass03b
25	direct ons from medical nursing staff	ass03b
29	communications with pts staff	ass03b
44	communication with the pt & other medical staff	ass03b
62	communication with pt/hospital personnel	ass03b
70	pt communication	ass03b
71	communication pt/doctors etc	ass03b
71	written history	ass03b
72	pt communication	ass03b
74	what language does the pt speak?	ass03b
77	communication	ass03b
78	communication	ass03b
81	communication	ass03b
83	working as ateam with pts staff	ass03b
98	communication/liaison	ass03b
102	pt communication	ass03b
104	communications skills	ass03b
35	observation	ass04
36	observation	ass04
47	visual assessment	ass04
5	observe outward signs	ass04a
8	observation	ass04a
10	observation	ass04a
20	visual skills	ass04a
23	visual assessment of pt's ability to cooperate	ass04a
26	observation skills	ass04a
27	visual	ass04a
28	visual assessment	ass04a
49	observation	ass04a
51	observation	ass04a
55	observation	ass04a
58	observation skills	ass04a

RESPON	COMMENT	CODE
59	observation;looking	ass04a
75	visual	ass04a
85	have a good look before you start . .	ass04a
87	observation	ass04a
93	visual appraisal of pt's condition	ass04a
93	noticing the pt's demeanour, nervousness etc	ass04a
95	observation of the pt	ass04a
9	observational skills	ass04b
12	observation	ass04b
21	initial observation of pt trolley/chair etc	ass04b
25	observation	ass04b
44	observing the pt & situation	ass04b
71	visual	ass04b
72	visual assessment	ass04b
74	what type of pt	ass04b
79	observation of pt	ass04b
98	observation	ass04b
50	plan priorities	ass08
8	planning	ass08a
18	common sense awareness forward thinking	ass08a
26	plann'ng ski ls	ass08a
37	p arn: ng assessment	ass08a
39	planned v ew	ass08a
66	plann ng	ass08a
76	plann ng sk l s	ass08a
80	plann ng	ass08a
89	p ann ng	ass08a
17	speed of thought	ass08b
21	p an pr orit se	ass08b
70	p ann ng	ass08b
81	p anning sequence & prior ty of x-rays	ass08b
102	p ann ng	ass08b
104	ab ' ty to p an pr or t'se	ass08b
47	prior tisation of rad'ographs with respect to condition	ass08
47	hands on assessment-are standard views feasible?	ass08
92	adaptat on of tech	ass10
7	ab ty to cooperate	ass08a
7	degree & prior ty of injur es	ass08a
10	deduct on	ass08a
23	dec's on of what to x-ray first	ass08a
26	preparat on & organizational ski ls	ass08a
30	pr'or t se f lms to a low assessment of condition	ass08a
31	to be able to make a decision as to what is required radiographically	ass08a
39	direct on of trauma team	ass08a
45	ability of pt to move/cooperate	ass08a
45	what is the main problem? How bad?What order to do the films in	ass08a
46	knowing/judging the pt's capabilities & how much you should ask them to d	ass08a
48	to confirm the amount of cooperation available from the pt	ass08a
48	assessment of the size of the pt	ass04a
65	what are obvious 'njuries?Can pt move? Able to cooperate?	ass08a
73	adapting/evaluating	ass08a
75	images evaluated with ref. to pt's condition	ass08a
80	dec'sion making	ass08a
84	the ability to prioritise views required,adapting techs	ass08a
86	deciding on tech to be used	ass08a
94	dealing with more serious conditions	ass08a
96	prioritising your work	ass08a
100	adapting tech	ass10a
101	sequencing/adaptation	ass08a
9	deductive skills	ass08b
11	ability to cooperate	ass08b
11	extent of injuries	ass08b
17	prioritising injuries quickly	ass08b
19	common sense	ass08b
41	level-headed;conscientious; thoughtful	ass08b

RESPON	COMMENT	CODE
43	prioritize the order in which radiographs are to be taken	ass08b
74	problems/adaptation	ass08b
79	which area would you x-ray 1st? Can you move pt?	ass08b
99	to assess which injuries are more lifethreatening	ass08b
102	adaptation/prioritise	ass08b
6	psychosocial care	ass09a
10	ability to empathise with the pt	ass09a
42	friendliness;approachable;affability	ass09a
42	intuitive skills	ass09a
58	empathy	ass09a
66	pt care	ass09a
68	pt care	ass09a
73	sympathy/pt care	ass09a
76	calmness	ass09a
89	pt care	ass09a
94	reassurance of the pt while assessing	ass09a
101	pt care	ass09a
103	pt care	ass09a
13	telepathy	ass09b
14	sympathetic.firm	ass09b
40	if pt needs reassurance radiographer can assist	ass09b
50	pt care	ass09b
72	pt care	ass09b
77	good pt care	ass09b
79	's the pt aware of condition .what is happening to thwem?	ass09b
83	essen pt's pain & discomfort	ass09b
35	adaptation	ass10
36	adaptation modification	ass10
47	whether pt needs supervision from nurse	ass10
50	sequence adaptation	ass08
6	technical needs-technique exposure factors	ass10a
24	assessment of pt's needs	ass10a
30	assessing position/condition of pt rel to type of injuries & views needed	ass10a
33	clinical skill	ass10a
39	adaptation of tech	ass10a
48	understand the degree of trauma suffered so that the pt may be moved	ass10a
52	sequencing adaptation	ass08a
52	severity & type of injuries	ass10a
55	equipment efficiency	ass10a
56	adaptability	ass10a
60	?correct views requested	ass10a
68	evaluation of images	ass10a
76	technique	ass10a
86	assessing pt's condition/injuries	ass10a
16	whether to attempt conventional views or improvise, getting the best views	ass10b
19	excellent tech including adaptation	ass10b
22	need to know how to adapt techs according to pt's ability	ass10b
54	technical/radiographic skills	ass10b
70	adaptation	ass10b
74	what type of injury; room.equip. needed	ass10b
74	if a woman-LMP	ass10b
83	radiation protection	ass10b

Appendix X

The concept of evaluation- database responses

RESPON	COMMENT	CODE
22	need to recognize anatomy, pathology,artefacts etc	ass13
25	pathology shown -need for extra views/knowledge of anatomy	ass01
29	knowledge-anatomy/physiology/radiographic	ass01
34	knowledge-radiographic/clinical/pathological	ass01
40	awareness of history/diagnosis	ass01
42	anatomical training	ass01
47	knowledge of how the radiographs will be used/interpreted	ass01
51	knowledge of anatomy & rad practice in relation to info required by MO	ass01
59	identification of abnormalities	ass13
74	determine area included ie good knowledge of anatomy	ass01
78	knowledge of what you hope to achieve & of radiography	ass01
80	knowledge	ass01
85	find out what caused the injury-may have bearing on projections	ass01
87	knowledge/circumstances pt's condition	ass01
89	knowledge	ass01
98	knowledge of clinical evidence & management of trauma pts	ass01
10	experience	ass02
15	common sense	ass02
17	experience	ass02
17	common sense	ass02
18	common sense	ass02
38	experience	ass02
41	experience	ass02
54	experience	ass02
57	experience + +	ass02
59	exper ence	ass02
63	experience	ass02
66	experience effic ency	ass02
67	exper ence	ass02
76	experience	ass02
78	exper ence	ass02
80	assertiveness	ass02
89	exper ence	ass02
96	exper ence	ass03
5	taking note of what pt saying condition of pt	ass03
18	association	ass03
28	commun cation with pt doctor	ass03
33	communication with clin cians	ass03
38	communication with pt/other a/e staff	ass03
44	lia sing with medical staff	ass03
67	commun cation	ass03
68	pt communication	ass03
70	communication	ass03
80	communication	ass03
93	pt communication	ass03
95	good communication with a e staff	ass03
102	pt communication	ass13
49	observation	ass13
55	observation	ass13
55	noting pathology	ass05
9	subjective analysis	ass05
10	calm, careful approach even under pressure	ass05
22	what is expected by referring clinician/radiologist?	ass05
26	ability to learn from what has taken place	ass05
26	ability to assess how this model will affect my job in time to come	ass05
26	ability to look at impact on the whole organization	ass05
51	reflection	ass05
58	awareness sk lls	ass05
79	confident that you have achieved all information	ass05
101	performance	ass05
102	performance	ass05
103	performance	ass09
36	to assess the pt's needs	ass08
1	how to adapt a projection/view to arrive at an acceptable image	ass08
8	planning	

RESPON	COMMENT	CODE
45	what & how many films to do;what projections?	ass08
47	ability to think from an early reporting level	ass05
52	type/severity of injuries > sequencing & adaptation	ass08
58	time efficiency skills	ass12
70	planning	ass08
70	adaptation	ass02
72	adapting to different techs with each different patient	ass02
73	sequencing/adaptation	ass08
74	be able to adapt tech	ass02
76	adaptation	ass02
77	adaptability	ass02
80	planning	ass08
92	adaptation of technique	ass02
93	planning	ass08
93	adaptation of technique	ass02
96	ability to adapt technique	ass02
104	sequencing & adaptation	ass08
8	monitoring & controlling	ass08
14	can the views taken help visualise the problem	ass08
16	to attempt conventional views or improvise?	ass08
21	patient able to move for further projections-is it worth it?	ass08
25	?patient condition will allow adequate/extra views	ass08
36	to prioritise the clinicians needs	ass08
37	sequencing adaptation	ass08
42	acceptability of the unachievable/eschewing of improbable aims	ass05
47	to accept a radiograph as diagnostic with ref to clinical details & pt condition	ass11
48	have sufficient views been taken?	ass08
60	any further views required	ass08
71	will more diagnostic info be obtained by further views	ass08
79	need for further better views	ass11
80	decision making	ass08
84	deciding where alternative further views may be required	ass08
85	decide priority order of x-rays	ass08
92	prioritisation of views procedures	ass08
6	psychosocial need-communication pt at ease	ass09
13	patient condition	ass09
23	condition of pt	ass09
27	pt's condition-cooperation	ass09
37	patient care	ass09
52	patient care	ass09
56	pt condition	ass09
68	pt care	ass09
93	assessment of pt condition pt care	ass09
95	ability to recognise condition of pt requiring immediate treatment	ass09
101	pt care	ass09
102	assessing patient	ass09
6	technical need-endproduct (radiograph)	ass10
12	radiographic skills	ass10
14	how to get better views if not	ass10
27	doctor's requirements	ass10
30	being able to obtain diagnostic films no matter what the position & condition of	ass02
30	films sometimes are adapted versions from the true technique	ass10
31	having adapted technique to demonstrate injuries suffered by patients	ass10
35	performance	ass05
35	adaptation	ass02
41	dimensional realisation/pursuing the impossible	ass13
48	technical aspects;image density	ass10
54	radiographic skill	ass10
56	radiographic technique	ass10
62	understanding of clinical position/equipment capabilities	ass10
62	knowledge of x-ray protocol	ass01
74	assess exposure	ass10
76	technique	ass10
81	technical ability to achieve necessary radiographs	ass10
83	technical details	ass10

RESPON	COMMENT	CODE
1	basic radiographic evaluation;contrast, density, sharpness etc	ass11
7	diagnostic evaluation films taking injuries into account	ass11
8	checking/discussing	ass11
9	being aware of the limits of acceptability-whether film is diagnostic	ass11
10	knowing when a less than perfect film is diagnostically acceptable	ass11
11	do they show the injury;would it be better to repaet to gain more info	ass11
12	quality	ass11
19	high standard of radiographic tech	ass11
21	is radiograph of diagnostic value?	ass11
23	is film the best you can reasonably get?	ass11
25	quality of images	ass11
27	information on the x-ray-diagnosis made or not?	ass13
28	visual assessment	ass13
32	ability to recognize diagnostic images with adapted technique	ass13
33	diagnostic quality of film with regard to pt's condition	ass11
36	provide adequate x-rays of diagnostic	ass11
39	further views/repeats based on evaluation of images or suspected injury	ass11
39	red dot system > passing on information to trauma team	ass03
41	visual acuity	ass13
42	spatial cognition	ass13
43	are the films diagnostic?	ass11
44	viewing of rad ographs;are they of diangostic quality;are further projections requi	ass13
45	are the resultant radiographs adequate & diagnostic-have you done a good job?	ass11
46	have you produced adequate diagnostric radiographs?	ass11
47	assume highest quality = standard view radiographs	ass11
48	what diagnosis can be made from the film?	ass13
48	what s the report on the film	ass13
50	evaluat on of images	ass11
55	quality assurance	ass11
56	accuracy	ass02
59	accuracy	ass02
66	accuracy	ass02
68	evaluation of images	ass11
71	film evaluation	ass11
74	determine whether or not the radiograph could be improved	ass11
75	evaluation of images	ass11
75	should be of diagnostic quality-showing details of injuries	ass11
76	standards	ass11
80	diagnostic skills	ass11
83	diagnostic rather than perfection	ass11
86	checking criteria/quality for radiographs	ass11
86	need for repeats & reasons	ass11
89	evaluation of images	ass11
93	assessment	ass11
93	evaluation of images	ass11
94	assessing the films for diagnostic content	ass11
94	determining the need for repeat films	ass08
96	image evaluat on regarding film quality/exposure/pathology	ass11
99	to evaluate the quality of your films	ass11
100	films need to be diagnostic but not necessarily perfect	ass11
102	images produced	ass11
103	evaluation of images	ass11
35	efficiency	ass12
47	speed/efficiency...	ass12
73	speed/efficiency	ass12
77	speed & efficiency	ass12
83	speed	ass12
93	speed & efficiency	ass12
95	speed in assessing need for further views	ass12
99	speed & efficiency	ass12
101	speed/efficiency	ass12
12	pattern recognition	ass13
23	pattern recognition-is view adequate for diagnosis?	ass13
71	pattern recognition	ass13
88	pattern recognition	ass13

Appendix XI

Covering letters relating to questionnaire 2 (appendix VI)

Dear Superintendent/ Clinical Tutor

I am currently undertaking research into trauma radiography and modelling the radiographic process. As part of the research I shall be presenting a paper at the Rontgen Congress at the NEC in June.

I should be very grateful if you would be kind enough to pass the enclosed questionnaires to radiographers in your department who regularly work with A&E patients and/or participate in the on-call rota for casualty and general work.

I enclose a stamped addressed envelope for their return and would be grateful to receive them by Monday 3rd April

Yours faithfully

Pauline J Culmer (Mrs)
Head of Department

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25/7/95

Dear Superintendent,

Some time ago I asked whether you could forward some questionnaires on to your staff for me for completion by radiographers who were working in A & E and/or participating in the on-call rota. At the time I stated that the questionnaires were required for a paper to be given at the Rontgen Conference.

The paper was given and you will see reference to it in this month's Radiography Today. The research is however still ongoing and as I see that I never received any completed questionnaires from you I am writing to you again to enquire if you would be so kind as to ask up to 10 of your radiographers to complete one of the enclosed questionnaires for me and to return them in the stamped addressed envelope provided. If anyone feels that they would like to discuss any aspect of the questionnaire before they complete it, my telephone number is 01978 316200 and I would be very happy to speak to anyone about it.

The help of your staff would be most appreciated and I would be very grateful for your returns, if possible before 1st October 1995. The responses I have had so far have been very interesting and I am keen to obtain the views of as many clinical radiographers as possible.

Yours faithfully

Pauline J Culmer (Mrs)
Head of Department

Appendix XII

"What is holism?" - database of responses

RESP	COMMENT	CODE
1	An approach towards something which takes account of its whole	HL01
1	eg holistic pt care involves the input of many disciplines	HL03
1	caring for various aspects of the pt's welfare	HL03
2	treating patient as a whole	HL01
2	rather than individual injuries	HL08
3	looking at situations overall	HL03
3	considering all aspects of the pt's situation	HL03
4	integrated approach	HL03
5	looking at the whole situation rather than just one aspect	HL01
6	taking an overall view	HL03
6	from the physical needs & emotional needs of the pt	HL02
7	take into account the mind & spirit as well as the body	HL04
7	treat pt as a whole	HL01
8	taking everything into account, all aspects	HL03
8	eg in medicine the mind, body & spirit	HL04
9	treating pts as individuals	HL02
9	attending to their needs as a whole	HL01
9	NOT treating diseases without regard for mental, physical & other physiological aspects that all interrelate	HL03
10	approaching the pt as a whole person	HL01
10	rather than as a body or part of a body with no consideration for psychological aspects	HL08
11	taking the whole person into account	HL01
11	ie mind body & soul	HL04
11	& making sure that all the persons needs are taken into consideration & fulfilling them	HL02
12	centralised care around the pt	HL02
12	look out for the pt's wellbeing, both physical & mental	HL02
13	keen on holidays	HL06
14	is it something to do with the science fiction program 'red Dwarf'?	HL06
15	alternative medicine	HL04
17	care & treatment of the whole person-welfare & wellbeing	HL01
18	treating the pt as a whole being	HL01
18	not just in terms of their complaint	HL08
18	taking into account other factors	HL03
19	the 'whole person'!	HL01
19	treatment of a person involving their health in general not just specific complaints	HL03
19	as a means to encompassing their whole wellbeing	HL01
20	the whole person	HL01
20	& not just their illness	HL08
20	holistic looks at lifestyle & stress factors etc	HL02
21	total care of person not just as a patient	HL03
21	from initial injury -> problems at home	HL03
22	looking at pt as a person	HL02
22	& not as eg an elbow x-ray	HL08

RESP	COMMENT	CODE
23	holistic care-the overall care of the pt	HL02
23	the trauma, social problems associated with the trauma, psychological problems etc	HL02
24	looking & dealing with the pt in all aspects-mentally & physically	HL02
24	not just concentrating on the injury alone	HL08
25	treating the WHOLE of the pt	HL01
25	physical & mental	HL02
26	we must consider the pt as a functioning whole	HL01
26	we must be clinically, ethically & legally responsible for this pt	HL03
27	treatment of the whole pt	HL01
28	assessing the complete situation	HL03
28	taking into consideration the whole treatment of the pt	HL01
29	'all encompassing'	HL01
29	a good A&E radiographer should have a 'holistic' view of the dept	HL03
30	using everything in your ability for total pt care	HL03
30	ie complete care of the pt in every aspect from time of admission to discharge	HL03
31	an approach to treatment in which all aspects, physical, mental & social of the pt are taken into account	HL02
31	in curing disease as opposed to treating symptoms	HL08
32	re pt care	HL02
32	total pt care	HL02
32	not just consideration of the 'parts' to be examined	HL08
33	it refers to a method of assessment & treatment of the WHOLE person ie mental state, lifestyle etc	HL01
33	as opposed to treating symptoms or specific conditions	HL08
34	care of the pt as a whole from 'all' aspects	HL01
35	the whole is taken into account	HL01
35	ie all factors such as environmental, social & psychological ones-not just physical factors	HL03
35	In this case the pt will be judged in terms of all of the above	HL03
36	a total approach to the pt	HL03
36	to see the pt as an individual whose needs may extend beyond the presenting injury	HL02
37	treatment of the body as one whole entity	HL01
37	thinking of all the bodies' systems & functions when treating one particular problem	HL03
38	treating the body systems as a whole rather than different parts requiring different treatments	HL01
38	eg in homeopathy where the whole body is treated	HL01
38	within a hospital where all the different disciplines being involved in pt care	HL03
39	an approach to the subject that takes in all aspects of that sphere	HL03
39	ie with pts it means looking at lifestyle & long term goals/benefit & adopting a tailored approach from this information	HL02
40	assess whole pt not just one area	HL01
41	when applied to a pt an holistic approach is combining all facets of the pt's condition & treating all aspects as a whole	HL02
41	physical, psychological etc	HL02
41	a term important in pt care but difficult to implement in a very busy x-ray dept	HL03
42	a method of addressing health care AS A WHOLE	HL01
42	ie physical, psychological, social aspects all considered with equal weight	HL03
43	caring for the pt as a whole	HL01

RESP	COMMENT	CODE
43	ie caring for the pt's psychological needs	HL02
44	treating the pt according to their needs	HL02
44	ie psychological or clinical	HL02
45	considering & caring for the pt as a whole	HL01
45	rather than just a broken wrist, twisted ankle	HL08
45	eg rather than just their injury taking an interest in their questions, feelings, worries etc	HL02
46	holistic means to take time with the pt	HL02
46	& to consider their psychological state not just their immediate physical illness	HL03
46	to answer their questions & concerns	HL02
47	I would imagine it refers to total care of patient from all carers	HL03
47	non specific, spiritual, pure, all-encompassing	HL04
47	Is it a nursing thing?	HL06
47	patient centred care	HL02
48	that the components of the learning process enhance each other such that a complete knowledge is obtained	HL03
48	which may be greater than the sum of the parts	HL03
49	treating as an entity rather than individually (**dict. entity =real being; reality)	HL02
50	care of the pt as a whole	HL01
50	looking at their needs as a whole person	HL01
51	caring for the whole	HL01
51	which includes attention to psychological, social & spiritual welfare as well as physical welfare	HL04
51	treating the pt as a whole person with many dimensions	HL01
51	rather than simply an injured part	HL08
52	treating the whole situation	HL01
52	rather than the individual separate entities	HL08
52	assessing the whole problem	HL01
53	treating the pt as a whole person	HL01
53	not just a limb on a trolley	HL08
54	whole thing as one	HL01
55	x-raying as a whole	HL01
56	total ie total care & well-being of pt	HL03
57	approach to a person as a whole thing	HL01
58	treating the pt as a whole	HL01
58	ie the whole approach	HL01
59	approach to the person as a whole	HL01
60	whole	HL01
60	medicine viewed as a complete entity	HL03
61	the treatment as a whole	HL01
61	ie chemotherapy, psychology, diagnostics rather than treatment of parts	HL03
61	thus the effect on the pt as a whole is greater than the sum of the individual components of the treatment if identified separately	HL01
61	a grossly misquoted term esp. in management techniques & by managers	HL06
62	the whole	HL01
63	looking at something eg a pt as a whole	HL01

RESP	COMMENT	CODE
63	not just as separate parts eg an ankle, a chest etc	HL08
64	in medicine it is to treat the complete person	HL01
64	to regard the pt as a whole & not just to concentrate on their being a 'disease'; a set of signs & symptoms to be evaluated & treated	HL01
64	it implies a humanistic approach	HL02
65	treating the whole person & not just a symptom	HL01
66	treating the pt as a whole .	HL01
66	not looking at 1 specific area	HL08
67	an approach to the pt as a whole (body, mind & soul)	HL04
68	looking at a situation as a 'whole' when dealing with pts	HL01
68	thinking not only about their direct radiographic needs	HL02
68	but taking into account other factors which will be troubling them especially in an A&E situation when their visit to hospital will not be p	HL02
68	ie children to pick up from school, the little old man who has left his dog at home, someone involved in an RTA or assault	HL02
70	a method by which consider the pt & their situation as a whole thing	HL01
70	rather than separate individual entities/systems	HL08
71	alternative	HL04
71	complete	HL01
71	on a whole	HL01
72	whereby a situation is approached as a whole & not separately	HL01
73	considering a pt as a whole	HL01
73	not just a particular part or organ	HL08
73	ie considering psychological, emotional, physical needs	HL02
76	mind/body/ spirit	HL04
76	treat the person as a whole	HL01
77	treating the whole pt	HL01
77	as opposed to just the symptoms	HL08
78	treating the 'whole'	HL01
79	treating the pt as a whole	HL01
79	rather than pin-pointing a particular problem	HL08
80	involving the 'whole'person	HL01
80	ie spirit, soul & body	HL04
81	treating the pt as a 'whole'	HL01
82	care of the whole person	HL01
83	treating the whole person	HL01
83	not just the injury	HL08
84	treating the body as a whole	HL01
84	an overall approach to a given situation	HL03
85	whole body	HL01
87	the whole person	HL01
87	including their spiritual well being	HL04
87	treating the whole body	HL01
87	including the mind	HL04
87	the environment of the person	HL03

RESP	COMMENT	CODE
88	considering something as a whole	HL01
88	rather than as a set of subsystems	HL08
89	the treatment of the whole person	HL01
89	treating the pt as a whole	HL01
89	rather than just the injury	HL08
90	approach to the pt on a personal level, knowing he is MR X rather than the fractured ankle	HL02
91	putting the pt's 'name' before the pt's injury	HL02
92	'all encompassing'	HL01
92	taking the whole examination (eg major trauma series) & organising the work from the beginning	HL01
92	Not doing one view & then considering which or what to do next	HL08
93	treating the pt as a whole-not just the injured site	HL01
93	taking into account the pt's status (psychological, physical, home, environment etc)	HL02
94	the all round approach to caring for the patient	HL03
94	Not just doing the radiography but caring for the needs of the pt	HL02
95	This means the continual assessment of the condition of the pt	HL02
95	& meeting all the needs of the pt in the right priority for the pt's well being	HL02
96	evaluating something as a whole & not in separate parts	HL01
96	bringing together all the skills required to give a final objective	HL03
97	treating the pt as an entire being	HL01
97	caring for their whole well being	HL01
98	overall	HL03
98	encompassing the entire process associated with any pt episode.	HL03
98	Includes physical & psychological well being, care & communication with pt & relatives	HL02
99	holistic medicine takes all the pt's needs into account	HL02
99	this not only includes their injuries but also their social needs & mental needs	HL02
100	looking at the whole entity & not just one thing	HL01
101	treating pt as a whole person	HL01
103	treating the pt as a whole being	HL01
103	& not just 'a hand' or 'a chest' etc	HL08
104	the complete radiographic process	HL03
104	the pt treated as a whole ie not just the injuries	HL01