Networked professional development: towards a model for primary care

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Abstract

Background. Although research has been carried out within higher education circles little is known about any educational benefits that may result from primary care professionals engaging in networked learning and what strategies may be used to overcome barriers to effective learning.

Aim. This research was undertaken to identify specific educational strategies which may inform educators wishing to support continuing professional development for healthcare professionals within communication and information technology.

Method. A model of networked learning was developed from the literature and using the experience of working models elsewhere. The model was implemented and evaluated over two case studies, and further refined in a third. The evaluation methodology used action research collecting data from surveys, interviews, observer participation, electronic text generated by e-mail discussions, and project documents.

Results. Healthcare professionals were able to usefully communicate over a prolonged period with colleagues about clinical and professional matters, developing a number of process skills; using e-mail, web and on-line database searching. Compared to face -to-face small group learning, the added benefit of using e-mail discussions supported by web based learning resources was being able to use the method at a place, pace and time of their own choosing whilst still remaining committed to a shared educational experience. GPs were able to use the educational material to put to-wards a portfolio (personal learning plan) for accreditation for PGEA. Specific roles for an on-line facilitator in addition to small group learning skills were identified. However networked learning is acknowledged to have many obstacles, eg access, using software, lack of support which will need to be overcome. Managing a learning environment for CPD for healthcare professionals involves an integration of the teaching and learning strategy of the host organisation with a networked learning environment.

Conclusion. A networked learning environment has the potential of supporting continuing professional development and its assessment with portfolios. For individual participants much depends on there own learning style, what they feel is relevant to learn at the time and their own preferences for a learning format. Much needs to be done to provide the necessary supporting infrastructure and integration of provision across traditional divides within healthcare education. This research describes a number of recommendations, which can inform action by educational stakeholders interested in healthcare education.

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Prologue

Ever since the popularisation of Schon's (1983) seminal book, reflective practice has been a constant theme amongst some groups of professionals. In 1987, Schon suggested that reflective skills are best learned in what he called "a professional practicum.... a virtual world, relatively free of the pressures, distractions and risks of the real one."

> In order to be credible and legitimate, a practicum must become a world with its own culture, including its own language, norms and rituals. Otherwise, it may be overturned by the academic and professional cultures that surround it. But if it succeeds too well in establishing its own culture, isolated from the larger worlds of university and practice, then it may become in the pejorative sense, an artifice (Schon, 1987).

This research is my reflection on an attempt to create and evaluate a virtual world using communication and information technologies to encourage healthcare professionals in their growth as reflective practitioners.

Introduction

Is it possible for healthcare professionals to usefully teach and learn in a virtual world created by computer based technology? How can such a structure be built? What might it be like to work within a virtual world? What would professionals usefully do in such a world? When I started thinking about this thesis at the end of 1996, I began by posing myself some questions. I wanted to bring together my experience as a general practitioner, as a teacher in the postgraduate primary care movement and the work from my Master's thesis, exploring how GPs may have used the Internet to support their professional development. As I progressed, I began to ponder on how Continuing Professional Development (CPD) might evolve for general practitioners five years down the track. As I scanned the horizon for future opportunities and threats, I began to speculate on how developing government policies and cultural changes might impact on CPD. As I began to write, the night stars called multi-professional education, quality assurance, evidence-based medicine, networked learning and so on would not come together in any stellar constellation that I could recognise or show to others. It was only many words later that I realised that my motives for focusing on this topic were much more related to my own history and experiences and far more so than I had expected.

My own experience is unique but many of the issues I deal with in this tome are common. The many people who have explored the relationship between computer technology and learning will recognise features of my story. The thesis represents an account of a number of networked learning projects interspersed with my own reflections. The link between all of the projects is the desire to see reflective practitioners dealing with life's challenges, personal, clinical, and educational with their portfolios as an articulation of their progress.

In November of 2001, some 60 health care professionals had registered to use an electronic portfolio through the WISDOM Centre for Networked Learning, recording an array of learning requirements. It has taken somewhat

longer than I originally anticipated to get to the stage where healthcare practitioners from all walks are prepared to spontaneously engage in what has become an educational service rather than a research and development project. Their stories are part of another action research project. This story is of the struggle to build a virtual community where electronic portfolio registration and the building of learning plans on-line was the preserve of innovators.

In assembling the material for this thesis, I had not fully appreciated the reflexive nature of the task. How could I write a long thesis without engaging in the very process that I was commending to others? Boud (1996) would suggest "starting with the autobiographical is a way of indicating the very tangible roots of ideas that might otherwise appear to be a little arbitrary."

My background in networked professional development

Why have I been so interested in using the Internet to support continuing professional development? In the mid eighties I was a full time General Practitioner (GP) in Rotherham, South Yorkshire serving a fairly deprived community ravaged by redundancies in the coal and steel industries. Encouraged by my senior partner I joined the local GP trainer's workshop and became a GP trainer taking my first trainee in 1987. Not long afterwards I became a Continuing Medical Education (CME) tutor. The experience of trying to change the world in such a post was overwhelming and instead I became course organiser for the Rotherham Vocational Training Scheme (VTS). I enjoyed the regular contact with a group of learning trainees (now called GP registrars) and the wider community of other course organisers, at the same time learning about education at the 'coalface' with little academic support.

On the computer front, I recall being so keen to have a practice computer installed, I persuaded my partners to accept a "free system" in 1988. Commercial firms in exchange for the promise of producing good anonymized patient data provided these. To reduce the installation costs I even went into the practice at the weekend with a neighbour to install the wiring for the computer! I had discovered health informatics! By 1995, I had burnt out. My

increasing interest in education and its research was at odds with the demands of a practice committed to maintaining a high income. I was reluctant to spend my leisure time trying to set up the practice computer for patient monitoring systems when there was no local support in terms of finance or other people who knew how to do it.

I took a huge personal gamble and took a year's sabbatical from practice to do an M.Med.Sci in Primary and Community Care at the University of Sheffield. My interest in research became very important to me. At the same time, I discovered reflective practice. I was proud to bring back new understandings and new teaching techniques to the trainers' workshop in Rotherham.

At this point, in November 1996, I was entirely self taught in the use of computers, both medical systems at work as a full time GP, and at home "messing about" with computers. In reflecting how I had met my own learning needs for computing, there seemed to be some observations that fitted in with the theory of reflective experiential learning. Firstly, that I learnt best and most effectively when I wanted to achieve or be able to do something specific. On my home computer, I had been in the doldrums for some time, trying to be enthused by learning word processing or a spreadsheet. Then I discovered the possibility of communicating with fellow professionals over the Internet. I found that I was driven to learn about e-mail, web browsers, downloading and fixing my computer when it went wrong. The twin motivations were firstly a desire to communicate with other professionals around both clinical and health service issues, and secondly a desire to produce something that acknowledged this educational experience. In my case this was a collection of evidence to support my submission for a Master's degree (Roberts, 1996). Once my computer was full of downloaded references, snatches of e-mail discussions often with experts in their field, I found I could cut and paste from these texts to enrich my own contribution to further discussion, that is I was able to prove to myself that I was learning. I was able to give an air of 'scholarship' to my on-line discussions that I could never do in face-to-face conversation. If I could do this, then could others do the same thing and also find it useful for their professional development? Could I help them to get the skills I had developed? If others could do this and I could demonstrate they

could, then my experience of the *practice* of computing, would add to *theory* of the emerging field of primary care health informatics. They would not have to do a Masters but perhaps they could produce a portfolio as a record of their learning achievements? My own circles of learning were driven by a particular kind of process within a community of like-minded professionals that I had 'met' on the Internet. My responsibility as a researcher was to report these findings to the wider academic community.

There was a second equally important pattern to e-mail exchanges which I had noticed within gp-uk (*ibid*). Someone would ask a clinical question to which the answer would come back from someone-else. The answer might be an opinion from experience, a web address of where likely information might be stored, or perhaps an extract from a paper or journal that seemed relevant. Whilst I recognised a similarity to the evidence-based cycle, I had identified a new process which could be undertaken collaboratively within a group of like-minded professionals. There seemed no particular pattern as which topics might engage and grow into a discussion or thread. The GPs were not facilitated or moderated in any way. Knowledge seemed to be constructed by the GPs through the threads of their discussions, but in a serendipitous manner. It seemed impossible to predict which subjects of discussion would stick and be further developed by the members of the list. We seemed to be learning in our e-mail discussion list. Could we not use these exchanges as the basis of our portfolios? Here was then a question for my own action research. I wanted to encourage or facilitate a process, amongst a group of like-minded professionals, whereby there was an ongoing clinical conversation. Participants would ask a question, some-one else would provide a practical answer, some-one else might look for relevant journal articles, and every-one would join in the discussion and learn something useful for their practice. My interest in evidence-based medicine was born.

I envisaged that CPD supported by IT, which I called networked professional development, would involve three complimentary processes:

- the principles of reflective practice;
- the evidence based cycle; and

- the power of the Internet to create the environment in which to embed the learning and construction of new knowledge and skills.

I believed that professionals would be motivated to join in this kind of discussion. They would acquire the skills of evidence-based practice and the computer skills to use e-mail in order to ask a clinical question, use a web browser to search a database, cut and paste into word processors and so on by learning as they went along.

In 1997, I joined a new practice in Sheffield on a part time basis. The contrast with my previous practice could not have been greater. Three of my partners were part time women in the midst of making their families and encouraged the professional development of all staff. The practice met as a full team every week led by the practice counsellor to consider all that had happened in the week. My interest in multi-professional education started there and then. I began to believe that there would be no reason why discussions on the Internet could not be truly inter-professional, mirroring the kind of debate that took place in my well functioning practice team. Around the same time I got a small amount of funding to run a small project in interdisciplinary learning amongst medical students in Rotherham (Roberts et al, 2000). I believed in taking risks with teaching but the problems in enabling medical and nursing students to work together was very challenging and made me very cautious about attempting something similar in the future.

The practice manager at my new practice had a Masters of Business Administration (MBA) degree and in discussion I saw every reason why the same process of evidence-based practice should be equally useful for managers, using the Internet as a resource to solve practical work-based managerial problems.

The partner, whom I had replaced at my practice in Woodhouse, Dr Paul Hodgkin, had set up his own research facility at the practice, which ran a number of collaborative research projects with other practices in Sheffield. Many of these projects involved sharing and analysing anonymised data derived from practice computer systems in order to answer specific problem-based questions put forward by the collaboration of practices. These collaborative data sharing projects were grounded in the literature of

experiential learning. It made sense that by sharing problems and examples of good practice and using practice computer systems, there would be an opportunity for collaborative learning. All practice staff might gain stimulation, motivation and a desire to learn more about the practice computer system, the systems behind them, and perhaps develop their own computer systems to improve the care to patients.

My new practice had had a practice development plan for many years prior to my joining. Some of my partners were keen educationalists themselves and had part time jobs with the university. Unsurprisingly we adopted a model of personal development plans for all of the practice staff, linking them into the practice development plan. We formed multi-disciplinary teams to work on specific areas identified by the practice plan. An area that interested me was the development of systems to enhance data collection on the practice computer system. Unlike at my previous practice I felt a sense of progress on the practice computer system because I was part of a multidisciplinary team. There was also a wider literature on both professional development and computing in primary care, for example it was now possible to read how to complete a "PDP (personal development plan) focusing on information technology (Wakley et al, 2000). This was also the time of a bringing together of many of the systems that underpinned quality healthcare through the clinical governance agenda.

For the other half of my working week, I was a facilitator on the WISDOM project. This involved setting up virtual conferences and stimulating discussion on various discussion lists which included: a clinical update list; an informatics list; a list for the general practitioners in the RAF; a nursing list; and a list for those working in the mental health field. I was involved in various bids for grants to undertake work in developing a networked learning environment for continuing professional development for primary care professionals. I was also involved in other collaborative research projects.

As the new century started, I was appointed as Senior Clinical Lecturer in the Department of Medical Education at the University of Sheffield. I had been appointed for a specific task, to put the Sheffield undergraduate degree in medicine (MBCHB) on the Internet. This was a project internally funded by the School of Medicine to join in a TLTP3-86 project involving the Universities of

Durham, Newcastle, and Nottingham to develop a 'networked learning environment' (NLE) capable of supporting undergraduate health care education. However, an important influence in this new job was my exposure to educational measurement. I had been involved in assessment and evaluations before, but not large-scale measurements of lots of medical students. Advocates of educational measurement in the department were not noted for their receptivity to the principles of reflection. I nearly lost my faith in 'reflection.' I tried to alter my emerging transcript for this thesis to reflect my new enthusiasms for positivistic inquiry. Not surprisingly, much was lost, as it was not conceived in that vein. This is the restored version.

This brings me almost up to date and the time had come to finally set down my work in one place, hence this thesis.

Structure of the thesis

This thesis is about continuing professional development for health care professionals. It is mostly concerned with exploring the way in which Internet-based technologies might enhance the processes of CPD, both for learners and educators. Although the thesis focuses on networked learning for continuing professional development, it reflects my own conceptions of what is important in teaching and learning in primary care. It emphasises that learners construct knowledge through collaborative working rather than receive knowledge that is transmitted to them passively by experts. Learners should take responsibility for their own learning and are directed by society through the clinical governance agenda to be prepared to change their practice in response to patients' needs and be able to communicate what they know and what they understand through their portfolios.

The first three chapters of the thesis provide a framework for discussing networked professional development. Chapter one begins by discussing some of the background to the principles of learning and methods of educational enquiry which have promise in exploring networked professional development. By discussing many of the features that make up CPD, the context is set for a

discussion as to how many of these activities might be transferable to a virtual environment.

Chapter two considers the broader context of CPD with regard to clinical governance and the information technologies required for supporting and developing clinical governance. By exploring just two systems, health informatics and evidence based medicine; the discussion considers the breadth of computer knowledge and skills that would be required of new practitioners to meet the clinical governance agenda.

Chapter three looks at what is known about networked learning both within medical education and in the broader higher educational sector.

Chapter four addresses the action research methodology and the justification for it, at the same time as describing the method of data analysis and establishing the criteria for the trustworthiness of this research.

Chapter five presents an action research cycle where participants were encouraged to explore the clinical governance agenda through networked learning.

Chapter six describes teacher practitioner research with in a networked learning course designed to encourage reflective practice.

Chapter seven goes beyond the micro-level of small cycles of action research to address system-wide concerns. It sets out strategic principles to embrace networked professional development and the questions of managing the learning environment to support portfolio-based learning assessment.

Chapter 1 - The Principles of Learning

This story is principally about the inter-relationships between continuing professional development in primary care, portfolio-based assessment, the clinical governance agenda, and the means to support those relationships with communication and information technology. My first challenge as an action researcher committed to educational enquiry is to ensure a coherence both in the underpinning principles of learning contained within these concepts and the methods of educational enquiry used in this research..

1. The principles of learning and the underpinning philosophy

Many of the concepts of teaching and learning are common to all levels of educational provision from primary school through to vocational training with a constant emphasis on:

- Curriculum;
- Assessment;
- Teaching and learning methods; and
- The Learning Environment.

There is considerable diversity in opinion as to which underpinning educational philosophy leads to the best doctors and nurses. The developments in professional healthcare education for primary care follow those that have transformed education in our schools and higher education institutions. The world-view of many health educators of professionals has been shaped by the work of several authors (Schon 1983, Boud, 1996 and Kolb, 1984) who advocate the cultivation of "the reflective practitioner". Educators of professionals have developed approaches to teaching and learning which help learners to be both reflective, self-monitoring practitioners and meet the requirements of professional accrediting bodies (Taylor, 1997:4). These philosophies are presented as a move from for more traditional didactic teaching. For Taylor there is a paradox:

How can professional education balance the predominantly outcome-focused interests of employers and government, with an emphasis on lifelong reflective learning and practice for the individual?

She feels there is a paradox because of a commitment to her own paradigm, which embraces reflective practice but rejects the kind of positivistic enquiry embraced by the principles of educational measurement. For myself, this example of philosophical questioning is crucial to making sense of both of the nature of educational enquiry and to the derivations of the principles of learning. Everywhere in the literature, there is offence and defence of well-sculpted philosophical positions. For example, Habermas (1972) in his corrosive critique of positivism argues that the scientific mentality has been elevated almost to a religion, such that all knowledge is equated with scientific knowledge reducing behaviour to technicism. In his view, this neglects aesthetic, critical, moral, creative and other forms of knowledge. Critical theorists, espousing Habermas, are equally vehement in railing against positivism, when writing in the educational literature. For example, the notion that educational situations operate according to a set of 'general laws' that regulate the behaviour of individuals leave Carr and Kemmis (1986:79) scathing:

> Of course, the actual achievements of the positivist search for these laws are not very impressive and theories that could be used to predict and control educational situations are almost non-existent.

Rather, they claim, the nature of educational enquiry is to describe "how individuals interpret their actions and situations in which they act (*ibid*)." The relationship between theory and practice in the context of the reflective practitioner is best understood where the underpinning philosophy is appreciated.

1.1. Epistemological Considerations in Education

Epistemology is that branch of philosophy which aims to discover what constitutes knowledge, the means by which our knowledge is acquired, the extent of our knowledge, and the standards or criteria by which we can judge the reliability of knowledge claims. The concern of epistemologists is to determine the basis of all knowledge claims, and to agree upon standards for judging these claims (Popkin and Stroll, 1993:212). According to Hollis (1994), three main philosophical models offer a framework for the interpretation of social sciences including education. These are:

- rationalism;
- empiricism;
- pragmatism.

According to Beyleveld (1975), these three epistemologies agree that:

- knowledge is contained in true statements (beliefs); and
- if a person may properly be said to know something in making a knowledge claim then that person adheres to a true belief (or statement) to which that person is justified in adhering.

However, the important differences hinge upon what is required for a statement to be true, and what counts as a justification.

1.1.1. Rationalism

Rationalists assert that by employing certain procedures of reason alone, we can discover knowledge in the strongest sense, knowledge that can under no circumstances possibly be false (Popkin and Stroll, 1993:239). Traditional learning, such as instruction in formal settings, is based on rationalist idealist epistemology (Kolb 1984:12), where a body of knowledge is transmitted to students, who are subsequently tested to determine how much and to what extent they have retained the knowledge, thus predicting their success in practice.

1.1.2. Empiricism

The best-worked out variant of empiricism is Logical Positivism (Hollis, 1994). Positivism embraces any approach that applies scientific method to human

affairs. Scientific knowledge is the decisive moment when hypotheses are tested against fact in the real world (*ibid*). The logical positivists hold that philosophy does not produce propositions which are true or false; it merely clarifies the meaning of statements, showing some to be scientific, some to be mathematical and some to be nonsensical (Popkin and Stroll, 1993:346). For Logical Positivists, philosophy is an activity, which leads to the clarification of the meaning of questions in order to show how these could be answered by appropriate disciplines. The logical positivists' criteria for determining whether a proposition had any cognitive meaning was called the verification principle. One must first analyse the question to discover what it means. To discover what a question means is identical with discovering how one would go about answering it (*ibid*). Empiricism underpins much of educational measurement theory.

1.1.3. Pragmatism

This school of thought includes Dewey and later thinkers such as Quine and Rorty. Pragmatism is a method for solving or evaluating intellectual problems, and a theory about the kinds of knowledge we are capable of acquiring. According to pragmatists, we think only to solve our problems, by working out hypotheses, or guides to future situations. Pragmatists describe the function of theory as a way to deal with experience. The theory is true if it works (Popkin and Stroll, 1993:328). Pragmatists have always been keen to apply their theories to contemporary social problems, and hence Dewey's association with the science of education. For Quine, a contemporary pragmatist, knowledge becomes 'a man made fabric' or 'a force field whose boundary conditions are experience,' (Hollis, 1994). This is similar to Kuhn's concept of paradigms. Kuhn's historical analysis portrays scientific revolution as a hiatus in the conduct of normal science, a period of paradigmatic questioning, as the result of which a shift of paradigmatic questioning occurs (Kuhn, 1970). According to Kuhn's thesis of incommensurability of paradigms, verification and falsification procedures operate exclusively within paradigms and cannot test them. Choice between paradigms therefore involves not rational, but subjective and aesthetic factors essentially (*ibid*).

Each of the three theories sketched out, rationalism, empiricism, and pragmatism can be seen to be at variance in defining means by which our knowledge is acquired, the extent of our knowledge, and the standards or criteria by which we can judge the reliability of knowledge claims. Secondly using Kuhn's incommensurability of paradigms, we can only test knowledge claims with tools from the same paradigm.

1.1.4. Epistemology and assessment

The broad questions of educational enquiry might include: "What is learning?" "What motivates us to learn?" "What should we learn?" "How do we know when it has occurred?" "What is the best way to learn. To illustrate how the underlying epistemology affects learning principles and the method of educational enquiry, I will look at an example of a 'what is the best way to learn' and its assessment, the process which determines whether learning has occurred. Rowntree suggests:

> If we wish to discover the truth about an educational system, we
> must look into its assessment procedures (1987:1).

In discovering the truth about an educational system (Rowntree 1987:1), we are trying to discover the means by which knowledge is acquired, the extent of the knowledge, and the educational ends. Any assessment procedure sets standards or criteria by which we can judge the reliability of the knowledge claims. Using the paradigm theory developed by Kuhn (1970), the knowledge claims can only be judged to be true by using tools derived from the same paradigm, the incommensurability of paradigms argument. Thus, a multiple choice test is marked using the principles of educational measurement whereas a reflective portfolio will be assessed qualitatively.

What is the best way to learn? One way might be the so-called 'progressive education' promoted by Dewey from the pragmatist tradition of philosophy According to Kolb (1984), Dewey's theory of learning change can be summarised in Fig 1-1.
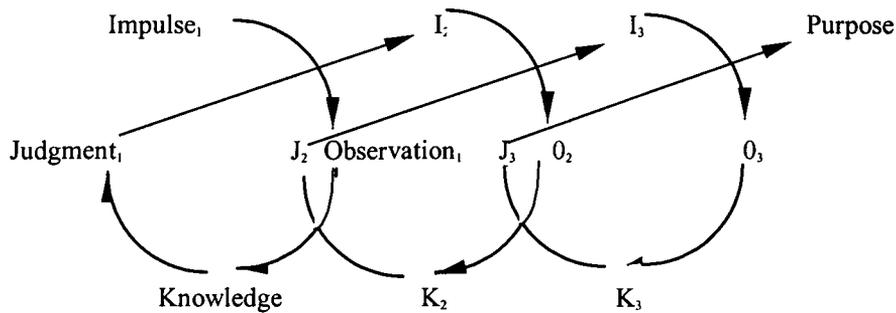
Figure 1 1 Dewey's Model of Experiential learning
(after Kolb, 1984))

In this model learning change is described as a "continuous process of purposeful action initiated by the impulse of experiences in situations from the real world." Dewey says of the actor in his model that "What he has learned in the way of knowledge and skill in a situation becomes an instrument of understanding and dealing effectively with the situations which follow" (Dewey, 1938:35). Thus as the situation is experienced, then begins the process where observations on the conditions surrounding the situation are collected. The third part of the process describes making explicit the actor's existing knowledge about this and similar situations, and the process of using the experiences of others. For Dewey, the fourth stage of the cycle is the "Judgement," where there is a move towards purposeful action based on the observation and knowledge parts of the cycle.

As an action researcher, if I accept that Dewey's claims of how we learn are true, how do I decide on an assessment process which determines whether learning has occurred? For Carr and Kemmis (1986) in 'critical theory,' influenced by the philosophy of Habermas (1972), assessment is a form of research in which individuals interpret their actions in the situations in which they act. In pursuing the assessment approach of Carr and Kemmis (1986) there are further considerations. The language of educational 'aims and objectives,' (ubiquitous terms in medical education), are criticised (*ibid*) because they 'betray a commitment to the scientific paradigm.'

> Educational aims are not the end product to which educational
> processes are the instrumental means. They are expressions of

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the values in terms of which some distinctive educational character is bestowed on, or withheld from, whatever 'means' are being employed (Carr and Kemmis, 1986:77)

1.2. Epistemology: aspects of modern day educational philosophy

1.2.1. A rationalist view

How then does the holding of one philosophical view or another affect how one perceives other aspects of education, for example the curriculum, learning methods, or evaluation? In the philosophical analysis of Peters, education implies that:

> something worthwhile is being or has been intentionally transmitted in a morally acceptable manner (Peters, 1966:25)

For Peters, morally the 'rational' person is synonymous with the 'educated' person. The rational person is one who conducts his/her life in accordance with the democratic form of life and its foundational principles are the principles of freedom (*ibid*: 180), equality (*ibid*: 120), justice (*ibid*: 125) and fraternity (*ibid*: 215). Peters recognises three cognitive aspects of education.

- For a student to be educated he (she) must have some body of knowledge and some conceptual scheme, implying the understanding of principles for organisation of facts... and to care and be committed to education *(ibid* 30-31)
- A conceptual connection between 'training' and 'education'. Training is defined as the development of competence in a limited skill or mode of thought, whilst education involves linkage with a wider system of beliefs (*ibid* 32).
- Education cannot be tied down to a specialised competence whereby there may be a very limited conception of what he/she is doing. Such a cognitive perspective challenges the limitations of a professional's vision (*ibid*: 32).

Whilst Peters picks out no particular educational process, Hirst (1965), puts forward clear provisions for the principles of selection to determine "what should be learnt" in the curriculum content. According to Hirst, knowledge is separable into a number of distinct forms, which can be seen as "complex ways of understanding experience which man has achieved" (*ibid*: 122). Hirst developed an argument in which he applies his theory of the 'forms of knowledge' to the various disciplines, which may make up a curriculum, for example mathematics or the physical sciences. In addition to the 'forms of knowledge,' which broadly follow the science of any discipline, he describes 'fields of knowledge' which arise when knowledge that is rooted in more than one form is built up around specific phenomena. Whilst Hirst acknowledges some of the tenets of student-centred education, such as project work, he suggests priority must be given to the study of the disciplines, or forms of knowledge, themselves. Understanding of the distinct approaches of different disciplines, for example physics or mathematics, can only be properly gained if they are taught as distinct and different (*ibid*). This is not dissimilar to the Flexnerian model (1910) that underpins much traditional medical undergraduate education where education in basic medical sciences is followed by clinical training.

1.2.2. The pragmatic view: the cycle of learning

Several authors, for example Kolb (1984:42), have developed the work of Dewey, and his learning circle, synthesising the work of others to refine the model of 'experiential' learning. For Kolb (1984:26), learning is best conceived in terms of a process rather than in terms of outcomes. Kolb's learning circle is described in Fig. 1-2

Concrete Experience

Active Experimentation

Reflective Observation

Abstract Conceptualization
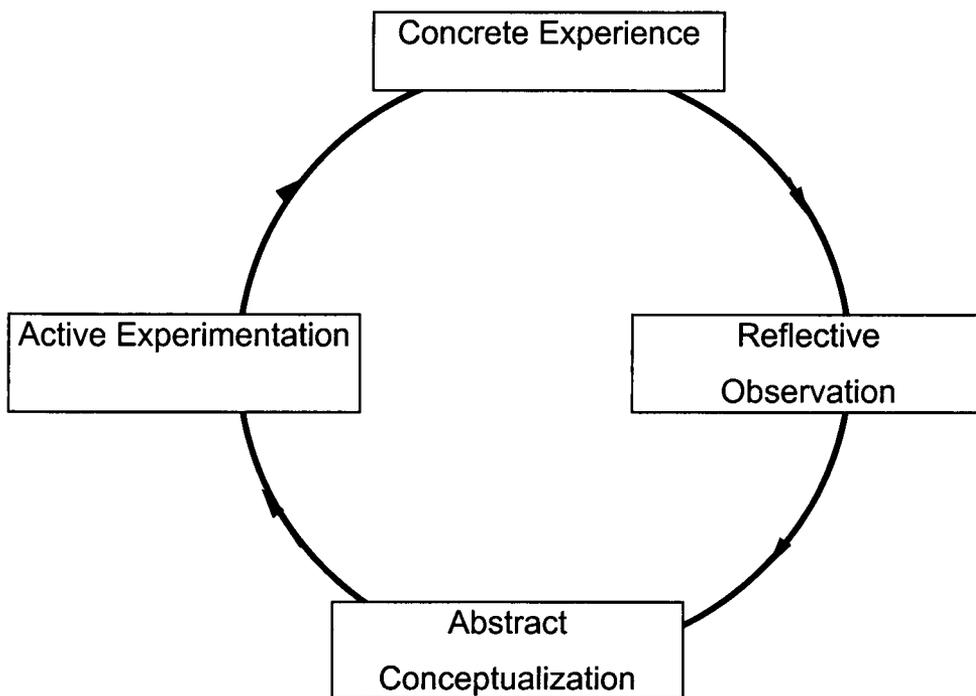
Figure 1 2 Kolb's learning Circle

Kolb (*ibid*: 30) cites different kinds of abilities for learners to be effective:

- Concrete experience abilities - the learners need to involve themselves fully and without bias in new experiences;

- Reflective observation abilities - the learners needs to reflect on concrete experiences from differing perspectives;

- Abstract conceptualisation abilities - to be able to create concepts that integrate the reflection and the experience into logically sound theories; and

- Active experimentation abilities - to be able to use the theories in decision making and problem solving.

In Kolb's model, learning changes are seen to be facilitated best by an integrated process beginning with a here and now experience followed by a collection of data and observations about that experience. The data are then analysed and the conclusions of this analysis are fed back to the actor in the experience for use in the modification of their behaviour and choice of new experiences. Thus, the focal point for learning is 'immediate personal

experience' on which to 'validate and test concepts'. Learning becomes a 'continuous process grounded in experience'.

The constant feedback within the model moves the actor to-wards a goal-directed action and the self-evaluation of the consequences of that action. A breakdown of this feedback leads to ineffective learning. This can occur at any part of the cycle and is a major obstacle to learning. The model describes a process of learning that suggests ways in which:

- Learning can be effective, by ensuring the learner completes the learning circle;

- Learning can be facilitated, by guiding the learner through each stage of the learning circle;

- The obstacles to learning may be overcome, by identifying in which part of the learning circle the learner has become stuck; and

- Learning can be assessed through evidence of completed circles of learning by the learner.

The central paradox for Kolb is 'How can you act and reflect at the same time?' (*ibid*: 30). His resolution of the tension or paradox created is to suggest that one moves in varying degrees from actor to observer and from specific involvement to general analytic detachment. Brookfield (1986) unpacks this concept further, for him the learning process:

> centres on the need for educational activity to engage the learner in a continuous and alternating process of investigation and exploration, followed by action grounded in this exploration, followed by reflection on this action, followed by further investigations and explorations, followed by further action and so on.

Schon re-phrases the paradox by drawing on the distinction between reflecting on action (1983:54) and reflecting in action (*ibid*: 277). Schon's model describes the continuing professional development of the professional drawing on their own behaviour. By examining and reflecting critically on their own practice, practitioners can discriminate between enabling and inhibitory aspects of their behaviour and improve their service to clients, patients or

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students. However, there are limits to this process, which Schon calls the paralysis of action (*ibid*: 277).

1.2.3. Critical reflection

There are concerns within the literature of the pre-dominance of the reflective model and its predecessors in modern day educational institutions and whether it has a higher moral purpose. Dewey has been interpreted by many educationalists that the child and its teacher be allowed to do what were in the best interests of the child. This debate hinges on what Dewey originally meant by democracy in education (Peters, 1966:310). For Peters (*ibid*: 36) 'child-centred ideology' is more to do with what society and its institutions think are worthy interests and areas of personal growth for children than what the child may think are worthy areas. Others claim that Dewey took for granted that learning objectives for children were based on the ideal of the democratic state. That is, children should become tolerant and rational adults, able to cope with a high degree of social freedom. Thus teachers should provide situations or activities for children, in a small-scale setting that mirrored the democratic world, that are not anti-social, that are appealing to the child (interactive) and that will lead on to further experiences that would also provide interaction (Woods and Barrow 1975:139). This debate makes me mindful of the current clinical governance debate. It concerns the freedom of the individual to learn what they want compared with what society as a whole thinks the individual should learn. That is for some educators coaching reflective practice is centred on the practitioner's needs. Thus for example, practitioners are encouraged to write creatively or compose poetry and discuss the meanings with appropriate others and include this in a portfolio (Bolton 2001:159). For some educators the portfolio has become a personal development plan (Wakley et al, 2000:65) in which clinical governance requires a shift in culture particularly towards education and training that meets organisational and individual needs as well as to higher bodies such as the NICE: the National Institute for Clinical Excellence (*ibid*: 170).

A central feature of portfolio learning is identifying and then meeting learning needs, often perceived as gaps in a professional's knowledge. To paraphrase

Schon (1983:49) who said, 'often we cannot say what it is that we know', a problem for the reflective practitioner is in deciding 'what it is that he/she does not know' and therefore needs to know about. Hollis (1977:6) challenges the paradoxical nature of such an assumption; that humans can have needs which can be met, when he says 'human nature is taken to be fixed enough to have given needs or wants, yet mutable enough for those needs and wants to be satisfiable'.

The views of Habermas (1972) informs much of the action research methodology (c.f. Carr and Kemmis, 1986) that is used in this thesis (see chapter 4.2.11). According to Parker (1997:53), Habermas's ideal speech situation grounds the tool of reflection in rational reasoning in that it provides the conditions necessary for rational, critical and reflective activity to take place. Parker claims Habermas's followers have a moral or metaphysical foundation imperative for reflection practice as it is centrally concerned with emancipation through rational thought. Emancipation represents a freeing of the mind from the distortions of ignorance, ideology, irrationality, tradition and habit so that the beneficiary is able to become properly rational and see the world truthfully (*ibid*: 41). Drawing heavily upon Habermas, emancipation is according to Mezirow, 'from libidinal, institutional or environmental forces which limit our options and rational control over all our lives but have been taken for granted as being beyond human control' (1981:5). For Mezirow, emancipation comes through 'perspective transformation,' in which the actor becomes 'critically aware' of the wider socio-cultural milieu, and can achieve social change through the tool of learning. Reflection as emancipation is a major theme for Friere (1972) in his work with illiterate South American ethnic peoples. For others, the reflective model provides emancipation from the dominant ideology, in Schon's case (1983) that of 'techno-rationality'.

1.2.4. Criticisms of Positivism in education

For positivists, professional activity 'consists in instrumental problem solving made rigorous by the application of scientific theory and technique' (Schon

1983:21). Further that, according to positivists (*ibid*: 23) the systematic knowledge base has four distinct properties. It is

- specialised;
- firmly bounded;
- scientific;
- standardised.

This leads to the assumption that professionals apply very general principles, and standardised knowledge to concrete problems. For Schon, this does not compare with his experience.

> Every competent practitioner can recognise phenomena - families of symptoms associated with a particular disease..... for which he cannot give a reasonably accurate or complete description. In his day-to-day practice he makes innumerable judgements of quality for which he cannot state adequate criteria, and he displays skills for which he cannot state rules and procedures. Even when he makes conscious use of research based theories and techniques; he is dependent on tacit recognitions, judgements, and skilful performances (*ibid*: 50).

Within education, empiricist perspectives are seen to dominate both educational management systems, and the inspectorate of quality assurance (Parker 1997:16). Citing the view of Popper (1959:99) that 'any scientific statement can be presented in such a way that anyone who has learned the relevant technique can test it' Parker describes inspection as algorithmic, depending on the use of standardised procedures and set wordings for comment and analysis.

Very broadly then the rationalist encourages the learner to aspire to a higher moral purpose, the pragmatist emphasises the process of learning guided by the principles of democracy, and the empiricist is interested in the measurement of learning. The challenge of portfolio-based assessment is to combine all three elements.

2. Life long learning for adults

In the foregoing section, I have unpacked some of the philosophical questions underpinning some of the principles of learning and methods of educational enquiry relevant to this research. I now want to consider some of the principles of learning as they relate to adult learning and in particular healthcare professionals. It has long been recognised that education should not end with school but that any initial education should promote the process of life long learning.

> The point of this common place is to ensure the continuance of education by organising the powers that ensure growth. The inclination to learn from life itself and to make the condition of life such that all will learn in the process of living is the finest product of schooling (Dewey, 1938).

If school is initial education then 'continuing education' is a term, which refers specifically to post-initial education. Continuing education has assumed a dominant place within the current terminology because it refers to both vocational and non-vocational education (Jarvis 1995:28). The professions have introduced the term continuing professional education and latterly continuing professional development. Its major concerns are the provision of vocational continuing education, access to it and extension of it (*ibid*: 29).

2.1. Adults learners

Within adult education, student participants are adult by definition, and have differing needs from traditional schooling. According to Rogers (1986: 24), adult learners have particular characteristics:

- They are in a continuing process of growth, not at the start of the process;
- They bring with them a package of experience and values;
- They come to education with intentions;
- They bring expectations about learning process;
- They have competing interests;
- They already have their own set patterns of learning.

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2.2. Motivations for adult learning

Maslow's 'hierarchy' of needs is often used as a justification within adult education, as a demonstration of the nature of being a human and the need to learn (cf. Jarvis 1995:11, Rogers A 1986:64).

Self-actualisation

Self-esteem

Love and belonging

Safety

Physiological
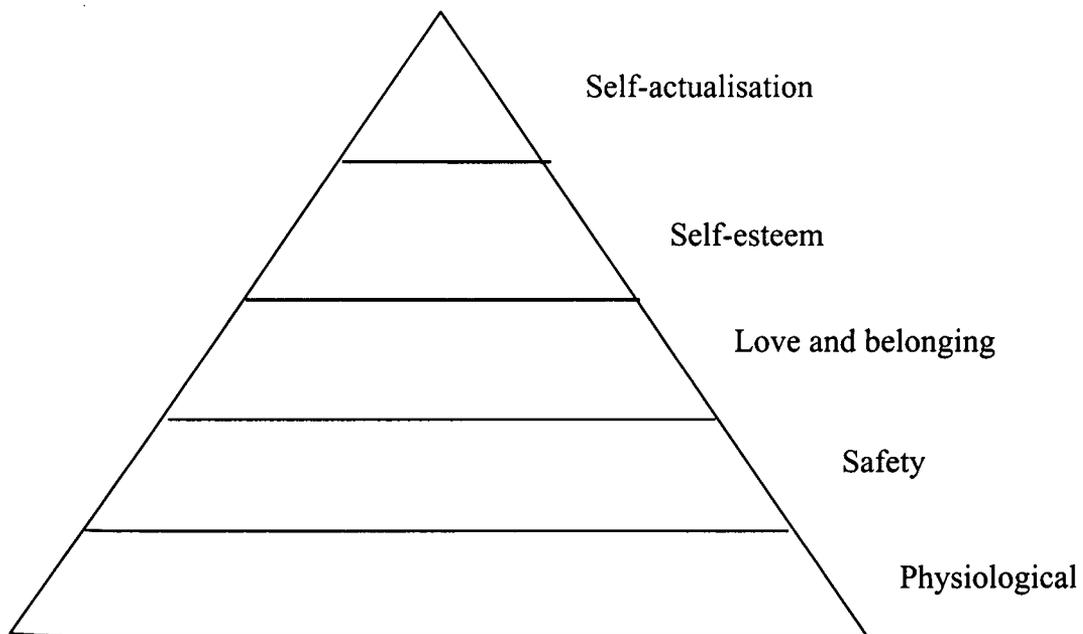
Figure 1 3 Maslow 'hierarchy of needs

Maslow's theory of self-actualisation is drawn from humanistic developmental psychology (Kolb 1984:117) and describes a process whereby a human being grows to its fulfilment. Maslow argues that all people are driven through the first four stages of basic needs. As each new need is in part met, the next higher level of need is triggered. Several levels of need can be in operation at the same time. Some individuals on more than an occasional basis may not reach the highest level of need, self-actualisation. This level consists of the need to create, the need to appreciate, and the need to know and understand (Rogers 1986:63). This hierarchy seems to offer an analysis of the preconditions to the type of learning adult educationalists are most interested in: the almost self-evident truth that the need for food, shelter, personal relationships and the sense of esteem must be met before creative, evaluative and cognitive learning can take place. However if learners come to education programmes from a desire for social relationships or to gain some sense of

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esteem, as many do, they are being driven by needs that must be satisfied at least partly before further learning can take place (*ibid*: 64). It is suggested that the failure of the learner to reach self-actualisation may be because lower levels of needs have not been adequately met.

The research evidence of motivation for adult learning in the real world has been summarised by Jarvis (1995:50-53). He suggests that the main reasons given for participating in adult education lie in a cluster of similar orientations including a desire:

- to know;
- to reach a personal, social or religious goal;
- to take part in the social activity;
- to escape; and
- to comply with formal requirements.

Jarvis concludes that the reasons for participation do not always lie with learners but in the dynamic tension that exists between learners and the socio-cultural world. In exploring the barriers to participation in adult learning, Jarvis (*ibid*: 52) suggests that cost and time are major hurdles, and the lack of flexibility in adult education provision which prevents people attending. He cites McGiveney (1990) who looked at under represented groups in adult education and found the barriers to participation were:

- lack of time;
- negative effect of school experience;
- lack of money;
- lack of confidence;
- distance from classes;
- lack of childcare;
- lack of daytime opportunities and reluctance to go out at night;
- irrelevance of education on offer;
- lack of transport.

Although McGiveney probably didn't have CPD in mind, there is no reason to suppose that these barriers would not affect a practice team including medical, ancillary and nursing staff arranging to meet for educational

activities. Jarvis (1995:53) also highlights the significant moral question about the extent to which adult educators should actively intervene and seek to persuade non-participants to learn. He questions, in a market-orientated service, the right that adult educators have to create "felt" learning needs in people who, for what ever reason are non-participatory in education. This echoes the moral dilemma of many CPD tutors when considering approving courses designed and sponsored by commercial organisations such as pharmaceutical companies.

2.3. Settings for adult learning: the learning environment

For Brookfield (1986), the learning of new skills and bodies of knowledge does not occur in a vacuum but rather in a setting where skills are being learned. Learners (c.f. Kolb, 1984) become acquainted with skills, apply them in real-life settings, reflect with other learners on their experiences in these settings, redefine how these skills may be adapted and re-applied to other settings. For Rogers (1986:132) a crucial part of teaching methods is the context in which they occur. The setting, that is the immediate learning environment, room conditions and its distance from where the learners are based, are all part of the learning experience. This extends to the atmosphere, or climate (*ibid*) created in the class session in which the hopes and expectations of learners are intimately connected with the evidence of the organisers and teachers intentions.

2.4. The adult learning small group

Jarvis (1995:114) summarises the considerable number of teaching methods which can be employed in adult education. However, he emphasises that a variety of methods might be employed in any single teaching and learning process.

Teacher-centred	The demonstration, guided discussion, controlled discussion, lecture-discussion, lecture, mentoring, the tutorial.
Student-centred group methods	Brainstorming; buzz-groups; debates, fishbowl; group discussion; interview; listening and observing; panel; projects and case studies; role play; simulation and gaming; seminar; 'snowballing'; therapy (T) groups; visits, tours, and field trips; workshops.
Individual student centred methods	Assignments; computer assisted learning; contract learning; experiential learning; personalised systems of instruction; practicals; personal tutorial; self-directed learning.

Figure 1 4 Teaching methods in adult education

(source Jarvis: 1995)

2.5. Roles and the teacher in adult learning

How then does the traditional teacher-student relationship evolve in such a setting? Jarvis (1995: 106) suggests that adult education in its tendency to emphasise the learner and learning more than the teacher and teaching have yet to clearly define the role of the teacher. The difficulties again arise from the differing epistemological backgrounds of the theorists. Whilst for Jarvis the role of teachers is clear in didactic teaching, based on Hirst (1965) and Peters (1966), the role of teachers is less clear within the experiential learning cycle (*ibid*: 110). Within a facilitated model, the role of the teacher is in helping the group choose the most useful concrete-experience/problems to work with. The teacher can in part facilitate the observations and reflections. However the latter stages of the learning cycle, the formation of abstract concepts, generalisations and the testing of these implications to reach a decision, require little input from the teacher. Inevitably, there is debate as to whether

the adult learner's freedom to learn is helped or hindered by the teacher (*ibid*: 113).

For Rogers (1969) the teacher of adult learners is a facilitator who asks:

> What do you want to learn? What things puzzle you? What are you anxious about? What issues concern you? What problems do you wish you could solve?

The teacher as facilitator then investigates resources within himself and the experience of others to best help the learners answer the things that puzzle, concern or are eager to find out more about. The teacher as facilitator helps the student to evaluate their own progress and set future learning goals. This is a characteristic of small group learning. Rogers (1986: 99) asks whether the existence of learning-teaching groups is more a question of habit and economics or of gregarious and educational effectiveness. Learning is individual whilst teaching in the real world is usually a group matter, causing a tension, which the teacher must strive to resolve. The teacher of adults needs to balance the usefulness of the group in achieving learning against the growth of individualism, discrimination and self-reliance, which constitute the individual educational goals. This tension is demonstrated in the responsibility of the teacher to set the whole tone of the small learning group (*ibid*: 118) and to deliver on subject matter and content (*ibid*: 140). The role of the teacher in the small group is described as a number of sometimes conflicting roles which need to be carefully balanced depending on the educational context (*ibid*: 118-120).

Teacher as group leader	Identifying and clarifying worthwhile tasks for the group; identifying and maintaining the necessary resources and materials needed for learning including persuading individual group members to utilise and share the resources at their own disposal; developing self-sufficiency for the individual learners whilst reducing leadership
Teacher as change-agent	Managing learning i.e. analysing, planning and evaluating course material in terms of aims and objectives; knowledge skills and attitudes; curriculum planning, resource allocation, the learning environment; discipline.
Teacher as a group member	Becoming a model of learning for the student participants; being a learner oneself; experiencing something of what other group members are experiencing; recognising the learning needs and learning styles of student participants; learning from each other how to learn.
Teacher as 'audience'	Teacher as expert; as evaluator; as assessor; critically judging the work of student participants; removing bias through self-awareness

Figure 1 5 The Role of the Teacher in a small group

The roles of the teacher may conflict where for example, a teacher claims to be an ordinary group member but the students know that she is also the assessor. This can lead to problems where it is institutional policy to have individual assessments. This may for example affect a portfolio group where portfolios are seen as being marked by the tutor who is facilitating the group.

2.6. Teacher as Mentor

Mentoring burst on the educational scene in the 1980's as part of a broad movement aimed at improving education. Policy-makers and educational leaders have pinned high hopes on mentoring as a vehicle for reforming teaching and teacher education. In one example, schemes were introduced following concern about the rate of attrition during the first three years of

teaching. The problems faced by teacher beginners were addressed by the provision of on-site support and assistance to novices during the first year of teaching in the form of mentors (Feiman-Nemser, 1996).

According to Bolton (2001:86) the first mentor was the goddess Pallas Athene who mentored Telemachus in human form: "For you, I have some good advice, if only you will accept it." In day to day life, mentoring is usually a situation of a more experienced professional supporting a less experienced one in a learning process (*ibid*). Mentoring has a number of enduring interpretations. In common to all the approaches (cf. Daloz 1986, Murray and Owen, 1991) is the one-to-one situation and the role of the mentor in seeking to assist the learner to reflect upon their own practice and improve upon it. Daloz (1986: 215-35) suggests a number of things that good mentors do in such situations:

Support	listening, providing structure, expressing positive expectations, sharing ourselves, making it special
Challenge	setting tasks, engaging in discussion, heating up dichotomies, constructing hypotheses, setting high standards
Vision	modelling, keeping tradition, offering a map, suggesting new language, providing a mirror.

Figure 1 6 The role of the mentor

The mentor helps the mentee step

> ...outside the box of his or her job and personal circumstances,
> so they can look at it together. It is like standing in front of the
> mirror with someone else, who can help you see things about
> you that have become too familiar for you to notice (Clutterbuck
> and Megginson, 1999:17).

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A mentor can act as a role model, enabler, teacher, encourager, counsellor, befriender, facilitator, coach, confidante, and supporter in 'unlearning negative habits or attitudes. A mentor deals with the whole person of the mentee in a way that is professionally based, and concerned with professional issues. The mentor helps the mentee examine and reflect upon the relationship between the emotional, intellectual and behavioural contents of issues (*ibid*).

According to Bolton (2001:88) reflective practice within small groups can be supported by co-mentoring, where pairs of learners create a working contract. In the context of a Masters course they agree to read and comment on learning journals and assignments-in-progress, and discuss appropriate issues. The students also spend time together as a whole group without their tutor in group co-mentoring activities, learning widely from each other.

However there are a number of contentious issues of policy and practice for organisations wishing to promote mentorship.

2.6.1. Assistance versus assessment

According to conventional wisdom, since the 1980's mentors should assist not assess on the grounds that novices are more likely to share problems and ask for help if mentors do not evaluate them. Some mentoring programmes within the teaching profession use a team approach in which mentor teachers fulfil the support functions while other more senior members, judge the novices' performance for purposes of employment or certification. Other programmes prefer to give mentor teachers an important role in certification on the grounds of professionalism and accountability (Feiman-Nemser, 1996). According to Murray and Owen (1991:5) there are two schools of thought about mentoring. One school suggests that mentoring can be structured and facilitated, while the other maintains that mentoring can only work when the relationship between the mentor and protege is 'right.' However, these are not automatically exclusive, since a facilitated relationship might actually develop into one where the chemistry appears to be right for the relationship to continue and develop. However, whilst Jarvis and Gibson (1997:10) accept that structured or facilitated mentorship is called for in education and training,

they point to a paucity in the literature describing the issues of one-to-one teaching and learning particularly with regard to the professions. They suggest the thin research evidence base leads to a lack of clarity in deciding where roles of mentorship, teaching, being an educator, and being a teacher practitioner begin and end, and overlap.

2.6.2. Assigning or choosing a mentor?

Within any organisation how can learners find a suitable mentor? If the 'chemistry' needs to be right, as Murray and Owen (1991) point out, does careful matching of mentors and proteges need to take place? Hutton-Taylor (1999) suggests that within an organisation like the NHS it is a matter of developing a coaching culture. She argues little is to be achieved by a handful of allocated or even fully trained mentors. What is needed is "an overall paradigm shift to a culture of coaching, with role models, positive constructive feedback, and good staff management principles. She suggests that it is a collective responsibility for anyone involved in medical education to press his or her own institutions to develop a coaching culture. Within primary care there have been a number of innovatory schemes in the UK which have recruited a network of paid mentors, for example in East Anglia (Hibble, 1996).

2.6.3. Learning to mentor

Practitioners and researchers recognised, after the apparent failure of many mentoring programmes (c.f. Barlow, 1991, Freedman, 1992, Boice, 1993), that training, coaching and follow-up for mentoring programme participants were required to extend the benefits of mentoring to a broad population of newcomers. With clear aims and objectives for mentoring programmes, involvement within the programmes improved and associated benefits within mentoring programmes increased (Murray and Owen, 1991).

Most mentoring programmes provide some orientation or training. Some of the principles are generic, for example, theories of adult learning and research on effective teaching. Other aspects of the programme are related to the context of the professional situation, for example clinical supervision in

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nursing and midwifery (Jarvis and Gibson, 1997) and beginning teacher concerns, in teacher education (Tomlinson, 1995). A less common but no less important need for mentors is to analyse their own beliefs about learning. For example to teach and to talk about their practical knowledge of teaching, mentor teachers need mentoring themselves as part of their own continuing professional development (Feiman-Nemser, 1996).

2.6.4. Time to mentor

In novice teacher mentoring programmes, mentor teachers may be released from some or all of the classroom responsibilities. Other programmes expect mentors to combine mentoring with full-time teaching (*ibid*).

For general practice mentors in a continuing professional development project in the West Midlands Deanery, the time to mentor (Field S, personal communication, 1998) can be a considerable drain on resources, and there may be a lack of evidence that mentoring schemes promote the move towards clinical governance. In the East Anglian Deanery it was anticipated that each paid mentor might have a caseload of around 20 mentees allowing for twice yearly visits, as well as holidays, mentor support groups, and training. A sessional payment based on locum costs was paid to the mentors. The fee was around £100 pounds a session (Alliot, 1996).

3. Curriculum Planning

In the reflective model, teaching involves listening to the students to discern their needs and encouraging them to take responsibility for their own learning needs (Kolb, 1984).

Jarvis (1995:196) highlights the opposing tensions inherent in curriculum theory, the andragogy-pedagogy debates. On the one hand, he claims that pedagogy is the "classical" curriculum derived from rationalist principles with the emphasis on instruction, information, obedience, assessing of objectives, and evaluation by teachers of set tasks and competitive examination. On the other hand, andragogy is the "romantic" curriculum, with its emphasis on

creativity, experience, discovery, drawing on real-life topics, based on involvement and co-operation, and self-assessed in terms of self-improvement. Jarvis (*ibid*: 198) suggests a framework of education for adults which changes the perspective presented by the highly influential Knowles (1990). Jarvis argues that many individuals with little experience in a subject may want the pedagogical (classical) approach, while those having a lot of experience in the area prefer an andragogical (romantic) approach. This leads to the possibility of conceptualising the initial vocational education curriculum in pedagogic terms and the continuing vocational education programme in andragogic terms. This means it is possible to discuss initial vocational education in traditional curriculum terms but to discuss continuing vocational education in learner-centred terms. In terms of a medical education, where is the cut off point? Traditional medical school and higher specialist training might be seen in pedagogic curricular terms, with the emphasis on instruction, information, obedience, assessing of objectives, evaluation by teachers of set tasks and competitive examination. Continuing professional development for GPs, consultants and practice nurses should be seen in andragogical terms, with an emphasis on self-assessment and self - improvement in performance. Jarvis and Gibson, (1997) suggest that curriculum can be defined as:

> all the learning which is planned and guided by the educational
> institution, whether it is carried on in groups or individually, in
> inside or outside the institution.

This definition may well encompass the curricula of continuing professional development programmes. In any case, educators in such programmes will need to understand where their learners' previous experiences of education lie if they are to "unlearn" processes that get in the way of the developing critical thinking and reflective practice. Taba (1962:422) suggested that the major points at which decisions need to be taken in the process of curriculum development are:

- aims and objectives;
- content;
- learning experiences; and

- evaluation.

In her model of the curriculum, there are four questions for any curriculum developer:

1. What is to be done?
2. What subject matter is to be used?
3. What methods and organisation are to be employed?
4. How are the results to be appraised?

Nicholls and Nicholls (1978:21), suggest a wider and more comprehensive approach. They advocate a cyclical model where there is an analysis of the factors which make up the total situation, a selection of objectives based on the insights gained from that analysis in curriculum planning, the selection and organisation of content followed by selection and organisation of method. Finally, there is an evaluation which leads to a further cycle of analysis. A further approach to curriculum design is the spiral curriculum. Bruner (1977) describes a curriculum in which topics might be developed and redeveloped later as the learners have acquired a greater capacity to understand the phenomenon. This approach is said to allow for learner growth and reflection because learning is developmental rather than linear (Jarvis and Gibson, 1977). An example of this can be found at Dundee Medical school, which has adopted a "spiral curriculum." Such a curriculum seems to work well with their programme of portfolio assessment for their students (Davis et al, 2001).

Aims are very general statements of goals and purposes, and they are usually expressed in abstract terms. An aim attempts to give both shape and direction to a set of more detailed intentions for the future. Objectives usually provide the actual direction over a more immediate time span. Although aims and objectives may be defined in any curriculum, the route to achieving those goals is not necessarily very clearly specified (Jarvis and Gibson, 1997). The pre-specification of aims of objectives, or whatever terminology is employed, are the result of educators attempting to provide direction for the development of the curriculum at every level. However, the desirability of providing such detailed direction is debatable, especially since it proposes a teacher-centred

learning model which is not necessarily acceptable to educators of adults. Consequently, there have been a number of different ways of expressing learning objectives:

- educational objectives (Bloom, 1956);
- instructional objectives (Mager, 1975);
- behavioural objectives (Reilly, 1975);
- performance objectives (Davies, 1976); and
- expressive objectives (Eisner in Popham et al, 1969; Eisner, 1985).

The conceiving of professional education in terms of competencies has given a new emphasis on matching learning objectives with the skills required of a new professional in her first post. Eisner (1985) objects to behavioural objectives for a number reasons. He suggests that outcomes of learning are more complex than those specified in behavioural objectives models of the curriculum. Eisner (in Popham et al, 1969) has also suggested that the educational encounter between students and teacher is one in which it is impossible to specify outcomes. It is the educational process that is the most important as it "enables individuals to behave intelligently through the exercise of judgement in situations that demand reflection, appraisal and choice among alternative courses of action". Consequently, the educational process will produce different learning outcomes for individual students. There may even be a moral imperative against behavioural objectives being forced inappropriately upon learners (ibid). According to Jarvis and Gibson (1997: 43), behavioural objectives may have a place in skills training but even these require negotiation and must be mutually agreed.

How then should we frame the aims and objectives for portfolios and in consequence set the criteria by which they must be judged? The answer will lie in what educators deem as the purpose of the portfolio. If the intended purpose is to enhance clinical performance or maintain and develop clinical skills then behavioural or performance objectives are appropriate. If promoting 'the reflective practitioner' is the main purpose then more expressive learning objectives, such as creativity or critical thinking may be appropriate. It may well be that in a mature portfolio-based assessment system educators would expect to see evidence of approaches to meet more than one purpose over a

cycle of five years. Objectives need to be negotiated individually with learners by the educational institution. However as we have seen in the Deaneries (section 4.64) where mentoring schemes have been set up there is a high and perhaps unacceptable cost of setting up sessions for negotiation of individual learning. At the level of the Deanery there may be well be some advantage to using information technology to manage the portfolio system.

4. Assessment and Evaluation

Given that assessment drives the learning (Rowntree, 1987) how shall we assess learners in continuing professional development. Rowntree (*ibid*: 4) suggests that assessment in education:

> Can be thought of as occurring whenever one person, in some kind of interaction, direct or indirect, with another, is conscious of obtaining and interpreting information about knowledge and understanding, or abilities and attitudes of that other person. To some extent or other it is an attempt to know that person. In this light, assessment can be seen as human encounter.

Evaluation "is an attempt to identify and explain the effects (and effectiveness) of the teaching...A full evaluation will also need to consider the effects of the course on people other than the students- on the teachers who have contact with the students, on parents, on employers and on other people in the community and so on (*ibid*)."

Thus, assessment tries to discover whether a learner is becoming or has become accomplished, whereas evaluation tries to do the same for a course, learning experience or episode of teaching. Formative evaluation is intended to develop and improve a piece of teaching until it is as effective as it possibly can be. Summative evaluation is intended to establish the effectiveness of the teaching once it is fully developed and in regular use (*ibid*: 7).

Assessment (*ibid*: 6) is a necessary precondition for diagnostic appraisal, that is ascertaining the students' strengths and weaknesses, and identifying their emerging needs and interests. Rowntree claims that it is the practice of diagnostic appraisal, as a means of assessment, that enables teachers to

claim they are teaching. Grades or marks are more properly to be considered outcomes of assessment. Diagnostic appraisal, directed towards developing a student and contributing to his growth, can be thought of as formative assessment. The emphasis is on potential. Summative assessment, however is represented by terminal tests and examinations coming at the end of a course, or indeed by any attempt to reach an overall description or judgement of students. The emphasis is on actual achievement (*ibid*: 7-8).

Boud (1996:11) suggests that all assessment - whether conducted by teachers or by learners - involves two essential elements. The first is the development of knowledge and an appreciation of the appropriate standards and criteria for meeting those standards, which may be applied to any given work. The second is the capacity to make judgements about whether or not the work involved does or does not meet these standards. In Boud's estimation, there has been a failure by both staff and students to engage with developing and understanding standards and criteria to the detriment of learning. Unpacking assessment further Rowntree (1987:81) describes the 'Why?' ' Who? ' 'What? ' 'How?' and 'When?' of assessment.

4.1. Why Assess?

Rowntree (1987: 16-33) outlines six broad categories of purpose in any educational assessment.

- Selection by assessment: the selection of learners for various kinds of educational opportunity;
- Maintaining standards;
- Motivation of students;
- Feedback to students;
- Feedback to the teacher;
- Preparation for life-long learning.

The teachers' use of assessment will be heavily influenced by the expectations of the teaching system within which s/he is working. The professional worldview has been called the pedagogic paradigm (*ibid*). It is suggested that this paradigm consists of beliefs and assumptions existing on

a continuum. At one end of the continuum are teachers whose first loyalty is to a public corpus of pre-existing knowledge or expertise, and the need to 'get it across' to a succession of students. The other end of the continuum attracts the teacher who gives her first loyalty to individual students and encourages them to exercise their own developing motivation and sense of purpose to create new knowledge out of the students' own ideas and experiences (*ibid*: 32). However there are unwanted "side-effects" of assessments (*ibid*: 36):

1. Prejudice: e.g. stereotyping around gender, social class, or race.
2. Awareness of assessment: once the student notices his/her behaviour is being observed and assessed, s/he may change that behaviour.
3. Extrinsic rewards: fear as to whether students regard their learning as expressive (valuing it as an opportunity to express and enlarge their capabilities) or as instrumental (valuing it as a means towards the satisfaction of goals external to itself).
4. Competitive: communication of ideas among students may be stifled because some students feel they will gain by the poor performance of others and suffer by imparting their own knowledge to fellow students.
5. The bureaucratic: What is actually learned can be dictated by those who control the assessment procedure.
6. Limiting assessment techniques: the problems of relying too much on any single assessment method, overlooking the fact that each has distinctive features of its own.
7. The giving of grades: the problems of emphasis on the easily measured, unfairness, standardisation, competition, and extrinsic rewards.
8. Reporting results: the issue of who should share in the assessors' knowledge of the student.

4.2. Who assesses?

Who assesses depends on the nature and purpose of the assessment as to whether it is the student, or the teacher, or external assessors (Rowntree, 1987:15). Nursing education, for example is still largely based on a teacher-centred assessment typology (Jarvis and Gibson, 1997). There is increasing recognition of self-assessment since in the context of professional practice,

the collaborative enterprise between teacher practitioners and learners requires a continual process of self-assessment by both teacher and learner (*ibid*). Rowntree (1987:145) suggests that self-assessment is part of formative assessment such that "students may be encouraged to keep diaries, journals and weekly reviews of their work."

Rowntree (1987:147) suggests that students in structured learning may be able to assess their own progress realistically in terms of the objectives being pursued.   Whereas students who are partly responsible for their own objectives would find self-assessment more difficult because they would have to develop their own criteria for judging progress and not use those of the teacher. Skilled facilitation by the teacher would be required to help students set reasonable criteria. Boud (1996) summarises some of the lessons from research in higher education settings on self-assessment

- in most studies greater numbers of student marks agree than disagree with staff marks;
- high achieving students tend to be realistic and perhaps underestimate their performance while low achieving students tend to overestimate the achievements probably to a greater extent than the underestimation;
- students in later years of courses and graduates have a tendency to either become more "accurate" in their ratings, or to tend towards increasing under estimation of their performance;
- there are insufficient studies of improvements over time on the influence of practice on self-marking;
- When self marks are used for assessment purposes students tend to over rate themselves; and
- The evidence on gender differences in self -rating remains inconclusive.

4.3. Assess what?

There are a number of things that need to be considered in deciding what to assess (Rowntree, 1987:81),

- Assessment constructs and learning objectives;
- Objectives in assessment;
- Sources of objectives;

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- Levels of objectives; and
- Negotiation of objectives

An assessment construct (*ibid*: 84) describes the qualities, abilities and traits that a teacher is looking to see in students. A learning objective refers to aspects of the student's knowledge, behaviour or understanding that the teacher is trying to change. Paraphrased as a question for the teacher: "What skills or abilities or knowledge or understanding do you want your student to have after you have taught him that he/she did not possess, or at least not in the same degree, beforehand?"

The use of objectives is grounded in an assumption that the purpose of education is to help people change. Giving thought to objectives is essential if assessment is to be relevant and worthwhile. Objectives need to be made fairly explicit to the students otherwise students are at the mercy of inferring from hidden criteria, and judgements which they cannot understand or have little power over *(ibid*: 90)

Given that the learning institution and students may have different objectives, choice of objectives is a complex "transaction" in which all parties concerned reach tacit agreement about what is to count as valid educational knowledge:

> Through persuading and influencing one another, through bribery and coercion, through trust and mutual responsiveness, teachers and students negotiate an acceptable compromise between what "the system" requires, what the student wants to learn about, and what the teacher feels capable of teaching *(ibid*: 109).

All those who have a stake in education are the ultimate source of learning objectives. Objectives are often divided into:
- Cognitive; to do with thinking and intellectual processes;
- Affective; to do with attitudes and feelings; and
- Psychomotor; to do with physical activity.

However, within the three types of objective, students may learn to move between several different levels of complexity. Some objectives will demand more, some less of them than others. Bloom's (1956) taxonomy has had an

important role in encouraging reflection on the distinction to be made between cognitive objectives: knowledge, comprehension, application, analysis, synthesis, and evaluation.

For any given content area, Rowntree offers four levels to inform thinking about levels of objectives in relation to any particular content area:

- *Recalling* facts or principles;
- *Applying* a given recalled factual principle;
- *Selecting* and applying facts and principles to solve the given problem;
- *Formulating* and solving own problems by selecting, *generating* and applying facts and principles.

4.4. How to assess?

According to Rowntree (1987:119) the teacher, in planning and evaluating his/her assessment methods in relation to the purposes s/he is pursuing is immediately called into conflict between the claims of various modes of assessment, each with an attendant technology. As a guide he suggests applying criteria of *educational relevance:* that is asking whether a particular assessment method seems to go with the content, style of teaching and the learning experienced by one's students. Alternatively, stating this more formally, whether the identified assessment methods are relevant to the educational objectives and assessment constructs.

4.5. Evaluation

Evaluation is necessary to achieve a number of things from an organisational, a teacher's, and a student perspective (Rogers 1986:172). Foremost is the goal of quality, to improve teacher performance and accountability, to ensure effective education by analysing, implementing, and evaluating educational strategies, and ensuring that learners have had their needs met. Becoming a reflective practitioner (cf. Schon, 1983) is said to achieve this by constant critical reflection on all aspects of the teaching and learning cycle.

Rogers (1986:172) distinguishes between external evaluation, often practised by the organiser of the programme or some inspector for an external

validation body, and internal, the more usual and regular evaluation, practised by the teacher in the course of the teaching programme. Rogers suggests a hierarchy of evaluation, where the organisers and inspectors encourage the teachers to evaluate, and they in their turn should encourage the student participants to engage in evaluation. According to Rogers (*ibid*), evaluation is one of the more difficult skills required of the teacher but can only be learned by doing it with a willingness to change the programme if the evaluation demands it.

Rogers is clear that the main concern of evaluation is whether the learners are learning (*ibid*: 174). Firstly, the evaluation must provide information as to whether the learning objectives set by the teacher were the right ones and how far they were met, i.e. the effectiveness of the course. Secondly, the evaluation must provide information about teaching skills; in particular whether there has been motivation. Finally as to whether the learners have learnt anything, how much they have learnt, what they have learned, and the quality level of the learning centre.

Rogers (1986:176) suggests that since there is no one right way of evaluating student learning, the teachers themselves have to decide how to do it, perhaps in conjunction with the students. However, he suggests there is a cluster of techniques used by organisers and providers to assess the effectiveness of programmes. Rogers (*ibid*) suggests that formative evaluation is more important in teaching adults than summative.

Jarvis (1995: 195) emphasis that the level at which evaluation should occur is not at the organisational level, or at teaching level, but at a level where students can be full participants in the process.

5. The learning professional

Eraut (1994) suggests that "professionalism" is an ideology which embodies the values of service, trustworthiness, integrity, autonomy and reliable standards. Professionals are experts who provide services, which the recipients are not adequately knowledgeable to evaluate. Clients need to be

protected against incompetence, carelessness and exploitation, but the control of the professions is vested in the experts themselves thus their emphasis on moral probity, service orientation and codes of conduct.

In recent years, there has been a massive expansion of claimants to professionalism with an associated increase in professional education and training courses and in the numbers of students and staff, trainers and trainees. Professional education is said to be distinctly different from higher education primarily because of its dynamic relationship with its key stakeholders; the professionals, employers and government (Taylor, 1997:1). Whilst historically education and training have played a central role in controlling entry to the professions, there has been a rapid expansion in the development, validation and accreditation of professional education influenced by powerful yet diverse stake holders. Professional education is also distinctly different because the curriculum addresses knowledge for and about practice and is delivered both in the context of the university and of the field of professional practice. Students in professional education are distinguished by their motivation to study for a very specific purpose which will have a direct influence on the rest of their working lives (*ibid*: 2).

Schon's (1983) original definition of what constitutes professional knowledge includes personal knowledge, tacit and process knowledge, and propositional knowledge. Eraut (1992, 1994:103-108) develops this further, and explores:
1. Propositional knowledge
   - discipline based theories and concepts, derived from bodies of coherent, systematic knowledge;
   - generalisations and practical principles in the applied field of professional action; and
   - specific propositions about particular cases, decisions and actions.
2. Personal knowledge (impressions and the interpretation of experience)
   - To what extent does the ordinary person's stock of knowledge constitute propositional knowledge?

- What, if any, is the difference between the personal knowledge (which is constructed) and largely codified propositional knowledge taught in universities?

3. <u>Process knowledge.</u>
   - Acquiring information;
   - skilled behaviour; deliberative processes, e.g., planning and decision-making;
   - giving information; and
   - metaprocesses for directing and controlling one's own behaviour.

Propositional knowledge includes discipline based concepts, generalisations and practice principles which can be applied in professional action, and specific propositions about particular cases. Most discipline-based knowledge is in the public domain, and is the traditional focus of higher education. However the rate of change in recent years means that knowledge quickly becomes obsolete and new knowledge is developing all the time, making the management of propositional knowledge increasingly difficult for both students and staff. Personal knowledge is that acquired by the interpretation of experience. Process knowledge is knowing how to conduct the various processes that contribute to professional action (*ibid,* 1992: 105). Taylor (1997:4-5) is concerned that much professional education has an over emphasis on behaviouristic learning objectives driven by the employers and government policy. She suggests two broader aims. Firstly that professional education, based on adult learning concepts should help learners to be self-reflexive, self-monitoring practitioners whilst allowing them to meet the requirements of professional accrediting bodies. Secondly, professionals must learn how to practise both independently (to respond to a constantly changing environment) and collaboratively (to respond to the complexity of today's society), and in partnership with the consumers of professional services.

The learning infrastructure to support such a vision requires an emphasis on:
- Learning for teamwork (*ibid*:59);
- Facilitating independence and interdependent learning (*ibid*:77);
- Problem based learning (*ibid*:91); and

- Educationally relevant assessment (*ibid*: 107).

The professional bodies in healthcare have endorsed such recommendations. The United Kingdom Central Council for Nursing Midwifery and Health Visiting (UKCC, 1992) have made a number of recommendations which were echoed by the General Medical Council (GMC, 1993). Recommendations include the development of a core curriculum; the introduction of problem based learning, with a view to lifelong learning; and more emphasis on community-based and multidisciplinary learning.

5.1. Learning for Teamwork

The increasing recognition of the importance of co-operation and collaboration between the professions has been endorsed in the UK by recent major social legislation, for example the Children Act (1989) and the National Health Service and Community Care Act (1990). Here, the prevailing ideology is reflected in the emphasis on "partnership", "working together" and the "seamless service". Situations where professionals interrelate are variously defined as multi-professional; "a co-operative enterprise, in which traditional forms and divisions of knowledge and authority are retained"; or inter-professional "a willingness to share, and indeed devolve, specialised knowledge and authority ... if the needs of clients can be met more efficiently by others" (Carrier and Kendall, 1995). One way in which effective working relationships might develop is through multi-disciplinary learning, and a number of levels have been described for multi-professional education, spanning the continuum between total separation of disciplines, through to true transprofessionality where disciplines are not distinguished (Harden, 1998). Different settings have also been described, including the "learning practice," where there is an established ethos for medical, nursing and paramedical education and training at undergraduate and postgraduate levels (Carter, et al 1998). Harden (1998) has drawn attention to the importance of appropriate contexts, goals and implementation strategies for the ultimate success of multi-professional projects, but there is still considerable debate about what this means in practice (*ibid*: 403). Several authors have

highlighted various internal and external factors which may affect the outcome of such inter- professional initiatives:

- Logistical problems of numbers, differences in prior learning, lack of strategic vision, divisions in funding (Pirrie et al, 1998);
- The importance of the minimum period for groups to reframe their ways of working together (Bond, 1997);
- Subtle psychological concerns about identity loss (Dombeck, 1997);
- The impact of role models during training, which may in itself be challenging: "students very quickly sense the pattern of relationships between tutors. Where interpersonal conflict is evident the credibility of interprofessional co-operation is in doubt" (Higgins and Jaques, 1986).

The challenges of multi-professional education are therefore considerable. The research evidence suggests that in reality we are still at the "innovative pilot" stage. Nevertheless, there is a strong value-based imperative to experiment with educational projects that reflect the consistent government policies of the late1990's.

5.2. Facilitating independence

With all adult learners, the facilitator is of central importance to learners learning to work independently and interdependently, particularly early in the course. The responsibility of the facilitator is to facilitate learners' independence in learning, what the content is, as well is learning how to learn and to assess whether the learners have learnt (Heron, 1989: 14). Heron describes three modes of learning in the context of the different ways that the facilitator can handle decision-making:

- Hierarchical;
- co-operative; and
- autonomous.

In the hierarchical mode, the facilitator takes full responsibility, thinks and acts on behalf of the group and directs the learning process. In the co-operative mode, the facilitator shares power over the learning process and negotiates

the outcome, collaborating in managing the learning process. The view of the facilitator although influential is not final. In the autonomous mode, the total autonomy of the group is respected and the facilitator gives the group members freedom to exercise their own judgement but retains responsibility (Heron, 1989:17).

According to Taylor (1997), the facilitator in professional education is a catalyst in the planned and deliberate process of change towards externally defined goals and objectives. This builds on Boud's (1987) identification of the facilitator as planner and evaluator, resource person, and an instrument of social action and change. Taylor (1997:80-90) highlights the dilemmas of facilitating progress towards the reflective practitioner within curriculum and assessment procedures driven by the agendas of differing stakeholders. Firstly (*ibid*: 82), as within adult education (c.f. Jarvis, 1995), there has been a move within professional education towards competencies, which appears to favour the tickbox mentality in covering areas of professional knowledge. Secondly, that many students have already been socialised by their previous educational experiences to expect an emphasis on propositional knowledge (*ibid*: 82). Whilst they may accept the value of process knowledge in the context of the application of propositional knowledge to practice, they are reluctant to accept the value of personal knowledge and experience. Thirdly, the dilemma of the "expertise of the facilitator" (*ibid*: 85). In the university, the teacher is seen as the expert who delivers subject expertise to the students. Yet in independent learning, the facilitator is expected to be an expert in facilitating and not provide subject expertise. A skill of the facilitator is to provide subject expertise in response to students' initiative and act as a resource for the students' learning. Fourthly, the facilitator needs to balance the needs of self, peer and course assessment (*ibid*: 86), which is a further layer of complexity to the facilitator role.

5.3. Problem based learning

In the Introduction, I described how the GPs whom I had studied for my Masters, had appeared to be offering problems up to the rest of the e-mail discussion group with a view to collaboratively solving that problem. I began to wonder whether there were any parallels with problem-based learning (PBL). PBL is an educational method that uses problems as the starting point for student learning. In medical education these problems are usually but not exclusively clinically orientated and integrate learning objectives from basic science and clinical skills. Such methods have been used since the 1960s, when a medical school at McMaster, Ontario first introduced an entirely new approach to medical education (Bligh, 1995). Evidence that PBL schools produce medical graduates comparable to those produced by traditional programmes has been sporadically produced, and concerns have yet to be assuaged that it fails to influence the development of general problem-solving skills (*ibid*). There is little evidence that it improves knowledge base or clinical performance and yet is acknowledged to be resource intensive to deliver (Colliver, 2001). Thus, students on problem-based courses are no less competent than on traditional courses but enjoy their work more. There is the suggestion that students on problem-based courses give higher ratings for humanistic areas, clinical reasoning, and preventative care and a gravitation towards family medicine compared with students on traditional courses (Albanese and Mitchell, 1993). Berkson (1993), suggests that the lack of remarkable advantages for problem-based learning can be attributed to the high expectations initially set for it in solving curricular problems that were too large for any innovation to conquer.

5.4. Educationally relevant assessment

Eraut (1992) suggests in professional education, the way courses have been designed and student assessed has more to do with power-sharing between higher education and professional bodies than any analysis of what professional education should consist of, or how any model of expertise should develop.

According to Taylor (1997: 108) there are three basic premises in the assessment of professional education:

- assessment must bear a direct relationship to the way professional practice is assessed in the workplace;
- independent and interdependent learning can be encouraged by having staff, self and peer assessment as part of the repertoire; and
- ensuring the proper balance between formative and summative assessment.

For higher education courses for professionals there may well be a selection procedure. Students are likely to have continuous assessment, with an end-point of assessment for certification. Taylor (*ibid*: 13) suggests the research is confident of assessing propositional knowledge but there is little experience of assessing personal or process knowledge, particularly in the classroom based parts of the course.

However, assessment can be kept relevant to the workplace by designing tasks individually and within groups which:

- are designed to meet the learners own learning objectives based on their learning needs (Boud et al, 1985);
- give outputs similar in content and structure to the workplace i.e. a brief report versus a 5000 word essay (Taylor, 1987:113);
- encourage the process of reflection (Schon, 1983);
- encourage students to become "critical thinkers" (Brookfield, 1986);
- encourage self assessment and self direction (Boud, 1996);
- allow presentation of the learning in differing media (Brown and Knight, 1994);
- orientate the learner towards further learning objectives (Boud et al, 1985); and
- encourage the use of self-assessment schedules or portfolios (Boud, 1996).

5.4.1.Feedback

According to Rowntree (1987:24), feedback is the "lifeblood of learning", and particularly in the initial stages, feedback is important in encouraging the student to learn for his/her own satisfaction rather than teacher approval. The independent learner provides his/her own feedback, by being "encouraged to recognise and internalise rules, standards, and strategies whereby he/she may test the validity of his own responses (*ibid*: 27). Feedback may take the form of individualised comments on work submitted, helping students formulate their own learning goals, helping students in their understanding of what reflection is and means in relation to the work. It is a communication skill central to the professional development of academic staff (Taylor 1997:118).

5.4.2. Certification

In professional education, certification for accreditation is primarily for the profession and society as a whole. It designates that the student is ready for practice, and that the accreditation procedure is valid and reliable. Failure may carry the risk for the students, to not only fail the course, but also fail to become a doctor, nurse, teacher, or social worker. In professional education, failure may not necessarily be on academic grounds, but related to skills, values and attitudes (*ibid*: 124).

The continued interplay between formative and summative assessment procedures is perhaps at the most acute at the certification stage. Within the pedagogic paradigms of a reflective teacher, qualifying is conceptualised as the beginning of practice and the start of continuing professional development, rather than an end of professional education. The problem as Taylor views it, is (*ibid*: 116) that in spite of significant degrees of innovation in the curriculum that the students see, some traditional assessment practices persist which undermine the impact of innovation. In particular, the focus for summative purposes remains predominantly on propositional knowledge and on work completed privately and individually, although work on the course may be predominately in groups with considerable emphasis on personal and process knowledge. Taylor feels that the continuity with a traditional model of

assessment reflects on a lack of specialist staff expertise about new assessment, and a lack of resources to enable any central provision in Universities to help.

However, Eraut (1994:159) feels it should be stating the obvious that any professional qualifications should indicate that aspiring professionals will be competent in the discharge of normal tasks and duties. Norman (1985) submits a list of competencies for any doctor following a methodological review for medical education:

1. Clinical skills: the ability to acquire clinical information by talking with and examining patients, and interpreting the significance of information obtained;

2. Knowledge and understanding: the ability to remember relevant knowledge about clinical conditions in order to provide effective and efficient care for patients;

3. Interpersonal attributes: the expression of those aspects of the physicians personal and professional character that are observable in interactions with patients;

4. Problem-solving and clinical judgement: the application of relevant knowledge, clinical skills, and interpersonal attributes to the diagnosis, investigation and management of the clinical problems of a given patient; and

5. Technical skills: the ability to use special procedures and techniques in the investigation and management of patients

5.4.3. Portfolio-based Learning

Portfolios are widely used in all stages of education from elementary school through to vocational and professional programmes. Inevitably, this high prevalence results in varying definitions and differences in their use. According to Redman (1994:11) a portfolio is simply a:

> tangible record of what someone has done.   This gets complicated only when limitations are imposed for when the

evidence shown in the portfolio has to conform to particular and required standards of competence.

The five aspects of the development cycle of portfolio building (*ibid*) are

- The *story* of what happened (the experience);
- The *discovery* that what happened has some significance for doing or changing things in future (learning);
- The *proof* that shows that what has been learnt is exactly as used in the workplace (demonstration);
- *Ownership*, which is when people take responsibility for what and how they develop (learning needs); and
- *Growth,* a sign that change has taking place (learning opportunities).

Portfolio building (*ibid*) is helpful because it is a tool for:

- Self development;
- Assessing prior learning;
- Gaining accreditation;
- Sharing good practice;
- Evaluating training;
- Enhancing performance; and
- Changing culture.

The relevance of portfolios within an organisational context is because, in a culture of constant change, workers must demonstrate:

- Flexibility;
- Self motivation;
- Communication skills; and a
- Willingness and ability to develop new skills (*ibid*: 15).

The portfolio must be the worker's own property. Whilst they may show parts of the portfolio to someone else for accreditation purposes, what goes into the portfolio is entirely up to them. Learning needs should come from their own significant experiences from work, play, or life events. The mentor will maintain a code of confidentiality providing the support needed for the individual to develop a portfolio for the purposes agreed (*ibid*: 23). Portfolios for professionals use the same process but in the appropriate application.

In an educational setting, portfolios have arisen as an innovation within assessment (McLaughlin and Vogt, 1996). Thus, the portfolio offers:

> Multiple indicators of student progress, encourages students to take an active role in their learning, affords teachers new roles in the assessment process, and encourages students to demonstrate what they know in ways that encompass their personal learning styles *(ibid:* 9)

These authors argued that portfolios integrate a number of current theories of learning and teaching:

1. Constructivism: Learners construct meanings of their world through a connection between what they know through experience and what they are learning.

2. Social Negotiation and the Zone of Proximal Development: Learning is 'scaffolded' by more experienced people. The 'Zone' represents the difference between what learners are able to do alone and what they can do with the assistance and support of others.

3. Schema-Based Learning Development: Learning takes place when new information is added to prior knowledge. Thus, educators build background knowledge for those learners with little previous experience of what is to be learned.

4. The Reflective Practitioner: learning to teach and improve through ongoing reflection about their practices and students based on Schon, (1987).

Portfolios are both a process and a construct (McLaughlin and Vogt, 1996). The processes are those of innovatory assessment, the construct refers to the folder, binder, or notebook where the assessments are collected. The reliability of portfolios *(ibid:* 69) as an assessment method is increased by educators ensuring:

- Portfolios are prepared to respond to a standard task or set of tasks;
- The possibilities of portfolios need to be tied in with course goals;
- The course goals need to be reflected in a modernised curriculum;
- Portfolios use multiple indicators of student learning eg discussions, evaluation sheets, presentations etc;

- Clear instruction and time in learning how to prepare portfolios.

The validity of the portfolio process (*ibid*: 70) is ensured by:

- Access to complex variables that contribute to student learning;
- Grounding in real work rather than artificial performance testing;
- Demonstration of completion of learning circles through planning, doing and reviewing learning;
- The experience of evaluating portfolio's on a large scale.

Their predominant use in medical education has been for formative assessment, often being a vehicle for encouraging a component of reflection. Challis, (1999) neatly summarises the steps required for this model of doing a portfolio:

- Develop a framework and documentation for portfolio;
- Establish means for supporting the learner during portfolio development;
- Introduce portfolio to learners;
- Develop individual action plan;
- Identify sources of evidence of learning appropriate to identified learning needs;
- Gather and document evidence of learning;
- Monitor progress;
- Assess/review portfolio; and
- Report results to appropriate bodies.

More recently the use of portfolios has been advocated for summative purpose for example in undergraduate education (Davis et al, 2001) and for revalidation of doctors (GMC, 2002).

Over the last 20 - 30 years, there has been increasing awareness of the need to develop new assessment tools and use them in a way which ensures a high degree of validity and an acceptable level of reliability. In the area of assessing clinical competence, guidelines have been developed for devising quality procedures (Newble, 1994). While achieving a high level of reliability may not be critical where the main purpose of use of the portfolios is for formative purpose, once they are proposed for high stakes decision-making,

such as for final students' examinations or revalidation, then evidence of sound psychometric properties needs to be established.

In the recent review of portfolio-based assessment by Friedman et al (2001), issues of reliability were briefly discussed. In the medical education setting there would appear to be few papers which have provided psychometric data, mostly from small-scale studies (Pitts et al, 2001, Davis et al, 2001). The focus of these studies was 'rater' reliability and conclusions were not very reassuring for psychometricians falling well below the generally acceptable value of 0.8. Importantly, other aspects affecting reliability have not been investigated. In the area of assessing aspects of clinical competence and problem-solving generalisability studies have shown consistently that content specificity is a major contributor to unreliability, more so than marker related factors (van der Vleuten, 1996). In essence, this means that a large sample of performance has to be tested before reliable generalisation about ability can be made. This has led to the understanding that OSCE examinations have to be long to be reliable, irrespective of whether the structured rating forms and training reduce examiner variance. It is inevitable that similar problems will beset portfolios, particularly ones that may allow considerable variability in the content to be included, yet no generalisability studies have been published which allow a judgement on the likely extent of this problem in determining reliability.

In view of the lack of evidence underpinning the widespread implementation of portfolio-based assessment in medical settings, what lessons are there to be drawn from the wider educational literature? The most comprehensive reviews are in the field of elementary education (Koretz 1998, Le Mahieu et al 1995, and Herman et Winters, 1994). There are a number of concerns which have been raised around the issue of reliability. The consistency of scoring between examiners across a range of studies has been highly variable. Whilst the high face validity of portfolios is not contested, criterion validity has also proved disappointing in that scores from portfolio assessments do not seem to correlate well with scores from other methods of assessment. However, these studies suggest that there are some general principles which can be used to guide large-scale portfolio based assessment. To achieve high levels of inter-rater reliability of around 0.8 (Koretz, 1998, Herman and Winters, 1994)

portfolios should be carefully introduced to well-prepared students, and should have a uniform content. Experienced trained scorers, who use clearly articulated criteria, and have a shared understanding of the purpose of assessment and a deep understanding of student performance, should mark them.

However there are a still a number of outstanding issues that need further research. Firstly the one of fairness. For example, how is one to ensure the material (evidence) in the portfolio is attributable to the person submitting it? Secondly, there are unresolved concerns about the cost and feasibility. Thirdly, there will be the effects on learning and teaching when implementing portfolio for institutions. Educators need to ensure they assess what they want learners to learn (van der Vleuten and Newble, 1995). If the assessment criteria for portfolios are not well thought out, students may inadvertently be directed away from intended purposes and outcomes by the portfolio process.

An example of this will become apparent when an attempt is made to use the same portfolio for appraisal and revalidation. The former process is primarily intended to be formative encouraging people to identify areas in which they could improve and plan how they might rectify deficiencies. The latter process involves an assessment of performance and may potentially have detrimental outcomes. Thus, it is a summative purpose and the person undertaking it is highly unlikely to willingly present a portfolio identifying their weaknesses.

In regard to portfolios, the evidence backing the widespread introduction for high stakes summative assessments such as revalidation is thin to say the least and many gaps are evident. Caution is advisable while at the same time institutions and organisations who are introducing portfolios should be strongly encouraged to take a research based approach and publish their data of validity, reliability, feasibility and effects on student learning.

5.5. Continuing professional development

Eraut (1994) notes that professionals continually learn in the workplace, because their work entails engagement in a succession of cases, problems or projects that they have to learn about. However case specific learning may only be of value where cases are regarded as special rather than routine and time is deliberately set aside depending upon its significance, integrating it into the professionals evolving theory of practice. The term "continuing professional education" (CPE) usually refers to formally organised conferences, courses or educational events rather than work based learning, while the term "continuing professional development" (CPD) refers to both. Eraut (*ibid*: 12) is concerned

> that even when CPE and CPD are strongly supported the emphasis is likely to be on preparing for organisational change or career development and new aspects of professional work, rather than improving the quality of current professional performance.

At its worst CPE becomes just another strand of separate, unintegrated and therefore minimally useful, professional knowledge. Any framework for promoting and facilitating professional learning all have to take into account:

1. an appropriate combination of learning settings (on the job, near the job, home, libraries);
2. time for study, consultation and reflection;
3. the availability of suitable learning resources;
4. people who are prepared (i.e., both willing and able) to give appropriate support; and
5. the learners' own capacity to learn to take advantages of the opportunities available.

In this chapter I have described a range of teaching and learning strategies that might support CPD, exploring aspects of curriculum planning, teaching and learning methods, assessment and the learning environment. I have emphasised the nature of assessment because 'Assessment is fundamental to teaching. Get the assessment right and the teaching, by and large, follows'

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(Brown and Knight, 1994: 149). There is a clear challenge in getting the purpose of portfolio-based assessment right.

I have illustrated some of the challenges of getting that purpose right within a debate amongst educators of professionals who promote a competency-based approach and those promoting a reflective practitioner approach.

Chapter 2 - Education and Governance

1. Education in Primary Care

Having reflected in some detail on learning and assessment processes, which might underpin continuing professional development and portfolio-based assessment, I want to look at the current context of primary care education, in which they processes are becoming embedded. Secondly, I will explore how the evolving clinical governance agenda is shaping CPD in primary care. Thirdly, I will investigate two aspects of the clinical governance agenda, health informatics and evidence-based practice which inform both the subject content and learning processes in the first action research cycle.

1.1. General practitioners and continuing medical education

The maintenance of good clinical practice for general practitioners has become a priority (Smith et al, 1998). Recent proposals from the General Medical Council on revalidation (GMC, 2002), from the Government for clinical governance (NHS, 1999a), and from the Chief Medical Officer (DoH, 1998) for CPD, demonstrate the central importance of continuing professional development as a vehicle for delivering education and training. The same documents also recognise that clinical performance is dependent on a good practice team.

The imposition of the 1990 contract (DoH, 1989) was a concrete experience (c.f. Kolb, 1984) that produced much reflection within the general practice literature as the system for professional development changed from a voluntary system of keeping up to date. From 1990, the postgraduate education allowance (PGEA) obliged GPs, who were principals to participate in an average of five days (30 hours) of approved continuing medical education (CME) activities per year. To receive the fee for the claim, GPs were expected to have attended a balanced programme of education to include disease management, health promotion and service management. Whilst 95% of GPs claimed their PGEA (Murray et al, 1991) the typical format of a PGEA session was a lunchtime meeting at a postgraduate medical centre, with the speaker most often a consultant from secondary care

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delivering a lecture. With the marketisation of the NHS, the typical setting changed to evening meetings, with sponsorship from pharmaceutical companies (McKnight and Bradley, 1996).

Noting that the uptake of CME activities often matched what had been provided in the form of PGEA meetings, there was much concern as to whether CME activities achieved any real learning (*ibid*). Non-attendees (Murray et al, 1991) were more likely to be those in small practices or in practice for over 30 years. However, in defence of CME, some older GPs preferred the lecture format (Kelly and Murray, 1994).

Locally based GP tutors were appointed formally to administer the PGEA system. Prior to 1990, their role had been largely a voluntary one, usually dependent on a traditional postgraduate centre based education programme. A survey of tutors in England showed that over 80% described the organisation of continuing education as their commonest activity, but over half were unable to fulfil all the tasks, with lack of time cited as the main obstacle (Singleton et al, 1999).

1.2. Non Principals

Not all GPs are principals and Baker al, (1995) have identified the so-called "lost doctors". These are all qualified as general practitioners, but are not working as a principal with their own list of patients. There may be as many as 6,000 within England and Wales compared with 24,000 principals. They are reported to be typically women, mean age 39, well qualified, with clear educational needs, but possibly lacking in confidence or are too inflexible because of domestic circumstances to commit to a traditional principalship. Non-principals were not eligible for PGEA, and there have been local attempts to provide educational resources for them (*ibid,* 1995) but this may change.

1.3. GP as a reflective practitioner

Since the 1990 contract (DoH, 1989), there is evidence of other forms of activity based on the reflective model delivered within the setting of small

groups of practitioners. Miller et al, (1998) acknowledge the themes emerging from the general educational literature as being central to the progressive growth of understanding and competence in established professionals. There is a recognition that there needs to be progress by individuals from educational dependency to autonomy requiring active participation, a sense of curiosity, ambition, and recognition of the need to learn. Miller, et al (*ibid*) feel that individual professional development requires both motivation to learn, and a process of learning based on the opportunities arising from the challenges of professional practice (*ibid*). Al-Sheri (1995) is confident that the gap between theory and practice, that is the failure of continuing medical education to produce changes in practice, can be addressed by encouraging GPs to be reflective. He claims that there is clear evidence for the greater effectiveness of this model over traditional education, but emphasises the need for good facilitation to allow practitioners to reflect on their shared experience. Although GP educationalists have explored the reflective model, for example in small group work in a practice setting (Hasler, 1991), much work needs to be done on operationalising the terminology of reflective practice in primary care, to allow valid comparisons of qualitative studies.

Handysides (1994) suggests that for learning to occur both educational and professional support is needed and mentoring can best provide this, and there have been several small-scale studies looking at this. Freeman (1997) describes a four-year mentoring scheme. The mentors are defined as:

> professionally experienced and respected peers prepared to set aside their own agenda and offer time and attention to the development of the mentee. The relationship between a mentor and mentee is voluntary and confidential but formal, with mentees being allocated to a mentor rather than paired informally.

The aims of the mentoring scheme in South Thames NHS (*ibid*) were to offer continuing education, personal support, and professional development. The primary benefits from the scheme appeared to be:

- the continuity;
- the supportive nature of the mentoring relationship enabling mentees to achieve a robust sense of professional identity;
- empowerment to take control of their own lives;
- the chance to rationalise work and personal pressures; and
- the opportunity to formulate and implement change in their working lives (*ibid*).

However if learning is to occur in a planned setting then the model of the reflective practitioner needs to be set in a framework whereby the learning can be accredited and evaluated (Mathers et al, 1999).

The emerging framework of portfolio construction for reflective practitioners has three elements:

- learning objectives: what the practitioner needs to learn to change their practice in a desirable direction;
- justification: the proposed planned learning methods to meet the objectives; and
- the evidence: the documentation supporting the claim for accreditation (*ibid*).

The underlying principles of this model is articulated in "Portfolio Learning," (RCGP, 1993) which acknowledges the work of Kolb (1984) and Boud et al, (1985). The concept of 'portfolio learning' should be seen as a continuum with the personal learning plan (Al-Sheri et al, 1993) at one end and a reflective portfolio (Mathers et al, 1999) at the other. The personal learning plan (PLP) has been introduced on a local basis and on a regional basis in Scotland (Valentine and French, 1998). In the latter model, which evaluated positively, practitioners received a learning needs matrix and an action plan. During a visit from a GP educationalist (an adviser to the postgraduate dean) from the postgraduate medical education department, GPs were encouraged to put in the matrix the subject area they would like to study and also the method they would like to use eg audit, practical skills etc. A clear message in the evaluation was that the GPs wanted the paper work kept to a minimum (*ibid*).

In a differing approach, Al Sheri (1995) asked GPs in Liverpool to keep a personal learning journal. Using facilitation by local GP tutors, three types of approaches by the GPs to personal learning journals were identified. Firstly, what Al-Sheri labels as descriptive, GPs who were more likely to keep a simple log detailing educational activities. Secondly, "analytical GPs", who were more likely to keep a diary of learning experiences and some reflective content. However, "evaluative GPs" were more likely to keep a reflective journal. Al-Sheri (*ibid*) suggests this spectrum of learning activities is predicted by Bloom's Taxonomy (1956) and facilitation may encourage GPs to move in successive years from simply recorded logs of activity to journals including reflective writing as they mature as reflective practitioners demonstrating 'synthesis' and 'evaluation.' Whilst Al-Sheri (*ibid*) does not indicate how long this process might take, he does suggest caution in interpreting studies completed within a year.

A further approach, as described by Challis et al, (1997) and Mathers et al, (1999), finds the teacher evolved into a co-mentor. In this model, groups of self-selected practitioners underwent self-directed and planned programmes of education. They formed groups of about ten GPs with a GP tutor from the postgraduate centre assigned as the facilitator. The GP tutors, who were also encouraged by the organisers themselves to complete a portfolio, offered three meetings per year for participants. At the first meeting, the GPs shared their initial statement of learning needs to set three or four learning objectives and then formulate a learning plan to meet these objectives. Midway through the year a second meeting looked at what had been achieved and any changes that might be needed to update the learning plan. The final meeting facilitated the writing up stage of the portfolio and submission of the evidence of learning for accreditation.

Snadden and Thomas (1998) and Snadden at al (1996) have explored the development and use of portfolios with a community of registrars and GP trainers in Dundee using an action research methodology. Although not clearly stated (*ibid*) they claim "trustworthiness" for their study which is a term usually associated with naturalistic inquiry (c.f. Lincoln and Guba, 1984). Using extensive interviews and field testing of a portfolio package, Snadden

and Thomas, (1998) outlined what in their view a portfolio should contain. Their list includes:

- critical incidents of events with patients;
- a reflective journal or diary;
- tutorials and learning plans, and reflection on them;
- routine clinical experiences;
- exam preparation material;
- video recordings, consultations and other relevant material;
- audit or project work;
- critical reviews of articles;
- feedback material; and
- management material.

Similar lists of tools to help learners identify their own learning needs can be found in Grant et al, (1999). One of the most useful tools which may facilitate the move towards the reflective practitioner, and be a useful way of turning experiences at work into a reflective piece suitable for a portfolio has been the 'critical incident' (Mathers et al, 1999). First described by Flanaghan (1954) in relation to aircraft pilots and accident prevention, the model has been severally refined as a research and an educational tool. For example within medical education research Allery et al, (1997) used the critical incident technique to describe the complete range of factors which doctors recognise as changing their clinical practice and provide a measure of how often education is involved in change. They found that traditional education was involved in about a third of changes in clinical practice. In reflective learning, the critical incident provides a useful framework for turning experience into an opportunity for learning. It is thought to encourage movement around the reflective learning circle (Boud et al, 1985).

However as I discussed in Chapter 1.5.4.3, there are issues within the wider educational community as to how portfolio-based assessment should be addressed, and medical education is no different. At the time of writing the only psychometric treatment of data relating to portfolio-based assessment research within medical education is that by Pitts et al, (1999). The paper looked at the characteristics of the portfolios prepared by 13 prospective GP

trainers based around a new trainers course, which ran on five day sessions over a period of four months. Eight assessors who were established trainers devised the assessment criteria. Although recognising that a consensus based on a deep understanding of learners' performance will only emerge through more experience, the authors examined the portfolios for:

- evidence of 'reflective learning';
- awareness of 'where they were';
- recognition of effective teaching behaviour;
- ability to identify with being a learner;
- awareness of educational resources; and
- drawing conclusions, overall reflection on the course and future career development.

Marking was done on a pass/refer basis for each individual criterion and a global pass/refer mark for the portfolio. Kappa was used to check agreement. Inter-rater reliability was slight to fair (Pitts et al, 1999). The study is clearly valuable in that it at least marks the beginning of an understanding of the psychometrics of portfolio assessment. However, if we apply the criteria (see Chapter 1.5.4.3) set out by Herman and Winters, (1994) for reliable and valid portfolio assessment then it would appear that this scheme met few of them. Davis et al, (2001) describe a much more ambitious portfolio assessment project where the final year of Dundee medical school had part of their final exam replaced by a portfolio assessment. At the time of writing only data related to the evaluation has been published, but data on the reliability and validity are expected in the near future (D.Newble, personal communication, 2001). These basic principles should help portfolio-based learning and assessment gain its own unique place in the range of processes available for primary care education and beyond (Challis, 2001).

1.4. Nursing Education in primary care

Nursing education would appear to offer several contributions to the development of theory and practice of postgraduate education for doctors. This is both in terms of nurses' wider experience with reaccreditation, reflective practice and portfolios but also in terms of exploring the potential for

multi-professional working. In primary care, there are three broad types of nursing roles. A practice nurse is someone who works with the GP and is responsible for implementing prescribed programmes of care, working under the supervision of the GP. The nurse practitioner, on the other hand, is usually qualified to degree level and works autonomously alongside the GP colleague (Lenehan and Watts, 1994).

Building on project 2000, community nurses are employed by community trusts and increasingly, able to train to degree level. Other policy initiatives to encourage the potential for nurses to explore the boundaries of their existing practice include the White Paper, Primary Care: Delivering the Future (DoH, 1996). Community nurses need a number of skills to keep up to date including: developing skills for critical appraisal of the relevant literature; contributing to the development of new knowledge through research; and teaching, so that the enthusiasm with which they aim to develop good-quality, evidence based care can be shared with those seeking to enter primary care practice (Pearson and Jones, 1997).

1.41 The Nurse as a reflective practitioner

The nursing literature taps the same vein of educational literature, drawing on for example Dewey (1938), Schon (1983), Kolb (1984), and Mezirow (1981). There is an ongoing debate about the nature of good nursing, and of professional knowledge and about how this can best be taught and learnt.

Benner (1984) describes the "wealth of untapped knowledge embedded in the practices and know-how of expert nurse clinicians." She suggests that for this knowledge to expand and develop, nurses need to record systematically what they learn from their own experience. Benner warns that if nurses only record their actions, rather than their learning from their actions, then clinical skills, intuitive decision making, and clinical expertise will continue to go unrecognised and the knowledge base of the discipline of nursing will not develop. Once nurses have completed their initial training and achieved registration, then post initial and continuing education should be based on a reflective model. To address the transition of a nurse from novice to expert,

within a speciality area, for example urology or community, Benner, drawing on Schon (1983), suggested guidelines to bridge the gap between the theory (reflection on practice) of the novice and the practical skills of the expert (reflection in practice).

This model forms the theoretical framework of the post registration education programme (PREP) for nurses (UKCC, 1990). Within this system all nurses, midwives and health visitors are required, for the purposes of re-registration, to develop and maintain a personal professional portfolio (Kelly J, 1995). A profile is a selection of evidence from the portfolio, which can be used for example to support recognition for the accreditation of prior learning (APL), or to support a career move (ibid). Preceptors, who are trained in mentoring skills, provide support for the process. Benner (1984) has provided eight categories of nursing on which to base learning objectives:

- Caring/helping role;
- Assessment and planning of care;
- Administering and monitoring therapeutic interventions;
- Management of specific clinical problems;
- Monitoring and ensuring quality of healthcare;
- Teaching and coaching role;
- Effective management of change; and
- Organisation and work role.

Jarvis (1992) admits that in examining reflective practice for professionals such as nurses, theories of action are 'extremely complicated'. As elsewhere there is a debate between the relation between theory and practice in nursing, and the tensions created by health service demands for efficiency and the needs of the reflective nurse for professional development. Jarvis claims that there is no substantive theory of practice (ibid) for nursing. The idea behind reflective practice, he asserts is that 'actions are carefully planned in relation to the theory known to the professional, unconsciously monitored, so that the outcomes of the action will be beneficial to the patient'. He feels that much so-called reflective practice within nursing is merely thoughtful practice.

Professional practice has a number of features (*ibid*). It is about meaningful conscious action in a specific field, seeking to learn from practice and so improve constantly, and so become experts. It is an occupational field in which actions are repeatedly practised. Expertise is gained through successful practice. Experts are those who have acted frequently within a specified field of practice and know that the level of probability in their practice is recognised but restricted because of their own knowledge and expertise. Jarvis suggests that experts have done it all many times before and that there is the risk of what Berger and Luckmann (1967) have called 'habitualisation', by which experts take things for granted. Whilst the novice may be creative and experimental, after constant repetition of tasks, professionals become increasingly unthinking, resulting in ritualistic behaviour and alienation. Schon (1983) called this the 'paralysis of action'. Berger and Luckmann (1967) add the concept of non-action in response to experience. In this model, actors may not know how to respond, they may be prevented from responding by other people or circumstances, or they may simply not respond at all. For Jarvis (1992) good reflective practice begins at the point where the taken-for-granted is questioned so that potential learning situations are generated. This might for example be where anticipated clinical outcomes have not occurred. Nursing managers and trained nursing mentors need to recognise when professional performance has become habitualistic, and use their knowledge and skills to create situations where reflection can occur. Professional performance can be kept fresh with creative and experimental action where knowledge gained through reflection is constantly adding to the professional's body of theory (*ibid*).

1.4.2 Writing nursing portfolios

Paterson (1995) reviews some of the literature on reflective writing for nurses, the common problems, the reasons behind them, and ways to make it a better experience. Not all students respond positively to journal writing as a learning tool. Some students complained bitterly about the requirements of regular writing. Others begin by writing enthusiastically but after several weeks, they become noticeably indifferent to the activity. Some see journal writing as like an examination or writing a paper but not worthy of the attention or effort

entailed. A common occurrence is procrastination about writing journal entries resulting in inadequate or omitted entries. Patterson (*ibid*) claims that not all students are capable of reflection, some failing to understand what is expected in journal writing, producing non-reflective entries about what they did in the clinical day. Students vary in acquiring reflective skills and these may be influenced by cultural and gender factors as well as the availability of reflective role models. Students vary in their personal interests and so as a consequence does their motivation for reflective activity. Students also vary in their self-esteem.

There are problems in assessment of written journals (*ibid*) and in the processes of facilitation by teachers. Students know they are being assessed. They are affected by past experiences of the process, their perceived trust in the teacher, and students are concerned at failing the clinical part of the course. Not all students are clear about the purpose and expectations of a journal, and its relationship with the clinical course. Teachers may be failing to make clear the aims and objectives of journal writing (process aims) prior to an assignment. Teachers may be failing to make clear the link between journal entry and course objectives (content aims). Teachers and organisers are undecided whether journals should be assessed. Some feel it should be to motivate, others feel it should be to promote true reflection. There are carrot and stick approaches to improve journal writing. The carrot is through offering sensitive facilitation from teachers, a more flexible structure with more learner centred learning objectives, clear written information from teachers about the how, why, and when and what of journal writing. The stick is making journals a part of summative assessment with the assessment criteria set at completeness and effort (*ibid*).

1.5. Evaluation of the reflective model within the NHS

Mathers et al, (1999) are confident that the co-mentoring approach to portfolios is an effective and efficient form of education where the outcome measures are changes in practice. We have seen that the reflective model has been evaluated in pilot schemes, often by the teachers who developed

the schemes. This form of action research is deemed highly appropriate to develop practice towards becoming a reflective teacher (Hart and Bond, 1995). However as in all professional education, there are a number of other stakeholders within healthcare who need to be satisfied as to the nature and quality of professional education. These include professional bodies such as the UKCC, the GMC, the Royal Colleges, the government, and the public. Ultimately at this level, the effectiveness of education is measured by the degree of change in physician behaviour towards the goals of the healthcare organisation (Davis et al, 1995), now set by the clinical governance agenda, However, there is a global debate as to whether any methods of continuing medical education are particularly effective in meeting the goals of healthcare organisations (Davis et al, 1995). This debate focuses on whether particular educational initiatives can be statistically shown to be superior in instituting physician change in a randomised control trial, that is empirical methods. An approach which develops reliable and valid assessments of learning, for example portfolio-based assessment may satisfy a wide range of educational stakeholders

As I stated in (1.5.4.3), the pragmatic approach to evaluating portfolio-based learning is to first define the purpose of the portfolio. A clear educational aim will give rise to an appropriate assessment procedure. As the debate within the medical educational literature stands, if the purposes are formative then the portfolio should be personal and linked in with an appraisal scheme. If the purposes are for high stakes summative assessment, then the portfolio has to have objectives set which are both measurable and lead to the desired outcome of improved performance of the individual. In the first and second cycles research the purpose of any portfolios would be formative.

1.6. Proposals for re-accreditation for doctors

It was initially suggested that a revalidation system for all doctors would be up and running by 2001 (Pringle, 1999a). Much work needed to be done to develop and implement a precise mechanism but, according to Pringle, validation would require a system that:

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- had the support of the profession;
- is a positive experience for the majority of good doctors helping them to develop their skills and services;
- works and is practical.

Much experience is available from models developed overseas, for example Australia (Newble et al, 1999), and America (Norcini, 1999). Work done by the Royal College of General Practitioners (RCGP) has developed a number of ways in which quality of care can be identified in general practice. Examples include:

- the system for the appointment of trainers and training practices;
- examination for membership of the college (MRCGP);
- Fellowship by assessment of the college (FRCGP); and
- Quality Practice Awards.

Revalidation is seen as a light touch approach to professional self-regulation for doctors. However, for those doctors whose performance gives course for concern there are performance procedures which could result in the removal of the doctor from the medical register (Southgate et al, 2001).

One interesting model in which revalidation for GPs may be proceed is described by Rughani (2001). In his model the cycle of identifying learning needs with a tutor to develop and monitor a personal learning plan is integrated with an appraisal system to ensure that revalidation criteria are met.

1.7. Professional and practice development plans

Professional and practice development plans (PPDP) are designed to fill the gap between continuing medical education and professional practice development. The review by the Chief Medical Officer (DoH, 1998) was a response to the criticism that the postgraduate education allowance had been based on an educational model, which is didactic, uni-professional and top down. It rarely involved the whole practice team and showed little evidence of any convincing benefits to patient care. PPDPs are a hybrid approach, which combines documented personal learning within an organisational

development framework. They are likely to call for the construction of learning portfolios for all the practice team (doctors, nurses, and managerial staff) which take account of the development needs of the working unit as well as the individuals within it. The development plan is therefore a combined systems approach to change management with self-directed learning. They represent a gradual shift away from individual to organisational performance as a proxy measure of quality. The involvement of patients could strengthen the process, ensure local responsiveness, and guard against the loss of personal care. The benefits of development plans are thought to be; in improving teamwork; measuring the achievement of planned priorities; linking the professional development of individual practitioners to an organisational development strategy; and an effective lever for change in primary care. Obstacles to successful implementation are thought to be the multiplicity of procedures of educational accreditation, particularly within nursing. To ensure the success of PPDPs, there needs to be clarity as to which organisational structures are to facilitate, maintain, and appraise development plans. There needs to be sensitivity to the needs of part-timers and single-handed practices (Elwyn, 1998).

2. Governance

So far, I have looked at some of the issues in portfolio-based learning that affect the continuing professional development of general practitioners and their colleagues in primary health care. In particular, I have focussed on the tension between portfolios as something measurable versus portfolios which promote reflection, set against a background of approaching revalidation. Next, I will consider some of the ways in which the content of portfolios might be set by the agenda for clinical governance. From there, I will look at how aspects of clinical governance might be taught and assesses in the context of primary care development

A central theme of current UK health policy is quality. The government's white paper, A First Class Service' (NHS, 1999) outlines a new commitment

whereby, for the first time, all health organisations will have a statutory duty to see quality improvement through clinical governance. It is suggested that new approaches are needed to enable the recognition and replication of good clinical practice to ensure that lessons are reliably learned from failures in standards of care (Scally and Donaldson, 1998).

A vital component of quality and therefore of clinical governance in relation to health services is effectiveness: doing more good than harm (Maxwell, 1984). At the level of service delivery, clinical governance entails the application of best practice, and this requires systems for evaluating clinical effectiveness, for evidence-based practice and for quality assurance through clinical audit. At the level of management, it involves systems for service delivery monitoring, the power to address poor performance, and quality improvement systems which will link together leadership and staff involvement (Scally and Donaldson, 1998). For these systems to work within an organisation the size of the NHS, there will be a need for devolving of control involving local professional regulation. At all levels, there will be a need for significant and continuous professional development and training to achieve these initiatives (*ibid*). For general practitioners the relationship between continuing professional development, clinical governance and revalidation is just beginning to be explored (Pringle, 1999b).

	CPD	Clinical Governance	Revalidation
Reflection: identifying strengths and weaknesses in service delivery.	✓	✓	✓
Education: acting upon the information gained through reflection	✓	✓	✓
Professionalism: adhering to '*Good Medical Practice*'		✓	✓
Communication: competency in communication skills			✓
Performance Indicators: monitoring at PCG level on prevention, prescribing, referral, chronic disease management, availability, patient satisfaction etc.		✓	✓
Cost Effectiveness: making the best use of resources		✓	

Figure 2-1 The inter-relationship between continuing professional development, clinical governance and revalidation Source: (Pringle, 1999a).

In strategic educational terms, if we accept that clinical governance is the 'system of systems' then continuing professional development is the process by which health professionals will learn about and apply clinical governance. The submission for revalidation (*ibid*) is then a record, or portfolio, that might consist of:

- evidence of the learning needs related to practice, being recognised, and met by appropriate methods;
- evidence of competency in communication skills;
- externally held (by the Primary Care Group) performance indicators.

However other commentators have suggested there needs to be a gradual shift away from individual to organisational performance as a proxy measure of quality (Elwyn, 1998). At the time of writing, much more understanding is needed to ensure a proper balance between protecting the public from poor doctors, developing the skills of all doctors, and quality assurance for monitoring and developing service delivery.

The evolving strategy for Clinical Governance continues apace, and it is clear that much work needs to be done on operationalising the many concepts involved to make it an integrated 'system of systems.' There are two 'systems' within clinical governance, firstly health informatics and secondly evidence-based practice. I will describe how these two 'subject areas' will become the basis of course materials for an educational intervention within a networked learning environment. It is important to establish some of the principles and assumptions on which these disciplines are built as they illustrate ways in which their teaching and learning should be approached.

3. Health Informatics

Eraut and du Boulay (2000:95) summarise their findings exploring the role of information technology and the attributes of professional judgement and competence in medicine:

> A great many systems have been developed for various aspects of training, but most come up against the consistently hard problem of having the system monitor, evaluate and react sensibly to the learner's attempts to master a skill or solve a problem. Decision support systems have had a mixed reception over the years, but seem to be growing in acceptance as just another tool in the doctor's armoury. Researchers foresee an increasing delivery of "processed data", e.g. about treatment options, at the point of care delivery, and the increased dependence of practitioners on validated and trusted databases rather than the primary (journal) literature. The anticipated coming together of evidence-based medicine and clinical information technology will provide the practitioner with what ever information is needed at the time and place where it is needed.

Medical informatics is a discipline, which is concerned with the systematic processing of data, information, and knowledge in medicine and health care, and addresses computational and information aspects of processes in medicine and health care (Haux, 1995). Wyatt (1996a) emphasises its application to support clinical research, decision-making and practice. In an environment where health care is increasingly patient/client centred and team based, health care professionals are encouraged to use the term "health informatics" rather than medical or nursing informatics.   The terms 'Information Management and Technology (IM&T)' or 'Information and Communication Technology (ICT)', are taken to mean the same as health informatics (NHS, 1999d).

3.1. Health Informatics in Primary Care

An overview of how emerging information technologies will support patient care in the NHS in the white paper 'The New NHS' (NHS, 1997). Not only will electronic patient records be available via the NHSnet, but also primary care will be able to book appointments on-line, and have access to specialist advice. Telemedicine will ensure that such networks cover all parts of the country. Administration will become highly efficient through accurate information on finance and performance. Patients will not be excluded from the revolution but will be encouraged to develop their own web sites, even digital TV programmes, to promote health, and improve knowledge about illness and its treatment.

A refinement of the IM&T strategy sets out three aims in achieving its goal of a better health service for the nation (NHS, 1998a):

- Ensuring that services are of the highest quality and are responsive to the needs of the patients. This involves the flow of personal health information needs between health authorities, hospitals and GPs.

- Ensuring effective targeting of health services to improve the health of local populations. This requires collated information on health needs and clinical outcomes.

- Improving the efficiency of the services so that as many well targeted effective services as possible are provided from available resources.

The benefits of this strategy to clinicians were stated as:

- Focusing patient contact time on diagnosis and the provision of care;

- Improving the availability of appropriate information for each patient encounter;

- Reducing the amount of information lost;

- Increasing the availability of information across primary, secondary and community settings ;

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- Improving the timeliness, availability and analysis of information and supporting decisions; and

- Enabling better targeting of appropriate patient care.

The NHS IM&T strategy is currently based on *systems integration* (*ibid*) and the primacy of the "electronic patient record" which can be shared across the NHS in a secure and confidential way. Weed (1968) described a model of a problem-orientated approach to medical records 30 years ago. He called for:

- Consistent structured recording of medical data, at the time of the consultation by the physician;

- The use of clinical protocols, such as one for diabetes; and

- Audit of records, to ensure efficient, effective and economical patient care.

There is a growing body of literature refining this model to develop a working electronic patient record (Purves, 1996). Whilst much has been invested in the NHSnet to deliver this model, much controversy remains about the security and confidentiality issues (Anderson, 1995, Mitchell, 1997) of sensitive patient information travelling within electronic networks. The Department of Health's response was to set up the Caldicott committee to review all flows of personal health information other than for patient care, research and statutory notification. The committee found that all the information flows it identified were for justifiable purposes, although in some cases it argued that less data should be used (DoH, 1997). Sixteen recommendations where made, including the establishment within each health organisation of a 'Caldicott Guardian,' responsible for safeguarding the confidentiality of patient information. The debate as to whether the NHSnet confers confidentiality continues (Kelly, 1998).

Amongst the critics of the *systems integration* approach, typical of the NHS, is Morgan (1989, 1997). In his view "technology favours small scale, experimental, step at a time projects". He further adds that "rather than developing large-scale, total systems engineering approaches based on clear pre-designs, organisations will develop user driven approaches that achieve

consistency and integration of technical and data management systems. (*ibid*: 1989)" This suggests the NHS IM&T needs to incorporate a more 'bottom up' than 'top down' approach to primary care informatics. That is listening to primary health care teams and their patients, and assessing what their educational and support needs are. One approach to developing a networked learning environment embedded in primary care is to assessing what the needs of primary healthcare teams. To some extent this 'scoping' exercise has been done (Nestor, 2000) for a virtual classroom for all NHS staff who might wish to access education and training in health informatics.

3.2. Information culture at the practice level

How ready is primary care for any IT revolution of working practices? At a practice level Gilligan and Lowe (1994) argue that a successful IT strategy is strongly linked with the central issue of improving care to patients. A more comprehensive information management strategy is put forward by Wood et al (1995). They argue that successful implementation of a practice-based strategy might be done by giving one person or small group overall responsibility for developing the practice IT strategy. However, they emphasise that many of their guidelines relate to communications and information management rather than information technology. This draws an important distinction between the management of information and the technology used to process the information. Thus, information management and technology guidelines are helpful even to practices that are not yet fully computerised. For good information management practice, practice managers need to consider the 'people' and the existing paper based systems (*ibid*).

3.3. Quality of data and primary care

The thrust of quality assurance is as Davies and Crombie (1995) put it:

> Every one wants information on clinical outcomes. High quality
> care should be reflected by good outcomes. Therefore, poorer
> outcomes should indicate deficiencies, including missed
> opportunities or wasted resources.

The authors cite examples of the large body of literature that support this view. So far, there is no clear evidence that primary care has the necessary

components of data quality to provide quality information. Practice computing is not without its problems. Liaw (1994) has identified several including 'unreliability of data collection ... ill defined responsibility and accountability in the multidisciplinary care team, controversial standards and guidelines in general practice, personal and opportunity costs incurred in keeping records, reduced patient contact times, and poor administration and organisation'. Such disorganisation suggests that for many practices new strategic directions from above, for example directives to collect specific types of information will add to the chaos. For such practices an approach aimed at facilitating the practice to collect and use its own data is required, and this has implications for training (Teasdale, 1997). In one network of practices there was a high enough level of data collection for data to be used in health needs assessment and evidence-based purchasing (Pearson et al, 1991). Elsewhere under-reporting and haphazard data collection prevented any useful 'early warning system ' for monitoring of outbreaks and epidemics (Johnson et al, 1991).

Sullevan and Mitchell (1995), in a systematic review of current GP computing systems, concluded that clinician performance, particularly in screening and preventative care, was helped but at the cost of increasing the length of the consultation.

3.5. Expert Systems

Pritchard (1995) summarises some of the benefits to clinicians of the new generation of decision support systems that are being developed:

- timely access to relevant knowledge;
- easy to use guidelines for a very large range of patient-specific tasks;
- helping the doctor to rank the decision options;
- reminders to the doctor of the potential dangers in a clinical situation;
- evaluation of the process of conforming to guidelines, concurrently; and
- evaluation of the outcomes, retrospectively.

There is evidence that computer based clinical decision support systems do work. Johnston et al, (1994) reviewed evidence from controlled trials of the effects of such systems and found that some of these could improve clinical performance and patient outcomes. However, there were also problems, such as unproven effectiveness, high costs, potential adverse effect on the doctor-patient relationship, legal accountability for mishaps, implementation problems including lack of use of computer based patient records, lack of inter-operability between different operating systems, and indifferent or antagonistic attitudes of physicians (Liaw, 1996).

Pritchard (1995) suggests that the most obvious area for application of these knowledge-based systems is within the area of prescribing. Wyatt and Walton (1995) reviewing some of the computer based prescribing tools currently available, suggest that cost savings of up to 30% are possible. In terms of quality, the CAPSULE study (Walton et al, 1997) suggest that doctors using an advanced decision support system select a higher proportion of appropriate, generic, and cost effective drugs, and also improved compliance with prescribing guidelines. Another computer assisted prescribing system, PRODIGY, has been made available to primary care (Purves et al, 1998).

3.6. Information on the Internet

Part of the clinical governance agenda is that professionals should have access to the 'best evidence'. Thus, evidence-based practice has moved from being an educational tool to becoming an essential driver in a primary care led NHS (Sackett et al, 1997). The approach may be summarised as improving clinical performance by using evidence from research findings to answer questions about best clinical practice.

The process of research evidence dissemination is itself supported by information technology. The Cochrane Collaboration is a world-wide network of 'health care providers, consumers and scientists who engage in the collaborative enterprise of preparing, maintaining and disseminating up-to-date reviews, by speciality, of all relevant random controlled trials of health care and when not available, reviews of the most reliable evidence from other

sources'. Much of the Cochrane Collaborations' work is only available by Internet or CD-ROM (Cochrane Collaboration, 2002).

3.7. Telemedicine

Telemedicine, the practice of medicine using technology where the patient and doctor are in different locations has yet to accumulate evidence, in terms of cost benefit to counter the claim that it is technology rather than need led (Wyatt, 1996b).

3.8. The theory and practice of health informatics

Primary care teams record lots of data on their practice computer systems, but how do they make sense of that data? What lessons can be learnt from the underpinning philosophy of those who design clinical computer systems? The concerns of the epistemology of health informatics are the origin and nature of knowledge responsible for creating and interpreting all facts, procedures, and theories concerning health care. However the issues, as in other fields are not fully resolved. In health informatics, an important question is 'What is the difference between data, information, and knowledge?' (Clancey, 1995). Several interpretations have been offered, for example; data is information stripped of its potential value. Data is random facts, whilst information is the ability to learn from such random facts. Data is gathered from various sources, it is inert (it exists), is technology based, and represents stored facts. Information is transformed from data, is active (it enables doing), and represents the presentation of facts (Christoff, 1990: 3).

As elsewhere in other discipline domains, there is a problem of the relation between theory and practice. To illustrate this point, Clancey (1995) gives the examples of an expert system, that diagnosed bacterial infections and prescribed treatment, was based on the rationalist view of learning. Within this view, every patient encounter with a doctor or nurse is a problem, which needs to be solved. The knowledge base within such systems is highly domain specific; that is, the system has a narrow range of knowledge relevant to one problem area. The system can explain its reasoning, begin to justify its advice, analysis, and conclusions. The system's knowledge is generally

recognised as equivalent to that of a human expert, or specialist in a particular field (Firebaugh, 1988). The concern of Clancey (1995) is that this rationalist approach reduces technology to a tool that merely stores for the physician what he terms descriptions, that is the data within medical records or the theories of disease management and diagnosis. Outside this very specific area, it has no use. In contrast Clancey (*ibid*) highlights the pragmatic approaches employed by collaboration between computer scientists and social scientists to design useful computing tools for medical practice.

The emphasis within this approach is that knowledge is:
- interactive, created within co-ordinated activity;
- collaborative and orientated towards shared goals and methods;
- developmental and changes as a consequence of activities;
- emergent, the focus of knowledge is within the group rather than individual; and
- participatory, developing through interactions between communities of practice.

Clancey, drawing heavily on Schon (1983), suggests that there needs to be shift in the culture of learning:

> It is paradoxical that even as we are developing the most advanced, mathematical, and abstract technologies, it must depend increasingly on informal modes of learning, design, and communication (cited in Clancey, 1995).

Clancey illustrates how this approach might alter the way a health informatics specialist might design "supporting technologies for knowledge access." Rather than considering the search and retrieval of stored facts online, *knowledge* should be viewed as the capabilities of people to form new conceptions and see things in new ways. *Access* should also be viewed as the opportunity to work with someone knowledgeable and at its most mundane might mean having an opportunity to converse with a knowledgeable person, enabled by technology, for example by e-mail. The

consequences of these two opposing approaches to software development equally apply to the construction of a networked learning environment.

3.9. CPD and health informatics in primary care

Basic computer skills are likely to be an important requisite for many health care practitioners to make the most of health informatics courses. However, it is expected that all health care professionals should be able to make good use of information technology tools for patient care and their own professional development (NHS, 1999c) and presumably ensure that they reach minimum standards of competence. As discussed in section 3.3 there may be some way to go before primary care teams are using IT effectively and efficiently. Some expectations for learning, which may serve as a set of proposed learning objectives to ensure competency in health informatics include (*ibid*) the ability to:

- organise electronic information (e.g. naming documents, setting up directories, moving files);
- use a word processing package to generate simple documents;
- enter and manipulate data using spreadsheets;
- search a simple database;
- undertake searches and access relevant sites on the World Wide Web and relevant health related databases (e.g. MEDLINE);
- retrieve/download electronic documents from various sources and transfer data from one application to another; explain the reasons for electronic networking and can give examples of its use in health care;
- send, receive, and acknowledge e-mails and attachments;
- identify examples of the use of information technology as an effective tool in the delivery and management of health care; and
- evaluate the effective use of information systems in the NHS. Discuss why different examples should be paper-based or electronic.

These suggested objectives form the basis of a curriculum that that could guides the CPD activities for primary care professionals wishing to know more about health informatics. However, there may well be a shortage of resource

to facilitate this process. There is a significant scarcity of health care professionals with the relevant attributes to teach health informatics. Therefore, priority should be given to "training the trainers" (NHS 1999d). It is also recommended that funding needs to be found to allow a career path for health care professionals with health informatics teaching skills. Health informatics needs to be integrated into established educational networks, for example vocational training for GP registrars, and at undergraduate level. Learning resources for health informatics needs to be shared across the professions, because of the current scarcity of tutors and the expense of delivering educational programmes. Decisions need to be taken by educational stakeholders as to whether the knowledge, skills and attitudes of both trainee and practising doctors in health informatics need to be assessed. In addition, whether such assessment should be formative or summative and, by extension accreditable. These problems of not enough teachers and scarce resources will be familiar to teachers of many disciplines in and outside of medicine.

4. Evidence based practice

Many GP surgeries are now directly connected to the Internet via NHSnet. The Government's information management and technology strategy for the NHS service, "Building the Information Core -Implementing the NHS Plan", (NHS, 2001) gave the target of 95 per cent of GP practices in England to be connected to NHSnet by end of March 2001. Therefore, in theory at least GPs and their staff are able to have free Internet access during office hours and many, in theory during a patient consultation. Some areas of the country have Knowledge Managers or Informaticists to assist the evidence based process for primary care. Greenhalgh et al, (2002) describe two informaticist projects designed to provide evidence based answers to questions arising in clinical practice and thereby support high quality clinical decision making by practitioners.

They conclude that an informaticist service should be judged on at least two aspects of quality: an academic dimension (the technical quality of the evidence-based answers) and a service dimension (the facilitation of questioning behaviour and implementation).

Given this access and opportunity for the practice of evidence-based medicine at GP surgeries I will consider two areas in more detail:

- Turning evidence into practice (an academic dimension) particularly in the context of primary care: and
- Teaching evidence-based practice (a service dimension).

4.1. Turning Evidence into practice

In educational terms, the concept of the *evidence base* is both a *construct* and a *process.* That is the *evidence base* is a thing that exists, it has a rationale behind it, it is being added to, it has an underpinning theory. There is access to it via books, journals, magazines, the Internet CD-ROMs etc. The *evidence base* is a resource for learning and external evidence is accessible to 'learners' through a number of channels at national level including:

- Cochrane Library;
- The NHS Centre for Review and Dissemination (CRD);
- The National Research Register;

- The National Institute for Clinical Excellence (NICE);
- The National Electronic Library for Health (NeLH);
- The NHSnet "Learning Zone" website.

In evidence based medicine (Sackett et al, 1997), the *process* is one of interrogating the evidence base held within the medical literature to answer questions related to clinical practice. The evidence base offers a theory to practitioners of how something should ideally be done in the real world of practice. There has been much research on how to close the gap between the theory (i.e. the evidence base), and the practice of ordinary practitioners. Education is not considered the only way of changing practice. I will illustrate this by expanding on one approach to researching the theory practice gap. The 'Effective Health Care Bulletin', (Feb, 1999), argued that the concept of changing professional practice (towards the *evidence base*) represents the gap between the theory and practice of evidence based medicine (or nursing or healthcare). There have been a number of systematic reviews on changing professional practice (*ibid*) which broadly fall into three categories:

1. The effects of broadly defined implementation strategies on professional practice:
2. The effects of implementation of strategies targeting specific behaviours:
3. The effects of specific implementation strategies on professional practice

The research suggests that a variety of interventions may lead to change in different settings. However given the complexity of changing behaviour, no "magic bullets" exist that can be reliably expected to change practice in all circumstances and settings (Oxman et al, 1995). However, systematic reviews suggest (Effective Health Care, 1999) that:

- Most interventions are effective under some circumstances, none are effective under all circumstances;
- Interventions based on assessment of potential barriers are more likely to be effective;
- Multi-faceted interventions targeting different barriers to change are more likely to be effective than single interventions;

- Educational outreach is generally effective in changing prescribing behaviour in North American settings;
- Reminders systems are generally effective for a range of behaviours;
- Audit and feedback, opinion leaders and other interventions had mixed effects and should be used selectively; and
- Passive dissemination when used alone is unlikely to result in behaviour change, but may be useful for raising awareness of research messages.

These authors conclude that it may be useful to examine theoretical models of change firstly to understand more about how health professionals behave. Secondly, to more understanding about which interventions might be lead to changes in clinician behaviour. Inevitably, there is further controversy as to which models may have validity or applicability, and the choices perhaps reflect the epistemological backgrounds, of their authors (*ibid*). They suggest that the learning theory that best fits into their objective scheme of things is the Skinnerian (Skinner, 1953) behavioural model. Critics would include those who hold the view of Kolb (1984:35) who ironically suggested that:

> the only way to apply the results of these studies is to make the world a laboratory, subject to "experimenter" control.

4.2. The evidence base for primary care

In primary care, it is argued (Jacobsen et al, 1997) that the best evidence is not available to the extent that it is in secondary care. Many primary care presentations do not fit into the rigid scientific epidemiological principles. The authors argue that the biomedical doctor at the centre of the EBM model does not take into account the patient as a person, and the context of the consultation into the diagnosis. Further that the emphasis on randomised control trials appears to exclude funding for qualitative studies into personal and contextual domains (*ibid*, 1995).

Despite such misgivings, the development of external evidence goes on apace. Clinical guidelines set out the optimum management approach for a given condition. They are developed in the belief that they will improve

healthcare outcomes and health service efficiency, and reduce levels of inappropriate practice. However the success of guideline development can be judged by whether awareness and use of recommended guidelines improve, and ultimately by whether clinical practice moves closer to the agreed standards of care, following appropriate audit of that care (Conroy and Shannon, 1995). Digests of clinical material are now available on the Internet (http://www.evidence.org), with the notion that these are more accessible to practising clinicians.

4.3. Teaching and evidence based practice

How then is it best to teach an evidence-based approach to health care practitioners? The 'evidence-based medicine' (EBM) movement itself has its roots firmly in a model of medical education that has evolved over time collaboratively. David Sackett and his colleagues have provided a framework for the practising of evidence based medicine which they claim means integrating individual clinical expertise with the best available external evidence from systematic research (Sackett et al, 1997). The processual aims and objectives of this project are clear:

> The practice of EBM is a process of lifelong, self directed learning in which caring for our own patients creates the need for clinically important information about diagnosis, prognosis, therapy and other clinical and healthcare issues, and in which we:
>
> 1. Convert these information needs into answerable questions
> 2. Track down, with maximum efficiency, the best evidence with which to answer them, (whether from the clinical examination, the diagnostic laboratory, from research evidence or other sources);
> 3. Critically appraise that evidence for its validity (closeness to the truth) and usefulness (clinical applicability);
> 4. Apply the results of this appraisal in our clinical practice; and
> 5. Evaluate our performance (Sackett et al, 1997:2-3).

For each learning objective, there are some suggested learning methods (*ibid*: 31). The role of the teacher is not only to know the attributes of "good clinical teaching in general, such as good listening, enthusiasm, and a willingness to help learners develop," but also to be an expert in the field of study. For example:

> As with most clinical skills, you will teach this best by example, that is by modelling the formation of good clinical questions in front of your learners (*ibid*: 30).

4.4. Teaching of the asking of answerable questions

Questions can be asked about any aspect of clinical work (*ibid*: 26) in, for example: clinical findings; aetiology; differential diagnosis; diagnostic tests; prognosis; therapy; prevention; and self-improvement.

Good questions form the backbone of both practising and teaching EBM and patients serve as the starting point for both. The challenge to the teacher is to identify questions that are both patient based (arising out of the clinical problems of a real patient under the learner's care) and learner-centred (targeted at the learning needs of this learner) (*ibid*: 30). One suggested self directed learning method is 'educational prescriptions'. After a clinical contact, the learner identifies a patient problem where he has identified gaps in his own knowledge. This gives rise to a number of educational tasks to be completed before he meets that problem again. The suggested format (*ibid*: 33) of the "prescription" is:

- How you found what you found;
- What you found;
- The validity and applicability of what you found;
- How what you found will alter your management for patients; and
- How well you think you did in filling this prescription.

4.5. Teaching skills on how to search

Recognising the differing learning styles, Sackett et al (*ibid*: 72) recommend workshops and short courses run by expert searchers. These have four objectives:

1. To show what databases/sources of evidence are available e.g. MEDLINE, Cochrane, EMBASE;
2. How they are organised;
3. Which search terms to use; and
4. How to operate the searching software.

The format of the workshops is to ask learners to present their own clinical cases. The teacher helps them to formulate four-part focused clinical questions around issues of diagnosis, prognosis or therapy. Trainees and their questions are then taken to the searching software and the trainer takes them through a few searches, enabling them to become acquainted with software and databases, as they begin the guided searches. Using this method the authors claim people can learn to do searches as competently as librarians (*ibid*: 72).

4.6. Teaching critical appraisal

The learning objectives of critical appraisal (*ibid*: 80) are in establishing, for any piece of external 'evidence':

- Its validity (closeness to the truth); and
- Applicability (usefulness to the clinician).

Depending on whether the research is about a diagnostic test, the treatments, on economic analysis, a guideline, there are a number of questions whose answers will allow a judgement on whether the research can be believed. For example in appraising the evidence from a systematic review of treatment, the clinician needs to ask:

1. Is it an overview of randomised trials of the treatment you are interested in?
2. Does it include a method section that describes:
   a. finding and including all the relevant trials?
   b. assessing their individual validity?
3. Whether the results are consistent from study to study?

Sackett et al, (*ibid*: 152) suggest that an effective self-directed learning method is to ask learners to prepare one page summaries or 'critically appraised topics' (CAT).

4.7. Applying critical appraisal to patients

It is suggested that many of the usual clinical educational meetings can be adapted to practice evidence-based medicine eg:

- Case discussions;
- Small group learning;
- Journal clubs;
- Lectures;
- Workshops; and
- Grand rounds and clinical conferences.

4.8. Self-evaluation

The emphasis whilst practising evidence-based medicine is on self-evaluation. Self- evaluation can be applied to each of the four steps of evidence based medicine. The learners are encouraged to become part of an EBM style journal club and to improve their practice by teaching others (*ibid*). Much of the controversy around the *evidence base* rests around the rationale behind it and its applicability to primary care (Ridsdale, 1995., Jacobson et al, 1997)). Therefore, the challenge is to apply the processes of the *evidence base* approach to primary care, and to evaluate the approach in a way that is meaningful to practitioners in primary care.

The naive assumption that when research information is passively made available it can be accessed by practitioners, appraised and then applied in practice is now largely discredited. Whilst knowledge of a practice guideline or a research based recommendation may be important, it is rarely by itself sufficient to change practice (Effective Health Care, 1999). Sackett et al (*ibid*: 224) themselves note that the existing evidence on the efficacy of different strategies for teaching evidence based medicine is weak, but hope that with more rigorous trials underway, teaching can become more effective and efficient. This approach to closing the gap between the theory and practice of

evidence based practice is to improve the performance of practitioners in the confidence the theory is true.

4.9. CPD and evidence-based practice in primary care

Some authors have taken a different approach to identify why the theory of the *evidence base* has not been implemented in practice. In a qualitative study, Greenhalgh and Douglas (1999) noted that in addition to time and cost (especially for nurses), some of the barriers to the uptake of these courses were:

- Confusion over what evidence based healthcare is (particularly the terminology);
- Cultural changes eg the *evidence base* seen as an aspect of rapid and unwanted change;
- Lack of confidence and fear of testing particularly in mathematics; and
- Evidence-based practice is seen as 'unwanted change in the workplace.'

Grol found similar obstacles in his study (1997). It is worth noting that Grol and Wensing (1995) had earlier found similar obstacles for GPs learning about medical audit, in which field there was confusion about terminology (Grol et al, 1998). Greenhalgh and Douglas (1999) conclude that evidence based healthcare courses need to have clear aims and objectives, effective marketing of courses, flexibility to meet learners needs, less theoretical and more practically based in areas of concern to the learners (*ibid*).

This evidence may point to an alternative way of closing the theory /practice gap where practice informs theory. The evidence-based approach is intimately linked with continuing professional development. The principal of asking a question, searching for the answer, and appraising the answer in terms of changing practice is a learning cycle. It will depend on the background of the educator as to which learning circle s/he encourages his/her learners to complete. Sackett et al (1997:223) have defined for themselves an evidence based learning circle. The circle described by Kolb (1984) might equally well predict what barriers there might be in changing

doctors' and nurses' practice, and applying the theories of the *evidence base* to patients.

The evidence that primary care practitioners accept the underpinning philosophy of evidence based medicine and are able to support the application of guidelines is variable. Learning about evidence in a virtual classroom might not be expected to overcome any of the barriers. However, Sackett et al (1997) acknowledge themselves how useful the e-mail discussion list *evidence-based-health@mailbase.ac.uk* has been in formulating their own views in what works and what doesn't in the context of teaching and learning evidence based medicine. That sounds suspiciously like an action research approach and unsurprisingly there are yet published evaluations of that approach by Sackett and colleagues. There is work published looking at face to face teaching of medical databases, eg MEDLINE, but none concerned with looking at whether evidence-based medicine can be learnt in a networked learning environment.

Chapter 3 - Networked Learning

Nowhere within this literature review, has so much changed in such a short time than within the field of networked learning. As I reflect as an action researcher on this phenomenon I realise how great an impact the Internet has had on my own, my family's, and my wider community's way of living. In 2002, at my family's insistence, I have 24-hour cheap Internet access in the home. With a set of passwords protecting them, some of my most intimate personal information is now available on the web, for example though personal banking. I can check availability and prices of accommodation and flights for my family holiday order CDs and books, especially as gifts for family in other parts of the country. My elder son checks his favourite web site for "cheats" jargon for shortcuts to enable progress in his favourite computer games. My wife uses the web to download documents that she needs for her social work and teaching practice. At my GP practice, I have 24-hour Internet access by the NHS net.

As I reflect on these developments, I am trying to make sense of how they have influenced my role as an action researcher. A period of reconnaissance can establish a base line picture at the start of any period of action research inquiry. For example in evaluating IT projects (Lousberg and Soler, 1998) the period of reconnaissance described the current course, the learner population, their current skills and knowledge, and their opinions. Even within the last two years, the huge cultural shifts towards an 'Information Society' have rendered some of the concerns about the costs, technological problems, and to some access, less important. Just as schoolchildren learn their vocabulary outside the class in a range of different situations in Brown et al's, (1989) theory of situated learning, so it is likely that learners will learn their IT skills in a variety of situations, not necessarily within the classroom, virtual or otherwise. If action research is future orientated (Waterman et al, 2000), then as far as this thesis and the future is here and now. To support CPD in primary care the direction networked professional development needs to go lies in something the Chief Medical Officer said (NHS, 1998:13) which was picked out by Eraut and du Boulay (2001:86):

The main message in delivering effective CPD is that the key to lifelong learning lies not in how to learn, but in how the learning process is managed.

My challenge is to provide not only some understanding of how CPD might be conducted using the Internet, but to think more broadly as to how, in any community, networked learning environments might be embedded into the networks and processes of institutions that deliver CPD.

Thus in this chapter I want to review some of the literature both within medical education and in the wider educational community that looks at:

- How the Internet is being used to learn (curriculum, content, assessment and evaluation); and

- How the Internet is being used to manage the learning process.

1. Models from the education field

1.1. Open and distance learning

The forerunner to networked learning was distance learning, pioneered by institutions such as the Open University. According to Rowntree (1992:1), "open learning" or "distance learning" is part of a family of approaches to education and training. However there are many offspring and sundry relatives going by a profusion of names; flexible learning, supported self study, technology-based training, and so on. Rowntree (*ibid*: 14) suggests:

> An open learning system is one in which the restrictions placed on students are under constant review and removed wherever possible. It incorporates the widest range of teaching strategies, in particular those using independent and individualised learning.

The literature contains a number of attempts to classify distance education based on either the technology used or the nature of educational provision. Keegan (1995:108) suggests it is useful to look at:

- Face to face;
- Teaching at a distance; and
- Teaching face-to-face at a distance.

Face-to-face is the kind of conventional education characterised by interpersonal communication between the teacher and learner in a face-to-face learning group, for example in schools and colleges. Teaching at a distance is characterised by the separation of the teacher from the learner and of the learner from the learning group, with the interpersonal communication of conventional education being replaced by a mode of communication mediated by technology. Teaching face-to-face at a distance involves electronically linking students and teachers in various locations using the technology to create a virtual classroom (*ibid*).

McConnell (1994) uses the term "networked collaborative learning" because he feels it places the emphasis on networking people and resources together, and on collaboration as the major form of social relationship within the learning context. Keegan (1983) feels it is useful to distinguish between providers of distance education. He suggests that within higher education there are autonomous distance education institutions, such as the Open University (OU), and distance subsections of conventional institutions, in the form of a distance learning module for example.

There are however a number of macro developments in virtual education which are summarised by Farrell, (2001). He outlines six important areas:

1. **The changing venues of a virtual education.** The "learning centre" concept has emerged as an essential strategy to address the problem of lack of access to connectivity and learning technology appliances. It is represented in a variety of forms such as multipurpose telecentres, regional centres of institutions, community-based learning centres, mobile learning centres, telecommuting centres and, at a global level, by large corporate global development of learning centre networks.

2. **Learning objects.** Learning objects can be described as the competencies to be achieved, skill and knowledge outcomes, lesson plans, assessment items and learning resources. Although existing in a variety of forms both paper-based, person-based and multimedia, they can be stored in databases and used, reused, aggregated as desired and re-purposed by learners, teachers and course designers for their own particular uses, thus moving towards a 'learning-on-demand environment.' The use of common standards will make these learning objects databases accessible to any organisation which has the same standards.

3. **The provision of learner support services online.** Access to services such as career counselling/advising, assessment of current skills and knowledge, development of learning plans, content quality assurance, credit transfer and provision of credit banking and personal records of learning are critical to the evolution of online content delivery.

4. **The developments of new organisational arrangements.** There has been an explosion of new organisational forms in education, particularly at the post- secondary level and in the area of companies' staff training.

These new organisational forms are the results of partnerships between businesses and institutions, joint venture initiatives between and among institutions and organisations, new consortia arrangements and a huge increase in the number of new "for profits" education and training organisations. Part of this is because of the globalisation of education and the burgeoning demand for lifelong learning. There has not been, as yet, a comprehensive look at what strategies are being implemented to do with such issues as copyright, teaching loads, tenure issues, job security etc. A number of virtual education initiatives have failed because of an inability to deal with such issues.

5. **Quality assurance.** There has been concern about the erosion of academic quality as a consequence of the growth in popularity of distance education. However new models are emerging, which address appropriate but valid and reliable measures of content and pedagogical quality. These will assist learners in the choice of provider as well as ensure the validity of competencies implied in the granting of credentials.

6. **The continuing evolution of IT capacity.** Some of the forces that have been identified as constraining the development of virtual education include the lack of access to technology appliances, and Internet connectivity which lacks the bandwidth to permit full multimedia use of the Internet. Developments on the horizon such as wireless networks, fibre optics, and major infrastructure development will lessen these constraints. However educational leaders must be able to justify the cost of IT investment in terms of the benefits to be gained and weigh those against other needs such as building more schools, more teachers, etc.

1.2. The Higher Education Community

1.2.1. The Open University

The Open University (OU) was the world's first university to teach only at a distance-and admitted more than 24,000 students in its first year. Its success has spawned many other similar institutions around the world. Among the many unusual features it pioneered were; admission without qualifications;

degrees built up from credits obtained by taking a number of modular courses, and a team approach to developing courses (Rowntree 1992:11).

Rowntree's model (*ibid*: 14-16) has two elements:

- A philosophy about opening up learning opportunities to a wider range of people and enabling them to learn more congenially and productively. This involves reducing barriers to access and giving learners more control of the learning.
- A method whereby learners' work is based around self-study materials. These packages may involve any of a variety of media eg prints, audiocassettes, television, computer "courseware" and practical kits. The learners using them are provided with various amounts and kinds of help from other human beings eg tutors and line managers.

Learning packages are strongly self-directive and designed to help learners with much less direct support from the tutor than is usual in face-to-face teaching. Their strengths are:

- Enabling more people to learn - by economising on the amount of face-to-face teacher time;
- Using a variety of media appealing to different learners;
- Enabling learners to study when and where they choose ;
- Enabling them to work at their own pace;
- Setting learning activities in the learner's home, community or workplace; and
- Giving learners responsibility for their own progress.

The Open University has been using computer conferencing since 1986 as a communication medium with students and tutors, and 1996 it was estimated that some 20,000 students were using computer network facilities (Mason and Bacsich, 1998).

In particular the 'affordances' of the new media have enthused some authors to rethink higher education teaching and learning. Affordances (Gaver, 1992)

are properties of an object, which stand in such relation to the properties of an organism that they readily allow some actions to be performed by that organism, but not for others. For example, the properties of the chair afford the action of sitting for an adult human, but not the action of lying down (*ibid*). For Laurillard (1993:168), communication technologies afford asynchronous discussion for students at widely dispersed locations in which there can be defending, articulating, and negotiation of knowledge, the "life blood" of learning. Multimedia systems offer controllable presentations where students have alternative forms of articulation and different mediums of expression. By being adaptive (*ibid*: 148) and interactive (*ibid*: 131) such programmes offer a variety of experiential learning opportunities such as simulated practice, experimentation, and with its rapid search facilities, scholarship, that is access to extensive and exact learning or knowledge.

Because staff at the Open University are encouraged to treat teaching as a form of research using reflective practice with a rigorous methodology, there has been a balance between the affordances of the old and new media (*ibid*). The 'learning package', rather than being a stand-alone package (c.f. Rowntree, 1992) has been transformed into "resource based learning". In 1996, the Open University in the UK established Open University Worldwide (OUWO) to export its courses and services globally (www.open.ac.uk/collaborate/contact.htm). By the end of 1999, OUWO had overseen elements of more than 20,000 and that number was growing with (Carty, 2000).

The Open University has made available its methodology in a healthcare context (Murray -personal communication). The study pack, available from summer 2000 was called 'Informed professionals, knowing patients: managing knowledge for the new NHS.' This CD-ROM and web-based study pack was developed by the School of Health and Social Welfare of the Open University. It addressed the interfaces of informatics and evidence based practice by providing users (i.e. nurses and other Healthcare professionals) with knowledge in the use of electronic information sources within nursing and at the healthcare context, and equipping them with the necessary skills to use their knowledge at work. The pack claimed to address the skills and

knowledge required to meet many of the objectives specified in the latest NHS information strategy (NHS, 1998).

1.2.2. Resource-based learning

The new technologies allow many of the characteristics of face-to-face small group work to be transferred to web based presentations supported by synchronous (in real time) or asynchronous discussion (as in an e-mail exchange over days or weeks). There are problems with synchronous presentation, in that only about 12 to 14 learners can comfortably interact with the on-line tutor. However, for the vicarious learner, it is possible to capture the text generated by such discussions, archive it on the website allowing the vicarious learner to interact with the material asynchronously, that is in his/her own time. By comparison, in face-to-face teaching a student who does not attend a lecture or tutorial has missed the learning opportunity.

To demonstrate how traditional learning packages may be transformed, Laurillard (1998) takes the example of English literature studies. At the Open University, the traditional presentation of the text is with video material supporting the narrative of the text under study. With multi-media this teaching material is transformed into an interactive CD-ROM-based investigation of the narrative. In particular fast search facilities of large quantities of text empower students to "be like a scholar." It is claimed that the student has the opportunity to access knowledge that would traditionally take years to achieve. Laurillard underpins her model with the theory of 'situated cognition' (Brown et al,1989), derived from cognitive psychology.

Laurillard has a strategic model of planning, implementation and evaluation for educational technology across the higher education sector. She suggests that by increasing the use of resource based material to 50% of students study hours, the number of lectures can be reduced and the number of small group tutorials increased, However, for this to happen, resource-based learning must be sufficiently well designed to support independent learning. It may well need to be developed externally rather than in-house. Quality resource-based

learning materials require large student numbers to be cost efficient. In such an innovative environment, tutors will need to divide their time between research on teaching, specialised development of teaching materials and intensive student support. Multimedia programmes developed externally should be customisable to allow local "ownership" for academics delivering the materials. In conclusion, Laurillard claims the new educational technologies should promote collaborative course teamwork and promote tutors to support and guide students in accessing the learning materials. However much depends on whether multimedia programmes are a naturally engaging or motivating medium and secondly, on accepting the economic argument that such a model can only develop quality if applied on a large scale (*ibid*).

1.2.3. Networked learning and the Information curriculum

It is claimed in the field of organisational studies, that the use of communication technologies to support enhanced information flow for group project and decision processes, can lead towards the concept of the "learning organisation" (Fowell and Levy, 1995).

Fowell and Levy designed a module for use in the Department of Information Studies, University of Sheffield which, it is claimed, would meet the needs of employees in a learning organisation to develop appropriate learning and information handling skills, which could be applied flexibly as new opportunities emerged (*ibid*). The underpinning educational principles were based upon experiential learning and constructivist principles (Duffy and Jonassen, 1992). A central aim of the curriculum design was to facilitate collaborative and independent learning by electronic means. The module was based upon active learning principles, and learning was facilitated primarily through electronically mediated group project work. The Internet was the learning environment for the course, providing useful communication between participants, and served as the information resource. Students gained practical experience of a variety of communication technologies as a means

of encouraging the development of skills in computer mediated communication for project management.

The learning environment contained opportunities for students to take an approach to learning through cycles of:

- Engagement in practical activities;
- Critical reflection on experience gained and testing of reactions and observations against generalisation or theory; and
- Application of new understandings to further activity.

The module explored mainly asynchronous communication group work, with e-mail providing the backbone of communications within and across student groups, and between students and tutors. Students and tutors made extensive use in the module of the e-mail facility on the university campus network, Pegasus Mail ® for Windows, which offered standard features such as distribution lists, filters and mail folders.

The module also offered access to newsgroups, which are discussion groups, often with international membership. Through the observation of, and participation in, these global groups, students gained information about network communication norms and etiquette of value to their own electronic communication practice.

In addition to the use of a module bibliography, students were encouraged to explore the local (eg the University of Sheffield website) and global network information resources at their disposal, through the world-wide web. To achieve the balance between encouraging students' independent exploration of information resources, and offering guidance and instruction, a set of world-wide web pages for the module with pointers to some useful information sources was created.

Process resources, both paper-based and on-line, supported students' own practice in the use of computer and mediated communication. Introductory

sessions in the first weeks of the module engaged students in structured awareness raising activities in experiential learning, reflective practice, group work as well as introductory workshops on the technologies.

Within the experiential learning model, students were encouraged to reflect and analyse their learning experiences, recording them in a diary. The tutor was seen as a support resource and it was students' responsibility to draw on their tutor when needed. The students were allocated to personal tutors who were briefed to respond to problems relating to content and processes used, as well as technical and administrative queries. Fowell and Levy (1995) demonstrated that distinctive tutoring skills and strategies were required to facilitate electronic learning groups to promote a sense of what Davie (1989) called the "electronic learning community." Just as in face-to-face teaching, tutors encouraged ice breaking sessions and general discussion, but in this module they did it by contributing to the social/general news group in which module participants introduced themselves to each other. Tutors regularly posted articles of interest both to individuals and to groups of learners, to generate a "critical mass" of contributions for electronic discussion in the news groups. The module was assessed by means of coursework (60%) and a traditional examination (40%). Assessed course-work comprised documents produced through group work and an individual personal learning review, or portfolio. It was acknowledged (*ibid*) that the examination reflected the constraints of traditional university-wide assessment criteria, rather than assessment based on the underpinning philosophy of the course, namely experiential or constructivist theory. The criteria for the portfolio element were:

- Demonstrate that students have kept a record of learning activities and a record of developments in their thinking;
- Demonstrate students' willingness and ability to reflect systematically and critically on their experiences, and to draw appropriate conclusion from them; and
- Demonstrate students' ability to communicate their ideas precisely and clearly.

The pilot was evaluated using an action research approach to discover the ways in which electronic information and communication resources can best be used to support independent and collaborative learning. The authors conclude that the important issues for research are:

- To come to an understanding of the nature and level of support required by learners to gain the most from their networked learning environment; and secondly

- The nature of the academic tutors' on-line role and skills (*ibid*).

1.2.4. Virtual Learning Environments

Virtual learning environments[1] can be set up with simple web pages to give course information and an e-mail discussion group to allow students to interact with each other. These cheaper technologies for networked learning have been evaluated, for example the LISTSERVER (the type of computer mailing system studied in this research). A LISTSERVER works by collecting all the e-mails sent in with the e-mail address of the list (eg wisdom@mailbase.ac.uk) and sending them, by computer, to all active subscribers to that list. LISTSERVERS are unsatisfactory for creating a successful computing conferencing environment (Mason and Bacsich, 1998), as it is more difficult to build a sense of community, partly because conferencing is not as asynchronous as earlier research workers believed. The advantages of on-line discussions over days or even weeks should allow learners to be more critical in their reflections and responses to messages they see. Mason and Bacsich (*ibid*) found that learners in LISTSERVER e-mail discussions did not have the time to reflect on a message before the discussion has moved on. In addition:

- Up to 10% of the mail can go missing with delays of several days; and

- There is no universal e-mail software package so students, particularly novices, have individual learning requirements around individual software.

However, it does have the advantage in this research that it is cheap to set up and maintain (*ibid*).

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[1] The term is synonymous with networked learning environment

Such simple technologies have largely been superseded, in teaching and learning contexts where there is good access to information technology. According to Milligan (1999), Virtual learning environments (VLEs) offer an integrated solution to managing on-line learning, providing a delivery mechanism, student tracking, assessment and access to resources. Although some can be restrictive, if used effectively, they can provide a familiar, but functional environment for the user. As a unified environment, a VLE is simple and efficient to administer and therefore attractive to the provider. Milligan (*ibid*) was reviewing the potential of the differing commercial and "home-grown" VLEs for the potential in managing large-scale professional development in the UK Higher Education. For example, he had in mind the gaining of membership of the Institute for Learning and Teaching in Higher Education (ILT) through development of portfolios and via accredited training and development courses.

A different approach is taken by Britain and Liber, (1999). They note that virtual learning environments are learning management software systems, and are not intended simply to reproduce the classroom environment-"on-line", but to use technology to provide learners with new tools to facilitate their learning. VLEs aim to accommodate a wider range of learning styles and goals, to encourage collaborative and resource base learning and collaborative sharing and re- use of resources. Most of the systems currently available have similar sets of features and a range of capabilities (*ibid*). However, some systems are better suited than others to particular education contexts and some are simply better designed than others. Britain and Liber (*ibid*) attempt to evaluate the properties, capabilities and orientation of different systems from an education perspective and secondly they wish to determine whether VLEs can be embedded into the teaching and learning context of a given institution. They give a schematic of a prototypical VLE to indicate its functionality (fig 3.1).

Notice-board	Course Outline	E-mail Tutor and students	Conferences
Class list & Homepages	Assignments/ Quizzes	Assessments	Metadata
Synchronous Collaboration Tools	Multimedia Resources Repository	File Upload area	
Calendar	Search Tools	Bookmarking	Navigational Model
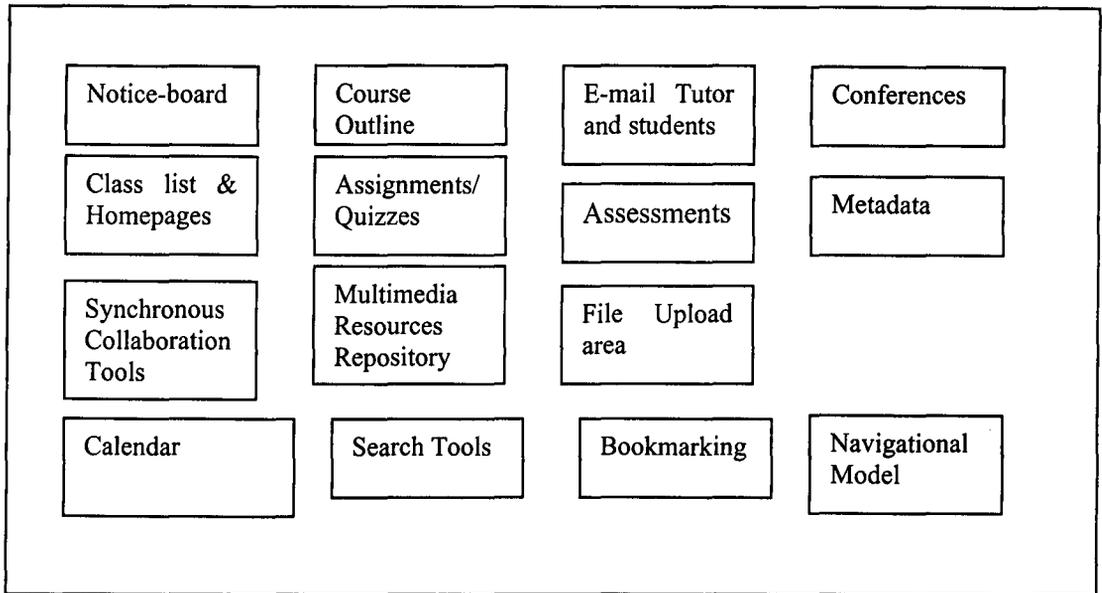
Figure 3 1 A schematic of a Prototypical VLE

(Source: Britain and Liber, 1999)

Most of the functionality is fairly self-explanatory, however it is the metadata scheme which is at the heart of what VLEs can do. Metadata is the way that learning objects are tagged within the database at the back end of the system. When a database query is run by clicking on a button in the browser learning objects are linked together dynamically to give an individualised learning experience. Thus, a student can be linked to her own teacher, the course materials, course timetable, learning objectives, and learning resources.

Britain and Liber (*ibid*) attempt to develop an evaluation framework and report how they tested the framework on commercially available systems such as WebCT, Virtual-U and TopClass. The frameworks they used were derived from an:

- educational perspective using characteristics of the conversational model drawn from Laurillard (1993:94-95). VLEs were examined to see if they were capable of supporting learning that was discursive, adaptive, interactive, and reflective; and an

- organisational model using the Viable System Model where VLEs were examined against the criteria of resource negotiation, co-ordination, monitoring, individualisation, self-organisation and adaptability.

The authors had admittedly small return rates from their evaluation questionnaire and they were perhaps more successful in highlighting the challenges of evaluating VLEs than they were in assisting institutions to make the choice of VLE for their own teaching and learning contexts.

The Joint Information Systems Committee (JISC) have an on-line information pack which is designed to support procurement decisions in the Further Education (FE) sector, which received funding (in April 2001) to purchase VLEs, but it is relevant to the whole Further Education (FE) and Higher Education (HE) community (Everett, 2001).

The JISC MLE Steering Group has said that the term Managed Learning Environment (MLE) is used to include the whole range of information systems and processes of a college (including its VLE if it has one) that contribute directly, or indirectly, to learning and the management of that learning. The principle functions that the complete VLE needs to deliver are (see fig 3.2):

- Controlled access to curriculum that has been mapped to elements (or "chunks") that can be separately assessed and recorded;

- Tracking student activity and achievement against these elements using simple processes for course administration and student tracking that make it possible for tutors to define and set up a course with accompanying materials and activities to direct, guide and monitor learner progress;

- Support of on-line learning, including access to learning resources, assessment and guidance. The learning resources may be self-developed, or professionally authored and purchased materials that can be imported and made available for use by learners;

- Communication between the learner, the tutor and other learning support specialists to provide direct support and feedback for learners, as well as peer-group communications that build a sense of group identity and community of interest; and

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- Links to other administrative systems, both in-house and externally.
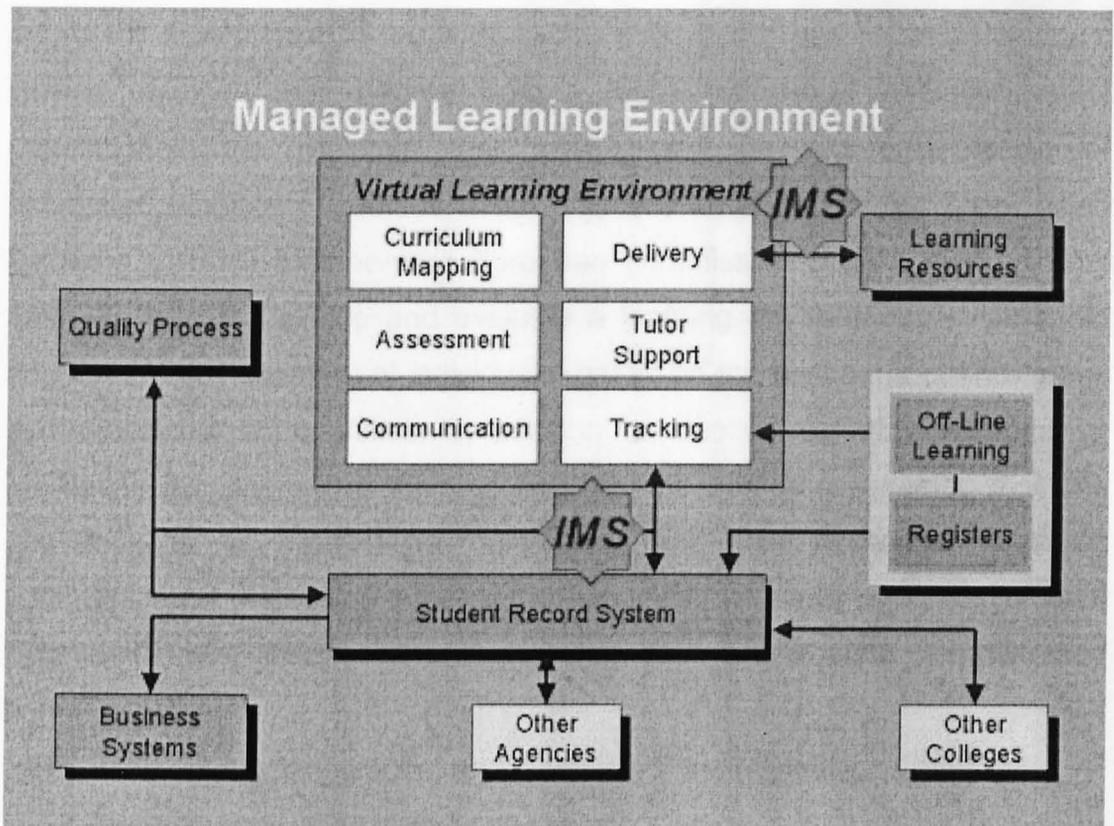
Figure 3 2 The VLE as a sub-system within the college MLE

(Source: Everett, 2001)

The VLE makes up only one part of the institution's overall systems (both computerised and non-computerised). Interfacing between these systems is possible by 'connecting up' the constituent parts by the use of interoperability standards such as Information Management Systems (IMS). Examples of these are between the student record systems and the VLE and between Learning Resources (or content) and the VLE (Everett, 2001).

1.3. Professional Development

1.3.1. The JITOL project

Having obtained their degree from a higher education institution, most professionals will maintain their professional development outside of accredited university courses. The objective of the Just in Time Open Learning (JITOL) a three-year European commission project running from 1993-96, was to develop and evaluate a learning environment which could support the development of individuals, based on the exchange of knowledge in professional communities. In addition to creating virtual classrooms or facilitating a collaborative learning network, the authors suggested that one can look at a pre-existing community and use computer mediated communication to develop a learning organisation (Bonamy and Hauglusaine-Charlier, 1995). They further suggested that within such a networked community that:

- It is possible for personal and collective knowledge to be created;
- The role of the tutor is one of animator;
- That there is a link with the job through the exchange and reification (converting into text) of professional knowledge and know-how; and
- The leading goals are the creation and sharing of expertise.

These studies add weight to the generally held view (eg McConnell, 1994) that asynchronous discussion has significant strengths. It allows the learners:

- To work in a social environment;
- They can receive and reflect on the messages of others;
- They may become exposed to new information; and
- They may be exposed to the process of writing as a powerful "scaffold of thought."

However, there are also significant constraints on learners within networked learning environments (cf. Mason and Bacsich, 1998) such as:

- Access to technologies;
- Pedagogy and course organisations;

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- Attitude of learner;
- At times a general reticence to participate; and
- The flexibility of the medium with makes it easy to opt out (*ibid*).

The concept of learning support in a medical setting has been looked at within the JITOL project. In particular the researchers' aims were to gain access to the expert know-how that is usually only available through experience. The pilot study involved doctors debating electronically on issues they felt critical to their practice in the field of diabetes. The underlying assumption was that talking about day-to-day practice would lead professionals to reveal their implicit cognitive strategies. A cognitive expert monitored the debates and, following an analysis, was able to extract those strategies and install them (reify) inside a knowledge base (Manenti, 1995).

The JITOL project suggests a typology of contexts where professional learning occurs with the impetus for the process coming from occupational practice (Saunders, 1995). These included immediate problem solving, project-based learning, validated learning and organic - longstanding communication between members of a group driven by a strong sense or professional values.

The evaluation of such innovative approaches is recognised by project researchers as highly problematic. This is not only because of the "complexity characterising the underlying assumptions of professional learning support" but also because "the implementation of technology requires social innovation" which makes it not only "necessary to analyse the user needs but also to reveal implicit assumptions of use by technology providers" (Bonamy and Hauglusaine, 1995).

2. Examining models from the Healthcare field

As within the Higher Education Sector there has been an explosion of interest in virtual learning environments (VLEs). Within the UK, there have been two

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broad approaches to VLEs. Firstly through the higher education sector (c.f. Cook, 2001) and secondly through the NHS (c.f. Nestor et al, 2000) where the prevailing acronym is the VMLEs, (virtual medical learning environment).

2.1. VLEs in UK Medical Education

Cook (2001) has reported that 17 out of the 21 medical schools around the UK who responded to his research have implemented a VLE, and the remainder either is in the process of implementation or is considering doing it. Of the 21 institutions, fifteen are developing systems which are wholly in-house or in conjunction with other institutions. Of the remainder, 5 were using commercial systems either on their own or combined with in-house systems. One institution had yet to choose a system at the time of writing. Cook (ibid) came up with a set of the recommendations to ensure best practice in the developments of VLEs in medical educational settings:

System developers should:

- work closely with medical educators about the content and organisation of the systems and training of users;

- work with medical educators to create VLE systems which foreground relevant learning materials at least as much as administrative functions and coarse background information;

- work closely with national strategy groups (i.e. Learning and Teaching Support Network subject centre for medicine, dentistry and veterinary medicine) to develop (or create) networks to:

    1. maximise collaboration and communication between developers at different institutions;

    2. ensure gradual but universal adoption of emerging technology and other standards;

    3. undertake further research and investigation into the delivery of the VMLE into Personal Digital Assistants and equivalent devices.

The national strategy groups, medical faculties and medical educationalists should collaborate to undertake research including:

a) effective use of the VMLEs from a learning and teaching perspective;

b) the potential of Personal Digital Assistants for mobile delivery of VMLE content.

Medical Faculties should:

- provide strategic direction and support to enable system developers and medical educators to develop and promote the use of the VMLEs;

- continue to encourage bespoke developments rather than adopt present commercial solutions;

- ensure VMLEs are provided with dedicated and long-term funding, principally for staffing and support of the systems;

- provide adequate incentives and rewards to encourage staff developing resources for the VMLE;

- consider carefully the implications before replacing paper distribution materials with exclusively online provision;

- promote collaboration between senior faculty and institution decision-makers to overcome political and managerial obstacles to the integration of data systems.

Medical Educationalists should become more involved in the development of the systems and training of users.

There is some experience in the literature of medical educators using sophisticated software. Sargeant et al (2000) used WebCT to create a virtual learning environment for family physicians in Nova Scotia. The course was a case-based module on medication induced headache originally developed by a neurologist for conventional problem-based learning to be delivered at a continuing medical education workshop. The case was modified for Internet presentation and was to be used by participants over a period of four weeks. The participants consisted of the neurologist, two educators and 31 registrants. Using the student accessing facilities of WebCT, the researchers were able to identify progress of those learners who participated but had to contact by more traditional methods those that did not participate. Of the 31

registrants, twelve did not participate at all beyond accessing the home page. Of the 19 who accessed the tutorial, 14 participated in the on-line discussion. The authors collected a variety of data, the WebCT electronic activity record, the programme evaluation questionnaire, facilitators' records of online and offline activities, a transcript of the bulletin board discussion, a log of technical problems, and interviews with registrants who did not participate. A graduate student familiar with WebCT provided technical support. The authors had predicted two general roles for the facilitators of an on-line PBL discussion prior to the course starting. These were:

- the pedagogic, or content role, assumed by the neurologist; and
- a combined social (creating a supportive environment), managerial, and technical role, assumed by the two educators.

The authors (*ibid*) were able to conclude that the anticipated facilitator roles were fulfilled. They claimed that the content facilitator, the neurologist, increased the depth and breadth of the content discussion, and the two educator facilitators performed the social supportive role by welcoming and encouraging learners. However, they also identified problems not least in achieving the equal individual participation of learners that is a goal of PBL. Minimal contributions from the learners meant that much of the discussion was teacher centred.

2.2. VLEs in the NHS

The 'Virtual Classroom' project (Nestor, 2000) developed out of the NHS Executive's 'Enabling People Programme' and subsequently became one aspect of an NHS Information Authority research and development theme. The first phase of the project aimed to describe the learning needs of professionals in relation to the white paper 'Information for Health - An Information Strategy for the Modern NHS' (NHS, 1998) using a mixture of focus groups and interviews. Broad needs were identified amongst NHS staff if they were to use a 'Virtual Classroom' approach for increasing their knowledge and skills of health informatics in the context of their work. Overall, the 'Virtual Classroom' was expected to provide a secure, friendly, private place, where health informatics was demystified, and knowledge was gained,

whilst reducing isolation and increasing independence. The project outlined a model in which information systems that underpin healthcare delivery were to be integrated with an associated learning process, to encourage more effective and efficient use of healthcare information within the clinical setting. This encompassed access to information, eCommunity technologies, and distributed learning resources. The heart of the model was to make the NHS 'Virtual Classroom' a system that: personalised learning; facilitated a lifelong educational process with emphasis on tutoring, mentoring, and personal reflection time; involved quality assurance of the learning experience; and supported personal development planning and certification using a personal learning record.

The 'Virtual Classroom' within the NHS was seen as thus:

> It is a personalised virtual learning space, or a connected personal learning desktop which enables lifelong learning, through a continuous personal needs analysis, and the development of personalised educational pathways.

A proposed implementation of the 'Virtual Classroom' would have consisted of an electronic shared learning environment in which participants accessed information and met for educational purposes.

The second phase of the project (Nestor, 2000) was along the lines of Britain and Liber's (1999) approach to evaluating a set of VLEs for functionality and pedagogical approaches with a view to advising the NHS Information Authority as to which VLE the NHS should invest in. At the time of writing, no decision has yet been made by the NHS.

2.3. Computer assisted learning packages (CAL)

Before the advent of VLEs, much of the effort within medical education computing had been to develop computer assisted learning (CAL) packages. The Medical Education Unit at the University of Liverpool provides a typical example of how these were developed. Mooney and Bligh, (1997) had identified the potential of computer- based learning materials as a valuable learning resource for medical education. They recognised that a common

problem in implementing computer-based learning material had been an imbalance between the technological and educational focus. Their theoretical framework promoted a developmental approach, which was structured and multi-disciplinary. It used information technology to support and stimulate learning whilst providing a variety of mechanisms to help produce materials on time and within budget. However, the framework acknowledged that educational strategy is the most important design guideline, and reflected the educational philosophy of the designers (Bligh, 1995):

- Support for personal learning needs;
- Presentation of material to stimulate the learner and provoke activity;
- Tracking of progress using, for example, self-assessment features to provide personal and reference progress reports;
- Clearly stated learning objectives;
- Map of content;
- Progress summary;
- Facilities to generate and explore hypotheses;
- Facilities to reflect on learning and achievements; and
- Testing/assessment methods that encourage high levels of learning.

Mooney and Bligh, (1997), realised this educational philosophy using a software developmental approach including modern programming languages such Toolbook™ and Visual Basic™. The authors recommended that a computer based learning project team included:

- A medical educationalist to identify the core information content for the package, key references, self-assessment questions, and review of on-line content for interest clarity, grammatical correctness and appropriateness; and
- A computer scientist for the design, development and management of computer based learning materials, and being responsible for the electronic production of the material.

The emphasis on collaboration between a computer scientist and a medical educationalist expert, and an emphasis on delivering the best educational

environment regardless of technological opportunities was endorsed by those involved in delivering undergraduate medical education via the Internet elsewhere (c.f. Konstan et al, 1997).

In medical education, any evaluation of computer assisted learning (CAL) software should be seen as an integral part of the development and implementation of the learning package (Hardy et al, 1996:225).

2.4. Healthcare e-mail discussion groups

Internet-based discussion lists such as 'GP-UK' and 'evidence-based-medicine' enabled busy professionals to communicate and gain access to information resources (Pallen, 1996). GP-UK is the name of the mailing list made available by a LISTSERVER based at Newcastle University called Mailbase. The purpose of the list, received by e-mail on joining states:

> GP-UK facilitates discussion on new ideas, research workshops, seminars, conferences, education, and software development etc, for the UK general practice (family medicine) community. Non-UK views are welcome. GP-UK intends to promote collaborative work, problem solving and support.

I have described participation in GP-UK by the general practice community, in my Masters thesis (Roberts, 1996) and in subsequent papers (Roberts and Fox, 1998., Fox and Roberts, 1999). It was a qualitative observational study of the electronic text generated by general practitioners and others in an academic discussion list. The methodology was based on naturalistic enquiry (Lincoln and Guba, 1985) and observer participation (Hammersley and Atkinson, 1994). One aspect of this research was exploring to what extent, if any, GPs and their colleagues were engaging in professional development. Whilst participants do not necessarily perceive themselves as engaging in professional development, they had a variety of learning needs relating to their own professional practice. Saunders (1995) typology (see Fig 3.3) indicates the range of learning activities:

Immediate	Numerous "how do I do, or find, this?" Requests were often associated with technical or computing topics. Answers came back, usually within a couple of days, with short hints or e-mail addresses of some-one who might know, or web addresses where information might be found
Project	There were examples of sustained discussion around more complex problems such as "What is the best way to the run an anticoagulation (warfarin) clinic in primary care?" Such problems were presented as practical problems which the initiator needed to solve, for possible implementation in their own practice The problem once presented then generated a sustained conversation by participants towards a tentative solution of the problem.
Validated	Time spent on GP-UK and the Internet was used by some participants, with the agreement of their local Postgraduate Director of GP Education for postgraduate education allowance (PGEA).
Organic	The long-term participation of a regular group of GP-UK participants, discussing a variety of professional issues, illustrates the organic or holistic level of computer network learning.

Figure 3 3 A typology of contexts where professional learning occurs in computer medicated environments with the impetus coming from practice

(after Saunders, 1995)

Building on this work, one of the aims of this current research was to explore whether participants of an e-mail list could be given specific purposes with

clear aims, objectives and a facilitated approach to support their continuing professional development.

3. Educational issues in networked learning

The foregoing examples serve to illustrate that the concerns of computer networked learning are the concerns important in any kind of education or training, those of teaching and learning (Rowntree 1992:1).

These issues which are well-rehearsed (Rowntree 1992, Lockwood 1995, Thorpe 1988) are:

- Underpinning learning theories;
- Supporting open learners;
- Learner use of media;
- The open "learning package;"
- Course design and assessment;
- Evaluation and quality; and
- Cost effectiveness.

3.1. Learning theories

Boucher et al, (1997) have noted the absence of a widely recognised and accepted integrated framework through which any sense can be made of the multitude of often conflicting factors which influence IT assisted teaching and learning in higher education. Dillon (1998) suggests that information and communication technologies in teaching and learning in higher education have been strongly influenced by two theories of learning: behaviourist and constructivist. The behaviourist approach is characterised by:

- An objective view of knowledge;
- Serial structuring of material and program control; and
- Regular review and testing against pre-specified criteria (Dillon, 1998).

The theory of constructivism is being increasingly invoked in descriptions of emerging approaches to web-based learning teaching. Grabinger and Dunlap

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(1995) have described how the essential assumptions of constructivism may be applied to the design and facilitation of learning environments:

- Knowledge is constructed through an evolving process of personal, active engagement with the external world. The learning environments should encourage personal responsibility and initiative. The learning should be organised around the identification and achievement of personal goals rather than topics.

- Knowledge is "indexed" to context, in that meaning is derived from, and closely associated with, the experience through which it is acquired. Learners need to engage in "authentic" problem-solving learning activities.

- Personal understandings are developed from and through a process of social negotiation and exploration of multiple perspectives. This is supported through collaborative interaction with peers and tutors on problem-solving or project work.

Other forms of experiential learning that are informing web-based learning include *situated cognition* theory. This has been promoted by such as Laurillard (1993). Situated learning (Brown et al, 1989) places the learner in the centre of learning activities consisting of:

- **Content**: the facts and processes of the learning task;

- **Context**: the situations, values, beliefs, and environmental cues by which the learner gains and masters content;

- **Community**: the group with which the learner will create and negotiate meaning of the situation; and

- **Participation**: the process by which learners working together and with experts in social organisation solve problems related to everyday life circumstances.

The role of the teacher in situated learning is to empower students to learn independently by what they describe as cognitive apprenticeship (c.f. craft apprenticeship). The teacher coaches or promotes learning, first by making explicit their tacit knowledge or by modelling their strategies for students in authentic activity, and then by supporting the learners' efforts. Learning becomes a social process dependent on transactions with others placed

within a context that resembles, as closely as possible, the practice environment (*ibid*).

Laurillard, (1993:94-5) prefers the notion of the learning conversation as an alternative to a more traditional approach to teaching, and one that would support constructivist approaches to learning. Laurillard (1993) traces the need for dialogue in the learning process backed to the Socratic method of philosophical inquiry. There is a need for the teacher to unearth students' mental constructs about a topic before negotiating the path to the target conception that is the goal of learning from the teacher's perspective. There are a number of key characteristics of the conversational model:

Discursive:

- teacher's and student's conceptions should each be accessible to the other;
- teacher and students must agree learning, topic, and task goals;
- the teacher must provide an environment within which students can act on, generate and receive feedback on descriptions appropriate to the topic goal.

Adaptive:

- the teacher has a responsibility to use the relationship between their own and student's conception to determine the focus of the continuing dialogue.

Interactive:

- the students must act to achieve the task goal;
- the teacher must provide meaningful intrinsic feedback on the actions that relate to the nature of the task goal.

Reflective:

- the teacher must support the process in which students link the feedback on their actions to the topic goal for every level of description within the topic structure.

However, in addition to pedagogical philosophy, that is whether a VLE is instructivist or constructivist, and learning theory, whether behavioural or cognitive, there are several other aspects. For example whether collaborative

learning is integral or unsupported, whether the VLE is sensitive to cultural issues or insensitive. Reeves and Reeves, (1997) offer an analysis of the dimensions of interactive learning that can be enabled by the web. Based upon theory from instructional technology, cognitive science and adult education they propose critical dimensions which include pedagogical philosophy, learning theory, goal orientation, task orientation, source of motivation, teacher role, metacognitive support, collaborative learning, cultural sensitivity, and structural flexibility. They suggest these critical dimensions can guide program developments, implementation and evaluation.

3.2. Learner use of the media

Wilson and Whitelock, (1997) evaluated a 'Students and Teachers Integrated Learning Environment' (STILE), involving 110 distance learning students and nine tutors within a Computer Mediated Communication (CMC) environment, attached to the Open University.[2] They found that learners used the CMC environment for activities that supported:

- Help with problem-solving;
- Keeping in touch;
- Contacting tutors;
- Accessing extra curricular course material;
- News and information;
- Accessing tutorial notes when they missed a face-to-face tutorial;
- Accessing tutors (other than their allocated one) in on-line conferences; and
- Web access, on-line chat and contact with students on other courses.

Wilson and Whitelock (*ibid*) suggest that this use of CMC demonstrated students activities were more in keeping with the acquisition of knowledge and the motivation to do this rather than the social by means of keeping in touch and chatting on-line. The tutors found that the CMC system provided an

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[2] A CMC environment or computer conferencing should be considered as an early form of a networked learning environment (NLE).

improved delivery mechanism for course material, assessment and information; improved quality of contact with the students and an appreciation of the students access to their peers. Selinger, (1998) described the development of a "critical community" of teachers through the medium of computer conferencing using First-Class®. Students were able to describe, inform, confront, and reconstruct their knowledge and understanding about teaching, so forming a "critical community" of teachers. The advantages of asynchronous discussion allowed time for students to consider their understanding, to think about context, to discuss their ideas with peers and tutors, and to embrace a larger number of them than would be the case in a real-time seminar or tutorial. Students found they had real opportunities to cast a wider net, seek the opinions of experts, or to hold one-to-one conversations through e-mail. This helped to clarify concepts and develop ability for teaching in the most effective ways. Disadvantages were of having to convey themselves through text, which for some was problematic or not being able to engage in vigorous quick fire debates. Students had a permanent record of ideas and arguments, and some students felt more reassured and confident.

Not all the students found computer conferencing an easy forum in which to air their views. Many of them only read messages and did not contribute their own, the so called 'lurkers,' but said they took ideas from the messages that they subsequently developed in their own teaching practice. In contrast others enjoyed being 'virtuosos' rather than 'lurkers' (Perkins and Newman, 1996), and were articulate and proactive in initiating debates, and their contributions were reported as being valued by others. However despite the educational potential, it is far from clear as to the circumstances in which CMC in higher education is actually effective and the reasons for this, where effectiveness has been demonstrated. Secondly, there is a need for the formulation of broad models of the processes involved in CMC to inform educational practice (Tolmie and Barbieri, 1997).

3.3. Learner Support

Levy (1998) has found that the introduction of new technology causes confusion amongst staff about their roles. What are the boundaries between the role as teacher and the role of supporting the new technology? Secondly, the introduction of new technology has teething problems for new learners. Others have found that the vast amounts of information on the Internet have baffled the student rather than assisted their learning (Sloane, 1997, Banks, 1998). In addition support for learners and staff has to be provided to allow them to work from a variety of locations, such as home, the workplace, and community centres or open learning centres in the college.

3.4. Course design and assessment

McConnell, (1998) has examined some of the issues related to assessments within the context of a Masters in Education in Networked Collaborative Learning at the University of Sheffield. This is a two-year part-time programme for professional people wishing to develop their skill and understanding of the use of the Internet and electronic communications in learning. The course is run using Lotus Notes GroupWare, and via a website. Participants and a tutor work in small Lotus Notes learning sets. McConnell claims it is possible to see recognised features of collaborative self-assessment taking place within the text of electronic discussions. Participants come to feel they are working within a trusting learning community where they can offer tentative thoughts and ideas concerning the course assignment they wish to produce. By engaging in discussion over several weeks participants have time to think about and reshape their assignment topics while receiving detailed comments from other members of the learning set, and formative feedback from the tutor. It becomes clear when participants have gone to the Web for information to develop their thinking and shared this new information with the group.

3.5. The 'learning package'

Banks (1998) offers an evaluation of a 'Learning Environment Club' a collaboration of eleven Further Education Colleges. Banks suggests that

resource based learning is important because it provides structured learning through direct access to a programme through which the learner progresses. However Banks emphasises that more resources outside of the course can be made available by the learner's own research, through searching and browsing information resources. Banks also notes the impossibility of an educational provider developing all the resources themselves, there needs to be use and re-use of materials within and between institutions.

3.6. Evaluation, quality and cost effectiveness

Examination of the economic issues of information technology-based teaching and learning has been conducted in the higher education sector (Boucher, 1998). Detailed analysis of the economic issues of IT assisted learning in the health sector is not yet available. Boucher notes that a modern communications and information technology for the Higher Education sector was given high priority in the Dearing Report (Dearing, 1997). The Computers in Teaching Initiative (CTI) was set up in 1989 by the then Universities Funding Council. An initial 20 (later increased to 24) discipline CTI Centres were located in universities around the UK, to advise and support academics in the use of computers in teaching. In 1992, the Universities funding Council launched the first phase of the Teaching and Learning Technology Programme, (TLTP). In 1997 the third phase was outlined with funding from the Higher Education Funding Council for England (HEFCE) and its Northern Irish counterpart. The emphasis in Phase Three was on implementing those courseware materials and IT-supported learning practice already developed in earlier phases, and on evaluating outcomes associated with their implementation and wide-scale use within universities. Dearing, (1997) estimated that 10% of the total higher education budget was spent on communications and information technology, representing a significant proportion of money used in direct IT assisted teaching and learning. Boucher (1998) uses the definition of:

Efficiency = Actual Output/Planned Output

Effectiveness = Actual Output/Potential Output

and summarises some of the problems involved in applying a 'Cost-Benefit Analysis' to resource allocation decisions in the context of IT assisted learning in higher education:

- Problems with the measurement of the opportunity costs and perceived benefits from new delivery methods;
- Judging the extent to which past and present initiatives have succeeded in delivering the efficiency gains and quality enhancements expected when the project was initiated;
- Lack of appropriate methodologies to identify and quantify benefits claimed for IT-assisted learning over conventional learning methods;
- Applying monetary values to educational, institutional and social benefits achieved through IT-assisted learning projects;
- The rapid growth and adoption of new IT solutions to all levels of society; and
- Many projects have been developed as prototypes from pump priming or path breaking initiatives. Benefits were expected to occur only when scaled up to an institutional or national level, over a period of time.

Boucher suggests that in the case of Universities a quantum leap in organisational thinking is required in embracing new technologies, because of the rapid change in their core business. The same argument is equally applied to the NHS.

Chapter 4 - Methodology

1. Introduction

At the outset of this research, little had been published on action research in medical education settings or in the field of information technology. In this chapter I critically appraise the action research literature within a framework of qualitative research (taking Lincoln and Guba, (1985), as a basis) to establish the principles which will be of use to me in my case studies.

The 'action' of this action research thesis is to create a networked learning environment with a collaborative partnership of like-minded professionals. The purpose of the networked learning environment is to support the continuing professional development for healthcare professionals. The 'research' of the action research is to explore the consequences of that action. I will be dealing with the specific research questions and the describing the methods I use to answer them in chapters five and six, which correspond to three cycles of action research. With relatively little published in the medical education field on networked learning it is difficult to say which methodological approach would be best to use. As the basis for my research, I find much in common with the definition for action research provided by Waterman et al (2001), who conducted a systematic review of the literature. It states:

> Action research is a period of inquiry that describes, interprets and explains social situation as well as executing a change intervention aimed at improvement and involvement. It is problem focused, context specific and future orientated. Action research is a group activity with an explicit critical value basis and is founded on a partnership between action researchers and participants, all of whom are involved in the change process. The participatory process is educative and empowering, involving a dynamic approach in which problem identification, planning, action and evaluation are interlinked. Knowledge may be advanced through reflection and research, and qualitative and quantitative research methods may be employed to collect

data. Different types of knowledge, including practical and propositional, may be produced by action research. Theory may be generated and refined, and its general application explored through the cycles of action research process.

It is worth critically examining the definition I use at this point to ensure that the action research I present does indeed meet the criteria contained within this definition. The period of enquiry of this thesis is from 1996 to 2001. The social situation is the affordances (c.f. Laurillard, 1993) of the Internet for the continuing professional development of healthcare practitioners. I will take the definition of continuing professional development provided by the Chief Medical Officer:

> A process of lifelong learning for all individuals and teams which enables professionals to expand and fulfil their potential and which meets the needs of patients and delivers the healthcare priorities of the NHS (DoH, 1998).

Personal learning plans are seen as key in providing evidence of CPD. Contained within this definition of CPD is:

- a process of lifelong learning;
- learning outcomes stated as meeting the needs of patients;
- and a learning context, the clinical governance agenda of the NHS;
- a means of assessment and evaluation through portfolios (*ibid*).

The change intervention in this action research was creating and embedding a networked learning environment collaboratively with a community of professionals, who were engaged in continuing professional development. I agree with Kemmis and McTaggart (1992: 16) when they point out that "action research is concerned equally with changing individuals, on the one hand, and on the other the culture of the groups, institutions and societies to which they belong." I see the change intervention process as iterative within the cycles of the different phases of the action research project. That is feedback from the learners and their reflections is key to improving the learning environment for all.

The focus of the research problem, is how to develop a networked learning environment for the future, which is capable of being used by professionals wishing to engage in CPD. The action research reported here has been a group activity at a number of levels by groups who I believe share an explicit critical value base. However the constraints of an academic thesis governed by university regulations make reporting action research somewhat problematic (c.f. Dick, 1999). As I assemble my material for reporting, I can say that there are three cycles of the action research process in this thesis. The first phase aims to establish a "field of action." The aim of this phase are, as Zuber-Skerritt (1996:83) suggests, the same as "the aims of any action research project or program" which "are to bring about practical improvement, innovation, change or development of social practice, and the practitioners' better understanding of their practices." The second phase of the project was more focused and aims to bring about a "form of collective self-reflective enquiry" (Kemmis and McTaggart, 1988: 5). This involved working with a group of like minded practitioners engaged in their own professional development in order that I might better understand my own practice as an on-line facilitator (Kemmis and McTaggart, 1992: 22-5). These action research projects started small by working through changes that I could try myself as a single action researcher, working through small cycles of planning acting, observing and reflecting, with a small group of collaborators, developing a record of improvements (*ibid*), and a reasoned justification of what we did though developing, testing and critically examining our rational. However, action research can work towards change that is more extensive (*ibid*), developing critiques of ideas or institutions which in turn might lead to more general reforms of classroom, school or system-wide policies and practices. From small cycles of planning, acting, observing and reflecting, the issues, ideas and assumptions can be more clearly defined, such that a wider community of participating action researchers can start to define more power questions as the work progresses. This brings me to the theme of the third action research case study, presented in chapter seven of this report which has a theme of action research for organisational change (Zuber-Skerritt, 1996: 83-105). In this case data is brought in from a range of projects to bring together an understanding of the relationship between CPD, portfolio-based

assessment, networked learning environments, and the educational provider institutions as learning organisations (*ibid*: 91). This three case approach has been used in medical education by Eizenberg (1991:179-206) as a Doctoral thesis. He was committed to help students improve their learning through interventions in the curriculum, and teaching and assessment practices through action research.

In choosing a methodology and appropriate methods for this action research there are four broad themes to consider:

a) 'Changing practice' to meet the needs of patients; 'changing practice' being one of the potential learning outcomes in portfolio-based assessment (Mathers et al, 1999).

b) The relationship between research and 'changing practice': does the evidence-based approach or the reflective approach to CPD have the greatest impact on changing practice for learners.

c) Organisational change; the promotion of institutional learning to adopt CPD, portfolio-based learning and the supporting information technology.

d) The quality of this research to ensure its trustworthiness and credibility.

2. Researching 'changing practice'

2.1 The philosophy of 'changing practice.'

Changing practice to meet the needs of patients is at the heart of continuing professional development. Within primary care, several models predict how health care professionals might change practice. In an educational setting two particular models have ascendancy. These are the 'reflective ' model derived from experiential educational theory and evidence- based practice drawn from a scientific view of health care. As I reflect on my experience as a clinical practitioner, or as a teacher practitioner, I feel that I am often in problem solving mode in my practice. But action research is not simply problem solving (Kemmis and McTaggart (1992), it is about problem posing, which is motivated by a quest to improve and understand the world by changing it and learning how to improve it from the effects of the changes made. Although Kemmis and McTaggart (1992) did not have in mind a clinical situation, the approach would surely work to make changes to clinical practice. I would:

- start by posing a problem of patient care;
- reflect on how to improve the care;
- act to improve the care;
- observe the effects of the change; and
- reflect on the effects of the change with a view to new changes next time around.

From small changes could come larger changes to groups of patients in collaboration with the practice team. The evidence-based approach is similar but different. It suggests that there is a right answer which is the evidence-based way to treat each patient (Sackett et al, 1997). The practitioner must pose a question to the evidence base, and critically appraise the information returned from the evidence base. The practitioner would then implement the treatment for the patient, and observe whether the change in practice worked or not. For the reflective clinical practitioner, I believe it is part of his/her continuing professional development to be numerate in order to follow the

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clinical governance agenda, and to a fairly sophisticated degree to be able to weigh up the evidence as just part of the reflective cycle.

In chapter 1.1.1.3 was discussing epistemic relativism. Reflecting back on this I still have a degree of discomfort about trying to measure reflective practice, for example in portfolio-based assessment, and yet accepting that it is possible to judge the quality of reflective writing in learners' assignments. Reflective practice, the constant refinement of one's personal world view within a democratic society, needs to be evaluated with a methodology from the same pragmatic philosophical origins, which is the stuff of action research. It is not possible to meaningfully measure reflective outcomes with a positivistic method, yet it would seem possible to get good agreement with raters where there is a structured marking schedule and markers have a shared understanding (see Chapter 1.5.4.3). However because of epistemic relativism, we cannot be sure that the reflective model has greater claims than any other model to educate healthcare learners towards the 'goals' of clinical governance. It is really a matter of faith in the reflective process. Pragmatists would argue that any demonstration that 'reflective practice' works is enough to establish its validity.

'Evidence based practice' captures a confident belligerence of 'prove it or else.' A move to-wards using evidence base is part of a wider drive to-wards 'clinical governance (Effective Healthcare Bulletin, 1999). The language of goals, objectives, outcomes and effectiveness challenges a reliance on sentimentality, opinion-based practice, intuition or lay knowledge. The validity of evidence-based practice in changing practice is reliant on the results of well-designed randomised controlled trials. Yet there continues to be a dearth of widely accepted research evidence that promoting 'evidence-based practice' makes any difference in changing the practice of practitioners.

This tension is mirrored within the educational research community by those who would promote reflection in and on practice as a form of research, which adds to theory, and those who believe theory tested by quantitative methods should inform practice. I feel the same tension exists within the action research community. Waterman et al, (2001) suggest that there are general

aspects in the evaluation of research that could be considered whatever the research method. Waterman et al, (2001) emphasise that qualitative or quantitative methodologies could be used during the action research process and that assessing the quality of the research should be based on the specific research methodologies. Carr and Kemmis, (1986) would support interpretative qualitative methodologies only. Because there are a number of research methodologies employed in the action research cycles of this project, I wish to discuss some of these issues in the context of changing practice at an individual and at an institutional level.

2.2 A Research framework

The approach I use is characterised by an action research methodology, specifically:

- Action research (Waterman et al, 2001), as a method of posing research questions, developing collaborative research partnerships, and generating and collecting data;

- Data analysis informed by the constant comparative method (Glaser and Strauss, 1967); and

- The principles of ethnography (Hammersley, 1992) as a method to ensure the quality, that is the relevance and validity of the research and its reporting.

2.3 Qualitative research: but which paradigm?

Two influential commentators on qualitative research, Denzin and Lincoln (1994) have announced that qualitative research has now entered a "fifth moment" in its development, and faces a "double crisis". Qualitative researchers face a "representational crisis", since research texts can no longer be assumed capable of capturing lived experience in the way once thought possible. A second crisis, of "legitimation", arises from a conviction that the old criteria for evaluating the adequacy of researcher's accounts no longer hold. They claim that words like "validity" and 'reliability' are markers of an earlier, now largely discredited 'moment' in the short history of qualitative

social research. Guba (1990:18) argues that all such "moments" or paradigms respond to three basic questions:

- What is the nature of reality? (a question of ontology);
- What is the nature of the relationship between the knower (inquirer) and the known (knowable)? (a question of epistemology); and
- How should the inquirer go about finding knowledge? (a question of methodology).

As Searle (1999) points out it is possible to do good work within different "moments", or "paradigms," without needing to resolve methodological disputes before beginning work. However, being aware of them feeds and enhances research practice (*ibid*). This thesis is located in an older view of qualitative research in the style of Strauss (1987), Lincoln and Guba (1985), and Miles and Huberman (1994).

2.4 Research or evaluation?

A quantitative evaluation aims to verify what works and what does work not with a controlled evaluation of social interventions against behavioural outcomes. However such studies may lack the intensity, subtlety, particularly ethical judgement and relevance that characterise evaluation born of qualitative methods (Shaw, 1999). Yet, within the field of qualitative evaluation there is much controversy as to whether evaluation is really research. According to Guba and Lincoln (1989), there is a strong distinction between evaluation and research. They have moved on from their position in 1985, and conclude that there are different forms of "disciplined inquiry", and thus research, evaluation, and policy analysis are different forms of "disciplined inquiry". In their model of 'fourth generation evaluation', (*ibid*) they describe the paradigm of constructivism. On reality, they advocate socially constructed realities, which can only be studied holistically in context; not "in pieces" as separate variables. The relationship between the knower and the known is one of respectful negotiation, joint control, and reciprocal learning. However because in their view all human behaviour is time and context bound, there is serious doubt as to the possibility of generalisation from one site to the next.

Shaw (1999) summarises many of the approaches to qualitative evaluation dependent on whether it is a policy, programme or practice that is being researched. He emphasises that the kinds of questions that are asked within an evaluation reflect the genre or paradigm in which the research is conducted. At one level this action research is aimed at developing a prototype networked learning environment that might inform action by other educational providers of programmes of continuing professional development. At the second level it is aimed at examining how practitioners might change their practice, both in terms of new learning methods using a networked learning environment, and in terms of healthcare practice as a consequence of that learning. Shaw (*ibid*) suggests that qualitative practitioner evaluation has four broad themes:

1. Research evaluation carried out by practitioners: teacher as researcher, qualitative clinical research, and critical (action) practitioner research.
2. Participatory research: essentially participatory action research;
3. Evaluation as a dimension of direct practice, through, for example, reflective inquiry; and
4. Evaluation for practitioners carried out usually by academic researchers: evaluative uses of ethnography, which may then go on to 'model' a service delivery that can be transferred to service providers. (*ibid*)

Qualitative techniques have a wide range of applications in health care research (Bowling, 1997: 312). Qualitative research methods have been typically used in health care research, for example documenting the experience of chronic illness and functioning of organisations. However, they have been less frequently used in the assessment of outcomes. This is because the testing of causal hypotheses takes place in a context that subscribes to the traditional, positivistic view of science, which requires adherence to the scientific method and uses experimental research designs and structured, standardised methods. While qualitative methods were not designed to test causal hypotheses, it is appropriate for the investigator to exercise curiosity and devise qualified hypotheses about cause and effect relationships in relation to the phenomena observed (eg "it is possible that

...("). The qualitative investigator has the advantage of getting closer to the research material, and can obtain a great deal of in-depth information that can be tested in subsequent quantitative studies if necessary and appropriate (*ibid*). According to Bowling (1997), this principle establishes the relationship between the small-scale qualitative studies and their basis as preliminary work to subsequent large-scale quantitative studies. Kemmis and McTaggart (1992) would argue that small-scale action research could grow into larger action studies which would use eclectic methodologies.

Qualitative research is a broad concept that subsumes several approaches including not only naturalistic enquiry (c.f. Lincoln and Guba, 1985), but also ethnography (cf. Hammersley and Atkinson, 1994), action research (cf. Carr and Kemmis, 1986), and grounded theory (Glaser and Strauss, 1967).

The writing of qualitative research is the art of interpretation, affected by many considerations. Not least amongst the difficulties in this art is the recognition that the science community to whom the researcher is offering his interpretation includes readers holding various epistemologies (Denzin and Lincoln, 1994:500). Whilst the emphasis in this thesis is on action research it will be seen that whilst action research suggests a methodology for the generation of data, the interpretation of that data draws heavily on more established qualitative methodologies such as grounded theory, ethnography or naturalistic enquiry (Waterman et al, 2001). There follows a discussion of the main points of these research methods from the point of view of the action researcher, with a particular emphasis on the relation between theory and practice, and the methods of enquiry in changing practice.

2.5 Naturalistic Enquiry

Commentators of qualitative research, such as Searle (1999), see Lincoln and Guba (1985) as a useful place to start in considering the issues within research methodology, because their position is amongst the most worked out in the field. Murphy et al, (1998:169-172) reconstruct the arguments Lincoln and Guba (1985) and Guba and Lincoln (1989) have used in developing their

approach. A researcher can be said to be doing naturalistic inquiry if he/she adopts the axiom or basic set of beliefs of the naturalistic paradigm or world-view. (Lincoln and Guba, 1985:250) There are 14 axioms to the naturalist paradigm, which are claimed to be coherent and interdependent (*ibid*):

- Natural setting - because the act of observation is so influential, phenomena are more fully understood in their natural settings;

- Human instrument - a human is the primary data gathering instrument because all instruments are value-based but only the human is in a position to identify and take into account those resulting biases;

- Qualitative methods;

- Purposive sampling (cf. theoretical sampling) increases the scope or range of data explored that can be pursued in ways that will maximise the investigator's ability to devise grounded theory that takes account of local conditions and local values;

- Inductive data analysis;

- Grounded theory - substantive theory emerging from the data;

- Emergent design - research design unfolds as the inquiry interacts with the phenomena;

- Negotiated outcomes - meanings and interpretations are negotiated with the human sources from which the data have been drawn because specific working hypotheses that might apply in a given contract are verified and confirmed by the people who inhabit the context;

- Case reporting mode - because it is more adaptable for producing a "thicker" more "reflexive," description than a scientific style report;

- Interpretation - interpretation of data is more likely to be in terms of the particulars of the case (idiographically) rather than in terms of law like generalisations (nomothetically);

- Tentative application - the findings are to some extent dependent upon the particular interaction between investigator and respondents;

- Focus determined boundaries - boundaries are likely to be set on the basis of the focus of inquiry, that is the problems for research in evaluation, and policy options for policy analysis; and

- Special criteria for trustworthiness.

2.6.1 Trustworthiness

Whichever methodological approaches are used, there is always the issue of whether the research can be trusted. Lincoln and Guba (1985:290) suggest that in relation to the trustworthiness of any research the issues are: 'How can an inquirer persuade his or her audiences (including self) that the findings of an inquiry are worth paying attention to, worth taking account of?'

The approach to special criteria for the trustworthiness is summarised in Figure 4.1.

Qualitative criteria	Quantitative criteria
credibility	internal validity
transferability	external validity
dependability	reliability
confirmability	objectivity

Figure 4 1 Equivalence of quality criteria between qualitative and quantitative research

(after Lincoln and Guba (1985:142)

2.7 Ethnography

Hammersley and Atkinson (1994:248), summarise four prominent features of ethnography. Firstly, there is a strong emphasis on exploring the nature of the particular social phenomena, rather than setting out to test hypotheses about them. Secondly, there is a tendency to work with unstructured data, that is data that has not being coded at the point of data collection in terms of a close set of analytical categories. Thirdly, there is usually the investigation of either one case in great detail or a small number of cases. Finally, the analysis of data involves explicit interpretation of the meanings and functions of human actions, the product of which mainly takes the form of verbal descriptions and explanations, with statistical analysis playing a subordinate role at most. Ethnographic methods rely substantially or at least partly on "participant observation." Nevertheless, there are other types:

- Complete observer;
- Observer as participant;
- Participant observer; and
- Complete participant.

Ethnography has largely been directed towards contributing to disciplinary knowledge rather than towards solving practical problems. Although ethnography may ultimately contribute knowledge of wide public relevance, this contribution has not usually been very immediate or specific. The ethnographical research may only change practice through the process of "enlightenment" (*ibid*). In an effort to resolve the theory-practice problem, for example the applied anthropology movement in the United States has been specifically concerned with carrying out research that is designed to address and contribute directly to the resolution of practical problems. Some ethnographers, perhaps those primarily concerned with contributing to disciplinary knowledge, have sometimes felt it necessary to engage in advocacy on behalf of those people in their studies. It is also recognised by ethnographers that there is a growing application of ethnographic methods in areas such as education, health and social policy (*ibid*). Moves towards more applied forms of ethnographic work have been associated with calls for more collaborative (cf. action) research. In part, these have risen out of concerns about the lack of impact that ethnographic research has had on social and political practice. Thus, the argument goes, its impact would be greater if practitioners were themselves involved in the research process. Both because that involvement would be likely to change the research and make it more practically relevant and because they would be more motivated to draw on research findings as a result of being involved. However, whilst it is important for ethnographers to rethink the relationship between the research and social/political practice, Hammersley and Atkinson (*ibid*) feel it is unwise to restructure ethnography on the basis of a single conception of the relationship between practice and theory. They claim that the goal of ethnographic research is the production of knowledge and that this should not be replaced with the pursuit of practical goals. Although practicalities may sometimes be

valuable in themselves they are no more worthy in general than the pursuit of knowledge especially where goals are of the kind that maybe difficult to achieve. They also have doubt as to whether change is always for the better suggesting that trying to produce change through idealistic research is of no service to anyone (*ibid*).

Hammersley and Atkinson note that the use of the justification of ethnography as a research method is marked more by diversity than consensus (*ibid*: 257). However, the methodological angst has produced a divergence in views amongst these two influential commentators on British ethnography. Thus Atkinson, writing with Delamont (1993) attacks the case study approach to educational practitioner research:

> Methodological sophistication is not a marked characteristic of
> the genre and its practitioners are 'anti-intellectual' and guilty of
> lack of scholarship. (1993:210)

Hammersley has been careful not to take a stance on methodological purity (1993a). He is unhappy that teaching should be regarded as synonymous with research, and feels that there is a risk of overestimating the benefits gained from research (1993b). I will present later the current thinking on Hammersley's suggested criteria for the quality of qualitative research.

Studies based on the ethnographic approach in healthcare include Fox (1992) and Dingwall and Murray (1983). An important advantage of observational methods is that they can help to overcome the discrepancy between what people say and what they actually do (Pope and Mays, 1999).

2.8 Some problems with ethnographic and naturalistic research

Cohen et al, (2000) suggest the there are several difficulties in ethnographic and naturalistic approaches even though their widespread use signals the increasing acceptance of them as legitimate and important styles of

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educational research. I will pick out some of the issues for comparison with the action research method:

- Implicit conservatism implying that the naturalistic research accepts the perspective of the participants and corroborates the status quo. It is focused on the past and the present rather than on the future. Action research is future orientated and aimed at change;

- Neglect of wider social contacts and constraints. In general, broader currents and contexts are ignored in a preference for studying situations that are highly context- bound. There is an issue with generalisability as naturalistic principles suggests that all situations are unique and therefore non-generalisable in addition there is the challenge of writing of multiple realities and explanations. Action research may start with small-scale research, but through the action research process can begin to define more power questions as the research progresses (Kemmis and McTaggart, 1992); and

- Who owns the data, the report and who has control over the release of the data? Action research is much more explicit (c.f. Kemmis and McTaggart, 1992) because it is collaborative.

2.9 Grounded theory and the constant comparative method

The constant comparative method of Glaser and Strauss (1967) forms the basis, with operational refinements, of data processing in both Naturalistic Inquiry (Lincoln and Guba, 1985) and the Miles and Huberman (1994) method. There are four stages:

(1) Comparing incidents applicable to each category;

(2) Integrating categories and their properties;

(3) Delimiting the theory; and

(4) Writing theory.

> Although this method of generating theory is a continuously growing process -each stage after a time is transformed into the next - earlier stages do remain in operation simultaneously throughout the analysis and each provides continuous

development to its successive stage until the analysis is terminated (Glaser and Strauss, 1967:105).

Glaser and Strauss (*ibid*) developed this approach to qualitative analysis in the early 1960s during a field observational study of hospital staff working with dying patients. The methodological thrust of the grounded theory approach to qualitative data is towards the development of theory, without any particular commitment to specific kinds of data, lines of research, or theoretical interest. Therefore, grounded theory is not really a specific method or technique. Rather, it is a style of doing qualitative analysis that includes a number of distinct features, such as theoretical sampling, and certain methodological guidelines, such as the making of constant comparisons and the use of the coding paradigms, to ensure conceptual development and density (*ibid*). In grounded theory, social phenomena are seen as complex phenomena. Grounded theorists put social interaction and social processes at the centre of their attention. Change is seen as a constant feature of social life but whose specific directions need to be accounted for. Theory is developed in an intimate relationship with data, with the researchers fully aware of themselves as an instrument for developing that grounded theory. Such researchers will bring experiences of various natures to the research. This is in contrast to the canons of, for example Miles and Huberman (1994) where personal experience and data are considered likely to bias the research. Strauss (1987:11) emphasises the essential nature of experiential data, which consists not only of analysis of technical knowledge and experience derived from research, but also the personal experiences. They give added theoretical sensitivity to provide a wealth of provisional suggestions for making comparisons, finding variations and sampling widely on theoretical grounds. The use of such experiential data helps the researcher eventually to formulate a conceptually dense and carefully ordered theory. If these guidelines are followed in the interpretation of data the research will be plausible, useful, and allow some further elaboration and verification, but may not be the only possible interpretation of the data. However, the researcher's biases are bound by controls exerted through a carefully managed trio of data collection/coding and memoing. Drawing on Dewey is the notion that the

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grounded theorist should care about their work in which they can 'find deep and satisfying meaning' (*ibid*: 9).

There are three processes that go on throughout the life of the research project, but not in simple sequential relationship (*ibid*: 12):

- Induction - refers to the actions that lead to discovery of hypothesis, that is, having a hunch or an idea, then, converting it into an hypothesis and assessing whether it might provisionally work as at least a partial condition for a type of event, act, relationship, strategy, etc. Hypotheses are both provisional and conditional;

- Deduction - consists of the drawing of implications from hypotheses or larger systems of them for the purposes of verification; and

- Verification - refers to the procedures of verifying, whether that turns out to be total or a partial qualification or negation.

Grounded theory is based on a concept-indicator model, which directs the conceptual coding of a set of empirical indicators (*ibid*: 25). The latter are actual data, such as behavioural actions and events, observed or described in documents and in the words of interviews and informants. These data are indicators of a concept the analyst derives from them, at first provisionally but later with more certainty. There is a constant comparison of indicator with indicator to force the analyst into confronting similarities, differences, and degrees of consistency of meaning among indicators. This generates an underlying uniformity, which in turn results in a coded category. After the conceptual code is generated, indicators are compared to the emergent concept. From the comparisons of additional indicators to the conceptual code, the codes are sharpened to achieve their best fits to data. Meanwhile further properties of categories are generated until the codes are verified and saturated, yielding nothing much new.

According to Strauss (1987) data collection will include not only field observations and interviews but also other sources of data, such as published documents of all kinds and private documents like letters and diaries. Analysis

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begins straight away and it follows that analytic questions and hypotheses inform the next interviews and observations about categories and their relationships. Data collection never ceases entirely because coding and memoing continue to raise fresh questions that can be addressed by the gathering of new data or the examining of previous data. Theory guided data collection can include the search or the serendipitous discovery of valuable additional sources of data.

Strauss suggests a coding paradigm which, he claims, becomes part of the researcher's thought processes (*ibid*: 27):

- Conditions - suggested by words such as "because"," since", "as", or phrases like "on account of;"
- Interaction among the actors - interactions occurring between and among actors, other than the straightforward use of tactics and strategies;
- Strategies and tactics -specific tactics associated with strategies; and
- Consequences - suggested by phrases such as "as a result", "because of that", "the result was", "the consequence was", and "in consequence".

The initial type of coding during a research project is termed open coding. The aim is to open up the inquiry and interpretation, at this point, is tentative. However, the emphasis is on analysing the data minutely.

The goal of grounded theory is to generate a theory that accounts for a pattern of behaviour that is relevant and problematic for those involved. The generation of theory is around the core category, which is the category that accounts for most of the variation in a pattern of behaviour.

A pragmatic line is taken by Strauss (1987:37) as to who should do the coding, depending on the aims of the project organisational factors like funding number of data sites, amounts of data to be collected and nature of the team at the outset of the research.

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2.10 Action research

Action research is a term that has been used rather loosely. For some, action research describes a process. Stringer (1996: 367) has coined the phrase 'Look, think, act' to describe action research. By 'look' Stringer suggests participants should define and describe the problem to be investigated and its context; by 'think' he means participants should analyse and interpret the situation in order to develop their understanding of the problem; and by 'act' he means they should formulate solutions to the problem. For others, action research is a view of the world. Carr and Kemmis, (1986) insist on three important elements in their argument to support action research as a 'critical education science:'

- Participation;
- Democratic impulse; and
- Simultaneous contribution to both social science and social change.

Shaw (1999) suggests that action research became known in the UK, with the Tavistock Institute's focus on intra-organisational and work life problems. However, in the 1960s action research became associated with the introduction of programmes of positive discrimination in education, and Community Development Projects through the Home Office. Evaluation of these projects was not primarily concerned with discipline development but was intended to be directly responsive to the needs and agenda set by the action programme. This emphasis on the political can be seen in the writing of Carr and Kemmis (1986), who suggest that action research will move from the organisation of enlightenment to the organisation of action, through to the exposure of aspects of social order which frustrate change. In doing so they emphasise the collective and collaborative dimensions of self-reflection and the dangers of self-reflection of the lone subject. According to many commentators such as Searle (1999), much of this 'critical theory' is polemical and demonstrates intolerance to other world views, which then becomes a problem when trying to institute change amongst those with differing views.

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There are a number of domains where action research has particularly been used, for example, organisational action research (Gill and Johnson, 1991), educational research (Cohen and Mannion, 1994, Kelly, 1985) and in healthcare, nursing research (Hart and Bond, 1995).

2.11 Action research in education

Carr and Kemmis (1986) define action research as:

> A form of self-reflective enquiry undertaken by participants (teachers, students or principals) for example in social (including educational) situations in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understandings of these practices, and (c) the situations and institutions in which these practices are carried out.

Carr and Kemmis (*ibid*) describe their own brand of action research as 'emancipatory action research.' Their epistemological position (Kemmis, 1985) is heavily drawn from the philosopher Habermas (1972, 1974,) who aims to synthesise the classical concern for praxis (wise and prudent action) with the logical and theoretical rigour of modern science. Habermas postulates that the content and form of our thinking are socially constructed. Habermas (1972) suggested that the search for knowledge was guided by self -interest of different kinds, broadly associated with each of the Aristotelian forms of reason:

- Technical: Instrumental knowledge directed towards the control of nature. The knowledge is accumulated through empirical-analytical sciences. The medium of social organisation in which the knowledge can be used is work;

- Practical: The interest is directed towards mutual understanding and wise action within a coherent framework of values. The knowledge is generated in the form of interpretations of social life and is pursued through hermeneutic or interpretative sciences. The medium of social organisation in which practical knowledge can be used is language (communication); and

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- Emancipatory: This interest is aimed at emancipating people from the dictates of taken for granted assumptions, habits, tradition, customs, etc. It is positively shaped by classical aspirations towards rationality, justice and fulfilment, but it must proceed by critiquing of existing modes of thought and action. In particular though the medium which science has most relevance, power, as in political organisation.

Reflection (Kemmis, 1985) becomes a political process in which individuals locate themselves in the historical struggle against irrationality, injustice and unfulfilment. Reflection is not a quiet contemplation primarily of significance to the individual and her or his own interests.

Kemmis and Wilkinson (1998) describe the methodologies and perspectives that flow from this epistemological position in the study of practice. They confirm the central features of participatory action research as:

(1)   A social process;

(2)   Participatory;

(3)   Practical and collaborative;

(4)   Emancipatory;

(5)   Critical; and

(6)   Recursive (reflexive, dialectical).

They offer no prescriptive method; rather they suggest the research process is itself grounded in reflexivity. Instead, they offer a checklist of points for reflection. These guide the researcher(s) through a series of critical questions that establish whether the project they plan has the features of participatory action research.

Cohen and Mannion (1994:188) suggests five purposes of action research within education:

1. Remedying problems diagnosed in specific situations or of improving in some way a given set of circumstances;

2. In service training, thereby equipping teachers with new skills and methods, sharpening their analytical powers and heightening their self-awareness;

3. Injecting additional or innovatory approaches to teaching and learning into an ongoing system which normally inhibits innovation and change;

4. Improving the normally poor communications between the practising teacher and academic researcher, and of remedying the failure of traditional research to give clear prescriptions; and

5. Providing a preferable alternative to the more subjective, impressionistic approach to problem solving in the classroom.

A single teacher operating in her own class may undertake action research. It may be undertaken by a group of teachers working collaboratively. A teacher or teachers may work alongside a researcher or researchers in a sustained relationship, possibly with other interested parties like advisers, university departments and sponsors on the periphery (*ibid*: 189). According to Kemmis and McTaggart (1992:10) the rigour of action research flows from planning, acting, observing and reflecting "more carefully, more systematically and more rigorously than one usually does in real life." Carr and Kemmis (1986:203) take a more philosophical stance and suggest that:

> In practical action research, participants monitor their own educational practices with the immediate aim of developing their practical judgement as individuals. Thus the facilitator's role is Socratic: to provide a sounding board against which practitioners may try out ideas and learn more about the reasons for their own action as well as learning about the processes of self-reflection. Practical action research may be a stepping stone to emancipatory action research in which participants themselves take responsibility for the Socratic role of assisting the group in its collaborative self-reflection.

Kemmis and Wilkinson (1998:21) suggest that the process of action research involves a spiral of self-reflective cycles of:

- Planning a change;
- Acting and observing the process and consequences of the change;
- Reflecting on these processes and consequences; and then
- Re-planning, and so forth.

The authors note that in reality the process may not be as neat as the spiral of self contained cycles of planning, acting, observing, and reflecting suggests. The stages overlap, and initial plans quickly become obsolete in the light of learning from experience. In reality, the process is more likely to be fluid, open and responsive. The criterion of success (*ibid*) is not whether participants have followed the steps faithfully, but whether they have a strong and authentic sense of development and evolution in their practices, their understandings of their practices, and the situations in which they practice.

Cohen and Mannion (1994) suggest several areas where action research would be appropriate in educational settings offering concrete examples, and include:

- Teaching methods - replacing a traditional method by a discovery method;
- Learning strategies - adopting an integrated approach to learning in preference to a single subject style of teaching and learning;
- Evaluative procedures - improving one's method of continuous assessment; and
- Aptitude values - encouraging more positive attitudes to work, or modifying pupils value systems with regard to some aspects of life;
- In service development of teachers -improving teaching skills, developing new methods of learning, increasing powers of analysis, and of heightening self-awareness; and
- Administration -increasing the efficiency of some aspect of administration for school life.

Action research has played a small part in the context of medical education, although there have been proposals that there might be a place for it (Genn and Harden, 1986). Snadden et al, (1996) used action research to explore the

unmet training needs for GP registrars in the area of interpersonal skills and self-management. They aimed to find out, within their local community, to what extent portfolio learning was useful and acceptable to trainers and GP registrars. The planning process began at an educational discussion group in 1990, followed by workshops in 1992 and 1993. In 1990, the learning model was developed using the critical incident technique. In 1992 the concept of portfolios containing reflective components was discussed, documentation created and GP trainers/registrar pairs were encouraged to explore ideas in a creative and practical way. In 1993, the portfolio concept was refined, and two booklets were produced to guide trainers/registrar in its use. Formal evaluation of the reflective practice/portfolio used was planned. During the implementation phase, reflective diaries were kept as part of the portfolio by GP trainers and registrars. The nature of the collaborative participation was co-learning. During the implementation phase there was increased use of reflective diaries but there was some fall off during the course of the registrars' year. The authors suggest this was due to the problems of integrating reflective practice into everyday work and the approach of summative examinations. Evaluation was done with semi-structured interviews of a group of GP trainers and registrars (n = 20), which gave some emergent themes. Reflective diaries have the potential to prevent complacency during training practice; diaries may provide a mechanism to map development and provide structure to teaching and learning; reflective diaries may increase dialogue in difficult trainers/registrar relationships; portfolio/reflective practice is not suitable for everyone's learning style and was valued more by GP trainers than registrars. The authors thought there was sufficient evidence of the positive effect of portfolio learning to encourage further developments. However, portfolios were not found to be an effective formal assessment because the threat of assessment influenced the type of material collected. The authors (*ibid*) identified the importance of the action research perspective as it resulted in clarification in the development of the educational model.

In action research, the relationship with theory and practice is not without its problems. The study of Snadden et al (*ibid*) is an example of where a change, which was planned to work in theory, may in practice work out somewhat

differently.   This is because of the inherent tension between the separate activities of *action* and *research* (*ibid*: 186):

> Action is tentative, noncommittal and adaptive. It concentrates upon the next step, breaking the sequence into discrete, manageable decisions.   It casts events in a fundamentally different perspective, evolving the future out of present opportunities, where research perceives the present in the context of the final outcome.   Research cannot interpret the present until it knows the answer to its ultimate questions. Action cannot foresee what questions to ask until it has interpreted the present.   Action attempts to comprehend all factors relevant to an immediate problem whose nature continually changes as events proceed, where research abstracts one or two factors for attention, and holds to a constant definition of the problem until the experiment is concluded. (Marris and Rein, 1967, cited in Cohen and Mannion, 1994:196)

There are also problems with the meaning of the word "practice" in both theory and research. Kemmis and Wilkinson (1998) offer a typology of the concept of 'practice' based on:

- Individual performances objectively viewed by an outside observer;
- The way the patterns of social interaction involved in the practice appear to an objective outside observer;
- The intentions, meanings and values which constitute practice as viewed subjectively by the practitioners themselves;
- The way the language of practice appears to communities of practitioners as they represent their practices to themselves and to others; and
- Change and evolution of practice as understood through on going reflection over time.

Cohen and Mannion (1994) suggest that a clear unambiguous statement of the project's objectives such that all participants understand them and their

implications, and a careful analysis of the context(s) in which the programme is to be mounted, to determine the precise, but flexible, relationship between the two components. This would help to show that the positive contribution of both theory and action are maximised and the constraints of each on the other are kept to a minimum.

A second problem is resistance to change. The action researcher can be not only in conflict with the power hierarchy within an establishment but also with other teachers who maybe reluctant to have their own individual practice scrutinised and changed.

The final concerns are methodological. The action research tradition has a methodology to create data but there remains the problem, no means unique to action research, of interpretation of that data (*ibid*).

2.12 Action research on implementing computer-based learning technologies

Much of the reported literature in this context concerns the evaluations of computer assisted learning technologies, which have been implemented in a higher education arena. Whilst this informs research on continuing professional development, accredited programmes of learning such as a certificate/diploma/masters are very different from the process that practitioners use to maintain and change their practice. However the approach used by the higher education research community is instructive. Thorpe (1988:5) offers a definition of evaluation in the context of open and distance learning as:

> The collection, analysis and interpretation of information about
> any aspect of a programme of education and training, as part of
> a recognised process of judging its effectiveness, its efficiency
> and any other outcomes it may have.

Thorpe (*ibid*: 157) feels that it is not necessary that all practitioners should subscribe to a role within the evaluation, 'What matters is that a collaborative decision-making process is set up, through which a definition can be agreed

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by all those concerned, together with procedures for its implementation', whereas for Kemmis and McTaggart (1992) action research establishes a self -critical community of people participating and collaborating in all phases of the research process.

Some researchers have described the utility of the action research methodology in evaluating the networked learning environments they have developed (cf. Fowell and Levy, 1995 in Chapter 3.5).

Computer assisted learning in general describes 'learning packages' designed for use by an individual working alone at a computer. There are four general types of evaluation (*ibid*) which have been proposed to evaluate the use of computer assisted learning (CAL):

- Formative (Scriven, 1967);
- Summative (Scriven, 1967);
- Illuminative (Parlett and Hamilton, 1972); and
- Integrative (Draper et al, 1996).

The aim of formative evaluation is to help improve the design of CAL. This is carried out on real students while the software is being developed and there are still resources to modify it. Summative evaluation is generally carried out after the software has been produced and to help users choose which piece of CAL to use and for what. Illuminative evaluation is an open-ended method, which aims to uncover unexpected important issues in a particular situation. It is a systematic focus on discovering the unexpected. The aim of integrative evaluation is to help users make the most of a given piece of CAL. Often the issue is not whether to use a particular piece of software, but how to make the best use of it. It is a type of formative evaluation, not of the CAL, but of the overall teaching and learning situation. Problems identified in the use of the CAL can be responded to by the teacher e.g. by producing a supplementary handout. In practice, there is often overlap of these different evaluation types. (Draper et al, 1996) Although integrative evaluation is not labelled as action research, there is a strong resemblance in iterative cycles of development in

collaboration with users. Problem areas of the package are identified and 'solved' in further refinements of the package. The results can then be shared with a wider audience.

2.13 Action research and healthcare

As part of NHS Research & Development Health Technology Assessment Programme, Waterman et al, (2001) conducted a systematic review of the literature including consultation with experts, funding agencies and users. They developed a working definition of action research and differentiated it from other types of research and development. They described action research in health care in the UK including analysis of its impact, strengths and limitations. The project also provided guidance to funding agencies, policy makers and researchers on criteria which can be used in assessing the quality of action research proposals and reports, consisting of 20 questions for assessing action research projects (*ibid*: 48-50).

An area in which action research has been developed is in community settings. Bowling (1997) suggests that community-based action research is useful where health professional investigate people's health problems in an area, with the aim of developing appropriate treatment and prevention programmes. A second area in which Bowling (*ibid*) suggests action research is useful is for the rapid assessment of local views and perceptions of problems and needs. In this scenario for community needs assessment, action research is used to gain insight into the community's own perspectives of their needs. Once the problems are identified, the aim is then to translate the findings into solutions or areas for action (eg by health authorities or primary healthcare teams). Ong (1996) has developed the notion of "Rapid Appraisal" to engage users in the development of health care policy and practice. This type of action research, hitherto predominantly used in developing countries, focuses on participatory methods to foster change, using ideas derived from the field of community development.

Action research has been used in exploring how organisational problems in the NHS can be overcome. Berger (1998) reports a study focusing on the

roles of clinicians, clinical audit staff and managers in implementing clinical audit. Meyer (1999:63) suggests that the value of action research in health care settings lies in its ability to influence practice positively in the course of the study, whilst, at the same time, systematically gathering data to share with a wider audience. The involvement of practitioners in this process ensures not only more likelihood of discovering successful solutions to everyday problems, but also of obtaining a different type of data that is more relevant and meaningful to practitioners.

The concerns of action researchers in healthcare are similar to education. Hart and Bond (1995: 40) have devised a typology which they claim 'makes sense of what otherwise might appear as diverse and disconnected ways of applying action research to a range of different problems and settings.' They suggest four broad traditions of action research:

- experimental - the problem is solved in terms of research aims;

- organisational - the problem is to be solved in terms of management plans;

- professionalizing - the problem is to be solved in the interests of research-based practice; and

- empowering - the problem is explored to increase understanding of the issues involved in both the problem and the solution.

Hart and Bond (1995) argue that there are seven distinguishing criteria of action research which when applied distinguish action research from other methodologies. They are that action research:

1. Is educative;

2. Deals with individuals of members of social groups;

3. Is problem focused, context-specific and future-orientated;

4. Involves change intervention;

5. Is aimed at improvement and involvement; and

6. Involves a cyclic process in which research, action and evaluation are linked

7. Is founded on a research relationship in which both the researchers and the researched are involved as participants in the change process.

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Meyer (1999:68) suggests that Hart and Bond's framework makes classification of single studies into any one type of action research problematic. Rather it is more useful to use the typology for critiquing individual studies, and in particular how concepts are operationalised, the features of the particular settings, and the contribution of the people within those settings. She suggests that there has been a move in health care from the experimental approach to the more 'empowering' type of research (*ibid*).

Those who advocate action research in nursing suggest it has an important contribution in ensuring that practitioners implement research findings. For example, Rolfe (1996) rehearses the arguments as to why researchers and academics believe research is not turned into practice. The claim is that practitioners are:

- Unaware of current research findings;
- Not properly implementing research findings; and
- Reluctant to change.

Rolfe (*ibid*) believes the real reason is

> not of the failure of nurses to put theory into practice, but of the inadequacy of the theory itself; that perhaps the theoreticians are out of touch with the needs and realities of clinical practice and are generating theories and models which either have no relevance to practising nurses, or else which are impossible to translate into practice.

For Rolfe the closing of the so-called theory/practice gap is through reflexive action research, based on the notion of the reflective practitioner (Schon, 1983):

> This is based on the process of reflection-in-action or on-the-spot experimenting, in which the researcher-practitioner evaluates a situation, develops a theory to account for that situation, tests the theory by constructing and implementing a clinical intervention, evaluates the new, transformed situation,

modifies the theory accordingly, and so on in a continuous cycle or spiral. Thus, not only is theory constructed and change implemented, but the effects of that change are immediately assessed and the theory and practice modified accordingly within the same study, and in this way negative outcomes are eliminated and positive outcomes are enhanced (Rolfe, 1996).

For Rolfe the best methodological approach to reflexive action research is using the grounded theory approach of Glaser and Strauss (1967). The situations Rolfe has in mind are where practitioners become directly involved reflecting-in-action on their own practice or through small hospital ward-based projects. According to Titchen (1995), such projects can have validity built into the action research process, as in any qualitative methodology but that there should be an emphasis on establishing validity collaboratively. Allan (1997), a health visitor, explored the effectiveness of a community based "pop in" clinic for people with learning difficulties. The literature before the study suggested that people with learning difficulties made less frequent use of primary care health services than the rest of the population, despite having higher rates of illness and special needs. Allan was already based in an adult training centre for people with learning difficulties and had observed that key staff including herself, seemed to work in ways which did not bring direct benefits to clients. The solution to the problem was taken collaboratively with Allan as the researcher in conjunction with other staff from the centre and guidelines provided by white paper 'Health of the Nation' (DoH, 1993) created 'changes in practice and delivery of care by helping shape changes in terms of accessibility, appropriateness, responsiveness and staff skill' (Allan, 1997). Allan concluded that the provision of a "pop in" health clinic is a means by which health visitors can meet the need of people with learning disabilities. The strengths of this research are that a practitioner was empowered to bring change for the benefit of her own clients through the action research process, and added to the theory of "nursing" people with learning disabilities. The change in practice involved the looking, acting and thinking suggested by Stringer (1996) and took account of the national guidelines on good practice. The study would not appear generalisable as it was researched in a particular

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context, however it does serve to illustrate the action research process in community nursing.

2.14 Action research in organisational change

Zuber-Skerritt (1996) describes a model of emancipatory action research for organisational change. A simplified version is presented here which marries a six-step model of managerial interventions for organisational change and the action research cycle. The model gives a framework for conceiving of the management of change in terms of action research.

MANAGERIAL INTERVENTIONS	ACTION RESEARCH
Clearly (re) define a business plan	Plan
Develop a shared vision	
Provide strong leadership	Act
Spread shared vision to all departments	
Institutionalise revitalisation through formal policies, systems and structures	Observe
Get feedback on draft policies, systems and structures	
Monitor the whole revitalisation process	Reflect
Reflect on the results and draw conclusions	

Figure 4 2 Organisational change and the action research cycle

(source: Zuber-Skerritt, 1996)

Action research in management should serve both the practical concerns of the managers whilst simultaneously generalising and adding to management theory. Thus the role of the researcher is to do immediately useful work which can be applied by the sponsoring organisation yet at the same time stand back from specifics so that the research may be more widely utilised by professionals in their day to day work. These twin objectives may frequently

be achieved by the resolution of a particular content problem in a specific case, and the investigation widened to address issues that are more general (*ibid*). Gill and Johnson (1991) summarise the literature of the approaches of problem solving in a way which contributes to both theory and practice. At one end of the spectrum is a traditional "science only" approach. The dangers of this approach are the very rigour of the research methods, which may limit the practical applications in a real life situation. At the other end of the spectrum is what amounts to "management consultancy". Here research is primarily concerned with problem solving for the client and not with testing theory.

2.15 Ethical framework of action research

The ethical dilemmas in action research in healthcare settings have been discussed. For example Fraser, (1997) undertook an action research study designed to evaluate a contentious part of a new midwifery programme in her school. She felt at the outset that her methodology required her to be democratic and adhere to the principles of participation. However in hindsight she could see that being both the evaluator and a chairperson of the course management team had a big impact on her study which could have been addressed at the planning stage and quotes Nisbet:

> Accountability structures put the evaluator into a powerful position. They give him the role of "gatekeeper" in that the evaluator controls access to information ... decides what information will be gathered, how it will be processed, which parts will be reported and the survival of institutions and individuals may be affected by the evaluator's decisions (Nisbet, 1979, p. 49-50).

Cohen et al, (2000: 68) adapt ethical principles for the guidance of action researchers from Kemmis and McTaggart (1981). These are:

- Observe protocol;
- Involve participants;
- Negotiate with those affected;

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- Report progress;
- Obtained explicit authorisations;
- Negotiate descriptions of people's work;
- Negotiate accounts of others' points a view;
- Obtain explicit authorisations before using quotations;
- Negotiate reports before various levels of release;
- Accept responsibility for maintaining confidentiality;
- Retain the right to report your work; and
- Make your principles of procedure binding and known.

Cohen et al, 2000 note that there is often little anticipation of the ethical consequences arising from the complexities of research methods in educational institutions particularly among the more inexperienced researchers. Certainly within the medical educational community there is concern that many studies fail to document ethically important safeguards and features, for example, informed consent (Roberts et al, 2001). Although they were looking at medical students, they drew an important distinction between medical education research and medical education practice, in particular the moral difference between education research and education practice. They note that regulations governing education research require more safeguards than often exist in education practice; and student participants in research have characteristics in common with members of special populations who require more protection. The authors offer several recommendations regarding ethically sound educational research. The ethos is firstly, to distinguish carefully as to whether creating and writing up an education related activity is intended as strictly educational as in any ordinary evaluation or whether the research is intended to contribute to generalisable knowledge. Secondly, the authors suggest that educational research should be guided by the same research guidelines as would be involved in human research. The ethical concerns related to each of the cycles of action research will be considered as I come to them, in Chapters 5, 6, and 7.

3. The Quality of Qualitative Research

In this section, I will critically appraise aspects of reliability and validity to establish the principles by which the quality of the action research can be judged. The debate surrounding the methodological rigour of qualitative research is confounded by the diversity and lack of consensus about the rules to which it ought to conform and whether it is comparable to quantitative research. Until the 1970s, validity in qualitative research was discussed in relatively conventional terms. In the 1970s and 1980s a more metaphorical interpretation of validity evolved, with concerns of confidence, authenticity, cogency and soundness.

In the 1980s, writers such as Lincoln and Guba (1985) had started to argue for the replacement of validity and reliability with criteria, that in their view were more suited to qualitative research. The 1990s has been characterised by an' oppositional stance' where some argue that no common standards of evaluation are possible (Smith, 1984), others that criteria are paradigm specific (Guba and Lincoln, 1989), others adopting more traditional criteria of validity and reliability (Le Compte and Priessle, 1993).

In reviewing the action research literature there would appear to be those (c.f. Kemmis and McTaggart, 1992) who are arguing that action research criteria are paradigm specific. For example, action researchers (*ibid*) can go beyond the concerns of the micro-level and address larger questions at the institutional level using the same data This is because the research process demands critical examination of the understandings gained within the action research collaboration to further refine the understanding of the phenomenon. This is at odds with eg Lincoln and Guba, 1985) who would argue that theory is generated by close analysis of the data using grounded theory (c.f. Strauss, 1987). The other view is that action research should adopt common standards of evaluation. For example Waterman et al, (2000) suggest that the quality

criteria for action research should relate to the research question and the research methodology employed in data analysis.

3.1 Towards quality in the health service

The context of this research is on the one hand health services research and the other educational research. This research has been largely funded through NHS monies and therefore the NHS is a key stakeholder in the research. The NHS Research and Development programme has commissioned a review of qualitative research methods relevant to health technology assessment, (Murphy et al, 1998). The authors follow the work of Hammersley (1992) and argue that the central criteria of rigour are:

- Validity; and
- Relevance.

They avoid the temptation to provide a checklist, suggesting such an appraisal is a matter of judgement. However, Mays and Pope (1999:98) are quite happy to provide a list of quality guidelines and point to others who have done the same.

Hammersley (1992:69) would appear to have taken great care not to be involved in the "paradigm wars":

> An account is valid or true if it represents accurately those features of the phenomena that it is intended to describe, explain or theorise.

Qualitative research, according to Hammersley (1992) has to be relevant in some way to public concern, although this does not mean that the research should adhere slavishly to the immediate concerns or problems defined by policy makers, professionals or managers. Rather research is relevant when it adds to knowledge or increases the confidence with which existing knowledge is regarded.

Hammersley's position is described as one of 'subtle realism,' an approach to social science which Searle (1999:26) suggests accepts that, although we

always perceive the world from a particular viewpoint, the world affects us in a way which constrains the points of view which are possible. Hammersley (1992:131) suggests that:

> For me, research is a process of inquiry which is collective not individual; and it is geared towards the production of valid and relevant knowledge, rather than the solution of practical problems.

Hammersley explains that this model of collaborative research is validated within a community of fellow researchers by their scepticism.

3.2 Quality criteria in research

Murphy et al, (1998:167) suggest to commissioners of health service research that the debate about quality in qualitative research involves three questions:

- Is it appropriate, or indeed possible, to identify criteria for evaluating qualitative research?
- If it is appropriate, what criteria should be adopted?
- Given the criteria adopted, how are these to be assessed in relation to any particular piece of research?

3.3 Assessing the validity of qualitative research

Murphy et al, (1998:167:194) suggest several criteria by which the validity (after Hammersley, 1992) of qualitative research can be assessed. There is some evidence in the literature of the ways in which action research can meet these criteria, assuming that the search for common standards.

3.3.1 Respondent validation or member checking

Respondent validation can be understood as the research community seeking communication with and perhaps reassurance from the wider community with whom (or on whom) research is done. Searle (1999:64), Lincoln and Guba (1985:314), and (Guba and Lincoln, 1989:239) suggest member validation is 'the most crucial technique for establishing credibility'. According to Searle

(1999:64), the concern of Lincoln and Guba (1985) in doing member checks is to provide the research with a moral commitment to the understanding of others' perspectives, as well as political commitment to democratic research practice. Further that in accord with Guba and Lincoln's (1989) conception of 'authenticity,' the strategies of action research are instances of member validation. In practice member checks are often limited to asking members whether a researcher's account represents a 'legitimate elaboration and systematisation of the members 'accounts' (Bloor, 1983:157).

3.3.2 Triangulation

Denzin (1978: 295) suggests four types of triangulation:

- Data triangulation: using diverse sources of data, that one seeks out instances of a phenomenon in several different settings, at different points in time and space, giving a richer description of the phenomena;

- Investigator triangulation: team-based research with continuing discussion of points of difference and similarity to reduce personal biases;

- Theory triangulation: researchers approach the research with several hypothesis to see how each fare in relation to the data; and

- Methodological triangulation: classically illustrated by a combination of ethnographic observation with interviews. Also is a frequently cited rationale for mixing qualitative and quantitative methods in a study.

Denzin and Lincoln (1994) summarise this approach as 'the combination of multiple methods, strands, perspectives and observers in a single study is best understood then as a strategy that adds rigor, breadth and depth to any investigation'. Meyer (1999:70) suggests that in her study of lay participation in a hospital setting, by using methodological triangulation in action research, the researcher can use qualitative methods to add to the quantitative results from questionnaires and discover key themes emerging from the project. This led to a greater understanding of the barriers to successful implementation of a new policy.

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Murphy et al, (1998:185) recommend that only five criteria are needed to allow judgements about the validity of research findings to be made:

1. Clear exposition of data collection methods;
2. Clear exposition of process of data analysis;
3. Reflexivity;
4. Attention to negative cases; and
5. Fair dealing.

3.3.3 Clear exposition of data collection methods

Althiede and Johnson (1994:494) suggest that there is a set of requirements for research that allows the reader to engage with the study in an interactive way that allows 'reliving the report as the playing out of the interactions among the researcher, the subjects, and the topic in question'. These include negotiation of access, self presentation and approach of the researcher, trust and rapport, the researchers role within the setting, any mistakes or misconceptions by the researcher, the types and varieties of data collected and how it was recorded, how such data was analysed and reported. According to Murphy et al, (1998:186) such a report would allow other researchers to use the original report as an operating manual to replicate the original study.

3.3.4 Clear exposition of process of data analysis

Murphy et al, (1998) suggest that the adequacy of any analysis depends upon the nature and quality of the process that is used to organise and interpret the data upon which it is based. Data analysis should be 'public and reproducible (Dingwall, 1992). Although clarification of concepts is often on-going throughout a project, Murphy et al, (1998) are adamant that at the time the results of a study are presented, a clear and defensible definition of each concept has been arrived at allowing the reader to evaluate the findings in relation to the definitions employed. They also suggest that the researcher must demonstrate that the conclusions that he/she has drawn are justified in relation to the data collected. Enough data must be reported in the research to assess whether the interpretations are adequately supported by the data. Such assessment depends crucially on the extent to which researchers have

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separated out the data and the analysis of that data in presenting their conclusions. Researchers should demonstrate that they have considered alternative plausible explanations of the data. The proposal of more formal procedures such as peer-review panels and audit trails are noted but considered too resource intensive to be practical for most research purposes.

3.3.5 Reflexivity

Hammersley (1992) has argued that the assumption that there is one version of truth which the researcher seeks to reproduce in his or her research, fails to take account of the fact that empirical phenomena are descriptively inexhaustible.

Murphy et al, (1998) define reflexivity in this context as:

> Sensitivity to the ways in which the researcher's presence in the research setting has contributed to the data collected and how their own a priori assumptions have shaped the data analysis.

Thus, researchers should make explicit the personal and theoretical biases which they bring to the research. They should compare their findings with fellow researchers and keep a reflective log to explore the assumptions that they themselves bring to the analysis. They should avoid going 'native' by regularly withdrawing from the field to allow time for reflection and distancing.

3.3.6 Attention to negative cases

The validity of qualitative research is the conscientious search for and presentation of cases that are inconsistent with the emerging analysis. (Murphy et al, 1998) This process is facilitated by theoretical sampling and helps researchers to establish the limits of their findings. The second issue is building on cumulative knowledge, a problem both in health and in education. According to Dingwall (1992:171) many qualitative researchers limit themselves to one-off studies which are 'conceived and executed in magnificent isolation'. One-off unrelated studies provide little more than 'anecdotal value to a policy maker trying to understand how an organisation works' (*ibid*). For example in Dingwall and Murray's (1983) study of an

Accident and Emergency department, they were able to provide a richer analysis, by incorporating their own data with other studies of relevant medical settings. This allowed them to build on earlier work (without imposing its conclusions upon their own analysis) to modify, extend and elaborate earlier analysis.

3.3.7 Fair dealing

Dingwall (1992:172) suggests that qualitative research should display a commitment to fair dealing. Murphy et al, (1998) make the point that whether one is considering the relativist position of for example Guba and Lincoln, (1989) or the subtle realist position of Hammersley (1992), there is a commitment to the notion that any phenomenon may be understood from a number of different perspectives. The researcher must endeavour to avoid partisanship and attempt to be as inclusive as possible at including interpretations from people at differing levels within an organisation or social setting. In particular Murphy et al, (1998) are scathing of those who insist upon prioritising the pursuit of the emancipation of the underdog over the even handed presentation of interpretations drawn from people at different status levels. This aside would appear to include the approach of eg, Carr and Kemmis (1986).

3.4 Establishing criteria for quantitative research

I will include a short reprise of some of the quality issues in quantitative research for three reasons:

- There is some treatment of numbers in the first action research cycle of this action research.

- It provides a context for the critique of quantitative methods which much of the concerns of qualitative researchers are based on (c.f. Lincoln and Guba, 1985).

- Proposals for portfolio-based assessment (c.f. Davis et al, 2001) rely on the concepts of reliability and validity for their quality assurance.

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3.4.1. Internal validity

Internal validity is the question, does the experimental treatment, in fact, make any difference in the specific experiment under scrutiny? Campbell and Stanley (1963) suggest that there are eight 'threats' to internal validity (cited in Lincoln and Guba, 1985:291) in the course of scientific research. In education, two threats particularly affect the interpretation of any measurements of an educational intervention:

- History - the specific external events occurring between the first and second measurement other than the experimental variables; and
- Testing - the effects of taking a test upon the scores of a second testing.

Cohen and Mannion (1994:170) discuss the threats to internal validity in terms of the problems often encountered in educational research. Thus frequently events may occur during the time between pre-test and post test conditions. Subjects may change as a result of things outside of the experiment. This is particularly a problem over long interventions. There is a tendency for subjects who are pre-tested to be sensitised and to get higher post-test scores. Tests for instruments need to be reliable and there is a problem with human observers in that there are can be changes in their skills and levels of concentration over the course of experiment.

3.4.2 External validity

> External validity asks the question, given these demonstrable
> effects, to what population or settings can they be generalised?
> (Cohen and Mannion, 1994:170)

External validity is built into experimental design where there is randomised sampling from a given, defined population. If a sample is selected in accordance with the rules that every element of the population has a known probability (not necessarily equal) of being included in the sample, then it is possible to assert, within given confidence limits, that the findings from the

sample will hold for (be generalisable) to the population. (Lincoln and Guba. 1985:291)

Cohen and Mannion (1994) discuss the threats to external validity:

- Failure to operationalise dependent and independent variables explicitly;
- Lack of representativeness of available and target populations;
- Hawthorn effect ; and
- Interaction effects of extraneous factors and experimental treatments

Good experimentation (*ibid*) in educational setting as in healthcare settings lies in maximising both internal and external validity.

3.4.3 Reliability

Reliability is synonymous with dependability, stability, consistency, predictability, and accuracy (Lincoln and Guba, 1985:292). Reliability refers to the reproducibility and consistency of an instrument for example those used in psychometric testing.

Four common criteria need to be assessed before an instrument can be judged as reliable. These are:

- Test/retest;
- Inter-observer reliability;
- Internal reliability; and
- Intra-observer.

By using statistical techniques, standards have been accepted by the scientific community for correlation coefficients (eg Cronbach's alpha > 0.70 for internal reliability) so that the reader can assume an instrument is reliable (Bowling, 1997:130). Reliability has several "threats". For example test/retest test reliability may be affected by resistance of subjects to further testing and a practice effect so that the *same* test will not be able to be administered under the *same* conditions (Oppenheim, 1992:160).

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3.4.4 Objectivity

A conventional approach to the problem of establishing objectivity is through methodology; to use methods that by their character render the study beyond contamination the by human foibles. (Lincoln and Guba 1985:293) Scientific research implies the exercise of objectivity from the inception of the research idea, the design of the study, the methods used, the process of carrying it out and the analysis and interpretation of the research results. Objectivity is maximised by reducing the threats to validity and reliability. (Bowling 1997:103)

3.5 Assessing the relevance of qualitative research

Hammersley (1992:107) has argued that qualitative research must be relevant "however remotely" to some public concern. Relevant research should not only investigate issues that are significant, but should also make an original contribution to existing knowledge. There is a place for confirmatory studies, to test out what we already know and to put it beyond reasonable doubt (or otherwise). Research may also make a significant contribution in plugging the gaps in our existing knowledge (*ibid*: 115). Research, thus, must in some way contribute to the accumulation of knowledge.

4 Computer Assisted Data Analysis

The data in this research was analysed with the assistance of a computer software package QSR NUD*IST (Non Numerical Unstructured Data Indexing and Theorising) Version 4.0 which enables analysis of qualitative data. It is perhaps worth just pointing out some of the benefits and some of the problems using software to assist with data storage, and analysis. There are now various evaluations of the methodological and practical value of various software applications within qualitative analysis. The general approach has spawned its own area of expertise (Fielding and Lee, 1995).

There are a number of authors describing the use of computer software in qualitative analysis:

> Clerical tasks of qualitative research-data recording, storage, and indexing- are handled by NUDIST by input into and exploration of separate text and index files. Data documents need not be on-line to be indexed. Indexed data can refer to finely defined extracts of data or to information about the text (thus to characteristics of people, or groups, who are the subjects of particular documents or parts of documents. Exploration and theory development are done in the interplay of the original text with the conceptual structure used for and created by its exploration. (Richards and Richards, 1992:45)

NUDIST stores information in tree-structured indexes. The categories (nodes) in a tree-structured index have titles, carry comments (memos) and contain references to the text which has been explored. The collected data can be entered into NUDIST and indexed.

> Construction of the index system becomes important from the start of the project and continues to the end and is itself a theoretical process. (*ibid*: 50)

NUDIST has a number of functions which allow data to be interrogated and theorised upon, within the framework of the research methodology employed (see figure 4.3).

Coffey et al, (1996) note the computer-based handling of textual data is a useful extension of the capacities of word-processing and textual data storage. However, they are concerned that many of the analytic strategies implied by code-and-retrieve procedures are tied to the specific inputting requirements of computer software strategies. Consequently, there is an increasing danger of seeing coding data segments as an analytic strategy in its own right, and of seeing such an approach as the analytic strategy of choice. That should not be the case. Coding segments of text, with or without the addition of analytic memoranda to selected segments, is by no means the only way of managing and manipulating data. The qualitative research community should not endorse the computer-based code-and-retrieve strategy as the automatic approach to management and analysis (*ibid*).
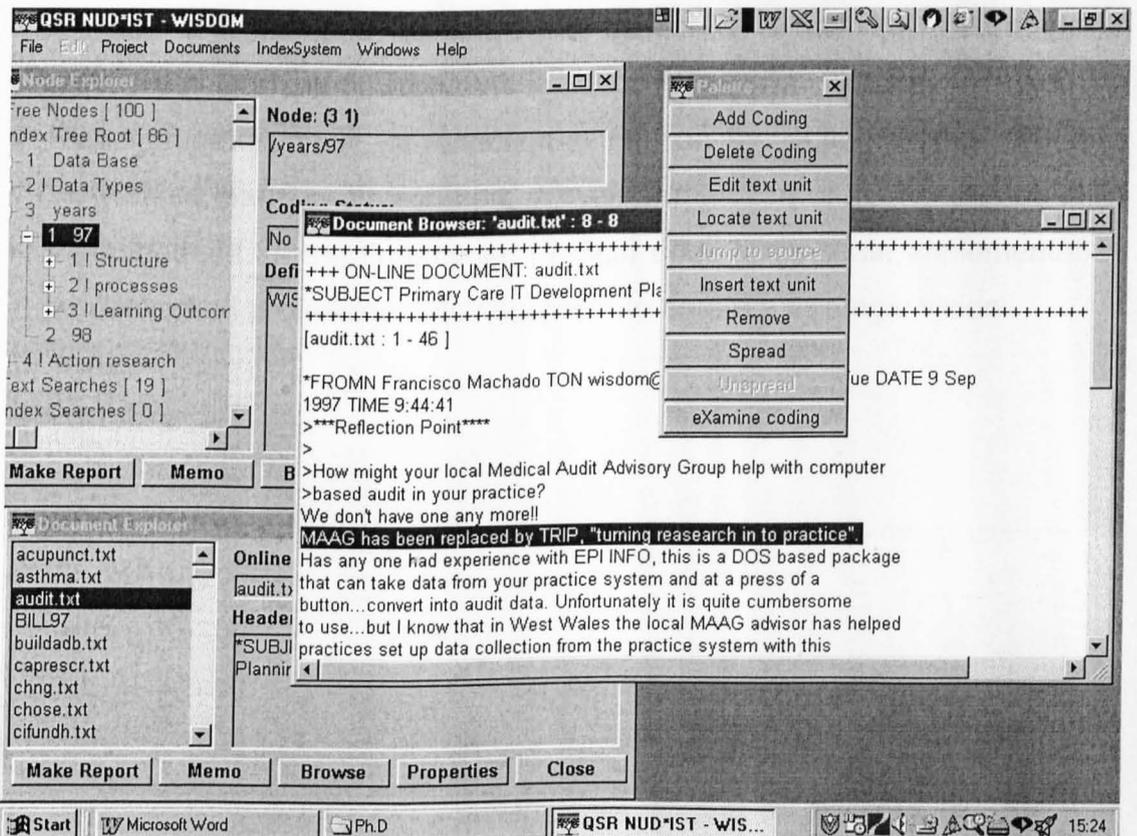
Figure 4 3 An illustration of the NUD*IST workspace

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5. Summary

In this chapter, I have reflected on the research methodology literature to refine my approach to this action research. I have established that evaluations of education interventions to promote a "change in practice " of health care professionals is a legitimate and relevant form of research. I have described how an action research framework can be used to develop a collaborative partnership for cycles of planning, acting, observing and reflecting to generate and collect valid data. In terms of which quality criteria (see section 3) to apply to the action research I describe, there is no easy answer. Whilst action research cycles one and two are based on the notion of common standards, action research cycle three is based much more on the quality criteria of (Kemmis and McTaggart, 1992). The specific methods I use are set out in each of the chapters.

In the following chapters, I will describe three action research cycles which look at specific levels of involvement in networked professional development.

- Course organising: a formative evaluation of a course run through a networked learning environment in action research cycle one;
- Teacher practitioner: a reflection-in and on the action of teaching in a networked learning environment in cycle two
- Management: in the final cycle, I reflect upon large-scale implementation of networked professional development to create a strategic vision.

Chapter 5 - First action cycle: The virtual classroom

1. Conceptual framework

Action research is a spiral of planning, acting, observing and reflecting (Kemmis and McTaggart, 1992) within a self-critical community of people committed to self-enlightenment through collaboration. This cycle of action research describes how a group of people came together to educate themselves about what it means to be part of a networked learning community exploring the possibilities for their own professional development. As I reflect back on this first cycle of action research, I have the benefit of understandings gained through reflection-in-action at the time and reflection-on-action shortly afterwards. In addition I was able to 'reflect-on-reflection' sometime later (Schon, 1983). This is the strength of action research (Kemmis and McTaggart, 1992). I am able, as an action researcher, to go back over previous cycles (this one commenced in late 1996), to collect and analyse my own judgements, reactions, and impressions. Then, through critical analysis, add to the emerging research themes of the third cycle of action research (Chapter seven) written in 2001.

This first cycle of action research is rooted in an older conception of networked learning than that which I present more fully in Chapter seven. This first cycle was based on the concept of the 'Virtual Classroom' (c.f. chapter 3.2.2). Adapting Hiltz's concept of the virtual classroom (1994: 71), the general premises of this first cycle were:

- The virtual classroom is a viable alternative for delivery of continuing professional development for healthcare professionals. (By 'viable' is meant a means of delivery which will result in acceptable levels of satisfaction from performance for both tutors and learners).
- Communication and information technologies as a mode of course delivery will require changes in teaching and learning strategies.

Hiltz (*ibid*) offers a range of examples of testing these hypothesises, which flow from these premises in experimental settings. Such an approach is not without its merits. With varying degrees of collaboration I have been involved in reporting this approach; by Fox et al, (1999) in health informatics for healthcare workers, Fox et al, (2000) for a change management course and Fox et al, (2001) for an on-line health informatics course for specialist registrars as part of the generic curriculum for higher specialist training. It is not however action research, although the body of work has been conceived within an action research framework.

This thesis is conceived and written as action research, and as such follows the accepted schema (c.f. Kemmis and McTaggart, 1992) of planning, acting, observing, and reflecting. I will demonstrate how the virtual classroom was:

- Planned and developed in connection with the body of literature existing at that time;

- Planned and implemented as a change intervention; and

- Observed and reflected upon in terms of an evaluation.

I offer the reflections of researchers and participants, which combined with the records of the educational activities and evaluation, led to a critically examined understanding of the research objectives of this first cycle.

Within research, a conceptual framework lays out the key factors, constructs, all variables, and the presumed relation among them. Miles and Huberman, (1994:441) have argued that graphic displays of "bins" (main variables) connected by directional arrows specifying the variable relationships are useful in making researchers' frameworks clear. This approach has been criticised because in an emergent design, the understandings of the researcher are reached at the end of the study, and thus the conceptual framework is only fully understood in hindsight. This is certainly true of this action research.

I will now describe some of the reflections around planning the virtual classroom project to indicate why certain aspects were chosen, rather than others.

1.1. Planning the Virtual Classroom

As I write in 2002, the WISDOM Centre for Networked Learning is a true 'virtual learning environment' as defined by Britain and Liber (1999). The word 'virtual' and 'networked' are interchangeable. A 'networked learning environment' equates to a 'virtual learning environment.' The WISDOM Centre was not integrated, that is it remained separate from any other postgraduate institution providing CPD, in Sheffield or elsewhere. That is it had not become a 'managed learning environment' (c.f. Everett, 2001) where a networked learning environment is integrated into the teaching and learning strategies of an educational institution.
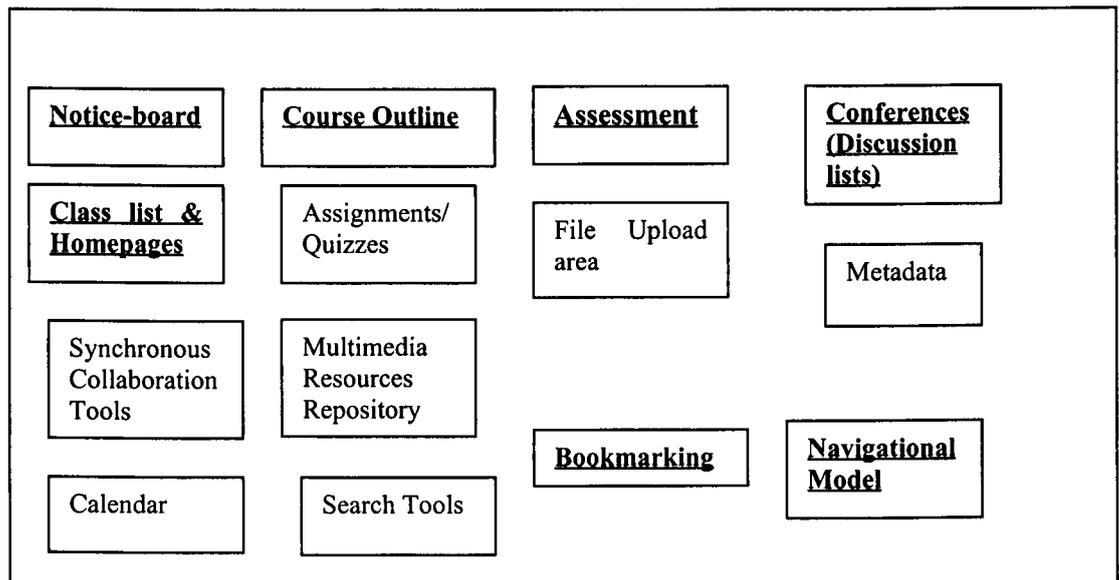
Figure 5 1 A schematic of WISDOM as a prototypical networked learning environment

(Source: Britain and Liber, 1999)

On reflection, I can see that the virtual classroom was a prototype of a virtual learning environment as described in (Britain and Liber, 1999). In figure 5-1, those areas in emboldened type have a clear presence in this case study. There was no attempt at working together on-line at the same time (synchronously). Although learners could not upload material directly to the website, they were encouraged to give material to the project team who would

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convert the documents into web pages, for example an example of a completed portfolio.
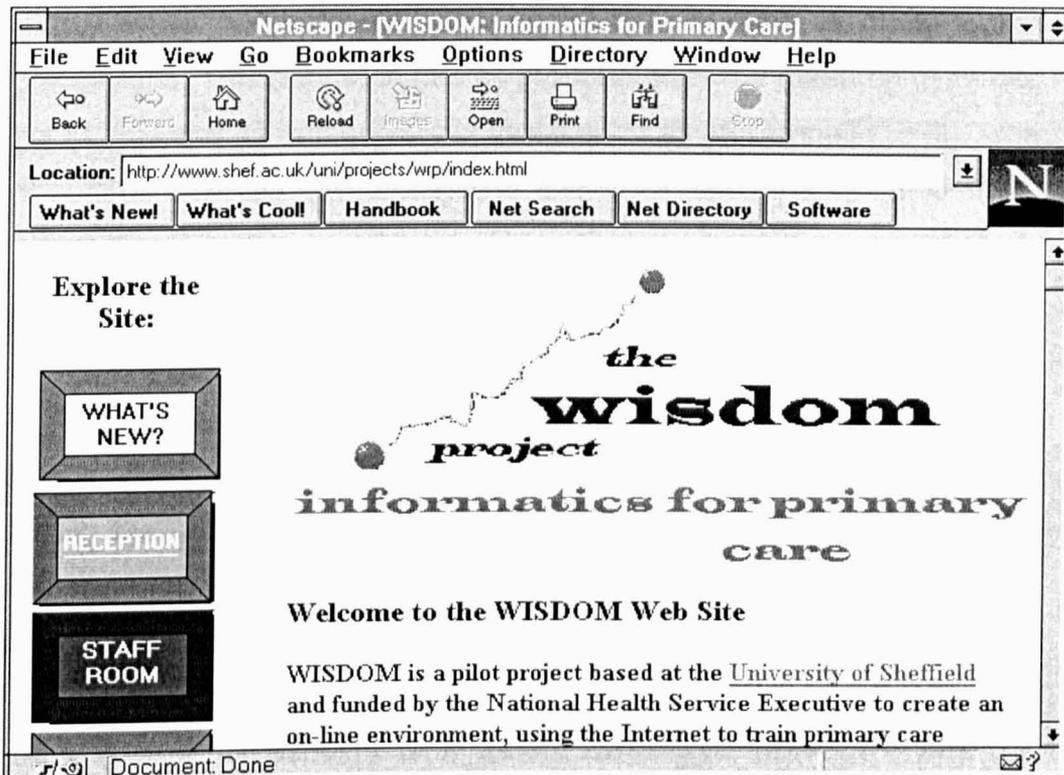
Figure 5 2 Home page of the WISDOM virtual classroom

However in 1997, in this first cycle of action research, WISDOM was conceived as a 'virtual classroom' (c.f. Hiltz, 1994). This was not a 'virtual learning environment' (VLE) as envisaged in the higher education sector (c.f. Britain and Liber (1999), any more than one or two classrooms make a school. However our 'school' mentality shows through in notions such as the 'staff room', (c.f. fig 5.2) which was intended to be a place for project staff home pages. Members of the wider on-line community, (the eCommunity as Nestor et al, (2000) refer to them), were invited to enrich the virtual classroom to give some semblance of a richer virtual environment and also add to the body of potential contributors (Roberts and Fox, 1998). Levels of contribution in academic forums elsewhere (*ibid*) suggested that in a group of 20, only three or four people would actively participate. Whilst the "lurkers" who although not contributing would gain educationally from reading the discussion material, I believed that some of the learners would fail to engage with the medium at all, through lack of interest or motivation, or computer-use

problems. There were not sufficient resources in the project to solve individuals computer-use problems but I believed a wider community, although not actively engaged in the continuing professional development programme, would nevertheless have useful contributions to make within group discussions. This approach has its proponents in the research of Fowell and Levy (1995) and its antagonists in those such as McConnell (1994), who feel that outsiders should have no access and would spoil the dynamic of the learning group.

1.1.1. Reflections on course design

From my action research perspective, I wanted to understand the social relationships and the forms of organisation in a 'virtual classroom' (c.f. Kemmis and McTaggart, 1992). Imagine, if you will, a self-critical community of researchers and learners engaged in learning together, and going through the full range of educational activities, to further understand how they could make this approach work better for everyone. I was more interested in understanding how all aspects of a virtual classroom worked. I was not concentrating on any one context, for example assessment, and I wanted to avoid being constrained by the micro-level. I wanted to explore the challenges of the 'virtual classroom' and, what Winter (1996:14) called "risking disturbance, which is an understanding of taken-for-granted processes and willingness to submit them to critique."

On reflection, there may be an ethical dimension which was I was not aware of at the time in relation to the NHS Enabling people programme and the learning group. I did not consider the learning group as an experimental volunteer population who were experiencing an educational intervention. Rather I was interested in their reflections as we shared the challenges, the surprises and the problems of learning together in a virtual classroom.

1.1.2. On-line facilitation

Hiltz (1994) suggested that the virtual classroom would require different teaching and learning strategies. However work in the higher education sector

(c.f. Fowell and Levy, 1995) suggested that the facilitator's role would, in addition to those in face-to-face activities (c.f. chapter 1.2.5), offer additional roles in terms of learner support to do with technological issues, and understanding the concept of networked learning.

It was largely conceived that the facilitator's role would emerge from the research, and as the facilitator I expected to critically reflect on my own practice and problem solving abilities as part of my own professional self-development (c.f. Zuber-Skerritt, 1996: 85). I would face a number of challenges in transferring my facilitation skills (of a typical postgraduate small group tutor) to a distance learning format. What were the particular knowledge, skills, and attitudes of a facilitator within a virtual classroom? How could I balance the needs of individual practitioners following their own learning agenda, the needs of an organisation to get its practitioners to learn specific attitudes and skill towards evidence-based practice, and the needs of adult learners to set their own learning objectives? I used my reflections as the facilitator in moving to an understanding of my practice as an on-line tutor by treating teaching as a form of research (Laurillard, 1993), and reflecting-in-action and on the action of my teaching practice. My understandings of on-line facilitation largely form the basis of the second cycle of this action research.

To enrich the number of experiential learning activities there were a number of planned educational activities, initially led by me but developed by the virtual classroom project team. These activities included simulated cases, which we called "clinical controversies" and recent articles from the journals. They were intended to stimulate discussion and the sharing of critical incidents from practice. It was also anticipated that participants would initiate their own discussions. It was intended that the facilitator would notice discussions and encourage reflection and critical appraisal of journals from the evidence base through MEDLINE. Facilitation was intended to maximise participation, and often set up problems for discussion rather than offering concrete information. The course materials were intended not only as self-instructional material but reference material to support the discussion.

1.1.2.1 Learner Support

It was intended that support for learners would become collaborative, after an initial "gelling' or "getting to know each other" period. Support, both in terms of using the technology and in undertaking educational activities, would come primarily from other learners in the group and the tutor. The theories of facilitation in face-to-face groups (Heron, 1989) predicted that initially I, as the facilitator, would need to provide a lot of "hand holding" support, but as learners became more independent they would be better able to use each other as a resource for further learning. Facilitation in the virtual classroom (Selinger, 1998) would include the creation of a 'critical community' of regular contributors to keep discussions going.

Because the introduction of new technology has teething problems for new learners (Levy, 1997), a trouble shooting service was provided. This role had been identified with the need to resolve learners' technology problems. Other researchers have reported that these were usually due to software configuration problems. The person fulfilling this role was to be available to travel to learners' homes, to try to help by telephone, and to help with technical queries on line. In theory, this would clarify within the virtual classroom, the boundary between the role of the facilitator as an educator or teacher and the role of supporting technology (*ibid*). Thus, the person providing network support would not be expected to provide facilitation or other educational input.

1.1.3. On-line Information Officer

The facilitator's role is recognised as complex in face-to-face learning (Jarvis, 1995) but is more so in an on-line learning environment (Fowell and Levy, 1995). Because of the potentially massive (and often misleading) information resources that the Internet contains, it was deemed important to have a web page with pointers to information resources which had already been evaluated as useful. In this research, such a web page was called a "virtual library". The on-line information officer was conceived of as a virtual librarian, with the responsibility of developing these resources. The learner could click on one of

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the "indexes" in the virtual library and access that information resource. A second role of the information officer was as a teaching resource to support individuals in their efforts to conduct searches of electronic databases such as MEDLINE. A third role was to help write the teaching and learning materials collaboratively that would be made available on the web site.
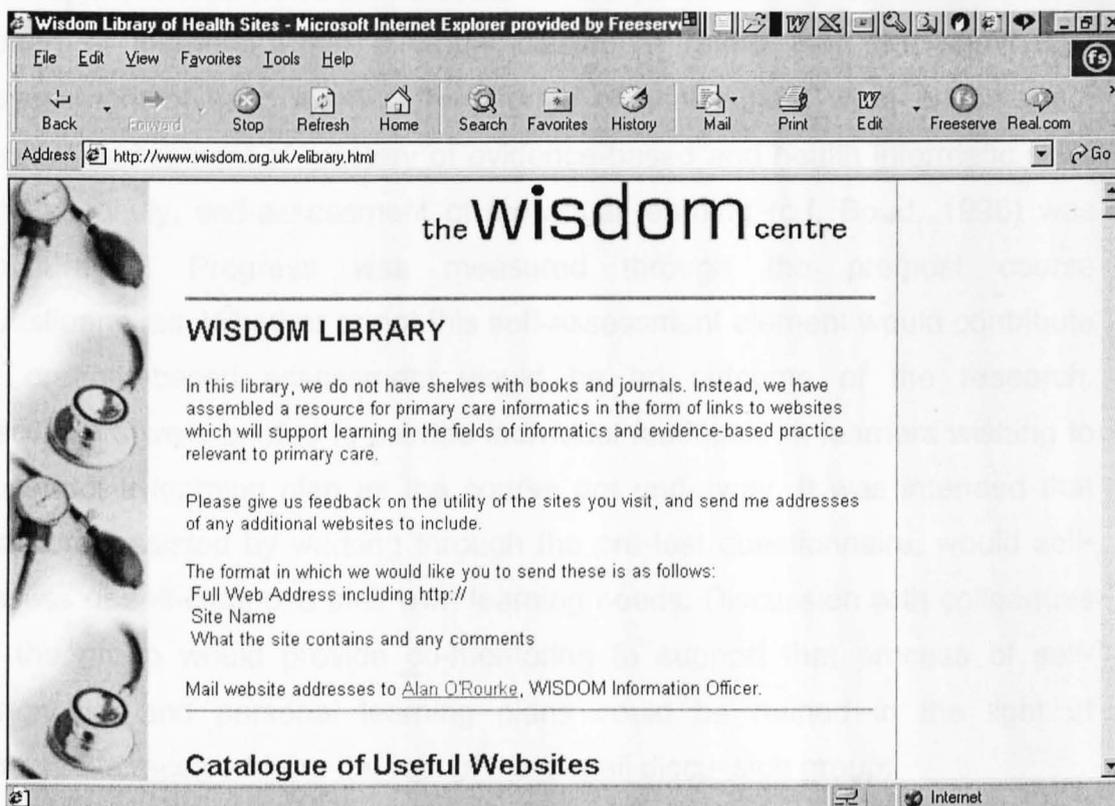
Figure 5 3 The virtual library

1.1.4. Assessment

Assessment within this project was in the context of continuing professional development at a time when accreditation of learning was governed by attendance rather than any measure of content or processes of learning (c.f. Murray et al, 1991).

Although I was interested in the assessment results as part of an educational evaluation on these lines, I was also interested to reflect on the opportunities or the affordances, as Laurillard (1993) would call them, of the virtual

classroom for those engaged in continuing professional development using portfolios. There was a strong local context in that much work had been done in Sheffield by the Continuing Medical Education office to develop a portfolio system for GPs engaged in continuing professional development (Challis et al, 1997, Mathers et al, 1999).

This action research was interested in the processes of assessment of a cohort of learners within a virtual classroom rather than the summative assessment of each learner. Two forms of assessment were encouraged. Firstly, assessment of mastery of evidence-based and health informatic skills and secondly, self-assessment of individual learning (c.f. Boud, 1996) was encouraged. Progress was measured through the pre/post course questionnaires. Whether or not this self-assessment element would contribute to portfolio-based assessment would be an outcome of the research. Facilitators were briefed to provide individual feedback on learners wishing to construct a learning plan as the course got underway. It was intended that learners, assisted by working through the pre-test questionnaire, would self-assess or self-diagnose their own learning needs. Discussion with colleagues in the group would provide co-mentoring to support that process of self-diagnosis, and personal learning plans could be refined in the light of comments received from the rest of the e-mail discussion group.

1.1.5. Multiprofessional learning

In addition, within a local context, The School of Nursing and Midwifery were developing experience with portfolios. An assumption of this research was that the availability of accreditation for postgraduate education allowance (PGEA) for doctors and eligibility for post registration education programme (PREP) requirements for nurses would encourage the production of reflective records from the virtual classroom to contribute towards their own portfolios.

In the wider context, (c.f. chapter 1:5.1) promoting multiprofessional teamworking was one of the NHS key policy directives. Akin to the issue of promoting evidence-based practice I wanted to discover how the virtual classroom might promote or obstruct multi-professional ways of working. Early

work by sociologists (c.f. Baym, 1994) on Internet communities had suggested that the formation of virtual communities might break social barriers, and thus I wondered whether barriers between doctors and nurses that existed in the real world might be easier to break down in a virtual classroom.

1.2. The WISDOM course: developing an educational intervention

1.2.1. Course 'Marketing'

Participants for the WISDOM course were recruited by mailing all general practices in the North Trent region with a single flyer (see appendix A1), using the existing postgraduate education distribution system. The flyer was aimed at any member of the primary health-care team, but particularly doctors, nurses, and practice managers. The only requirement was access (either current or imminent) to the Internet. The flyer outlined the course aims of providing a fresh and innovative approach to learning about health informatics, 'the handling, assimilation and use of information' over a five-month period from 1 May 1997 to 31 October 1997. The flyer also set out the course process objectives of being able to design and meet personally set objectives with facilitated self-directed learning. The learning resource materials were laid out, that is: the provision of on-line tutors; the provision of weekly materials in the form of on-line tutorials; and the opportunity for face-to-face learning. It was suggested that the anticipated workload would be one hour per week. The flyer was clear that there would be an assessment of their own progress as learners, and an evaluation of the course. Finally the flyer gave contact details of the WISDOM project team and a reply slip, by which to register interest. The flyer was also sent out as an e-mail attachment to the established electronic medical discussion groups: gp-uk, and evidence-based-health. Details of respondents were kept in a Microsoft Access™ database. Expressions of interest received a further information pack, giving further details of the course.

1.2.2. Setting up a virtual classroom

In summary, the features of the virtual classroom at this cycle of the research developed collaboratively by the research team, (whose membership, I will introduce shortly) were as follows:

- Establishing the learning needs of a group of registered participants to establish common group aims and objectives;

- Facilitated discussion group(s) through e-mail using a LISTSERVER;

- A newly created electronic discussion group (wisdom@mailbase.ac.uk);

- Course objectives which were process driven and set at mastery of key health informatic skills and the steps of evidence-based practice;

- Flexibility in terms of content which would be created by negotiation between learners and facilitators to meet learners' learning needs;

- Facilitation using the principles of experiential learning;

- As well as for the registrants, there was encouragement for other interested parties who might usefully contribute from time to time as learning resources;

- An on-line Information Officer to offer guidance in information management;

- Technical support from a GP experienced in computer-based communication technology ;

- Encouragement of co-mentorship, that is, learners working collaboratively and offering guidance and support to others within the classroom;

- Practice of key informatic skills by a variety of tasks geared to searching and reporting back information from the Internet, in particular the on-line database of MEDLINE;

- A commitment to encouraging the facilitation of learners to meet process objectives i.e. learning to be reflective, learning to ask evidence-based questions, critical thinking, to think collaboratively;

- Web based learning materials specifically designed for the course to meet anticipated learning needs. These were linked to the virtual classroom as a library or index or catalogue of website links, and a set of linked seminars;

- A range of experiential learning activities designed to stimulate and motivate learners and introduced by the facilitator at appropriate moments throughout the learning programme;

- A self-assessment record of the learning needs of the learners;

- Encouragement to learners to keep a reflective record of learning;

- The opportunity for accreditation for postgraduate educational allowance for GPs and the PREP system for nurses by using the portfolio system for continuing professional development; and

- A project length of 5 months.

1.2.3. Curriculum and learning objectives

The Informatics Joint Working Group (1996) provided a broad 'curriculum' for health informatics. Examples of the suggested learning outcomes from this document are given in appendix A7. Such a didactic approach to the discipline area of health informatics was carried out by the University of Newcastle pilot site (Pringle et al, 1998). I felt the curriculum was more in keeping with a Masters in Health Information Management rather than a feasible programme of continuing professional development for primary care professionals. Accordingly the health informatics curriculum we set had learning objectives that were largely process driven, and took into account the Informatics Working Group documents, the anticipated needs of participants, and the experience of the project team in teaching health informatics. These were:

Knowledge

- Networked communication/information technologies and resources;
- Impact of information technology on healthcare organisations;
- Management of information and communication technology systems;
- Quality assurance in information technology and management systems;
- Role related use of IT; and
- Individual and group dynamics of electronic discussion groups.

Skills

- How to use e-mail;
- How to use web browsers: to search for, fetch, and appraise health information from the Internet;
- How to use MEDLINE effectively;
- Learning skills, including "reflection in action" and "critical appraisal;" and
- Working collaboratively

Attitudes

- Development of life-long learning;
- Becoming a reflective practitioner; and
- Synthesising health informatics learning into previous learning.

Six seminars were designed collaboratively by the project team to take the learners through each step of the evidence-based cycle. Generic learning skills, such as "sending e-mails", and "how to work collaboratively" were also designed. The principles of portfolio learning had been provided in the course book, but were also available as a floppy disk or could be downloaded over the Internet. Learners were thus provided with a wealth of material (see fig 5.4) from which they could choose, with facilitation, what was most appropriate for their own continuing professional development.

Seminar Topics
Introducing E-mail
Collaborative and Networked Learning
An Introduction to Evidence-based Practice
EBP Seminar 2: The basics
EBP Seminar 3: Databases
EBP Seminar 4: Literature searching using MEDLINE
EBP Seminar 5: How to evaluate the evidence
EBP Seminar 6: From evidence to practice
The WISDOM Portfolio for Accrediting Learning in Informatics
Towards Quality Assurance with Information Technology in Primary Care
Model Portfolio
How to write a web page in HTML

Figure 5 4 The Seminar programme

1.2.4. Programme Delivery

The course was capable of being delivered entirely by the Internet. However, a number of practical and theoretical concerns required the project team to use the telephone and the postal service as in distance learning courses. For example, the pre-test questionnaire were delivered to learners by traditional postal services, amidst concerns that reports that E-mail surveys were highly problematic. Tse (1995), for example, reported a response rate of 6% to his e-mail questionnaire.

Experience from other educators outside the higher education sector (Hammond, personal communication, 1997) suggested that much learning in these environments was 'vicarious.' Thus, as in the real world experience of education, learners might not read or might lose learning material but still participate in classroom activity. The project team tried to ensure that the materials were delivered to the learners in a format with which the learner was initially comfortable. All the learning materials, for example the seminars, were

delivered via e-mail, post, or as a floppy disk, as well as being available to be downloaded from the WISDOM website.

1.3. Planning the Action Research process - the evaluation

> Action research aims to contribute both to the practical concerns of people in immediate problematic situations and to the goals of social science by joint collaboration within a mutually acceptable ethical framework, (Rapoport in Gill & Johnson, 1991: 60).

The initial brief for the research in 'The NHS Enabling People programme' was around implementing a programme of learning in line with (the then) current thinking in health informatics training as set out by the Informatics Working Group (1996).

Although the Informatics Working Group had a strategic vision in the wider national context, the question for them was how to implement health informatics training in a sustainable way for clinicians within primary care. In the local context of North Trent, this was the problem of Dr Lane, the Director of Postgraduate Education for General Practice. The NHS Enabling People programme directed that the pilot should demonstrate:

- Long-term sustainability;
- Linkage with existing educational frameworks;
- An examination of what had been learned by individuals and how they had benefited;
- Cost effectiveness;
- Marketing strategy; and
- A mapping exercise relating guidelines (curriculum) to learner's needs.

If we accept that Dr Lane was in the business of educational management, then we have the basis of an approach well recognised in management research (Gill &Johnson, 1991: 74).

1.3.1. Relevance of action research to practitioners and users

The best way of implementing health informatics and evidence-based training in a sustainable way for clinicians within primary care was unknown at the outset of this action research cycle. For practitioners in North Trent, the relevance of this research was to give them an opportunity to think about their continuing professional development needs and how they may support them with information technology. Additionally practitioners would gain the opportunity to collaborate in shaping the theory of any emerging framework of health informatics training in the light of their practical experience.

1.3.2. Funding support for my action research

In 1997, funding was obtained to run a pilot programme for the NHS Enabling People programme. The brief for the research was around implementation of a programme of learning in line with contemporary health informatics training as set out by the Informatics Working Group (1996). This project gave me sufficient funding to support my work on this first cycle.

1.3.3. Project management

A project steering group with Dr Lane as the chair was set up for the pilot, with Dr Nick Fox (my academic supervisor) as principal investigator. Almost immediately, the WISDOM project, as it became known, was able to appoint Ms Elaine Dolman as 0.5 FTE Research Assistant, and Dr Alan O'Rourke as 0.5 FTE Information Officer, in addition to myself having two sessions as co-investigator.

Hart and Bond (1995:77) suggest that the important features of a proposed action research strategy are the underlying value base and the collaborative relationships within a cyclic process aimed at improvements. There are a number of factors involved in choosing a methodological approach within an action research framework. Central to all research is the generation and analysis of data, but within an action research project, these activities are intertwined with gaining access, reading relevant literature, analysing emergent findings, evaluating progress and planning subsequent phases. The cyclical and problem-solving nature of the enterprise as a whole result in a

blurring of lines between "finding out more" and "doing something about " the issue or situation selected for investigation and improvement (*ibid*: 72).

In this action research, as the number of collaborative parties increased then so did the complexity of negotiation between the sponsoring organisation (the Department of Health), the client (Dr Lane), the principal researcher (Dr Nick Fox:) and the practitioner (myself). Hart & Bond's (1995: 40) typology of action research offers some understanding of how the negotiation between these stakeholders affects the chosen research process. The sponsors were looking for an *experimental* design, with specific outputs, to be externally evaluated. Dr Lane, the client was looking for *organisational* change, where health informatics would become an essential driver in clinical effectiveness. Dr Fox had an agenda for research with the emphasis on self-reflexivity and *empowering* learners, particularly groups with less access to technology such as the nurses, to meet their own learning needs. I was a practitioner and interested in *professionalizing* GPs by promoting their access to mentorship, critical appraisal skills and reflective practice.

Secondly, Hart and Bond's action research typology (*ibid*) shows how the negotiation between stakeholders in the research affects the nature of the collaboration. In a more experimental type, the relationship between experimenter and participants may in practice retain traces of the unequal power relationships of more orthodox approaches. "In the empowering type the lines between researcher and participants becomes blurred to the extent that they become co-researchers and co-change agents (*ibid*: 57)."

Within this action research, I have had four professional roles that have overlapped in varying proportions throughout the three action research cycles. These are:

- An action researcher;
- An investigator on a health informatics programme;
- A clinical practitioner; and
- An educator

Whilst most of the time the roles were mutually compatible and I believe enriched my interpretations of the data, there was a conflict of roles as an

action researcher and as an investigator. For example, my doctoral thesis demanded that my prime role be an action researcher, however the project paid me to be an investigator on a health informatics programme.

1.3.4. Collaborative working

The collaborative relationship with the learning group of participants in the virtual classroom project was learning together. This compares with Snadden et al (1996) action research cycle in developing a portfolio amongst a GP training community, who were prepared to critically reflect on their actions so that collaboratively they were able to produce a better understanding of portfolio learning.

The project team shared values of a commitment to action research and working with all of the stakeholders in the project collaboratively to better understand the research objectives.

1.3.5. Participants and stakeholders

In addition to the learning group, the other stakeholders were seen as the:
- External evaluators;
- The NHS Enabling People programme;
- The Postgraduate CME tutor movement in North Trent headed by Dr Lane;
- Interested academics within the University of Sheffield Institute of General Practice and Primary Care;
- Interested parties within the University of Sheffield School Nursing and Midwifery in Sheffield;
- Interested parties within the Health Services Library, Sheffield; and
- The health informatics community of Sheffield Health Authority.

2. The first action research cycle: a case study

2.1. Aims of Case Study 1

The principle aim of this thesis was to come to an understanding of the broad processes that make a successful collaborative network learning environment to support CPD in primary healthcare through a cycle of action research. The primary aim of this first cycle of research was to explore whether the virtual classroom approach (c.f.Hiltz, 1994) was a viable alternative for the delivery of continuing professional education for primary care professionals. By 'viable' was meant a means of delivery that will result in acceptable levels of satisfaction from performance for both educators and learners.

The objectives for this first cycle of action research were:

- To collaborate with the learners and the WISDOM project team to provide as authentic educational experience as might be expected were it run face-to-face;

- To produce a course which both met the learning needs of the learners for mastery of health informatics process objectives eg e-mail, web browsing, information handling and specific content learning objectives for their own professional development to be achieved through the evidence-based cycle;

- To identify an evaluation group and conduct a pre-test/post-test exploration of their self reported mastery of both computer skills and evidence-based practice skills for summative assessment; and

- To generate, collect, and analyse a broad range of research data for an evaluation of the prototype design of the WISDOM virtual classroom.

2.2. The setting

The action research was primarily conducted in the region of North Trent, UK, from 1 February 1997 to 30 April 1998.

2.4. Research Question

The purpose of this action research thesis, was to develop and evaluate a 'networked learning environment' capable of supporting continuing professional development for healthcare professionals in primary care. The purpose of action research cycle one was to develop and evaluate an evidence-based course delivered by a 'virtual classroom' approach.

2.4.1. The primary research question

"To what extent can the perceived learning needs of health care professionals in North Trent for continuing professional development be met with an evidence-based practice course delivered via a virtual classroom?"

2.4.2. Secondary research questions

1. To what extent did the participants develop basic health informatic skills (Self reported mastery in key skills e.g. e-mail, web browsing etc.) as a consequence of using the virtual classroom approach.?
2. To what degree do theories of teaching and learning outlined in the literature review match experience gained from the intervention?
   a) What support do learners need to identify and then meet their own learning needs?
   b) What is the role of the tutor/facilitator in an on-line discussion group?
   c) What is the supporting role to learners of other members of the learning environment?
   d) In what ways do learners engage with learning materials? In particular, what problems did the learners have in engaging with the material (with a view to developing a networked learning environment and the educational processes next time around)?

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3. What are the quality assurance issues of the virtual classroom approach?

4. How can learners be encouraged to produce a portfolio for both self-assessment and accreditation to their professional bodies?

5. To what extent does the virtual classroom approach impact on multiprofessional learning?

6. What lessons can be learnt regarding the evaluation methodology for virtual classroom approaches?

2.4.3. Research design

This action research used mixed methods in a qualitative study, broadly a 'one group pre-test /post-test experimental' design and a qualitative evaluation. This was partly to achieve methodological triangulation (Denzin, 1978). In the 'one group pre-test/ post-test' experimental design the learners were being exposed to an educational intervention, the course on evidence-based practice delivered through a virtual classroom. The research design used qualitative methods to generate a rich source of data for analysis. Data was collected from a number of sources including observer participation (Hammersley and Atkinson, 1995). To give a full description of the research to make it valid, the interpretation was done in the vein of ethnography (Murphy et al, 1998: 167-194 after Hammersley, 1992). The principles of the constant comparative method (Glaser and Strauss, 1967) were used as the method of data analysis. The analysis of the broader set of data was done using the principles of action research (Kemmis and McTaggart, 1992).

In reflecting back on this approach i.e. running a case study within an action research cycle, (then using Hart and Bond's (1995) typology) this phase of the research was *experimental*. That is there was an educational intervention, and an emphasis on looking for educational outcomes.

2.4.4. Operationalisation

Qualitative research methods such as that of grounded theory and naturalistic inquiry are based on the concept-indicator model (Strauss, 1987:25). It is important, that although the concepts used in research may emerge as the research progresses, the researcher has an obligation to develop clear

definitions of the concepts, which are developed in the course of the research, so that their meaning and application is unequivocal (Murphy et al, 1998). I have operationalised my primary research question for this phase in the following way, which I provide as an overview in Fig 5-5.

Concepts	Indicators
Perceived learning needs	Where a professional has identified within his own practice a need to improve patient care which can be met through education
Meeting (learning needs)	Evidence of practitioners changing their practice through learning
Continuing professional development	A process of lifelong learning for all individuals and teams which enables professionals to expand and fulfil their potential and which also meets the needs of patients and delivers the health and health care priorities of the NHS
Evidence-based practice course	A seminar based programme designed around the principles of evidence-based medicine (Sackett et al, 1996) and used as an educational intervention.
Healthcare professionals in North Trent	Any doctor, nurse or manager working within primary care in the region of North Trent (1997 boundaries)
Virtual classroom	The model of networked learning outlined in detail in Chapter 5.1.2.2.

Figure 5 5 Concepts and Indicators for the first action research cycle

The concept of "meeting learning needs" in the context of primary care CPD was largely developed from the work of Challis, (1997) and Mathers et al (1999). A learning need can be said to have been met most clearly when there is evidence from the learner that there has been a change in practice. The concept of "evidence-based practice" has proved problematic for health care professionals in other qualitative studies examining the teaching of the

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evidence-based process (Greenhalgh and Douglas, 1999). Evidence-based practice was conceived of as being inclusive both of the evidence base of primary care related research and of the process of answering questions arising from practice, searching, appraising, implementing and evaluating the findings. "Healthcare professionals" were largely perceived as those spending the bulk of their job in a primary care role. In the evaluation group there is representation of the primary care community with clinicians (GPs, nurses, health visitors) and non-clinicians (managers, and a primary care researcher).

2.4.5. Possible Educational Outcomes

Because this was a case study within a cycle of action research, the possible educational outcomes would arise at various levels as:

An investigator: The evidence from the pre-test/post-test questionnaire would assess learners' progress, terms of course objectives of mastering health informatic skills and the steps of evidence-based practice. Softer process measures would allow evaluation of aspects of the feasibility of running the course, the acceptability to learners etc.

An action researcher: By collecting data from several sources, more action research orientated outcomes were expected to emerge from the data analysis. I would anticipate these at two levels both as an educator and as a clinical practitioner

An educator: The understandings gained through participatory action research would enhance my understandings of the relationship between a fully functioning networked learning environment and CPD for healthcare professionals. Secondly at a teacher practitioner level I would learn more about what was needed at the teaching level to make virtual classrooms work.

A clinical practitioner: The interpretation of the data, and perhaps particularly my own reflections, would allow me to understand more of the real needs of clinical practitioners wrestling with rapid change at the sharp end of clinical practice.

2.4.6. Questionnaire design

Instrumentation in the context of qualitative research describes the tools developed to measure a phenomenon. The use of instrumentation (in this case a questionnaire) adds to the interpretation of the data available from the project as a whole. Lincoln and Guba suggest that the primary mode of investigation in naturalistic enquiry is the use of the "human instrument" (1985:239), that is the use of interviews, and document analysis etc. They recognise the utility of the questionnaire provided it is "grounded" and not used simply to verify facts from a large sample of respondents. Miles and Huberman (1994:441), suggest that instrumentation is one of the important conceptual and analytic aspects of qualitative research design. Whilst Miles and Huberman are acknowledged to be scholars from a more positivistic framework (cf. Lincoln and Guba, 1985), they suggest that minimally pre-designed instrumentation maximises what they describe as construct and descriptive-contextual validity whilst minimising researcher impact. Fully designed pre-instrumentation enhances internal validity, and generalisability to other case settings but at the cost of increasing the impact of the researcher.

Clarity in questionnaire design is driven by attention to detail in answering the research question. Four aspects are deemed helpful to distinguish between distinct types of question content (De Vaus 1996:81). These are:

1. *Behaviour* - to establish what respondents do;
2. *Beliefs* - to establish what people think is true or false rather than on the accuracy of the beliefs;
3. *Attitudes* - an attitude is defined as a state of readiness, a tendency to respond in a certain manner when confronted with certain stimuli. Attitudes are reinforced by beliefs and often attract strong feelings which may lead to particular behavioural intents (Oppenheim, 1992:175); and
4. *Attributes* - to establish information about the respondent characteristics e.g. age, education, etc.

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Attention was given during the questionnaire development phase to developing clear, unambiguous and useful questions. There are several checklists to ensure that the most obvious problems with question wording are avoided (c.f. De Vaus, 1996:83, Oppenheim, 1992, 119-149, Cohen and Mannion, 1994:95). For example avoiding double-barrelled questions, and using open ended versus closed questions to collect data on attitudes and beliefs. Further factors taken into consideration in the questionnaire design included duration, confidentiality and anonymity, the ordering of questions sequences and scales, and the order of questions within each sequence (Oppenheim, 1992:101).

2.4.6.1. Using scales

Within any questionnaire, there are serious objections to the use of single questions to measure such non-factual topics as awareness, opinions, beliefs and attitudes (Oppenheim, 1992:150). In this research, the pre/post test design used a constructed scale which recorded their perceived competencies in aspects of health informatics and evidence-based medicine. The two sub-scales measured different domains. The first subset measured computer skills:

- General computer skills (as used at home or in the surgery- health informatics); and

- Specific computer communication skills eg e-mail or web browser (networking).

The second subset measured self-confidence in the steps of evidence-based practice. The sub-domains for competence in health informatics were: word processing, databases, spreadsheets, electronic-mail, interactive CD-ROMS, operating systems, windows, statistical packages, MEDLINE, and Web Browsers. The assessment criteria for competence in evidence-based practice were the steps of the evidence based cycle (c.f. Chap 2:4.3). Adapting Miller's pyramid of competence (1990) the standards were set at:

- Not knowing (unaware of);

- Knowing the right thing (aware of but unable to use/do);

- Knowing how to do it right (can use/do); and

- The right person to do it (can use/do and teach how to others).

The scale was administered to the evaluation group of learners before the course and afterwards. The statistical treatment of the constructed scale within the questionnaire was checked by a statistical consultant attached to the Institute of General Practice and Primary Care, University of Sheffield. He confirmed that analysis would be undertaken using non-parametric statistics, in particular Wilcoxon matched pairs given the pre-test/post-test design. Cronbach's alpha should be used or reliability.

2.4.6.2. Pre-test questionnaire design

This scale is in both the pre and the post-test questionnaire. A copy of the pre-test questionnaire is given in appendix (A2). Additionally, aims of the pre-test questionnaire were to:

- Collect attributes about the respondents age, sex, professional role, and characteristics of primary care base;
- Establish the length of time of their previous computing experience;
- Measure their perceived self-confidence in health informatics skills and the evidence-based cycle;
- Establish their rating of various learning methods to enhance their computer skills;
- Describe their previous experience in using e-mail discussion groups
- Record their preferred learning methods for keeping up to date in their professional practice
- Establish some measure of the respondents personal learning needs for the course;
- Establish some measure of their expectations from the course and their motivations for doing it.

The questionnaire went through a number of stages in development to make it more unambiguous, clear and useful in answering the research question. Oppenheim (1992:48) points out the danger in assuming "that we know in advance how respondents or field workers will react". The questionnaire was

piloted with a small convenience sample of medical practitioners (n=6) which helped in refining the questionnaire.

2.4.7. Post questionnaire design

The post-test questionnaire aimed to:

- Repeat the measures of their self-reported competence in computing skills;

- Repeat the measure of their self-reported competence in the stages of evidence-based medicine;

- Establish some measure of the changes in respondents' personal learning needs including identifying future learning needs;

- Establish some measure of whether their expectations of the course had been met;

- Report on personal experience of using the e-mail discussion group

- Gain some reflections of attitudes, beliefs and behaviour for the processes of health informatics and evidence-based practice, and portfolio learning

- Gain some qualitative data as to what barriers to learning had been encountered and reflections on how things might be improved next time around.

In addition to administering the post-test computer skills and evidence-based learning scale, the final questionnaire was largely an instrument for gathering qualitative statements about where practitioners were in terms of their learning needs. How far had they got in terms of meeting them? How successful were the learning methods in achieving the learning needs? How had they ascertained whether their needs had been met? What would their future learning needs be in the light of their experience of WISDOM?

2.4.8. Reliability and Validity of the Competence rating scale

The trustworthiness of the analysis of qualitative statements collected from both questionnaires is considered as part of the quality issues of qualitative analysis.

The reliability of a measure refers to its consistency. This research uses the Cronbach's alpha calculated using SPSS (Statistical Package for the Social Sciences) version 8.0. This is a measure of the extent to which the items in my questionnaire are related to each other, giving an overall index of the repeatability or internal consistency of the scale as a whole. In theory, one can identify problem items that should be excluded from the scale. The items selected for the fourteen-item scale for the questionnaire where those related to computer experience (ten items) and evidence-based practice (four items). The widely accepted benchmark (*ibid*: 65) is for a Cronbach's alpha of 0.8 or above to demonstrate internal reliability.

Validity is concerned with whether the instrument is really measuring what it purports to do (*ibid*: 68). Within this research, there was no previously well validated standard instrument to establish criterion validity against. However face validity is claimed because the questionnaire asked questions which were explicitly related to the concepts they measured. Content validity is claimed for the measurement scale because it was based on collaborative expertise

2.4.9. Participant observation

In this research I have used an ethnographic approach to on-line communities that I developed in my Master's dissertation (Roberts, 1996) and enlarged upon in a subsequent paper (Fox and Roberts, 1999). Ethnography (c.f. chapter 4.2.7) is naturalistic, attempting to describe and perhaps explain the phenomena rather than testing of a hypothesis. Observer participation (Hammersley and Atkinson, 1994) requires a degree of reflexivity both in the observation and subsequent analysis and writing. I accessed the research discussion lists both from home via the Internet and from the Institute of General Practice and Primary Care. All electronic messages were read and stored electronically and subsequently transferred to the NUD*IST database. Within this first action research cycle, I had adopted the role of on-line facilitator, taking the opportunity to research my own teaching and learning practice (Hammersley, 1992).

2.4.10. Interviews

There are recognised advantages in combining participant observation with interviews. In particular the data from each can illuminate the other (Hammersley and Atkinson, 1995: 131), for example one's experience as a participant observer can have an important effect on how one interprets what people say in interviews. In survey research (Oppenheim, 1992:68) the aim typically is to seek a representative sample. However, whilst I was concerned to document a range of perspectives and practices from across the primary healthcare field, I was also concerned with eliciting information about the field under study, i.e. the networked learning environment. Interviews in ethnographic research can range from spontaneous informal conversations in day-to-day settings to formally arranged meetings in bounded settings. The concern in selection of interviews was to target those people who had the knowledge needed to illuminate the research questions and who would be prepared to divulge it. Some needed to be interviewed twice to trace patterns of change over time and to check previously supplied information (Hammersley and Atkinson, 1995:137).

In-depth semi-structured interviews were carried out with a purposive sample of thirteen participants, face-to-face or telephone according to the participant's preference, in March to September 1998. Of these, eleven were in the North Trent group and two were outside. Twelve were GPs and one a practice manager. Discussion was encouraged to gain further insight of the participants' perceptions. The sample reflected a diversity of opinion from those perceived to be sceptical, to those with a research interest, a teaching interest, a health informatics interest and a managerial interest. The interviews explored the initial motivations and expectations of a networked course in evidence-based practice; the strategies and tactics they used in discussions; how they used the material from the discussion group that they had written and read, how they perceived the facilitator; the perceptions of group interactions; their reflections on the help they might need to turn evidence into practice; and the perceptions of what they had learnt from the project.

- Interviews with librarians (interviewed by Dr Alan O'Rourke [AOR], analysis by CR);

- Midway interviews of 15 participants (interviewed and preliminary analysis by EAD, depth analysis by CR);

- A purposive sample of 13 participants (interviewed and analysed by CR);

- Electronic text generated by electronic discussions including private mail generated to the facilitators (collected, organised and read by CR); and

- E-mail traffic analysis (done by the external evaluator and EAD, and repeated by CR).

In building on the data collected by others without imposing their conclusions upon the analysis (Murphy et al, 1998), I was able to develop a richer and more coherent analysis, which for the purposes of this doctoral thesis is exclusively mine. Collecting data by more than one researcher addressed research quality issues. For example in interviewing those who had not completed the course, a more honest opinion would have been given to someone who was not the facilitator, i.e. me. The participants may have perceived a need to be nice about the course rather than be critical to enhance the understandings of the research objectives.

2.4.13. Quality Criteria of the Qualitative Research

The quality criteria of the research in this first action research cycle are taken from the five principles of ethnography (Murphy et al, 1998 after Hammersley, 1992). These have been dealt with in detail in Chapter 3.4. However, aspects relating to this case are noted.

Clear exposition of data collection methods

Althiede and Johnson (1994:494) suggest that some useful criteria for data collection methods should include negotiation of access, self presentation and approach of the researcher, trust and rapport, the researchers role within the setting, any mistakes or misconceptions by the researcher, the types and varieties of data collected and how it was recorded, how much data was analysed and reported. Action research naturally encourages working towards

such criteria by the research group sharing the same values and establishing a collaborative relationship with the participant learners.

Clear exposition of process of data analysis

In this research the processes of the enquiry are available in my own personal reflective log, within the research teams minuted project meetings, within the research teams publications, and within reports furnished by the research team to the appropriate bodies and within the data analysis included in NU*DIST.

The audit trail for research is said to provide a framework of good practice which allows the researchers to be more systematic, to more clearly examine relationships, to cross reference, and attach priorities to data that might otherwise remain undifferentiated until the writing task is undertaken (Lincoln and Guba, 1985:315). All data and analysis should be retained for external scrutiny (Miles and Huberman, 1994) should there be doubts raised about the research process. The use of NU*DIST within this study provides the opportunity of a clear audit trail, as does the storage of paper records including the original questionnaires, including development work, in filing cabinets.

Reflexivity

The action research process is driven by planning, acting, observing and reflection within a community of self-reflective people seeking self enlightenment about a social phenomenon (Kemmis and McTaggart, 1992). By promoting self-reflexivity, the reader of the reported research is encouraged to come to his/her own conclusions as to whether the findings can be transferred or applied to situations within his/her experience (Woolgar, 1988). Lincoln and Guba (1985:360-3) suggest that a "proper" thickness of description can be reached by using the format of the "Case Study Report". This case report shows how the work unfolded from the original intentions through implementation, modification and the final evaluation. However for Kemmis and McTaggart (1992) action research allows the action researcher to use the data to go beyond the concerns of the micro-level and address

some of the power questions of how institutions might deal with the understandings gained in an action research project.

Attention to negative cases

There was a conscientious search for and presentation of cases that were inconsistent with the emerging analysis (Murphy et al, 1998). This is driven by an action research process that demands critical examination of the understandings gained to further refine the understanding of the phenomenon (Kemmis and McTaggart, 1992). However, little attention was paid in this action research cycle to learners who were not able to connect to the Internet with other than minimal help. I did not believe that the frustrations of uncommitted practitioners to experimental software would be helpful at this point. The issue of access for all I believed was really a question for a future cycle of research when my action research collaborators had a much better understanding of all the issues involved.

Fair dealing

Fair dealing is inherent in the principles of action research, and efforts were made to understand the phenomenon of a virtual classroom from a range of different perspectives (Murphy et al, 1998). However, in terms of emancipatory action research there was an overt political message that was shared with the learners. That was around the issue of lack of resources. We as researchers and part of an NHS programme of research would do all we could to focus on resources for health informatics in the primary care sector.

2.5. Data Analysis

2.5.1. The evaluation groups

The course ran from May 1997 to October 1997. The Access database of contacts contained details of the original 106 initial enquirers, including 10 from overseas and 48 being from the North Trent region. Once the project commenced, no further entries were added. From these 48, a group of 35 participants emerged who commenced the course, the remainder was classified as 13 who decided not to join. Of the 35 commencing the course, eight did not complete the programme, and were classified as non-completers. For the purposes of this research those healthcare professionals an evaluation group from North Trent who completed the course (n=27) formed the cohort for the pre-test post test data collection. The flow of participants is given in fig 5-6.
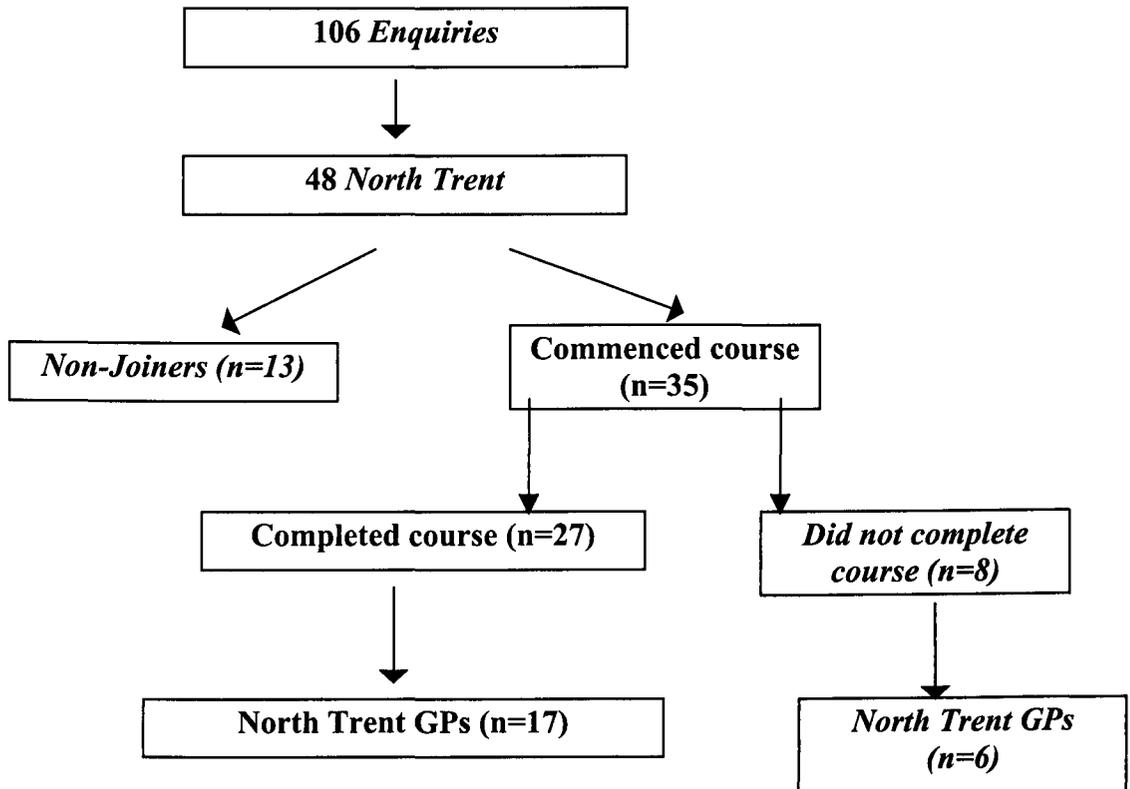
Figure 5 6 Flow chart of participants through the Virtual Classroom project

The characteristics of those who completed the course (n=27) group are summarised in Fig. 5-7.

Characteristic	Participant Details
Gender	22 Males, 5 Females
Age	Range 26 - 55 years 16 in 36-45 years group 7 in the 46-55 years group
Posts	16 GP principals, I GP locum 2 Nurses 1 Health Visitor 4 Practice Managers 2 Health Authority managers 1 primary care research (GP computer systems)
Post Status	26 full-time 1 part-time
Additional Roles	13 also held another professional post

Practice	3 not attached to a practice 15 urban/inner city, 3 rural, 6 mixed 5 were in practices with 3 or less partners 19 were in practices of 4 or more partners 6 of the practices were training practices.
Library Access	19 had easy access to a health services library or resource centre 5 did not have easy access.
Computing Experience	9 had < 5 years 10 had 6 - 10 years 8 had >10 years
E-Mail	20 had not participated before in e-mail discussion groups

Figure 5 7 Characteristics of participants in case study one

2.5.2. Learning needs

The learning needs of the North Trent group commencing the course (n=35) drawn from the pre-test questionnaire are summarised in Fig 5.8.

Clinical controversies

Evidence-based practice

General computing skills

Practice computing

Use of IT in practice management

Use of databases and statistical packages

Use of Internet using IT in practice and beyond

How professionals learn and change using electronic media

Teamwork

Improving e-mail and typing skills

Innovations in practice

Health visitor case-load profiling

Child health and nursery nurse role

Various clinical topics including post-natal depression, cardiovascular, HRT, dyspepsia, anti-coagulation.

Figure 5 8 Summary of learning needs

2.6. Pre-Intervention Questionnaires

2.6.1. Reliability analysis of scale (alpha)

The fourteen items testing self-rated competence of computer skills and the four items testing self-rated competence in evidence-based practice were combined to give a single scale. Analysis using SPSS 8 for Cronbach's alpha confirmed that the scale was a reliable instrument with a Cronbach's alpha of greater than 0.8, both for the two sub-scales and the overall scale (fig 5.9).

Total Scale
For N of Cases =   25.0
Reliability Coefficients   14 items
Alpha =   0.8501   Standardised item alpha = 0.8558
Sub-scale for Computer skills
For N= Cases = 24.0
Reliability Coefficients   10 items
Alpha =   0.8835   Standardised item alpha = 0.8893
For evidence-based sub-scale
For N= Cases = 26.0
Reliability Coefficients   4 items
Alpha =   0.9116   Standardised item alpha = 0.9129

Figure 5 9 Reliability analysis of questionnaire scaling

2.6.2. Computer Experience

The following data (fig 5.10) describes the level of computing experience amongst the group:

Software	Blank	Unaware of	Aware of - unable to use	Can use	Can use and teach
Word-processing	0	0	0	18	9
Databases	0	1	9	11	6
Spreadsheets	0	0	8	11	8
E-Mail	1	0	4	17	5
CD-ROM	0	0	10	13	4
Operating Systems	1	7	8	7	4
Windows	0	1	1	17	8
Statistical Packages	1	4	16	5	1
MEDLINE	1	3	7	15	1
Web Browsers	1	2	7	12	5

Figure 5 10 Level of computing experience pre-intervention (n=27)

The data was explored with simple cross tabulations and descriptive frequencies. There were no significant differences in the experience with

personal computer use and either age or gender of learners. Eleven learners principally from the 36-55 age groups also used software packages other than those considered as essential informatic competencies on a regular basis. These varied from GP clinical systems to website authoring packages. As a cohort, the group appeared to be competent and experienced with computers. Weaknesses of the group as a whole were with statistical packages and using CD-ROMs.

2.6.3. Evidence-based Practice

The following data (fig 5.11) describes the level of awareness regarding the stages of evidence-based practice amongst the group:

Activity	Blank	Unaware of	Aware of - need to know more	Can do	Can do and teach
Formulate question	1	3	10	10	3
Locate information	0	2	9	13	3
Evaluate data value	0	2	15	8	2
Implement	0	3	12	9	3

Figure 5 11 Self-confidence rating of the stages of evidence-based practice

(n=27)

This suggests that around half of the group were already competent in evidence-based practice and the other half were not. There were three experts in evidence-based practice
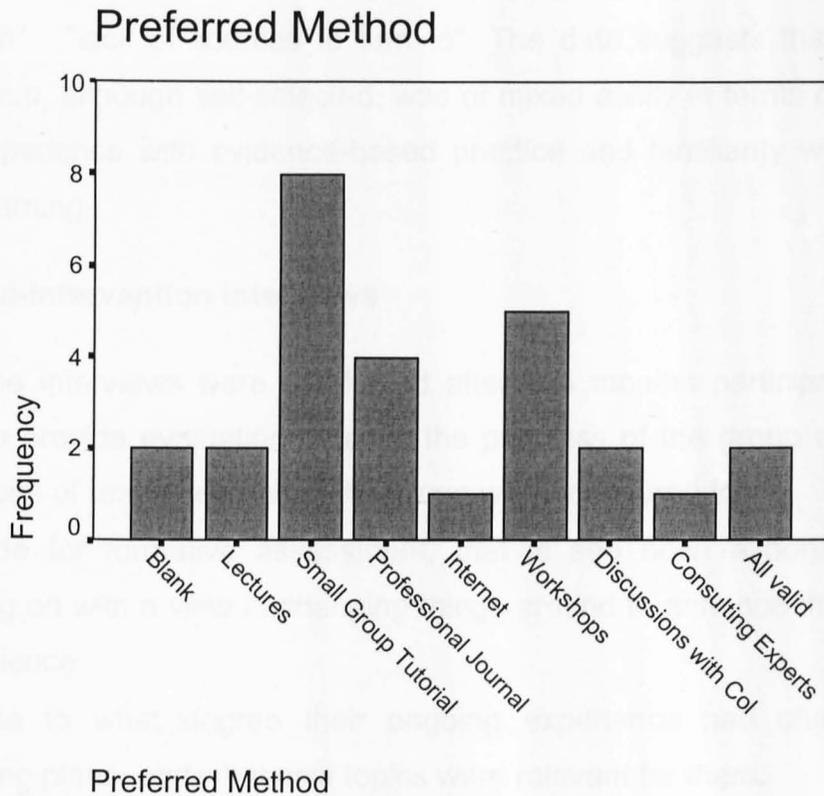
Preferred Method

Figure 5 12 Preferred learning method of participants n=27

2.6.4. Learning experience

Within the group (see fig 5.12), the preferred methods for keeping up to date with current knowledge and practice small group tutorials, workshops, professional journals, and discussions with colleagues and lectures. The Internet as a method ranked low. Of the group, only five had used a personal learning plan before, and nineteen considered that there had been obstacles, which had prevented them from their personal continuing professional development. These obstacles included items such as "time", "motivation", "pressure of work", "knowing where to access", "energy", "timidity in asking questions", and "too many commitments". The learners group considered that

"self-teaching" and "learning on the job" were the methods which had most contributed in the development of their computing skills to date. However, from the group, twenty one had identified that there had been obstacles to them developing their computing skills which included comments such as: "time", "family commitments", "useful teaching tools", "equipment", "money", "bad relationship with clinical system suppliers", "no mentor", "lack of inclination", "lack of sources to turn to". The data suggests that the North Trent group, although self-selected, was of mixed ability in terms of computer skills, experience with evidence-based practice and familiarity with portfolio based learning.

2.6.5. Mid-Intervention Interviews

Telephone interviews were conducted after two months participation in the project to provide evaluation data on the progress of the group as a whole. For reasons of resources half of the group were monitored to:

- Provide for formative assessment, that is see how respondents were getting on with a view to changing things around to enhance their learning experience

- Assess to what degree their ongoing experience had changed their learning plans, and what new topics were relevant for them.

A random sample of 15 learners from the learners evaluation group (n=27) was selected for a short telephone interview (see fig 5.13).

Gender	10 Males, 5 Females
Posts	10 GPs, 2 Nurses, 1 Health Visitor, 1 Manager, 1 Researcher

Figure 5 13 Characteristics of midway interviewees

The schedule for the mid-way interviews is given in appendix A9.

Their responses (fig 5.14) give an indication of how active they had been in engaging with the project.

Activity	No. of people completing activity at least once
Sent E-mail to Individuals	11
Sent E-mail to Group	7
Accessed Wisdom website	10
Accessed other websites	13
Conducted a search	10

Figure 5 14 Activity levels of midway interviewees

(n=15)

From this group of 15 participants, eight commented that they checked their mail on a daily basis whilst the remainder tended towards twice a week. Within the group there was a range of responses concerning how much time they spent browsing their mail messages per session, it varied between less than 15 minutes to over an hour, with the majority taking between 15 to 30 minutes. Only half of those interviewed regarded themselves as having any local support when it came to computer problems. Topic areas which respondents wished to see in the remainder of the course included:

Information technology and management

- More opportunities to develop and practise skills;
- Basic informatic skills information, including experiences with Pathology lab links etc;
- Advice on surfing start points to find information sources; and
- How to set up Web pages

Evidence-based practice

- More search examples and advice on strategy development;
- More examples regarding implementation, particularly outcome measures; and

- More on what EBP is not, so as to dispel myths and encourage positive attitude

Portfolios

The number of participants in the North Trent evaluation group (n=27) likely to produce a portfolio was established by e-mail requests from the facilitator (me). Eight GPs (other than me) expressed an intention to produce a learning portfolio for assessment and a tutorial on portfolio learning was also requested, particularly examples of what it should contain. One nurse was using the material for a portfolio towards a higher degree in nursing. The six managers and the primary care researcher did not need to do a portfolio and thought it unnecessary. It was suggested that a sample portfolio should also be made available for inspection. Consequently, both a tutorial was constructed and two sample portfolios were subsequently available on the WISDOM website.

2.7. Post-Intervention Questionnaires

All learners were requested to complete a self-report questionnaire concerning their experiences of the WISDOM project. In Figs 6-11 and 6-12 results are given in bold and shaded for the post questionnaire. To allow for a comparison with the pre-test questionnaire those results appear in normal text. All those who completed the course replied.

Computer Experience

The following data (fig 5.15) describes the level of computing experience amongst the group:

Software	Blank		Unaware of		Aware of- unable to use		Can use		Can use and teach	
	pre	post	pre	post	pre	post	pre	post	pre	post
Word-processing	0	0	0	0	0	0	18	12	9	15
Databases	0	0	1	0	9	5	11	16	6	6
Spreadsheet	0	0	0	0	8	6	11	10	8	11
E-Mail	1	0	0	0	4	0	17	15	5	12
CD-ROM	0	0	0	0	10	4	13	13	4	10
Operating Systems	1	0	7	3	8	8	7	10	4	6
Windows	0	0	1	1	1	0	17	17	8	9
Statistical Packages	1	0	4	2	16	17	5	7	1	1
MEDLINE	1	0	3	5	7	5	15	19	1	3
Web Browsers	1	0	2	0	7	1	12	18	5	8

Figure 5 15 Self-confidence rating for computer skills of respondents post intervention

(n=27)

Evidence-based Practice

Figure 5.17 describes the levels of self -confidence reported for the steps of evidence-based practice.

Activity	Blank		Unaware of		Aware of-need to know more		Can use		Can do and teach	
	pre	post	pre	post	pre	post	pre	post	pre	post
Formulate question	1	2	3	2	10	5	10	15	3	3
Locate information	0	2	2	2	9	5	13	14	3	4
Evaluate data value	0	2	2	2	15	10	8	11	2	2
Implement	0	2	3	2	12	9	9	11	3	3

Figure 5 16 Self-confidence rating for evidence-based practice post intervention (n=27)

2.7.1. Wilcoxon Signed-Rank Test

The Wilcoxon Signed-Rank test detects differences in the distributions of two variables for related or paired subjects (Bryman and Cramer, 1999). Statistical manipulation for this thesis was undertaken using SPSS version 8.0. The following table (fig 5.17)gives the significance of the change between the pre- and post-test self confidence in computer skills and the stages of evidence-based practice.

Test Statistics

Statistics			
Software	N	Z	P (2-tailed)
Word-processing	27	-2.449	.014
Databases	27	-1.897	.058
Spreadsheets	27	-2.236	.025

Electronic Mail	26	-3.317	.001
Interactive CD-ROM	27	-3.000	.003
Operating Systems -	26	-2.887	.004
Windows	27	-1.000	.317
Statistics	26	-1.000	.317
MEDLINE	26	-2.326	.020
Web Browser	26	-2.968	.003
EBP Question	24	-1.721	.085
Locate information	24	-0.965	.335
Evaluation	25	-0.584	.559
EBP Implementation	25	-0.566	.572

Figure 5 17 Wilcoxon Signed Rank Test results

Accepting a 95% confidence interval (P=< 0.05) then it would appear that participants achieved a significant change in skills in the areas of e-mail, web browsing, MEDLINE and operating systems. It should be noted that the sample size was too small to provide adequate power to test the hypothesis that the intervention improved skills in the other areas. However, in all cases there were trends towards increased levels of skill or knowledge.

2.7.2. Non-Joiner Interviews

From the original enquiries (n=106), thirteen people who did not join the project were identified as having been from the North Trent area and thus potential participants in the "evaluation group". This group (non-joiners) comprised seven GPs, two nurses, three practice managers and one health visitor. Of these 10 were interviewed by telephone by myself (CR). Three GPs were unavailable for interview due to maternity leave, long-term illness and being uncontactable.

All non-joiner respondents were partially able to identify the aims of the WISDOM project:

> ... a group of people discussing Health Service issues on-line [wisnjsl]

.. a PGEA course through the Internet. [wisnjdra]

... using the Internet to help my education. [wisnjia]

Their initial interest was due to a variety of reasons (fig 5.18):

Reason for interest in project	No. of respondents giving reason
Information Technology	8
Evidence-based Practice	6
Education	6
Professional Support	1
Innovation	2
Research	1

Figure 5 18 Reasons given for initial interest in non-joiners

These were related to issues such as:

.. wanted to promote the Internet. [wisnjsl]

... development of IT. Using it for other processes, direct links, items of service links. [wisnjia]

...management issues around IT. [wisnjkh]

The main obstacles to participation were time and cost, with three worried about the cost of connecting:

I tried a free connection for a month. It was very slow to download and I was worried about the cost [wisnjdrg]

and eight thinking they would have insufficient time to complete the project.

2.7.3. Drop-out Interviews

From those who commenced the course (n=35), eight people who joined the project initially and based in the North Trent area did not continue their

participation. Data was available from their pre-test questionnaire. Since I was the facilitator it was decided that to avoid bias, these subjects be telephone interviewed by another team member (ED), whilst I would analyse the data. The interview schedule is given in appendix A8. They comprised two practice managers and six GPs, with one GP and practice manager based in the same practice. Those who dropped out largely shared the same expectations of the course as those who completed, and felt more time pressure than those who remained on the course did. Two of the GPs had registered intending to observe but not participate. They left because of what they perceived as the volume of irrelevant messages. This theme was repeated by the four other GPs who left, typically feeling that they were participating in a personal conversation by a few regular contributors, which they had increasing difficulty in keeping up with. The two practice managers left because they perceived that the course was of little relevance to practice managers and in particular did not focus on their own learning needs. Both managers had been encouraged to sign up by their lead partners in computing.

2.8. Mapping Exercise

The Informatics Working Group (1996) provided a curriculum of 52 separate learning outcomes, covering topics from using data in clinical practice, data handling and data quality issues through to the strategic uses of information, for example health needs assessment. I analysed the data to look for matches of where the recommended outcomes had been covered in the course (fig 5.19). Data was not available to analyse to what depth the learners engaged in each of these 52 suggested learning outcomes.

Area in WISDOM where covered	No. of IWG learning outcomes covered	Notes
General discussion	17	The topic was covered in general discussions
Formal Seminars	5	The evidence-based practice seminars
Informal seminars designed by facilitators	14	The topic called 'Primary Care IT Development' was designed and implemented by the facilitator in response to perceived learning needs
Resources available on the website	2	Information that was available on the website but not otherwise covered.
Not covered	14	10 of the learning outcomes were considered too advanced for ordinary continuing professional development
Total	**52**	

Figure 5 19 Mapping of informatic learning outcomes against teaching activity

2.9. Traffic Analysis

The extraction and formatting of the data given here illustrates the activity of the participants on the discussion list and informs the qualitative analysis. There were 433 e-mails sent to the discussion lists from 5 June 1997 until 31 October 1997. The list initially used a server at Newcastle with the address wisdom@schin.ncl.ac.uk (155 e-mails) and from early July 1997 used the Mailbase server with the address wisdom@mailbase.ac.uk (278 e-mails).

Just under a half of all e-mails were sent by a member of the WISDOM project team (fig 5.20).

Message sender	No (% of total) of messages sent
WISDOM Facilitator (CR)	118 (27%)
WISDOM Information Officer (AJO)	45 (10%)
Other WISDOM team members (PL, NF, EAD)	46 (11%)
North Trent Professionals	123 (28%)
Information officers (out with the project team)	14 (3%)
Professionals outside North Trent	71 (16%)

Figure 5 20 Analysis of traffic on WISDOM discussion lists

2.10. Qualitative data analysis

All of the qualitative data available concerning the research aims and objectives of action research cycle one is analysed, and reported. Miles and Huberman (1994:432) suggest that the condensed version of the full data set be displayed to:

1. Permit analysis in close conjunction with the displayed data;
2. Allow the analyst to see what further analysis is called for;
3. Allow easy comparability across the data sets; and
4. Heighten the credibility of the report.

A content analysis of the qualitative data using a constant comparative approach was performed to provide a basis from which a conceptual framework could emerge. Validity was ensured by considering the themes reiteratively and crosschecking for consistency within the individual responses (Strauss, 1987). This approach aims to do justice both to the research questions and the concerns of the participants.

In this section, having reduced the data collected in this research, I display it under headings under three broad themes. These are:

- Exploring the learning environment;

- Modes of teaching and learning; and

- Learning outcomes.

The analysis takes account of all of the data available to the research team and the analysis is entirely my own.

By the end of the course most participants valued the virtual classroom approach, commenting on:

> The ability to learn at home at times of my own choosing with a flexible day-to -day approach and the ability to access material from the website. [POST- QUESTIONNAIRE-COMMENTS: 128]

However it these that are most of interest I resolving problems in future action research.

2.10.1 Exploring the learning environment

2.10.1.1. Accessing the Internet

Most of the professionals who joined the leaning group were already experienced in using and communicating through computers. The majority of participants were accessing from home and maintaining access to the Internet and the course was not always straightforward. Even the experienced were not immune to computer crashes, losing course materials from their computers, and being disconnected from the Internet for long periods. Most felt limited for both time and the frustration they could tolerate with software problems. In addition to ringing the project team, 'for support during the initial

problems in getting started,' [endof.txt: 179-179] anybody to hand including participants' family members were called upon to get them back on-line:

> I am waiting for my other daughter to come back from holiday
> because her boyfriend knows about computers, he will probably
> fix it. [Midways: 703-705]

Sometimes however shared use of the computer in the home was a problem, and at times participants expressed exasperation at the number of things that could go wrong:

> Modem not working? I say this 'cos I tried to get the mail earlier
> to-day and didn't notice that my son had pinched the modem
> until the computer complained that it couldn't get an outgoing
> line. [ED: 16840-16845]

Although most participants were able to access the Internet themselves, the 'trouble-shooter' GP needed to visit three of the participants to get them on-line, visits taking around an hour. Some had need of technical support beyond what was available and consequently:

> It took us all year to get connected what with one thing and
> another. [Facilitator's e-mail: 247-247]

Some blamed their Internet providers or their home equipment or both for their Internet connection problems:

> I have heard stories from other providers, but it does seem to
> me that a) the whole business of getting a reliable connection is
> much difficult than anyone lets you know and b) if you have an
> older machine few people will want to help you. [homeconn.txt:
> 376-379]

Many needed reassurances about the risks attached to downloading information from the Internet, particularly 'catching' a virus. Advice was always available from the more experienced participants:

The analogy with safe sex is a good one. If you are careful who you connect with and how and take necessary precautions, the chances of catching something are very small. A good thing about computers is, if you do something it can be cured. Always providing you have good back ups. [homeconn.txt: 245-252]

For those who were confident at accessing the project website, it was 'a great resource' [endof.txt: 533-533]. It was also seen as something to which every-one involved; course participants and organisers, could contribute to make it a resource for all:

if we get a collection of resources from our own, individual collections, is there anywhere we could, as a group, store it for future reference? ;-> [limb.txt: 59-60]

2.10.1.2. Novice users

Those coming to networked learning for the first time (novices) reported that they were more likely to communicate if they were given some help as to how to use the software. They believed themselves more likely to communicate with people they knew face-to-face. Some participants needed more learning support than was available on-line, many reported they did not get enough support to get the most out of the on-line material. It was widely agreed that 'face-to-face contact is also needed to develop basic skills'. {librarians: 45-50]

I feel I would have got further with one session from a "hands on facilitator". I wasted hours pressing the wrong buttons. [jo97int]

Many of the new users to e-mail took a while to grasp the mechanics of sending and receiving mail leading to speculation that they were somehow being deliberately excluded rather than it being the fault of the technology. Although there was no moderation or censorship of messages by the WISDOM team, one participant said:

Main problem is that if something I send doesn't appear then I'm left wondering whether it didn't make the grade (OK not a problem - I am no expert) or whether there is a fault in the

system. I've no doubt the former is the case most often.) How do I know and therefore tune up my comments [F-P-E: 1914-1921]

About half way through the course, there was a clear disparity between novices to the technology and those experienced in the technology.

During our recent face to face meeting, which I enjoyed being very much a non-verbal communicator, the word mentor was mentioned and then forgotten. I feel in desperate need of help with basics the rest of you take for granted. How do I send and receive attachments? What happens if I download a file? Can somebody start a tutorial for novices PLEASE ? [ENTIRE ED EMAIL LIST DATA: 18120-4]

The strategy taken by the WISDOM team to address this typical request was to create a separate group for the novice users and appoint a new (volunteer but again medical) facilitator, from amongst the participants. However, despite repeated attempts at stimulating activity the on-line novice group was abandoned. The WISDOM team recognised that a short one-hour face-to-face session with several novices was the best way to give new starters the confidence and basic skills to proceed with networked learning.

2.10.1.3. Using e-mail

Many participants were able to demonstrate that they could develop systems for handling their mail as they progressed through the course. Participants varied as to how they handled the mail. Some preferring to briefly look at everything, even though some things were not of interest:

Some things frankly didn't interest me. If the debate had gone on too long I think I lost interest. The anticoagulation one went on and on and on. I think it was at the beginning and the end. I scanned all mail. It wasn't sort of, "Oh, anticoagulation - delete". [g97: 57-57]

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Others wanted to read everything and risked overload of information. There was frustration by what they saw as the flouting of established rules of etiquette for e-mail (referred to in jargon as "netiquette"), for example where the title of an e-mail had been changed making a 'thread' discussing a particular topic difficult to follow :

> Too many messages - a method of sorting had to be established but this meant that sometimes you missed interesting discussion as the header (subject) was different than what was actually being discussed in the main body of the text. [disad.txt: 25-28]

2.10.1.4. Using the virtual library

The part of the WISDOM website that contained structured and indexed information was called the library. Two librarians themselves, observing as lurkers in the discussion group and participating in the project, offered their own observations of what support participants might need from the health services library:

> Little librarian input seemed needed; doctors seemed to like the
> help of other doctors in devising searches and strategies.
> [librarians: 28-29]

Another saw the WISDOM network as providing many of the services of a local library:

> Librarians need to be in at the beginning. Need for librarians to
> engage in out reach work, to advise primary health care workers
> on the use of local libraries, or to get network connected.
> [librarians: 45-50]

The participants themselves took up this point. Using the Internet was 'different from sitting in a library. More fun.' [chose.txt: 68-70]. In particular using MEDLINE over the Internet was:

> Good but slower than using the CD-ROM interface. BUT it's a
> lot quicker than getting in the car and driving to the local post
> grad centre to use the library! [fmedline.txt: 8-11]

Participants suggested that ultimately access to a network should be at the practice. It was thought that there would neither be little time during consultations nor would there be the resources to support having access to the network on the clinicians desktop. A compromise might be:

> the idea of access in a practice library linked to primary care clinicians working in groups within their primary health care teams to answer clinical problems. The questions, answers and rationale should be disseminated within the team- and could be made available on the clinical system as "clinical FAQs (frequently asked questions)" [inpracer.txt: 197-201]

2.10.1.5. Using the virtual seminar room and seminars

Most participants were able to grasp the concept of the "virtual classroom" from early on in the project. An attempt by the project team to have more than one "virtual classroom" was undertaken. Participants were informed that there would be two seminar rooms or mailing lists for discussion. The aim was to get the North Trent evaluation group on one discussion list to do the evidence-based course. Confusion for the participants (other than the project team) resulted. The project team had assumed that the notion of the website as a "virtual postgraduate centre" had been comprehended by all of the participants. The larger discussion group, termed a 'seminar room' was called WISDOM and was available to all participants. It was described as a general discussion forum or "coffee room" for general discussion and chat. PROGRESS was the name given to a smaller "seminar room" or discussion group where only those people from North Trent would talk about the tutorials, seminars and issues related to North Trent. This separation on geographical boundaries did not work. Participants struggled with the concept of what it meant to be part of some discussions but not others.

> Even if I'm barred from the Seminar room (not having had the foresight to join a practice in Trent ;->>), couldn't us outsiders drop in for a cup of coffee? [ENTIRE ED EMAIL LIST DATA: 20852-20852]

Participants were divided as to whether the seminar programme was useful or not in terms of meeting their own learning needs. The perception was one of the seminars being too theoretical and not related to the kinds of problems experienced by practitioners in primary care:

> I suppose I would like to see more of the exchange and interaction regarding actual practice problems, in the broadest sense, which began to develop at times and seminars to arise out of these issues rather than a further pre-planned syllabus. [endof.txt: 166-166]

Others valued the structure of the seminars and used them as a resource for teaching and learning with groups they themselves were involved in outside of WISDOM. Others planned to use them as a resource for planned future learning:

> I printed off the tutorials because they were fairly lengthy and I couldn't concentrate with those on the screen. I've still got them and they're all on hard disk but what I do if I'm still working through, if I want to go and look at something they are saved so I can actually still use the hypertext. [g97: 51-51]

2.10.2 Modes of learning and teaching

Three broad modes of teaching and learning emerged from the data analysis. These were:
- Multiprofessional;
- Experiential; and
- The evidence-based cycle.

2.10.2.1. Multiprofessional learning

At the outset of the course, a "multidisciplinary team based approach to problem solving" [schinlog: 796] was taken by the WISDOM project team. Learning needs that included multiprofessional working were identified by some of the participants. For instance, one professional allied to medicine wanted to learn about

> Contributing to a team approach for Health Visiting in our area, broadening the scope for the service, supporting colleagues, forging links with other services. Multidisciplinary meetings. [ppact.txt: 62]

There was evidence that for some the anonymity that the medium afforded helped in breaking down of barriers between professional groupings:

> the advantage of this medium, you haven't got the face to face so no-one is wearing a uniform and if they are you can't see them, it just becomes another group member and in a way, because you can't actually see them they are more likely to be an equal group member. If you're sitting in a practice team you are still Doctor So-and-so, that's a health visitor, that's a receptionist. There is this hierarchical thing whether you like it or not that people will perceive, even if it's only related to earnings. [pat97: 138]

However, it was evident that shared learning between the different professions had not taken place, for most participants. There were a number of reasons for this, and some examples are given. Typical behaviour of stereotyping of professional role was apparent. In one example a doctor had been having an e-mail discussion anonymously with a nurse and was shocked to find she was not medical:

> .... we'd been having this good conversation, it was ages before I realised she was a nurse. [pw97:106-106]

In a private e-mail back to the facilitator whilst discussing 'multidisciplinary education' this stereotypical behaviour was more crudely expressed by another:

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> I don't want you to publish this to the group as it will just cause trouble...but my view is that doctors need to learn doctoring things and nurses need to learn nursing things. The two cannot be mixed. [FACILITATOR-PERSONAL-EMAILS: 98]

For others, multiprofessional learning was perceived of as one more barrier to learning:

> It was hard enough without doing it with people from a different profession. [jo97: 14-15]

Despite the lack of success, participants were able to reflect on how shared learning might have been organised; yet still betraying their own underlying preference for uniprofessional education:

> ... more thought should be given to separating the different disciplines in the primary care team, such as having separate mentors and tutors. [librarians: 141-142]

For others there was problem with both facilitators being medically trained, which biased the content towards the medical, for example, one non-clinician complaining:

> Unfortunately, you chose all doctors' subjects really which was
> of no use to people like me. [joe97: 7]

2.10.2.2. Experiential learning

The majority of participants were clear about the aims and objectives of the course (see section 1.2.3), including those who did not complete the course. There was an appreciation that the learning objectives of the course could be a basis for the learning objectives within personal learning plans. There was healthy debate as to whether there was a matching of the course objectives with their own learning needs (see fig 5.8). For example, some participants were convinced that the evidence-based process for searching and appraising healthcare information was NOT the right approach to learning for them:

I'm not sure what it is we're learning. I want to learn about electronic information exchange and that's why I joined. Maybe I've made a mistake - is this about evidence-based medicine? [chose.txt: 37-40]

The role of the facilitator

The facilitator role was appreciated by many as one of keeping the group discussions going in a learning conversation (c.f. Laurillard, 1993), encouraging participants to reflect on their contributions:

> .... directing the potential topic, but not too heavily. But there were sort of constant interjections 'what about this?' giving you the opportunity to reflect or bring issues up that we may not have considered before. [ag97: 27-27]

There was however, much diversity in what participants expected of the facilitator role in a "virtual classroom" role, some expecting a more didactic approach. One wryly observed that he had not noticed any facilitation but then:

> ... in good facilitation, you shouldn't have a sense that it is there at all. [dp97: 63-63]

However, for others there was little sense of anything educational happening in the e-mail discussion group rather "glimpses of some people trying to do something".

This lack of appreciation of small group learning activities (c.f. fig 1.4 and 1.5) was perhaps because the technology used did not help in providing a clear mental picture for them of what was going on. Problems with the e-mail technology included:

> delays in replies, the lack of visual clues, the lack of sense of what kind of person/how confident/how experienced [ebp1.txt 73-73]"

Many participants needed more one-to-one support in order to produce a learning plan and a portfolio than was evident either from the facilitator or from other group members. There were implications of this failure in supporting the nine people who had indicated they would submit a portfolio of learning to WISDOM:

> I think the lack of one-to-one was a problem. And I wasn't sure that the mentoring system got off the ground. I'm not sure if there were that many people involved in it, or enough people to have a proper mentoring system [g97: 21].

The WISDOM team had indicated in various messages that co-mentoring pairs would form among those participants who wished to produce a portfolio, for instance, the facilitator said:

> Co-mentoring is just another name for the "buddy" system or "working in pairs". I hope that people within the WISDOM project will do some co-mentoring [pfolio.txt: 586-590]

Some were able to form their own pairs and conduct a conversation with each other outside of the main e-mail discussion group, but without any particular educational focus:

> I had a chat with a {another WISDOM participant} for ages and we - basically when the National Health Service pension scheme was coming up for practice staff - and we were shooting messages back and forth. It was great. [jd97: 98]

However, most did not pair up and the invitation to find a "buddy" or co-mentor was not successful.

On working in small groups

There was plenty of apprehension for participants starting an Internet based course, for the first time. One participant drew a comparison between the known entities of traditional face-to-face education and the uncertainties of "virtual education":

We are coming from serious traditions where you are used to being in control and you go out on the net and you are talking to anybody, you only have their e-mail address you don't know what their background is, you are not blinded by status and identity [idk: 41-43].

Once underway, for many, there was a sense of being in familiar face-to-face small group discussion:

I've found the experience of taking part in a group learning project with reasonable time for reflection at one's own pace quite unique. [mbl99711.txt:128-128]

Another participant comfortable with the experiential nature of the course, commented on the value and safety of peer group learning:

I can learn at my own pace. It was with peers … and therefore is less threatening. It was learning by doing and there was room for messing up. And no one was critical. [g97: 15-16]

This way of learning did not suit everyone, some recognising that they probably worked better in a physical environment:

It was like trying to learn a tool with a machine you don't understand with people you have never met. [jo97: 20-21]

Health informatics as course content

Most were familiar with the computer systems in their own practice. One participant described the ideal of what health informatics could achieve, believing that the main barrier to progress might be negative attitudes to computers:

Computers should be utilised to reduce duplication of effort, reduce storage facilities required for paper, and enhance job satisfaction as we demonstrate outcomes and audit activity. The biggest obstacle is ignorance, followed closely by prejudice and fear [itplan.txt: 433-436]

However most of the participants found they were at a more basic level of progress than they would have imagined at the start of the course and had perhaps been overconfident at their abilities:

> I have also learned some of the practical problems, which need to be overcome to use medical informatics on a regular basis (and which hindered my participation at times). [endof.txt: 214-217]

Most reported little success with searching the Internet (in contrast to medical or nursing databases) for health related material often to do with the way health information was presented by the public sector and the NHS:

> ... getting this White Paper I searched along Health and Government and I read lots of crap about the United States government and it was learning things like this and eventually I sort of stumbled across an obscure department called the Department of Health and it had a picture of Tony Blair. [jd97: 131-131]

2.10.2.3. The evidence-based cycle

There was some prior experience of evidence-based practice amongst the participants. For example one participant had been in an e-mail discussion group, dedicated to evidence based medicine, albeit with no formal facilitator. The participant reported the value of such groups:

> I've learnt stacks from participating in mailing lists (especially evidence-based-health) and made contact with all sorts of helpful people who have been more than generous with information and advice. [inpracer.txt: 206-209]

Others recognised that evidence-based practice was a difficult or "heavy" subject to learn, even where learning materials were considered helpful:

> I mean there's some very difficult principles to understand, just trying to understand Boolean logic, things like that. The examples were good where they're referencing against papers and setting the critical process. I thought that was very good but again it's the time. [g97: 80-80]

Participants largely wanted to discuss, as a group, questions that had arisen from practice. For example, one doctor writes:

> A middle-aged woman states that she has a family history of early death from sub-arachnoid haemorrhage. I cannot immediately remember the inheritance of this but it would appear to be dominant in some form. Therefore is the risk sufficiently high to justify investigation (possibly invasive with associated risks)? [ebpsah.txt: 9-13]

As the above participant's search failed to produce anything on inheritance, the WISDOM Information Officer demonstrates how a MEDLINE search should be organised to refine the question:

> First, it could be a question on the aetiology of a subarachnoid haemorrhage (SAH): Patient: middle-aged female Intervention (risk factor): positive family history. Outcome: risk of suffering SAH. Or, it could be a question on the choice of management of cerebral aneurysms: [ebpsah.txt: 16-22]

He then offers a rapid appraisal of important references he has produced from a search, which suggest that the patient should be screened:

> In those who have a first-degree relative who genuinely suffered a SAH, their risk of also suffering one is 3-7 times that of the general population. Second degree relatives do not seem to be at increased risk. [ebpsah.txt: 160-164]

The doctor was then able to take this information back to the patient who had originally asked, and work through how the search had been organised to improve his own abilities. The same doctor was able to reflect on this process more thoroughly:

> I guess one would be influenced by the patient's wants and degree of distress in which option I would choose. I have found that on at least

some occasions, searches can result in practically useful information quite readily. [inpracer.txt: 71-75]

Progress, however, for most participants seemed limited to turning a clinical problem into a searchable question and using MEDLINE to explore it. For example, there were questions on paracetamol, anti-coagulation and fibromyalgia.

Some felt more confident to teach evidence-based principles, whilst at the same time gaining more insight into barriers to learning:

> ... most of all it has shown me how difficult it will be to get people to understand and adopt EBM [endof.txt: 212].

Throughout the course, there seemed little change in pre-existing attitudes to the validity and relevance of evidence-based practice for clinical or managerial practice. For example, a nurse reported that in ·her team, doctors thought evidence from the medical literature was in some way more valid than evidence from the nursing literature:

> We are currently looking at our post MIs with regard to their lipid levels and the suggestion that we should be treating all with lipid lowering agents. As a nurse I suggested that we also look toward suggesting healthier lifestyle (as we already do) but with particular reference to exercise. This idea was poo-pooed in the light of recent research, apparently. [ehcbull.txt: 8-13]

That sceptical doctor had not read the latest evidence on the value of a 'Mediterranean style diet' according to another doctor on the WISDOM list. The nurse in question felt her own knowledge validated by having access to a wider information source, such as the WISDOM discussion list, than her own practice. Perhaps more likely than the validity of evidence are the wider concerns of power and professional identity which are raised by exchanges such as this.

Other participants remained unconvinced that the philosophy behind evidence-based practice was appropriate for primary care. For example, one participant was confounded that evidence-based medicine did not seem to allow her the common sense approach of asking someone else the answer to a practice-based problem. Rather it encouraged her to find it for herself in a much more ineffective way (her own capitals):

> A phone call to the lab gave me two minutes talking to someone who KNEW and was able to give me several possible strategies and a fall back scenario, helped me to understand the issues without overwhelming with detail and left me KNOWING what to do. [ebp2.txt: 157-160]

2.10.3 Learning Outcomes

For the purpose of this study, I explored the data to see what learning outcomes emerged from the participants' experiences. Participants reported a diversity of learning outcomes, some more concrete than others. These included:

1. A clearer sense of how to set learning objectives and developing a learning plan for the portfolio;
2. Better understanding of communication issues with patients around what works and what doesn't in clinical practice;
3. A greater awareness of the potential of evidence-based practice and health informatics in supporting patient care; and
4. A confidence to try out networked learning with educational groups they were involved in.

In addition, there were some negative concerns, which affected the production of learning outcomes. Within the action research framework, negative outcomes are taken as problems to be solved in the next cycle of action and research. These were the issues of:

1. Lack of time;
2. A failure of the course to meet some individual participants' expectations;

3. A failure to design the course at the right level for a shared experience of multi-professional learning;

4. Life events: illness, bereavements, new babies;

5. Lack of one-to-one support for learners who were wishing to pursue doing an electronic portfolio; and

6. A failure of many individuals to appreciate the dynamics of electronic discussion groups

2.10.3.1 Reflective Outcomes

For some participants, vaguely held needs of "wanting to find out" more had been satisfied. For one participant their learning need was the basic health informatic skills of on-line communication:

> For those like myself who are new to on-line communications this process of exploration is probably sufficient for now. There's still a lot to learn, particularly about stuff like transferring files, attaching documents etc. and all the arcane expressions that seem to go with this sort of thing. [ENTIRE ED EMAIL LIST DATA: 21725-21725]

For another participant it was the confidence in the health informatic skills that allowed them to go further with evidence-based practice and the step of searching to answer his own evidence-based questions:

> Mostly I think it's more sort of qualitative, just feeling more comfortable with access to the medium I'm familiar with now. And, "Yes I can do this," sort of thing. Certainly with MEDLINE I find that now I'm definitely more familiar with, more comfortable. [b97: 36-36]

Four GPs, from those completing the course (n=17) including myself, submitted portfolios to the project, which were independently accredited for 30 hours postgraduate education. One nurse completed a portfolio for a higher professional nursing qualification. Three of the four, including myself, had never done a portfolio before and one had done the face-to-face portfolio with

Sheffield Continuing Medical Education previously. For one participant the benefits of the portfolio method were that he:

> Learnt it is possible to clean the "weeds" from untidy thinking that develops after 17 years being a doctor - the cobwebs had to be cleared. Difficult to see the wood for the trees. A plan is essential and needs to be reformulated regularly. [chng.txt: 6-9]

A recurrent criticism was the lack of support, which learners who were trying to do a portfolio felt. In particular, there was very little sense of co-mentoring or mentoring from project team members:

> I began to want something more like a discussion group kind of feeling, a feedback about one's own personal plans with somebody facilitating or mentoring that. I think maybe it's not how it should have started but maybe I began to feel I sort of wanted something like that. [b97: 42-42]

In particular there was a lack of comfort at sharing learning plans with a large group, which as a consequence made doing a portfolio less collaborative than doing it face-to-face:

> I think the portfolio that was done with Wisdom, that I'm doing, is almost a very personal portfolio. There's very little outside influence on it or direction on it. I mean you almost need to be able to maybe do it, send it in and get feedback on it but where it's not actually posted up on a mail-base. [b97: 116-116]

Most of the doctors (n=12) who were eligible for portfolio accreditation for PGEA did not submit a portfolio at the end of the project. Some suggested they might include contributions in a face-to-face portfolio with their local CME office.

2.10.3.2. Evidence-based practice outcomes

Participants were able to demonstrate how they were able to use the processes they had learnt not only with patients but also by teaching colleagues and students

> Yes, I learnt how to be more flexible with my mail; use e-mail properly;
> access MEDLINE. I've used stuff off the Net in the practice. I've used
> it for my new principles group. And one two or things I've used for
> tutoring [of medical students] in the small groups [g97: 128-128]

A practice manager found he was able to access documents from the Internet
at a time of rapid change in the practice in time for important meetings:

> On the day a White Paper was published we actually had a meeting the
> same night with two practices that the health authority were trying to
> push us into a commissioning group with, and I managed to download
> all the relevant parts of the White Paper because even the health
> authority didn't have a copy [jo97:53}

There were examples of completion of learning circles and empowerment of
professional roles as participants applied their new evidence-based skills in
practice. Most of the participants preferred to use questions of evidence
arising from their own practice. For example, one participant suggested they

> would be influenced by the patient's wants and degree of distress in
> which option one chose. I have found that on at least some occasions,
> searches can result in practically useful information quite readily.
> [inpracer.txt: 14 - 17]

Many participants felt confident enough to do their own MEDLINE searches,
some able to do them with 'with minimum hassle':

> I was able to search MEDLINE for subarachnoid haemorrhage and
> came up with a number of references that helped me to answer the
> question about inheritance and whether it was appropriate to
> investigate the relatives. [inpracer.txt: 45 - 61]

For others, there was an increase in confidence in using the computer in
practice work for example preparing audit and clinical guidelines. For others,
the WISDOM approach encouraged them to look for applications for example
in Vocational Training for GP registrars, or for supporting local portfolio

groups. Some GPs were able to use their 'new' critical skills to challenge the 'wisdom' of consultant colleagues:

> It enables me to get the same information as the specialist. Perhaps more information than some. A lot of consultants don't have access to Medline unless they go to the library. Their database is what they've got on their bookshelf [ao: 307]

Or the Health Authority:

> A critical appraisal ... allowed me to challenge at local level a circular from the health authority recommending a change to clinical practice with major cost implications. [The appraisal] allowed me to provoke a change in future methods of the local Drugs and Therapeutics Committee. [postques.txt: 57]

Some had progressed towards implementing evidence-based findings in their practice:

> Yes. I've started to use the Rod Jackson tables (from the CEBM website) to assess cardiovascular risk and base my treatment recommendations on this. [ebp5.txt: 515-611]

3. Discussion

This first cycle of action research demonstrates the complexities of networked e-learning and the challenges of designing and implementing a virtual classroom for the purpose of supporting continual professional development. The virtual classroom approach would appear to be a viable alternative for delivery of education for healthcare professionals to face-to-face teaching. The structure of the WISDOM virtual classroom emerged from a collaboration between both learners and the WISDOM project research team. It absorbed the principles of experiential, collaborative and open learning. It was used by a volunteer group of general practitioners and their colleagues, who were prepared to offer constructive criticism on the emerging design. A case study was run where learners were able to design their own learning objectives, using the group and the facilitators, as resources to help them. An insight into the complexities of teaching and learning around clinical governance in key topic areas such as health informatics and evidence-based practice was gained. The learners were able to engage with a range of learning activities, including interactive seminar materials around health informatics, evidence base practice and portfolio learning. The virtual classroom approach as a means of delivery resulted in acceptable levels of satisfaction for learners. To varying degrees, there was progress in important health informatic skills and a suggestion of improvement in evidence based skills of being able to ask a clinical question and use MEDLINE to search for journals. This work demonstrates that there is some added value to doing CPD over the Internet in terms of time, the convenience of learning at home or work, and a pace to suit.

The results from this action research cycle suggests that the model of networked learning proposed in this research had only partial success in the supporting the delivery of continuing professional development. Within the action research approach, negative outcomes as such should rather be seen as obstacles, barriers or problems that need to be overcome in future research. Some of the shortcomings of the project were perhaps predictable,

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that the 'virtual classroom' was not an acceptable learning style for everyone, for example the pedagogical style with an emphasis on experiential learning. The barriers, both personal and technological to access WISDOM were complex.

However, much useful experience to reflect upon was gained and I will discuss this in more detail, in the light of the research questions I set myself in section 2.4. of this chapter. I will enlarge upon some of the wider 'power' questions (c.f. Kemmis and McTaggart, 1992) to do with implementing regional-wide or even national aspects of the virtual classroom approach in the third cycle of the action research in chapter 7.

3.1. CPD in health informatics with the virtual classroom approach

3.1.1. Evidence-Based Practice

In this research, progression in evidence-based skills seemed limited to the tasks of asking searchable questions and using MEDLINE (though the Internet) to explore them. The participants largely provided the topic areas for discussion from their own experiences of practice, with a good mix of common clinical problems and subjects that were more esoteric. Some learners who had previous experience felt that their ability had improved sufficiently to teach evidence-based skills, after the course. It may be that high level evidence-based skills such as critical appraisal or implementation may require more time than was available during the five months of the evidence-based course. Certainly some participants were overwhelmed by the commitment needed to master the higher level skills and were perhaps deterred by the advanced academic discussions concerning these. Mastery of evidence-based medicine is a process of lifelong learning (Sackett et al, 1997) and as such participants in any programme of learning would not be expected to become experts in five months. For those who used it, personal technical support was highly valued.

There was much interest in being provided with a workshop of 1-2 hours face-to-face to learn basic networking and MEDLINE searching skills. Further research is needed to compare the effectiveness of teaching these skills on-

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line versus a face-to-face approach in primary care settings. Certainly, Haynes et al, (1990) and colleagues have done a lot of work in North American secondary care settings about the things that enhance the quality of searches for secondary care physicians.

The participants in the evaluation group (n=27) were exposed to the basic principles of evidence-based practice. In particular there was no real requirement for any mathematical knowledge to complete the course objectives, although some individuals asked for more information on statistical concepts such as numbers needed to treat (NNTs) or the difference between absolute and relative risks. Whether or not this is important is largely set by the clinical governance agenda. There is a wider feeling that clinicians do not use mathematical concepts in the consultation and make themselves prone to errors of judgement based on this misunderstanding, particularly in the area of communicating risk to patients (Hoffrage and Gigerenzer, 1998). If this is indeed the case then there must be levels of competence identified for generic training, for example at the vocational training level for general practice. This has to be balanced by the freedoms and rights of a reflective practitioner, who may feel that within the scope of her practice, such a competency is not a priority compared with, for example counselling skills.

There were some surprising findings in the data. For example, to what extent where participants engaged in studying evidence-based practice? On re-exploring the data for example in (section 2.10.2.3) alternative views that seems to fit the data emerge. Rather than accepting the epidemiological basis of cycle of evidence-based medicine (c.f. Sackett et al, 1997) learners in this research were engaged in reflection (c.f. fig 1-2: Kolb's (1984) learning circle). Learners were identifying a concrete experience, a clinical situation where they were unsure what to do. As part of the 'reflective observation" they:

- Explored their own past experiences of 'practice' in a similar situation;
- Shared with colleagues what they might have done; and
- Explored the 'theory' contained in medical databases.

Rather than 'critically appraising' the 'theory' contained in the journals returned from the database, they were integrating the 'concepts' gained from their own

'reflection-on-experience' and from the 'theory'. Armed with this 'abstract conceptualisation,' they would need an opportunity, the next time a similar situation arose, to use it and reflect upon it with a view to further enriching their 'abstract conceptualisation'. Alternatively, perhaps in using Eraut's (1992,1994) model, propositional knowledge can be said to exist within databases such as MEDLINE, and personal knowledge is evident in their practice. By developing their process knowledge, in this case the ability to search MEDLINE, they were increasing their personal knowledge and able to demonstrate to themselves that they were improving their performance.

There was clearly some criticism, which I accept, that the WISDOM flyer (see Appendix A1) did not specifically mention evidence-based practice. There has been some debate, both within the literature and amongst the participants of this research as to whether evidence-based practice has a significant inter-relationship with health informatics. Some observers of medical informatics are convinced of the positive benefits and relevance of using and searching the evidence base for reliable health related information (Coiera, 1997, Clancey, 1995). From a different perspective this view is shared by educationalists who " anticipate a coming together of evidence-based medicine and clinical information technology" (Eraut and Du Boulay, 2000:95). A further interpretation is that evidence-based practice may not have been taught in the best way in the intervention used in this research. Thus, the learners were struggling with the course. Some authors feel that although evidence-based practice is often taught as a process as in this action research cycle, more successful learning outcomes might be achieved where the teaching relates to pre-defined topic area or areas (Greenhalgh and Douglas, 1999), for example cardiovascular or musculoskeletal medicine. With the clinical governance agenda being dominated by National Service Frameworks in clinical situations (such as care of the elderly, diabetes, and heart disease) there are plenty of suitable topics that can integrate with locally set clinical priorities.

This action research suggests that evidence-based practice has yet to be widely accepted by health care professionals as a method for meeting their own learning needs. For this particular group of learners, reflective practice

had the biggest impact on learners. More research is needed as to how to synthesise the undoubted strengths of both approaches to the benefit of healthcare professionals and their clients.

3.1.2. Computer skills

The results suggest that computer skills can be successfully acquired by taking part in an on-line learning environment. This would appear to be independent of the particular subject discipline under study. More knowledgeable participants were happy to pass on 'hints and tips' on a variety of computer problems. However some learners needed more support from the facilitators than was available on-line. More use could have been made of the telephone to "troubleshoot" novice users technical problems, and to provide initial learner support. Novice users of the virtual classroom model were motivated to learn basic keyboard skills to get at the information they needed. This supports the view that informatics is about more than computer skills, the incentive to learn new skills often coming from seeing the application to patients (Purves, 1996).

This research suggests that there was a shift in the self-perception of the participants from being able to use computers to access and manage health related information from the Internet to feeling confident enough that they could now teach these steps to others. Given the observation that the programme recruited innovators in primary care, a clear benefit of the programme may be its suitability for "training the trainers of tomorrow". This suggests a cascade approach where clinical leaders in information management can be recruited and trained up in the 'virtual classroom' approach and then transform what they have learnt to suit their own particular organisation. With more professionals having connections to the Internet through NHSnet (NHS, 1998), course organisers and providers of health information management are more likely to recruit active learning sets as described by Revans (1992) with more focused aims and objectives than were possible in this research. Higher level skills such as might be needed to

achieve change in practice based clinical systems would require more time and commitment than was evident in the volunteer participants in this course.

Learning resources for health informatic teaching and learning were costly to produce for the project in terms of staff time. More thought needs to be given to economies of scale, so that quality evaluated materials can be delivered for use on a regional or national basis. Materials developed for this purpose need to reflect the anticipated learning needs of the intended audience. They also need to include relevant and valid assessment procedures. Some of the original materials on this course have been adapted and enhanced to provide the basis of a generic health informatics course for specialist registrars as part of the generic curriculum for higher specialist training (Fox et al, personal communication 2001). One way this might be achieved in an experiential setting is to set health informatics learning objectives to be completed as part of a personal learning plan. Would-be facilitators in health informatics courses need to be aware of the range and appropriateness of health informatics teaching and learning materials appropriate to their own local groups.

3.2. Teaching and learning approaches in the virtual classroom

My primary research question (and the first of my secondary questions) in this first action research cycle asked to what extent the perceived learning needs for health informatics could be met by an evidence-based practice course delivered via a virtual classroom. The answer has been a fair degree if sound educational principles of clear aims and objectives, assessments and quality assurance mechanisms are in place. My secondary questions (section 2.4.2) posed questions around which aspects of the virtual classroom were most important for enhancing teaching and learning within the virtual classroom. I will now describe how this research has added to my understanding of the secondary research questions.

3.2.1. Educational theory, teaching and learning and the virtual classroom

Banks (1998) suggests that

The on-line environment itself will not dictate the pedagogical approach, any more than physical environments such as lecture theatres and seminar rooms do. However just like physical environments they will tend to favour certain learning processes, and the sum of the environment, it's content, and how it is used by teachers and learners will determine the overall learning experience

Banks (*ibid*) used the constructivist principles from Grabinger et al, (1997) describing student responsibility, dynamic generative learning, authentic contexts, collaboration and reflection to tabulate how the learning environment and content features support effective learning. By critically analysing my own practice as both a researcher and facilitator in the virtual classroom (c.f. Kemmis and McTaggart, 1992) I came up with the schema in fig. 5-21 which describes the features of the virtual classroom which might support effective teaching. I have taken five features of experiential learning, which I believe underlie effective learning in the context of continuing professional development. Against these I have tabled both the role of processes (specific educational activities in the learning environment) and content (specific areas of knowledge) in constructing the learning environment.

Key features of Reflective/Experiential Learning	The role of process	The role of content
Learner Centred Self directed learning, identifying own knowledge, managing own learning	Development of learning objectives and learning plan	Teaching material that supports "learning to learn" eg 'How to do portfolio-based learning.'
Collaboration Inter-professional and multi-professional working. Setting group aims and objectives for learning	The role of the facilitators and on-line information officers to promote a collaborative, team-based or group problem solving. The learning environment supports communication	Resources which direct learners to work collaboratively. The learning environment supports group access to shared learning materials eg 'how to use e-mail '
Work based problem solving Using real events from the workplace as the basis for further individual and group learning	Tailoring the learning programme to match the individual learner's interests. Promotion of inter-activity to support learning.	Resources which provide a number of simulated opportunities to problem solve eg planned clinical /managerial scenarios drawn from areas of mutual interest.
Critical thinking The learners are adult learners; they have a range of depth of experience prior to any new learning. New knowledge is integrated and synthesised with what they already know.	Encouraging the exploration of the relationship between the theory and practice of being a health professional	Access to resources which catalogue or index knowledge, eg a virtual library, MEDLINE database, guidelines and protocols for clinical management.
Reflection The learner needs to reflect on concrete experiences from differing perspectives. She will have the ability to create concepts that integrate the reflection and the experience, and to use these developed theories in decision making and problem solving. The evaluation of this cycle will inform the next phase of learning.	The role of the facilitators and mentors in coaching reflective practice. Encouraging of self-direction in the reflective process, eg using "critical incidents". Encouragement is needed to use the process of reflection as the basis of a personal learning plan/portfolio	An important aim in the construction of learning materials is to promote reflection. Resources which encourage reflective learning, eg "How to use a critical incident from practice".

Figure 5 21 Conceptual Framework of teaching and learning components within a virtual classroom.

(After Banks, 1998)

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I touched earlier on the issue of which pedagogical approach would be best for the teaching of scientifically based subjects such as evidence-based practice and health informatics. As part of the process of reflecting on my own networked learning teaching practice, I was struck by the similarity of the evidence-based cycle, the reflective cycle, and the principles of evidence-based learning. The similarities are displayed in Fig. 5.22. Kolb (1984:33) describes the similarities between models of the scientific enquiry process, problem-solving process, decision making process and even the creative process, endorses this view and calls these conceptions of basic adaptive processes of experiential learning theory.

Portfolio-based learning	Reflective learning	Evidence-based learning
Identify a learning need (a problem or a gap in knowledge or skill)	A concrete experience from the work place	A practice problem generating a question to explore further
Turn this need into a learning objective	Reflecting in action .	Turning the clinical problem into a searchable question
Gather and document evidence of learning	Reflect on experience from differing perspectives	Searching sources of information relevant to the problem
Assess/review portfolio	Generating an abstract theory	Evaluating the value of the information found
Undertake relevant learning	Applying the new theory in decision making and problem solving	Implementing the useful findings into practice
Evaluate learning outcomes in terms of change in practice	Evaluation of the learning cycle informs next phase of learning	Evaluating the change in practice

Figure 5 22 Models of portfolio, reflective and 'evidence-based' learning

Further pedagogical research is required to tease out the relationship between evidence-based practice and reflective practice in the context of primary care. Thus, how could the reflective practitioner use the evidence base? How should the reflective practitioner approach learning which involves mathematical or scientific concepts? In practice, it would seem many practitioners are happy to think that they do not need scientific or

mathematical concepts in primary care and therefore do not need to learn about them. An alternative view is that they do not really know what they don't know, which suggests more needs to be understood about the process of facilitating the turning of evidence into practice. There is a gap between the theory of the teaching of evidence base practice (Sackett et al, 1997) and its application to practice (Greenhalgh and Douglas, 1999). Within this research, the evidence seems to support the notion of teaching "the reflective practitioner to use the evidence base" and teaching "the evidence-based practitioner to be more reflective".

3.2.2. Supporting learners

This action research confirms that learners need substantial support to identify and then meet their own learning needs. Whilst it demonstrates that it is possible to provide learner support on-line, more work is required to understand and provide the kind of resources to help learners who prefer this kind of learning but are not making the expected progress. Some learners are happy to support other members of the learning environment, particularly in providing Internet addresses of information sources (URLs) and in giving advice on using the computer.

Registering learners for a course in effect sets up a contract of learning where learners will have clear expectations from the course outline. Learners will vary considerably in the degree of support they need, but this study suggests that learners in a networked learning environment have added needs for support over and above those required for face-face-learning. Overall, the level of support needed will depend on the purpose of the networked learning. There are some generic support needs, for example, extra technical support can be provided by the telephone. The group itself can be self-supportive with help on basic information seeking and common software problems. The successful functioning of the group can be facilitated by the course facilitator. Clear mechanisms need to be in place to provide additional support to those in danger of dropping out. One way of doing this may be to set participation levels, which if learners drop below triggers a contact from the facilitator.

Addressing the cost issue of accessing computer communication technologies and promoting equity of access is another way of supporting learners.

3.2.3. The 'information officer' role

Librarian services, represented by an Information Officer, were useful to enhance the virtual classroom learning activities and a model for how librarians may support an on-line learning environment is reported elsewhere (O'Rourke et al, 1999).

The information officer role was one of encouraging a learning culture of "I don't know but I'll found it out for us" in the virtual classroom.

3.2.3.The facilitator role

In a large group of learners, the role of the tutor/facilitator in an on-line discussion group is one of a stimulator or animator of discussion. Only minimal one-to-one support is possible. As a facilitator I needed to develop my own on-line teaching skills in an experiential manner, in effect researching my own practice (c.f. Laurillard, 1993). Having access to technical support (c.f. Fowell and Levy, 1995) restricted my role to educational matters and was helpful. I could see that many of the features of adult small group teaching (c.f. Jarvis, 1995:114) could be transferred to an on-line environment, albeit with the restrictions of lack of face-to-face contact. However, what became difficult was the level of support that individuals needed. It quickly became apparent, that if professionals were to engage in genuine CPD as opposed to undertaking a course which would contribute to their CPD, much higher levels of support was needed. That is the learners seemed to want mentors (c.f. Daloz, 1986 in Chap 1.2.6.) rather than facilitators. Trying to encourage a 'buddy system' between group members did not work, but according to Murray and Owen (1991), this should not have been surprising, as the mentoring was not structured and training was not given. It is this particular aspect of networked learning, the facilitator's role that I explore more fully in action research cycle two (chapter six).

3.2.4. Small group teaching

This research adds to the belief that small group teaching skills based on adult and experiential learning can be readily transferred to a networked learning environment (Fowell and Levy, 1995). However, it is not necessarily an easy option. The problems of lack of visual clues and face-to-face contact giving a sense of lack of support have been widely reported (Mason and Bacsich, 1998). The expectations of the learners need to be explicit from the start and learners with common learning needs grouped together

There need to be sufficient learners to create sufficient relevant material for learning to occur. It is apparent that networked learning is no different to any other educational process when it comes to size of group. Educational purposes rather than the technologies dictate the size of the group. Didactic teaching allows much higher learner/teacher rations. In this first cycle about 30 learners per 2 sessions of facilitator time seemed appropriate for the evidence-based practice but insufficient to provide intensive support to those wishing to do electronic portfolios.

3.2.5. Teaching and learning with the virtual classroom software

It was clear that the virtual classroom software behind WISDOM would need to be extensively developed if it were to become a virtual learning environment (Britain and Liber, 1999). However, much experience was gained in this cycle to indicate which features of a virtual learning environment would be most useful. I will give one example; The outcomes of the learners' activities, for example useful journal articles or critical appraisals of journals, would be fed back to other participants. This was done by e-mail. However, such information is not easily retrieved when the learner needs it, for example, answering questions around a new patient problem. In a simple virtual classroom where the web pages are based on HTML, any additions to the environment have to go through the webmaster and management of the website becomes an issue. The webmaster becomes a 'pinch point' and develops a backlog of material to be put up on the website develops. A learner 'upload facility' would be needed to allow learners to put material on

the website without recourse to any programming skills. The learner uploads useful information to an on-line database. It is fully searchable and therefore the information is fully retrievable. Collaboratively the uploads of many learners will produce a large database of appraised information.

Learners engage with learning materials in a number of ways. This research confirms that it is important to have a number of activities embedded in the learning environment that cater for differing learning styles and preferences for formats. It may well be that there also needs to be formalised self-assessments built in which are appropriate to the type of learning taking place. Learners had clear problems with the technology and conceptualising a networked learning environment from simple web pages and e-mail discussion. This suggests the development of more sophisticated networked learning environment that gives a greater sense to the learner of being within an educational activity.

3.2.6. Assessment

The degree of learner control over there own learning is an issue. In this project, learners were given a lot of control and could decide they didn't want to do a formal self directed course but could still gain much from being involved in a 'learning conversation' (c.f. Laurillard, 1993) which existed in the e-mail discussion group. The degree of learner control is set by the assessment procedure. If a course has clear behavioural objectives (c.f. Reilly, 1975) or performance objectives (c.f. Davies, 1976) then any assessment must be designed to measure these and learner flexibility is reduced if a satisfactory assessment is to be achieved. Where objectives are more expressive (c.f. Eisner in Popham et al, 1969:16) the learner and teacher can explore objectives in terms of mutual agreement. They become a basis on which teaching may be planned. The most appropriate assessment in this context is self-assessment (c.f. Boud, 1996). The virtual classroom needs to be able to structurally link individual learners to their learning

assessments. One way to do this is to have individual set learning objectives as part of an electronic portfolio-based assessment.

3.2.7. Quality Assurance issues

In any virtual classroom, whatever the course, the principals of educational management still apply. There needs to be on-line registration, on-line assessment and evaluation, teaching quality information. Good administration would be needed, ensuring learners register, and their progress monitored and their status known, for example whether they are proceeding or have dropped out.

Although the education was virtual, learners require good information about the course, they need to trust the educational institution providing the education, and they need to give informed consent if evaluation data goes beyond the immediate course.

3.2.8. Portfolio Learning

In terms of the collaborative action research agenda, the attempt to introduce the concept of portfolio learning within the virtual classroom was perhaps an action too far. However, from a practitioner viewpoint, it was a good learning experience. I was able to think very critically about how the learning for an electronic portfolio should be managed. It would have been better to have engaged with the community of CME tutors in Sheffield to collaborate on how the CME portfolio system could have been web-enabled rather than try to set up an institution to solely manage electronic portfolios.

For traditional face-to-face portfolios in Sheffield (Challis et al, 1997, Mathers et al, 1999), participants have three meetings with their mentors. This is partly to explain the process of producing a portfolio and partly to validate the portfolio for accreditation. In the WISDOM project learners felt unsure as to who was mentoring them and felt that the lack of structure was an obstacle to completion. The external evaluators (Pringle et al, 1998) also picked up this point. For future learners there were a number of lessons. Participants were unlikely to produce an extract of their portfolio for accreditation if there was no incentive. This included doctors who were non-principals or who already had

enough PGEA points, and managers who did not need any accreditation. However although they did not need to produce formal evidence in the shape of the portfolio, as their facilitator I felt they were using reflective adult based learning typical of portfolio learning. There appeared to be confusion between a portfolio, which would include all learning activities, and the claim for accreditation. Learners were shy of using material that was non-clinical and did not directly benefit patients in any portfolio. I suspected that participants had a lot of material which they had used for the project on their computer hard disks but had been unable to manage it or format it into a form they would be happy to have had scrutinised. One way forward might be to provide a software tool to manage the information generated from participants' learning activities. Such a tool would be provided by a web-based database. This would allow easy data entry at the time the learning activity was done, to produce a continuous learning record. However, the database would need to be sufficiently flexible to allow updating, in a way that suited the individual learner and is password protected for confidentiality and security. This concept of an ePortfolio, a personal database· that is embedded in a networked learning environment is taken up more discursively in chapter 7.3.1. It was also clear that learning to do a portfolio on-line was a job in itself and perhaps ought to be covered as a separate course.

The encouragement of learners to produce a portfolio for both self-assessment and accreditation is at the time of writing part of a vision for clinical governance. Educational providers need to gain the trust of learners, and to be both sensitive and responsive to their needs. As in other spheres quality standards need to be set as to the kind of support learners have the right to expect. There needs to be a demand from learners for networked learning before committing resources to development work.

3.2.9. Multiprofessional learning

Although it has been suggested that practice development plans are a way forward for general practice (Elwyn, 1998), there was little within this action research cycle to suggest that barriers to inter-disciplinary learning had broken down within the virtual classroom. Secondly that there was no

evidence to suggest that participants would find it easy to marry their individual learning plans to practice development plans. There was little evidence of collaborative working outside a health professional discipline. Perhaps for more advanced practitioners or those following higher education courses at Master's level, the similarity of process between nursing portfolios and medical portfolios would allow them usefully to work collaboratively (c.f Bolton, 2001).

I am of the opinion that inter-professional working works best around content or topic-based objectives rather than around process objectives. My initial impression was that evidence of shared learning around health informatic issues boded well for multi-disciplinary training and developing a curriculum (NHS, 1999d) which embraces health informatics rather than nursing or medical informatics. In terms of learning facilities i.e. hardware, software, staff trainers it makes no sense to have 'uni-professional' facilities to provide generic health informatic skills. However, this multi-professional learning seemed limited to health informatics and there was little evidence that it occurred in clinical situations experienced by the practitioners or within the learning group in the virtual classroom. I am not saying that networked learning cannot support multiprofessional learning. Rather that in this research cycle; multiprofessional learning did not appear spontaneously as an outcome. As for any educational purpose, multi-professional education needs to have clear aims and objectives to reach clear learning outcomes.

I feel that, tempting though information technology may appear as a driver for change on the multiprofessional agenda, the virtual classroom is not the right context in which to create change. The right way round is to change the teaching and learning strategy towards learning outcomes that embrace multiprofessional working and embedding the strategies into healthcare educational institutions, whether university or NHS. At that point, educational methods can be developed within a virtual classroom approach to support those intended learning outcomes.

3.3. Reflecting on the 'virtual classroom': supporting CPD

The virtual classroom approach (c.f. Hiltz, 1994) assumed that the virtual classroom was a viable alternative for delivering continuing professional development to a face-to-face environment. This action research demonstrates that whilst it is possible, a more satisfactory arrangement is to have the virtual classroom embedded within the institution processes and networks, rather than try and take a technology and fit the organisation around it.

The action research objectives were to come to a broad understanding of the processes that make up a future collaborative networked learning environment for primary care professionals. However as I write this up in 2001/2002, I am conscious of the somewhat dated understandings because of the rapid changes in the literature in this research area. Not all educators want or need to build a full-blown networked learning environment. Many will be content to support for example a local vocational training group, a portfolio group, a network of clinical supervisors, a practice managers' action learning set. These reflections on the lessons I have learnt by planning, implementing and observing an educational programme through a 'virtual classroom' may still have some value to educators in other professional development settings.

In planning a 'virtual classroom' approach educators need to:

- Work out a clear purpose for the virtual classroom, which must be to enhance some aspect of the teaching and learning strategy of the educational institution. It is not appropriate to try to change educational institutions towards any new pedagogical approach.

- Consider the economies of scale and efficiency which an integrated institutional policy on networked learning would bring. This is in contrast to individual educators trying to 'do their own thing.' The cost of computer communication technologies and promoting equity of access needs to be addressed. In particular the access requirements of professions allied to medicine needs to be addressed.

- Whilst listserver technology can provide a basic "virtual education centre" a number of problems could be eliminated if more sophisticated (and more

expensive) Networked Learning Environment technologies were used. Gaining access and maintaining access to networked learning is not straightforward even for experts. It is likely in the future that this will be provided either via the NHSnet or by the national academic network JANET.

- Develop short face-to-face 'learning to learn' sessions, where learners can be shown around the 'virtual classroom' and taught basic searching skills in preparation for on-line learning.

- Encourage the development of an action learning eCommunity, a collaborative community of people committed to learning together who can act as learning resource for those undertaking continuing professional development

- Ensure uniformity in the quality of distance educational provision and the quality of accreditation procedures on a regional or national basis. Action learning communities exist across traditional geographical boundaries.

- Be aware of the range of bespoke web-based educational packages but ensure the aims and objectives of these packages are commensurate with the anticipated educational needs of their potential learners.

- Market existing educational provision to allow learners to access the full range of continuing professional development activities available. One way to do this is to have a directory of CPD resources within a searchable web-based database.

- Make explicit the expectations on learners to complete an Internet based course from the start. High levels of support for beginners should be anticipated particularly when accessing from home where high levels of expertise in software configuration may be required but with low levels of support.

- Be aware of contemporary policy developments, for example multiprofessional teaching and learning, to identify innovative ways of delivering the appropriate CPD activities to support the policy.

- Acknowledge that learning environments are sensitive to the underlying pedagogical approach of the host educational institution. For example,

issues such as the degree of learner control over learning objectives need to be considered carefully during construction of the learning environment.

- Embed a range of learning activities into the learning environment to suit learning style preferences and broaden its appeal.

- Avoid the passive transmission of learning materials, as this is rarely effective. In particular lecture note style materials transfer poorly to the web and do not utilise the power of the medium

- Encourage a participatory learning culture of "I don't know but I'll found it out for us" in the virtual classroom. Only then can obstacles to learning collaboratively be overcome. In the absence of such a culture, there would be a need for directive facilitation.

- Group learners with common learning needs together in distinct learning groups with a clearly identified tutor/facilitator. The technology should be kept simple because many learners will be based at home with slow and potentially expensive Internet connections. This research suggests that the number of people that can be managed in an eLearning group depends on the educational purpose.

- Consider the staff development of tutors. Small group teaching skills are transferable to electronic discussion groups. The facilitator's role is to stimulate and encourage discussion, and engage with non- contributors. There need to be sufficient learners in a learning set to create sufficient relevant material for learning to occur.

- Think about the development of Library services. A new role of 'Information Officer' may have value particularly for new learners, where the process of learning to locate information on the Internet for themselves is a skill to be learnt.

- Be clear on assessment as it drives the learning, virtual classrooms are no different to face-face education.

- Reflect on the best way to encourage on-line portfolios. This may well need to be taught as a separate activity possibly as a face-to-face course or as a networked learning course. However it is anticipated as more people become competent at producing face-to-face portfolios, they may well be tempted to manage their portfolios on-line.

- Consider an action research approach to both evaluation and the development of the virtual classroom.

There are clearly no 'magic bullets' (Oxman, 1995) to be found in Internet-based technology for continuing professional development, however there is evidence of several promising educational strategies worthy of further exploration.

4. Conclusions

An action research methodology was used to develop, implement and evaluate a virtual classroom as a means of delivering continuing professional development. For a small number of people, it was possible to use the virtual classroom experience as an element of their portfolios. From the educators' viewpoint, lessons were learnt. Some of these were re-enforcement of basic educational management principles. From a teacher practitioner perspective experience was gained both by learners, some of who had teaching roles, and by project team members, especially myself, in the challenges and opportunities of teaching and learning on-line.

Finally, action research is about bringing change. Although it failed to be truly multiprofessional the postgraduate GP network of North Trent now had a facility, a virtual classroom, which they didn't have before, where they could engage in, collaborate with, experiment with, develop some more. As action researchers, the project team had an action research agenda for further change.

5. Reflections on methodology

5.1. Qualitative

Overall, I would use the action research approach again. It satisfying to solve real life problems, producing change through research, and adding to theory. In this case, creating a networked learning environment to support CPD in North Trent and making contributions to the wider evolving theory of how networked learning might support CPD for NHS primary care professionals. I gained much in the way of new understandings as both a practitioner, an educator, an action researcher, and as an investigator. In terms of the project team, there were also developments. Elaine Dolman developed a role of 'network liaison.' This new role entailed liasing with both practitioners and organisations to tell them of the potential of the virtual classroom approach. She was particularly concerned with new learners and the technologically shy. She developed and ran a face-to-face MEDLINE course for doctors and nurses. Alan O'Rourke role evolved into developing more on-line teaching material and as an on-line facilitator in his own right. Of the course learners, then certainly in their interviews and qualitative comments on their questionnaires I feel gained from the experience

However, my feeling is that the action research literature is at an early stage and much more experience with the method in a variety of medical education settings needs to be reported. Some of the literature eg Carr and Kemmis (1986) has a polemical ring to it which I feel would alienate many potential users of the method. In relation to data analysis, many practitioner researchers, in my experience, associate the constant comparative approach only with grounded theory. I would recommend its use for action researchers for small-scale projects. However action research can also handle large projects and here the constant comparative encourages to almost obsessive detail with the small, whereas action research is trying to promote change on a larger scale (Kemmis and McTaggart, 1992). Titchen, (1995) suggests that the validity of the process of planning, acting, observing and reflecting are

grounded in the collaborative nature of the research. All the collaborators should be involved in each step. I remain sceptical that such a level of democracy can be achieved. Waterman et al, (2001) suggest that the validity of action research lies in the standard criteria of the research method employed and this is the approach I have tried to take. Whether this has compromised true collaboration from the learners in this study is a matter of further reflection.

With the benefit of much reflection, I can see that it was the assessment part of the virtual classroom project that caused the most problems to the collaborative participants, including the external evaluators (Pringle et al, 1998). At the time some sixty GPs in the North Trent region, but largely Sheffield, were engaged in doing portfolios. I do not know whether portfolios in Sheffield were conceived of as an action research programme. The approach appeared similar to Snadden   et al's action research on GP registrar portfolios in Dundee (1996). However, there was evidence of a self-critical community amongst educationalists in North Trent developing an understanding of how portfolios work in practice through several iterations, developing course handbooks and promoting tutor training. It was important for me to explore how the virtual classroom could integrate with the CME portfolio project. I envisaged integration in the sense of expanding the community of action researchers engaged in developing the portfolio system and in the sense of developing a better experience of learning and teaching for both tutors and GPs. I did not reach this understanding in the first cycle but rather I present it in the third cycle (chapter seven).

I have taken care to avoid the paradigm wars which seem to beset the quality of qualitative research literature. I originally set out with the Naturalistic Inquiry principles of trustworthiness, which I had used in my Masters. However the principles are complex and as my understanding of quality issues increased I found myself more in empathy with the principles of validity and relevance drawn from ethnography (Hammersley, 1992) by Murphy et al, (1998).

It is in the area of data collection that I have probably most increased my knowledge base. The importance of timely data collection, correct labelling of

data, storage of data was a repetitive lesson following several mistakes. In retrospect this is particularly important in setting up the NUD*IST database. The addressing system I have used reflects an over complex way of storing the data. The NUD*IST allows such comprehensive and rapid searching of the stored data in a variety of ways that enhance the analysis. The process of data analysis would be very clear to anyone with access to the NUD*IST programme and data files. Awareness of this audit trail, I believe, encourages rigour in the research techniques. I can recommend the use of computer programmes in data analysis but it is vital to consider very carefully how they should be set up.

I had anticipated that the electronic text of e-mail messages would be very valuable data. This view changed and I concluded that too may interpretations were possible, which made it unreliable as a primary data source. I felt that interviews would become the better approach by far. However, the e-mail messages were useful for triangulation of data sources.

The spirit of action research is one of problem solving. Negative cases or outcomes are seen as problems, barriers to be overcome in the next cycle of research.

5.2. Quantitative

The data collected from the quantitative elements of the questionnaire are in the tradition of the pilot study. They are largely descriptive and in a sense add to the richness of understanding of qualitative data. Many of my researcher practitioner colleagues seem to feel one either uses qualitative method or quantitative methods. I am sure the right approach depends on the question you are trying to answer. In educational research, quantitative data on the number of learners starting the course, number of finishing the course, numbers of people dropping out and some kind assessment are essential for quality assurance both to inform the educational institution and to ensure value for money.

I share concerns that education is complex and attempts at 'experimentation' are often artificial. I believe that much of the data produced from natural experiments are valuable to reflect upon, particularly with a view to making

the experimental setting as near to real life as possible. Whichever approach is followed, the discipline of research encourages one to be more rigorous in designing an educational course and evaluating whether it has been successful.

Action research models allow an evaluation both at the level of the organisation, asking questions such as: "Does this approach work? Should we invest money in this approach?" Also asking questions at the level of practitioner research: "How can I improve my own teaching and learning?" Broadly, quantitative data tends to support the organisational evaluation and qualitative the practitioner research.

This study demonstrated some of the strength and weakness of the action research methodology. In being collaborative, a larger study was done than would have been possible in the time scale with a lone researcher. In particular the constant self reflection amongst a community of people learning together allowed understandings to emerge that would not have existed in the raw scores of performance

The weaknesses were around the quality of research issues. Researchers collaborating on designing research questions and devising the appropriate methodology are more prone to inconsistencies in the research process which are highlighted in the writing up stage. Ultimately this research was driven by my PhD and the responsibility for the inconsistencies are my own.

Chapter 6 - The second action research cycle

1. Action research framework

1.1. Personal action research agenda

For the second action research cycle, I wanted to understand more about two particular themes that had arisen from the first cycle. These were firstly my own teaching and learning practice in a virtual classroom. Secondly, I was particularly interested in exploring some of the underlying assumptions about reflective practice for general practitioners that were in the literature (c.f. Al-Sheri, 1995). This action research cycle, occurred within a framework of collaboration and commitment to shared values.

The aims of this the second cycle in the thesis was firstly to understand the issues in becoming a 'reflective practitioner' from a pedagogical perspective by reflecting on the value of a course in reflective writing. The second aim was to reflect on any added value for individual doctors in pursuing their continuing professional development via the Internet compared with their previous experiences.

The first case study had demonstrated that the barriers: both from a learner perspective; an educator's perspective; and the technology to access WISDOM were complex. In addition there were issues around establishing an appropriate underlying learning theory, from which would flow a coherent account of appropriate curriculum design, learning objectives and appropriate assessments, and the establishment of a set of criteria by which to judge the success of the virtual classroom in achieving course objectives the next time around. The action research agenda of the first cycle had produced a change in providing an innovation that was not there before and an understanding both of its strengths and weakness and its affordances (c.f. Laurillard, 1993) for continuing professional development in primary healthcare settings. It had also produced change amongst the collaboration of researchers and learners. As a practitioner I had a greater sense of the impact of reflective practice not

only as a pedagogical foundation for constructing a learning environment but also as a means of learning, which I recorded in my portfolio. As an action researcher, I was still strongly motivated to investigate my own teaching practice in an on-line environment. I was also interested in other approaches to the portfolio than the one used by the Sheffield CME office. I therefore needed to plan a further action, then observe and reflect upon it to gain these new understandings (Kemmis and McTaggart, 1992). Once again I was acting before I was exactly certain of what I should do, but I was convinced that by collaborating with both the research team and the learners, there would be a more extensive critical reflection to inform the implementation of any emerging model for future learners (c.f. Snadden et al, 1996). As in the first cycle I intended to:

- set up a course (planning),
- run the course (acting),
- see what happened (observing), and
- collaboratively with researchers and researched, work out how we could do it much better next time (reflecting).

1.2. Project action research framework

The collaborative nature of the WISDOM project had now changed. The WISDOM project was able to secure further funding, facilitated by Dr Lane, from monies ear marked for continuing professional development by the Trent region postgraduate deans. The task undertaken by the WISDOM project for 98/99 was to encourage the expansion of the WISDOM model piloted in North Trent to the whole of Trent. I continued to work on the project for three sessions per week, from February 1998 to 31 January 1999. From 1 February 1999 to 31 January 2000, I was fortunate to be in receipt of a Trent Health Services one-year grant to undertake the second action research cycle and to complete writing up of this doctoral thesis. Overall project management remained under the guidance of Dr Fox.

Looking again at Hart & Bond's (1995: 40) typology of action research some understanding of how the negotiation between WISDOM's stakeholders and the chosen research processes could be seen. The sponsor of the research,

and in effect the client, was the Postgraduate Deans' committee, who were looking for *organisational* change, where continuing professional development (integrating on-line activity with Trent-wide educational networks) would become a key driver in clinical effectiveness. Dr Fox had developed an action research agenda with the emphasis on working with health care organisations to promote change towards clinical governance. Elaine Dolman, the research officer had developed the role of networked support officer Trent-wide with a particular interest in developing a web based database to support continuing professional development; 'Trent-net' (www.trent-net.org.uk). Alan O'Rourke was able to come to the project full-time following the awarding of funding to pursue a pre-test post test with control group design using a management of change module as the educational intervention. Dr Fox was the principal researcher (Fox et al, 2001), and participants were recruited from all health care professionals across the UK.

The WISDOM project was able to recruit healthcare practitioners on a casual payment basis to facilitate WISDOM discussion groups. These people were interested in *professionalizing* their own healthcare groups, be it doctors (Trefor Roscoe) managers (Ian Carey) or nurses (Joan Booth), by promoting their access to mentorship, critical appraisal skills and reflective practice. My own research agenda had moved to *empowering* my fellow healthcare professionals to become 'reflective practitioners'.

The collaborative research team had been enhanced by these additions and their differing perspectives added to the collaborative cycle of planning, acting, observing and reflecting. The impetus at the end of the first cycle of research was to expand the WISDOM project. A true virtual learning environment capable of delivering postgraduate education at a regional level would involve being in partnership with a large organisation, for example the University of Sheffield or the NHS. I had by this time explored collaborative possibilities within the university, but substantial investment in distance learning had yet to be decided upon. It was not until February 1999 that the NHS called for more work on the Virtual Classroom approach. As a research

group, we long debated what our collaborative research objectives should be. These were:

1. Continuing the process of developing the virtual classroom by engaging with a variety of users and contexts including researchers who were beginning to explore the use of the Internet for patients.

2. Exploring longer term funding possibilities to finance the development of a networked learning environment.

3. Maintaining a research output by evaluating courses run through the virtual classroom.

1.3. Planning a virtual course on reflective writing

My starting point was my own reflection on how I had become a 'reflective practitioner' as described by Schon (1983, 1987). The greatest impact on me had been the educational module of the M.Med.Sci in Primary and Community Care, which I completed, in late 1995. Up to that point I had been involved in postgraduate education for GPs as a trainer, vocational training course organiser and continuing medical education tutor. I had been a traditionalist. I was desperate for education to be in pre-digested condensed packets of new knowledge transmitted directly into my memory by expert teachers. I was also demoralised in full-time clinical practice and ready for change. In the first week of the Masters education module the tutor commented:

> Once you get into this way of thinking, you will wonder how you ever thought any differently. It will just become a way of life (CR reflective diary 1995).

And in week three:

> In years to come you won't remember a thing about what we talked about on this course, you'll just remember the process (*ibid*).

Looking back, I would agree that both statements were true and I was left with a trust and faith in the ideas of Kolb (1984) and Schon (1987). The aim of the M.Med.Sci educational module was to produce a portfolio of reflective writing.

At the time the 'process' of becoming a 'reflective practitioner' was difficult, the old ways of thinking had to be unlearned. Knowledge was not some absolute thing that experts possessed and to be striven for by managing impossible reading lists, but was something developed by oneself relative to one's own worldview and needs.

On the M.Med.Sci, it had been a truly multiprofessional learning environment. In theory I felt that there would be no reason why discussion in a virtual classroom could not be truly inter- disciplinary but in practice the barriers to multi-professional learning on-line seemed a major research question in itself. I had by now had the face-to-face experience of trying to facilitate multiprofessional learning with medical students (Roberts et al, 2000). It was not easy, either as a teacher with the students or as an educator, trying to mesh course aims and objectives into shared learning needs. I had sensed little evidence in the first cycle of action research that the on-line environment would break down these barriers. Although multiprofessional education remains a worthy subject for action research and one I would be happy to pursue it was not my current research question in the context of networked learning.

My action research plan was to transfer the process of the educational module of this M.Med.Sci into an e-mail discussion group embedded within the WISDOM virtual classroom. Paraphrasing Rogers (1969), who was really talking about reflection, I had faith in my own knowledge, skills, and experience, I trusted the process of being an action researcher. I believed I related to my learners, my research colleagues with respect and unconditional positive regard. I worked collaboratively with Gillie Bolton one of the tutors of the M.Med.Sci. educational module to produce some course aims and objectives, and teaching and learning method for a course entitled "Writing as a reflective practitioner."

As I write up in 2001, I have the additional opportunity to reflect on a much fuller treatment of Gillie Bolton's teaching philosophy through her book which:

demonstrates a creative and effective mode of reflective practice, using the illuminative force of explorative writing alongside the-in-depth educative facilitation of group work or mentoring; and appropriate focussed research. Together these three processes can enable the busy practitioner towards a deep, sensitive and critical examination of practice (Bolton, 2001).

This would appear to be a highly relevant context for action research for practitioners, educators and NHS stakeholders including patients.

2. Context to the action research cycle

General practice is a highly demanding job and general practitioners face many strains caused by constant time pressures, problems of practice administration, heavy workload, patients expectations, and conflict between the demands of home and work (Rout, 1996). However, there were moves, led by the Royal College of General Practitioners, to re-value the strengths and rewards of general practice. To this end, there have been a number of projects seeking to promote the turning of doctor's experiences from practice into learning. Such projects have 'reflective practice' as the cornerstone of furthering life long professional development and education (Freeman, 1997). This has not happened in isolation. The chief medical officer, in consultations with academic and NHS colleagues, identified the need for reflection on practice as central to the concept of "continuing professional development" as:

a process of lifelong learning for all individuals and teams which enables professionals to expand and fulfil their potential and which also meets the needs of patients and delivers the health and health care priorities of the NHS (DOH, 1998).

He made clear that reflection on practice should be part of planned learning to meet individual practitioner's needs.

Reflective practice (Bolton, 2001) can enable us as practitioners to:

- study our own decision-making processes;
- be constructively critical of our relationships with colleagues;
- analyse hesitation and skill and knowledge gaps;
- face problematic and painful episodes;
- identify learning needs.

To promote a culture where it is possible to say 'I don't know' practitioners need to be able to

- let go of certainty, in an environment where they feel safe enough;
- look for something when they don't know what it is;
- begin to act when they do not really know how they should act (*ibid*).

For the reflective practitioner, every thought and action needs to be subjected to both reflection-in-action and self-respect for reflection-on-action. Reflection-in-action is the hawk in your mind constantly circling over your head watching and advising on your actions -while you are practising. Reflection on action considers the events afterwards so that practice can be effectively enhanced Schon (1983).

Sometimes reflection involves both uncertainty as to what to do, also some difficult and painful issues, but one can be guided by three basic principles:

- *actions*: what you did;
- *ideas*: what you thought about;
- *feelings*: what all of it made you feel (Bolton, 2001:15).

Encouraging professionals to become reflective practitioners is also an appropriate context for action research.

> The practitioner writing about their work, sharing it with colleagues in order to offer insight, and relating this to a wider field professionally and politically are together engaged in an activity rather like [action research], in which the researcher and subject collaborate in all stages of research, including reflecting on the experience to make sense of it (Bolton, 2001:22).

According to Bolton (*ibid*), this reverses the polarity on establishing learning needs:

> Effective reflective practice can enable the practitioner to provide care or education which is not a working out of their own needs and wants but is alert and alive to the client's or student's needs and wants, whether professed or not. It can enable the practitioner to use this skill, knowledge and experience creatively and lovingly, and to look forwards with a greater confidence.

Imagine then a drained doctor at the end of a long week, she gets home and after tea late at night she switches on her computer and begins to write to a community of like-minded people....but first some more theory.

2.1. Writing as a reflective practitioner

There are a number of principles in running the face-to-face course which have been validated by action research over a number of years (Bolton, 2001) and it would be useful to set these out so as to be able to gauge the comments of the learners which have been chosen to illuminate my story of what happened.

2.1.1. Principles

Respect, shared responsibility, confidence and confidentiality are vital cornerstones. A group can be powerfully facilitative if it can create its own rules of behaviour and function as a safe place to learn. Group members, who may be from wide-ranging and different abilities, interests and confidences, should take each other as they experience them within the close social system of the group. Members should relate to and support each other through discussions of the writing without seeking to question the boundaries of that writing, and the group

2.1.2. Group processes and facilitation

A reflective practice group exists to support practitioners in their own professional and personal explorations and expressions to:

- understand more clearly the import and implications of experiences they choose to share;

- think of fresh reflecting writing avenues to try;

- enable them to discuss sensitive issues with involved and supportive others, who are on similar voyages themselves, yet are 'disinterested' (i.e. are not interested parties such as line managers).

The purpose of the group is for participants to decide before they start: more or less what they are there for, how they are going to do it, why, where and when. The group is likely to be organic: develop its own specific working aims, objectives, patterns and relationships overtime, but some agreements and start is useful. The facilitator takes on different roles at different times, as appropriate. Roles may include teacher, giving a keynote talk on an essential issue; a participant; chairman of the group; consultant where the group may need advice on where to go next; a manager ensuring the group meets, and have any necessary paperwork. There are a number of particular issues in group management such as having:

- encouraging communication (both verbal and non verbal);

- coping with problematic participants;

- listening to, commenting on and eliciting comments reflectively is usually a skill to be learned and practised tentatively;

- learning how to take the comments and discussions of others about one's own work needs practice; and

- variety of group size and organisation can provide opportunities for smaller group work or co-mentoring in pairs.

2.1.3. Assessment

One may subscribe to the view that assessment destroys 'raw reflection' and implies a formal learning context which imposes the kind of boundaries which reflection is meant to cross. Bolton's (2001:83) preferred method is to ask learners to "draw upon their reflective journals and stories for their portfolios, certainly not to hand in 'raw reflection'." In Sheffield, the preferred format of portfolios is that provided by Challis et al, (1997) and Mathers et al, (1999) which are sufficiently flexible to encompass reflective writing. Winter et al,

1999:108 suggest assessment criteria for a reflective writing course in an educational setting

- careful observation of events and situations;
- empathising with the standpoint of other people;
- noticing the various emotional dimensions of events and situations;
- addressing the complexities of issues, events and situations;
- making connections between different events and situations, and between specific details and general principles derived from a range of professional knowledge; and
- demonstrating learning, in response to both professional experience and the process of reflecting upon/writing about it.

2.1.4 Evaluation

According to Bolton, (2001:85) evaluation is feedback from participants on the experience of course-advantages in disadvantages-supporting facilitator in improving practice. Summative evaluations are at the end, summing up participants experience of the whole course There is always a formative evaluation at the end of each session to check if members are receiving what they want. One way of encouraging a summative evaluation is to get members to write a brief evaluative story at the end of the course.

2.2. Adapting the course for the virtual classroom

This was done collaboratively between myself and Gillie Bolton in a series of meetings face-to-face before and during the running of the course. We were not aware of the course having been done in this way anywhere. The approach we took was based on a number of assumptions:

- The course material in the form of a document setting out the course aims and objectives and suggested learning methods including 'how to do a learning journal' would be e-mailed to all those members of wisdom-reflect at the start of the course;

- Gillie Bolton and I would be co-facilitators of the learning group;
- The project management would be through Dr Nick Fox.

3. Research methods

Within the context of this thesis, I now present the refining and operationalisation of the research question, within the action research cycle.

3.1 The research question

3.1.1. Primary research question

What is the role of a facilitator in a networked learning course for general practitioners on 'writing as a reflective practitioner'?

3.1.2. Secondary research questions

1. What were the important lessons learnt in delivering a course promoting reflective practice via the Internet?
2. How can learning outcomes from CPD done via a virtual classroom be recorded in a personal learning plan or portfolio?
3. What are the barriers for general practitioners in becoming 'reflective practitioners' from a pedagogical perspective?
4. To what extent did the technology impact on the experience of course participants?

4. Operationalisation

For the purpose of this case study the table summarises the concepts and indicators used.

Concepts	Indicators
The role (of the facilitator)	The sum of the parts played by a person in an educational setting.
Facilitator	The responsibility of the facilitator is to facilitate: learners' independence in learning, what the contents is, learning how to learn and assessing whether they have learnt it.
Writing as a reflective practitioner	A programme designed around the principles of reflective practice (Bolton, 1999, 2001).
General Practitioners	Any doctor working more than three sessions per week in general practice as a principal or non-principal.
networked learning course	The virtual classroom approach outlined in the first action cycle.

Figure 6 1 Concepts and indicators for case study 2

5. Setting and recruitment

The learning group was recruited to an e-mail discussion list by sending a paper circular via the established postgraduate network in North Trent. An electronic version was circulated to the established medical discussion groups, wisdom@mailbase.ac.uk and gp-uk@mailbase.ac.uk. Primary healthcare practitioners were invited to take part in a course run by an experienced non-medical educationalist within a 'closed' (i.e. no access to outsiders) e-mail discussion group entitled "Writing as a reflective practitioner". The course had been run previously as a face-to-face group (Bolton, 1999). The flyer described that the aims of the group were to encourage professional development by writing as a reflective practitioner. Participants were invited to achieve these aims by writing and sharing on-line about experiences from practice that had had an impact on their practice. The role of the facilitator was stated as offering information about reflective and writing processes.

An e-mail discussion group wisdom-reflect@mailbase.ac.uk was set up. The group was closed, so that its archives were not available on the web. After checking with members that they were on the right course, the final learning group consisted of 23 people in all. The failure to recruit a multiprofessional group immediately changed the sense of the research questions to the uniprofessional learning of doctors

```
                    ┌─────────────────────────┐
                    │  Wisdom reflect discussion │
                    │      group n=23            │
                    └─────────────────────────┘
```

┌──────────────────────┐   ┌──────────────────┐   ┌────────────────────┐
│ 20 *GPs including CR* │   │ Facilitator (GB) │   │ 2 *non participant* │
│ *as participant*   │   │   │   │ *observers*   │
│ *observer*   │   └──────────────────┘   └────────────────────┘
└──────────────────────┘

┌─────────────┐   ┌──────────────┐   ┌──────────────┐
│ 2 non-   │   │ 5 'lurkers' │   │ 13 active   │
│ completers │   │   │   │ participants │
└─────────────┘   └──────────────┘   └──────────────┘

                    ┌──────────────────────────────┐
                    │ Completed wisdom-reflect (n=21) │
                    └──────────────────────────────┘
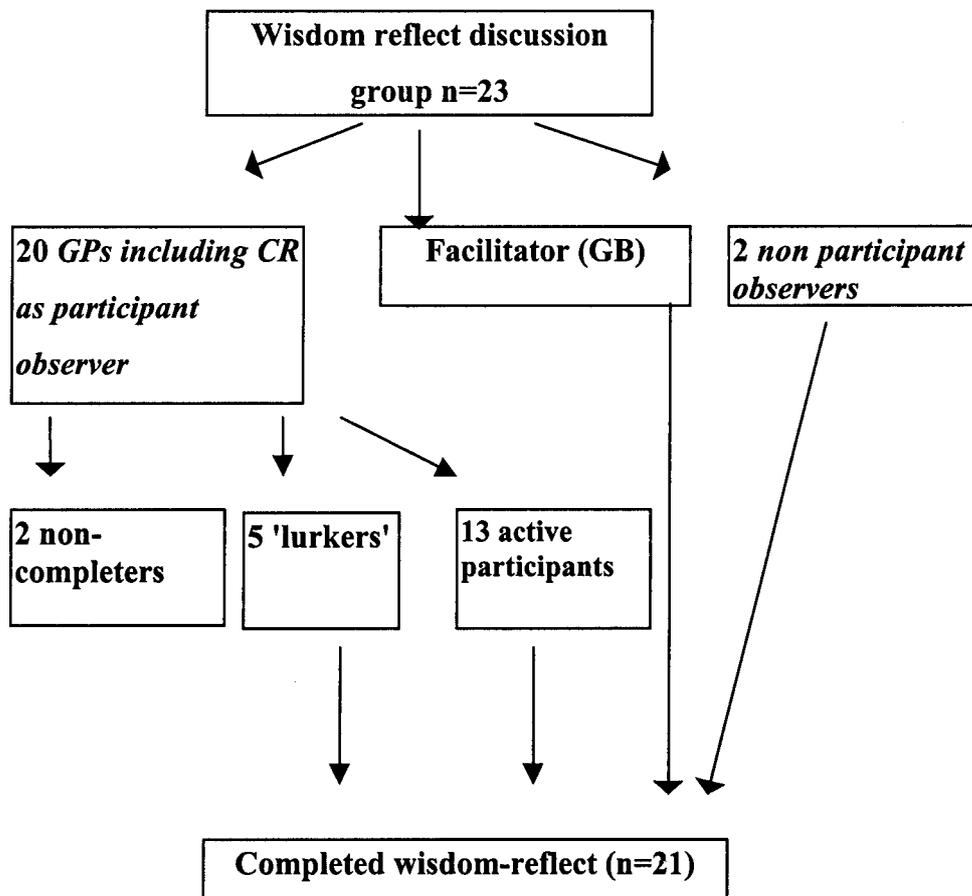
Figure 6 2 Flow chart of participation in wisdom-reflect

There were 20 general practitioners (including myself), the facilitator (Gillie Bolton), and two observers Robert Murray, a nursing lecturer with a particular interest in reflective practice and Elaine Dolman, the research officer on WISDOM. Six of the GPs were women, and fourteen men. Two of the GPs were non-principals; one was a GP in Australia, one in London, one in North Wales, the remaining 15 were in group practices in North Trent. The GPs ages ranged from 34 to 56 years. Of the 20 GPs, nine had taken part in the case study reported in the first action research cycle. The discussion group was active from May 1 1998 to 30 April 1999.

6. Study design

An action research approach was adopted because the purpose of this exploratory study was to understand how the participants themselves perceived and experienced the medium of an e-mail discussion group established for professional development.

In-depth semi-structured interviews were carried out by myself with 17 of the GPs either by face-to-face or telephone according to preference, and discussion was encouraged to gain further insight of the participants' perceptions. Two GPs, both Sheffield, were unavailable for interview for personal reasons. One had actively participated the other had dropped out early on. The interviews explored the initial motivations and expectations of a course in reflective writing; the strategies and tactics they used in discussions; how they used the material from the discussion group that they had written and read, how they perceived the facilitator; the perceptions of group interactions, personal and professional aspects of general practice; and the perceptions of what they had learnt from the project. In addition, both observers were interviewed. To capture the reflections of both myself and Gillie Bolton as co-facilitators, we taped a dialogue in which we reflected on a series of critical incidents that occurred during the project. Both observers were also interviewed.

The confidentiality and anonymity of data was assured. All interviews, (17 GPs, two observers and a dialogue of Gillie Bolton and me) were audio recorded in full (with the subjects' consent), and transcribed. Thematic analysis of the transcribed tapes and the text of the electronic discussion was carried out with the assistance of NUD*IST software (version 4, Qualitative Solutions and Research, Victoria, Melbourne). Readings were organised under thematic headings in a manner which did justice both to the research questions and the preoccupations of the subjects' (Strauss, 1987). Evidence of reflective learning outcomes was defined as those that demonstrating 'deep' learning: for example, where subjects used words such as 'evaluate' and 'prepare' (Mathers et al, 1999). Additionally evidence was looked for indicating a change in practice.

Interpretation of the analysis was done using the principles of naturalistic enquiry (Lincoln and Guba, 1985). The consistency (reliability) and confirmability (validity) of data analysis and interpretation was based on four techniques. Firstly, major themes from the data were identified and the analysis was agreed with two experienced qualitative researchers (Dr Nick Fox and Gillie Bolton). Secondly, the interpretation of the data was discussed with the respondents. Thirdly, the results were triangulated with different data sources within the study, including data from the first action research cycle, with the available literature, and with data collected incidentally outside the formal interviews. Fourthly, NUD*IST allowed a clear audit trail open to external inspection.

7. Ethical issues

The ethical position I took in this study was guided by a confluence of three strands of thinking:

- ethical issues in qualitative research on internet communities (Herring, 1996);

- ethical aspects of action research methods (Winter, 1996); and

- ethics of writing as reflective practitioner (Bolton, 2001).

7.1 Ethical issues in qualitative research on Internet communities

However at the time of writing there is a newer concern; that the ethics of medical educational research should be guided by the same principles as human subjects (Roberts et al, 2001).

In computer-mediated communication (CMC) research, the use of electronic messages as data should be governed by conventional academic and professional guidelines. Allen (1999) sums these up as to:

- Protect the subject from harm as a result of the research fieldwork and research practices;

- produce good social science research; and

- not unnecessarily perturb the phenomena studied.

Herring (1996) agrees that existing ethical guidelines within each subject area largely suffice to guide on-line research but has extended these provisions. She suggests the addition of a CMC- specific recommendation clarifying the rights and obligations of the researcher and researched in restricted access as compared with open access on-line groups. As Wisdom-Reflect was a restricted access group discussing "private material," I will further expand on the ethical issues of restricted access groups.

Herring (1996) compares two sets of proposals regarding ethical conduct in CMC research; one based on the notion that CMC is "published" material, and the other on the notion that CMC is "private" interaction. The first asserts that all messages posted via computing networks are published works and

hence protected by copyright law. Quoting a message or part of a message in another published work without giving full credit to the source (i.e. naming the message writer, the group it was posted to, the time and date, etc) is a violation of copyright and legally actionable.

The second proposal (*ibid*) suggests that all messages posted to computing discussion groups are potentially private in terms of how they are intended and perceived by participants within the groups. In order to protect the "perceived privacy" of participants in the electronic interactions, no potentially identifying characteristics of the data should be reproduced in scholarly work, including participants' names, the time or date from the message, or the real name of the group itself. According to this view, one should paraphrase rather than quote messages, or if messages are quoted; they should be carefully stripped of all group and author specific information.

Herring is critical of broad guidelines, which attempt to do justice to the many different situations within CMC research. However, she suggests that when private arrangements have been explicitly made in the setting up and management of private interaction, messages should not be repeated outside the group without explicit permission from the source. The public nature of open access groups suggests that this interaction may be repeatable for any reasonable and non-malicious use, with citations of the source where credit for ideas is due.

Eysenbach and Till, (2001) suggest that

> researchers and institutional review boards need to consider whether researchers are intrusive with potential for harm, whether the venues are perceived as private or public space, how confidentiality can be protected, and whether and how informed consent should be obtained.

7.2 Ethical aspects of action research methods

Winter (1996) suggests that the 'actions' of action research are deeply embedded in the existing social organisation, and warns that the failure to work within the general procedures of that organisation may not only jeopardise the process of improvement but also existing valuable work. He suggested a number of principles for any action research fieldwork

> The action research needs to follow a vigorous intellectual discipline, ensuring that the conclusions of the work are broadly based, balanced and comprehensively grounded in the perceptions of a variety of others. The outcomes of the work are therefore objective and truthful in the sense that the understanding of meaning is directed towards the attainment of possible consensus among actors (*ibid*: 17).

7.3 Ethics of writing as reflective practitioner

According to Bolton, (2001:100)

> Ethical dilemmas, a sense of professional and personal risk, and judgements about values are inevitable within reflection upon the caring and educational professions. More than inevitable, they are cornerstones, and as such need to be supported by effective evaluation, facilitation, supervision, or mentoring, as well as carefully and sensitively assessed if appropriate.

For this case study there was explicit permission from all those within the group to use the electronic data within the evaluation, based on an understanding gained from the course documentation. Their permission was reconfirmed at the time of interview. I have largely taken the view of King (cited in Herring, 1996) that 'because of the private nature of the discussions no identifying elements should be included'. I have for the sake of research audit used identifying numbers which signify the address of the data within NUD*IST. It was considered that the research was neither intrusive or had the

potential for harm. There was one occasion where a potential ethical dilemma arose following a disclosure in the writings of one of the participants of the learner group, and was resolved. As Bolton (2001: 91) says, " there can be no hard and fast rules made in the abstract about these issues: careful one-to-one discussion with the practitioner who disclosed the case would be the starting point."

8. Results

8.1 E-Mail traffic analysis

A total of 389 e-mails were sent in all (see figure 6-3). Of these, eight included a message each from the two non-participating observers. The other six were messages from doctors who did not register for the course and took no further part. Nearly a third (29.6%) of messages were sent by the facilitator (Gillie Bolton). Two thirds (61.9%) of messages were sent by participating GPs excluding me.

Message sender	Number of	(% Total) of sent messages
Facilitator (GB)	115	(29.6)
Co-facilitator/participant observer (CR)	25	(6.4)
North Trent GPs (excluding CR)	193	(49.6)
GPs outside North Trent	48 ·	(12.3)
Other messages from non participants	8	(2.1)
Total	389	(100)

Figure 6 3 Wisdom-Reflect e-mail traffic analysis

Around one third of the GPs were regular contributors (see figure 6-4), sending more than 10 e-mails. Around one third actively read the e-mail discussion but contributed from five to ten e-mails. Of the third that contributed less than five e-mails, two considered themselves to have left the course early on, the remaining five considering themselves as 'lurkers'

Number of sent messages (Coding Number of GP)	Number of GPs n=20
Greater than ten (03, 05, 06, 10, 14 16, 21)	7
From five to ten (04, 08, 11, 15, 19, 18)	6
Less than five (01, 02, 07, 12, 13, 17, 20)	7

Figure 6 4 Level of participation in Wisdom-Reflect

Three themes were identified from the data in relation to the primary and secondary research questions:

- The processes of the facilitation in an e-mail discussion group;

- The added value to GPs of participating in an on-line course (as opposed to face-to-face) and the obstacles; and   .

- The self-assessment of the impact of networked learning on changing practice.

8.2 Learning and the facilitator.

8.2.1 The facilitator's story

It is perhaps as well to begin with the story of what happened in the discussion group to allow you to make judgements on the processes of learning via an e-mail discussion group. This story is intended as an illustration to illuminate some of the processes within the group. I will give fictitious names to this particular section to give more of a sense of narrative, yet preserving confidentiality. After the round of introductions and Gillie Bolton introducing how she saw the group working, the discussion came around to 'challenging patients' in the GP surgery. Gillie Bolton suggested writing a story from the perspective of the patient to better understand the issues. Pete, one of the participants, wrote a story, from the perspective of a heroin user coming to seem him in his GP surgery. It started:

The waiting room's all right, not as bad as the DSS [Department of Social Security] but still boring. That receptionist thinks she's posh. That doctor's posh. He's a bit like a boff at school. He's friendly I suppose but still a bit stuck up. I do say good luck to people who are clever and have done all right for themselves though. I could have done better for myself, but I'm no boff. But all that doesn't matter. Only heroin matters…..

The story ended with a request:

I'd welcome some feedback on the above, to help with my learning. Could I develop this? Or ditch it and try something else? Is there any feedback on the style or content?

Feedback came within the next few days from Gavin

Hi I enjoyed reading your reflection, the style is quite modern. Did you overhear it or did you make it up? I wondered about this person's social class (is that politically correct?) Calling drs posh sounds lower class but then some of the phrasing sounded middle class so for me a bit of credibility was lost. You do seem to know a bit about the subject tho'

A discussion ensued as others revealed some of the depth of feeling concerning past experiences with drug misusers. Aiden said:

I found it a rather more benign version of the thoughts of a heroin addict than I have gained from my own contacts. I'm sure there are a range of attitudes like there are in any group perhaps I've just been unfortunate enough to see some of the more malign ones. I've had more encounters of the aggressive,

threatening type but perhaps this is also because I'm not involved in supplying substitution therapy.

Another asked, "What did Pete get out of this role reversal?" to which Pete replied

> The person is fictional - I drew on different experiences, so he's a sort of composite figure. I think I've been more interested in my communication with drug users since. It's clarified my views. The limitations of reversing roles (class, culture) are fascinating too.

Some claimed not to have engaged with Pete's story, including Sarah:

> I thought it was excellent reading. I didn't comment because the written account was powerful, relevant and was someone else's story - I hadn't engaged therapeutically and didn't feel I could reply to him via you.

The facilitator, Gillie, stepped in with more encouragement

> What an interesting reply, Sarah. Yes I agree with your comment on Pete's story. But I am interested in your idea it might be possible to reply to the addict rather than to Pete. I wonder if you or anyone else would like to have a go? Read the story again with pen and paper in front of you. Begin writing straight away as if...Very interesting.

Chas rather than Sarah was inspired to write another story on the same theme, as he was thinking about a learning plan around methadone use. He was unsure if he should prescribe for heroin users although he had inherited a couple of patients from a retiring partner. There had been a critical incident

at his practice with a "Mafioso looking chap" turning unexpectedly up looking for a prescription.

> However I think wholly inspired by Pete's "reflection on a heroin addict" and Gillie's exhortations I tackled some creative writing. I thought this was a really useful way of addressing some of the complexity of the subject.

His story began:

> It's a cold November rain, and its drumming on my skull. I'm looking for Ahmed, but in several wrong places. The rain seeps into my 'Ron Hill.' Should have got more for that leather jacket. This is going wrong; he should be hangin'. He's always hanging, waiting, expecting seeing what's up, what your needing. He's my doc... Doctor A. The wind turns enough to blow the stiffening chip papers across the park. I suck in on my last Superking. Anoraks let their dog crap one last time before they bolt behind front doors double locked for the night .....

There was further reaction from the group, this from Debbie.

> I was reflecting on your story and wondering why I turned it off half way through not wanting to read any more. I had written something myself about a night visit to a user so there seemed to be a bit of a theme developing, but your piece put me off and thinking it through (and re-reading it), I think it is because you caught some of the feelings that make me so uncomfortable that I think *this person's inner world is so horrible I must try and do something about it*. I suppose I have dealt with it tho'.

The facilitator, Gillie noticed this reflection and gently encouraged Debbie to carry on with her story

This is an amazing personal and philosophical response to your own reaction to Chas's writing. I also found it very troubling, and had to go and make another cup of tea between reading it and thinking of how on earth I could respond. I feel there is more you could say here about your reaction both to Chas's story and to your own addict patients. Whether you would feel you could share it with us is another matter... And your story? Still half written? It is so easy to think our own efforts are naff compared to another's. We see all the inadequacies of our own and only relate to the shiny finished surface of another's writing. I would be very pleased to read. Looking forward :)

It was clear some people did think their stories were 'naff' and didn't send them. Roy said afterwards at interview.

I suppose for me the fact that there was a discussion going about something about work which I do too, stuff around addicts and I actually wrote something which I didn't put on the list. So I suppose that's what made me think about, I thought, "Why haven't I put this?" I didn't completely finish it but I started writing something which was a doctor's response to Pete's patient's story of the HEROIN user going to see him from the patient's side of things and he sort of invited a response. I should have been able to do that because ... I don't know; I think I read it back and I thought, "I don't think this is very good .....

The facilitator summed up some of Chas's contribution to the thread as well as his story and offered an interpretation of how the writing had allowed reflection on a complex subject and led to improvements in practice to the benefit of patients. The potential ethical dilemma if Chas had disclosed a past drug problem was passed by.

> This really wowed me, Chas. You have really got into the mind
> of the addict. I am curious how you gained that kind of inside
> knowledge? Reading it I was almost ready to swear you'd had a
> go yourself and lurked on street corners to score too.
>
> Your whole account - the passage about the Mafioso looking
> guy which sent you off on your research - leading to you
> understanding not only him and other users better, but your own
> approach and [that of] your colleague. And then sharing it with
> your team... .
>
> It's clear your practice has benefited, as well as your
> relationship with your team and individual colleagues. Could
> you say a bit more about your relationship with the addicts and
> your understanding of them? Has the writing affected that?
> Like Pete. Looking forward to responses from more of you. [GB]

Some several weeks later Chas had some news about caring for drug misusers. "You remember I did that "Heroin addict story."

> So all I needed to complete the circle of learning was to try the
> system out on new patients. I am happy to say that I have two
> new patients underway.

Debbie did remember and her initial response to the story had been sombre.

> This cheered me up instantly - I will reflect internally on why!

Debbie's 'external' reflection didn't arrive for some weeks but was more to-do with the right approach for sharing professional issues in a "semi-public" place like wisdom-reflect or at a personal level in "private place" with family and close friends.

> If wisdom-reflect contributions are taken in this way I think it is
> possible to respond usefully with personal work experiences and
> support and challenge the views shared, without feeling

overwhelmed by more stories of personal angst that we have to respond to as we do to patients stories. Acknowledging publicly that an item or an experience has somehow unsettled you at a personal level does not mean that it needs exploring and resolving in public.

Other challenging areas the group discussed included bereavement, particularly the loss of one's own parents, sexual abuse, patient complaints, health service changes, dealing with authority and critical incidents from practice.

8.2.2 Supporting the learners

For the facilitator it was important to hold group members with "unconditional regard" and establish an environment of trust where

> .. people have to learn, group members have to learn, to be forthcoming verbally in offering support. I don't think this is easy and I attempted to facilitate them to do it. In a group of course you're supportive in all kinds of ways. There's little grunts and nods and smiles, encouraging smiles and sighs, even hand holding sometimes. But on-line it can only be done verbally. So people have to be alert to others needing support and I think it was my role to kind of nudge them towards doing that. But also some people were really good at picking it up, anyway at realising that they had to do it. [GB: 31-31]

Many of the participants readily identified the importance of a facilitator who was 'warm, positive and generally encouraging people to contribute:

> She was never critical; she was very constructive, very positive and she said, "Why don't you go back and instead of looking at what happened, write a story as what you would have liked to have happened." [05:55]

The line between holding everyone in 'positive' regard and appearing contrived was made harder without the visual contact:

> I sometimes thought the positivity was a little bit consistent maybe to the point of being artificial [08:87]

8.2.3 What sort of facilitation?

For the more experienced participants the facilitation was seen as a process rather than as the role of any one person:

> in quite a few examples someone would bring something up and one of the group, or a couple of the group, would sort of act as a facilitator for that next step and would say, "It was interesting you said that. I had such and such and such." And it's only when you realise you're sharing it with someone else you then start a dialogue on it. [16:50]

The less experienced members or those with a different worldview of education, did not recognise the format:

> I don't think there was any facilitation. It was just all of those messages [02:40]

They looked for traditional guidance and leadership from a teacher figure rather than the role of facilitator:

> I don't think there was every any negotiation of what the group was about. Perhaps if the first thing had been, 'Okay, here's a group. What's it about?' without having, as it were, material gathered before everybody else saw everybody else's material.[15:112]

8.2.4 Setting the boundaries

The facilitator was clear in her contributions that reflective writing involves exploring the 'boundaries between the personal and the professional." Some were happy with this:

[The facilitator] seemed to think that anything was OK, and a lot
of people were putting on quite personal stuff, so I though it was
okay. Obviously I set my own boundaries; there were some
things I wasn't prepared to put on there, but was comfortable
with it-with my own contribution to it [05:49]

Not every one was so sure:

I don't think personal soul bearing ... I don't think it's that helpful
for stuff that's highly personal and, although it might be pertinent
to doing a 'critical incident' -I just don't think this a good format
for this.[04:49]

In any case, participants had differing ways that they separated the personal
and the professional boundaries in their own life. For example one doctor, in
trying to keep work and home separate was ambivalent about where
education via e-mail fitted:

I know some people like to use e-mail at home. However, I am
strict with myself in deciding that I'd rather stay late at work and
finish than take work home. I don't mind doing specific stuff
about learning at home but not work. That might be something
to do with trying to keep separate work and family time. [02:53]

For others, there was a confidence that the discussion of personal issues
would be valuable but that the technology was a barrier to dealing with it
satisfactorily:

I felt that if it had been happening in a room I would definitely
have taken part but I was unsure of my own skills in contributing
to that effectively in a discussion group, in an e-mail list like that
[17:109]

8.2.5 Educational aims, objectives and assessment

A need to define the group's aims and objectives was central to subsequent learning. For most of the group, rather than a wishing to achieve something specific it was more a sense of having trust in the process of 'reflection' and where it might lead. This suggested that many participants were driven by acquiring "process" or "personal" knowledge rather than acquiring "propositional" knowledge (cf. Eraut 1992 for definitions of these terms):

> I understood it was just a way of exploring experience, kind of
> bring up sort of areas to explore. I thought it might be a
> clarifying experience.[21:13]

There was a trust that increasing self-awareness through reflection can lead to being a better doctor:

> Just because we are clinicians as such I don't think it was to do
> with improving your clinical skills. I thought the group was more
> for improving yourself, which then potentially improves clinical
> skills. [05:241]

There was general recognition by participants of the difficulty of setting specific learning needs around something they wanted to explore and be creative with. There was acknowledgement of the difficulty of negotiating on-line as to what the group as a whole should discuss but which would meet individuals' needs as well:

> There are some doctors who just want to talk about clinical
> medicine. That's fine; they should join a group and participate in
> activities where they just deal with clinical issues. And we need
> to have those - we still need to keep abreast of those.' [16:148]

There was also recognition of how difficult it was to set specific learning needs within the context of a personal learning plan and yet take part in group

learning. One doctor who was also a part time GP tutor reported a project in his area to try to link portfolios to evidence-based learning:

> We held a couple of meetings to present some of these ideas to people and to discuss it with them and talk about how to pursue a portfolio and also how to use some of the evidence based techniques to pursue some of the things they might identify as learning needs...This basically fell pretty flat. [06:26]

Some saw it was the responsibility of the facilitator to assess the learning needs of the participants and then provide material that would meet the anticipated learning needs. However practice constantly provided unexpected new material on which to base learning needs. For example, one doctor reflected on the unexpected death of a patient for who she had been caring:

> I have already learned something about how patients grapple like us with the big issues in life. That honesty, openness and a readiness to apologise can allow people to cope without needing to punish doctors failures. What I want to learn is how to make it less likely that anything similar would ever happen again. [14:wr693]

Rather than seeing this as a clinical problem, other members of the group saw the value of reflective practice in helping doctors to cope.

About a third of the original group either left (two GPs) or did not actively contribute (five 'lurkers'). It was not easy to know until afterwards at interview that they had dropped out as they were still receiving e-mails to the end of the course. Only one formally resigned and announced this to the group. This person and partner (social) had both been members and their reflections to each others messages had been so heated, the person resigned! Another 'lurker' claimed never to have really been in a learning group. Rather, as a member of several e-mail discussion lists, he tended to take them all at once in his e-mail inbox and reply to those he found relevant, regardless of the e-

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mail list. At least two felt unable or lacking in confidence to put forward their own view of what topics the group should be discussing. Typically, they commented ' I had hoped it would be more clinical' or 'about practical problems related to my job as a GP'.

There was however a tension within the group as to how the e-mail discussions and story writing should be accredited in a portfolio. What had seemed certain in the face-to-face course explaining how the course was accredited was not so clear on line

> And although I thought I'd said what I'd said very clearly, I
> realised - and I couldn't have known this before - that over the
> Net is actually different. Although I thought I'd said it very
> clearly, they hadn't really heard my request for something
> slightly more formal than the dialogue they were having. [GB:
> 130]

Some were finding the writing material very time consuming, for example on had spent five hours on a story which still needed refining. For some the clarification of
portfolio-based assessment, in terms of setting specific learning plan was unhelpful but for different reasons. For example one said

> I thought it [the reflective writing course] was designed to help
> me put together my portfolio. I just couldn't see how all this
> personal stuff could be helping at all.... I felt a bit like a 'traitor'
> watching all of these personal messages going by and not
> participating. [02:34]

The facilitator felt the emphasis on the portfolio approach had been a "party stopper" in the sense of stopping many "valuable contributions" in their tracks.

> Because [a non-completer] was absolutely smashing until them.
> I really missed [that participant] and one or two others. [GB:
> 145]

Clearly lessons were learnt that the next time around a clearer, simpler outline needed to be given in the e-mail discussion write at the beginning setting out the expected outcomes and methods of accreditation.

8.2.6 Group forming

The participants were encouraged to give a short introduction of themselves to act as an icebreaker. A contribution at this point was taken by the facilitator to mean a commitment to doing the course on "reflective writing." The facilitator used the metaphor of being in a room:

> Come right into the room, say hello and tell us a bit about
> yourself [08:wr2325]

All twenty two participants (20 GPs, including myself and the two observers) and the facilitator (GB) provided a short personal introduction stating where they worked marital status, kids and interests and some gave an outline of professional interests and what they were hoping to get out of the group.

However as time progressed it was not always clear who was "in the room." In response to a "is there anybody listening " message one doctor wrote:

> yes I am still in the room but more or less out for the count
> because of Christmas and 'flu hence the response times are
> longer than usual [14:wr4468]

8.2.7 Mentoring

Developing a prolonged one-to-one relationship within a group was seen as difficult by participants. For some there were technical difficulties, which needed to be overcome to give a sense of a face-to-face conversation with a group in real time as opposed to messages exchanged over a period of weeks:

> The only way ... would be if you had one-to-one e-mail. Even
> then there would be a bit of a delay really. I've thought about
> doing it in a chat-room or one of these community areas, but I
> am not sure. It would be very private and they are not easy to

get at and I've not been very successful in talking in those places really. I find everyone is talking at the same time. [07:110]

Storing the messages in a meaningful way, which could give a sense of conversation, was another difficulty that made electronic mentoring compare poorly with face-to-face mentoring:

I can't keep track of bits of paper. I've got some way because there is a mentorship scheme in [respondent's area] and I've done the first discussion with Peter and we are supposed to be getting together after Christmas, well it is after Christmas' [15:67-67]

The sense of trust for a mentoring relationship was not easy to develop on-line:

The situations in which I get that from other people that I know quite fairly to very well, and have a known level of trust and understanding about what their parameters are. [17:293]

However, the continuous feedback from some in the group was valuable to some compared with how mentoring might work in the real world:

You don't have to wait until you see somebody. When you've got a need to know somebody's out there who will get back to you pretty quickly. And I thought the responses were appropriate and timely and quite quick. [21:165]

Some saw the researcher's participation in the group as co-mentoring:

It's interesting that you're (CR) the sort of co-mentor of the group but also I felt quite a lot of collective co-mentoring from the group as a whole, which was interesting too. [21:171]

> You actually in some ways ... in the background you're acting as
> a medical facilitator as well. I don't know if you're doing that
> intentionally or not, ... [10:101]

8.2.8 Involving the silent observers

There was much speculation as to why people should be on the e-mail list
and receiving messages but not contributing:

> Whether they are just people at that time kind of hovering
> around the edges waiting to come in or whether they were
> having some kind of difficulty. It's hard to tell isn't it? [21: 129]

Others saw these silent observers or 'lurkers' as part of a wider community of
colleagues:

> I think it is probably good to have lots of lurkers who don't have
> a lot of time but whose rare pearls are very helpful just to
> broaden what is happening. [04:73-73]

Yet the 'lurkers' themselves were confident it was a legitimate thing to do
rather than a 'voyeuristic tendency':

> You learn from what other people are doing and you can reflect
> on what they're doing and you can say "Yes" but you may not
> necessarily want to chip in with "me too" answers. You might
> say, "Yes, I've come across that but you wouldn't necessarily
> want to contribute that to the whole group. You don't think it is
> significant enough.' [07:44]

8.3 Advantages and disadvantages of e-mail discussions

At the start of the discussion group, some GPs looked forward to making
contact with colleagues of a like mind, who they perhaps would otherwise not
meet, suggesting a professional isolation in their own practices. As the group
progressed, the e-mail messages provided an intimacy that was familiar and
reassuring despite the lack of physical contact:

It was of great interest to read that other GPs go through the same emotions that you yourself may go through and many of the same thought processes, many of the same fears, concerns and joys as well. [10:25]

The opportunity to be in a facilitated e-mail group was a new educational challenge particularly for those who had 'already just begun to experiment with e-mail'. Some found the discussion group offering a refreshing change of perspective than was possible with 'your partners, or competitors, or colleagues.' [15:05] in more traditional face-to-face settings. This access to additional support was seen as important, and for one an 'enormous stress relieving thing'.

Many identified the e-mail discussion group as a 'unique form of communication' [21] giving many benefits that were not otherwise available for reasons such as time factors or opportunity. There was the probability of getting feedback on their own messages and to have a 'great source of reflection' [09:25] in the postings of others. The e-mail group was seen as a safe place to do this:

it was a supportive group I thought, but also a certain amount of challenge within the group of wanting to explore quite difficult and dangerous areas which was quite exciting and quite uncomfortable. There was a time when we all felt very uncomfortable. [21:111]

The facilitator was sure that for some e-mail discussion was an important form of communication for some.

But what I'm terribly impressed to have discovered is that there are people for whom it is the right way of doing it, and I can understand that because I know from my reading and I know from my colleagues that there are people who actually find it much easier to communicate via e-mail and these virtual worlds. And I do know that there are people who find interface

relationships difficult, frightening, troubling, just not right for
them. [GB: 85-85]

Over a period, many doctors were willing to share their uncomfortable and
challenging experiences from practice around issues such as bereavement,
child abuse, and drug misuse. They valued being able to offer their reflections
on these experiences offered to their colleagues for on-line support and
comment and in return received their colleague's offerings. Sharing difficult
patients with the discussion group offered GPs more than just mutual support
from a group. In the facilitated discussion there was the opportunity to explore
how their own attitudes, education, upbringing might affect consultations with
such challenging patients.

you can share these problems - not in a sense of your receiving
counselling; you can actually relate some of your own behaviour
to past experience and share that. [16:19]

Many observed that the e-mail discussion group offered an opportunity for
doctors to do something that was unlikely to happen otherwise, and met a
real need that they had for communicating about difficult aspects of practice:

To get 20 people together is very difficult. If you have an
evening meeting to see everyone face-to-face, I haven't got time
to do that necessarily, most people haven't. [05:211-211]

This ability to reflect about sensitive areas of general practice and
acknowledge 'mistakes and that things upset us and has an impact on how
we behave clinically' [16:19] may be expected in any small group that met
face-to-face with the same aims and objectives. 'There was the sense that the
prolonged e-mail discussion could achieve a depth of communication with
colleagues 'getting through the brick wall' normally only associated with
residential courses or dedicated 'doctors support groups':

And really people need two or three of those experiences to
realise there is a value to this. They don't need it all the time or
a lot necessarily but from time to time we need that sort of
experience - something where you actually feel something is
going on rather than just cerebrally contacting. [16:148]

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For others there were more immediate and practical concerns from general practice which participating in an e-mail discussion group offered benefits:

> I think it's very good for if a patient comes in with "x" and "has any body else got any ideas with dealing with this? [04:43]

For one doctor the e-mail discussions offered the advantage of a kind of anonymity:

> if there is something you've really got on your chest and you don't want this judgement coming back, you just put it out there. And what I did, I didn't care what any-one thought really. It was just the end of the process of writing. [05:127-128]

However, for others there were disadvantages to being on the list, as opposed to face-to-face. Replies were seen as quite finished pieces of writing [17:176] rather than things written 'very much on the hoof' [05:38]

> people who were just too high powered on it, and I think it might have intimidated and frightened a lot of people off, thinking, "Unless my contribution is brilliant and shows that I'm bang up to date, know exactly what I'm doing, I'm not going to put it on? [19:13-14]

The doctors identified a range of the problems associated with on-line compared with face-to-face groups, and many offered constructive comments as to how these barriers could be overcome. It was difficult for most to unpack which were problems related to the aims, objectives and course delivery of "writing as a reflective practitioner" and which were related to the medium of delivery i.e. the e-mail discussion group.

Issues that seemed to relate to the medium were the steepness of the learning curve to master the technology before becoming comfortable about contributing. For some, it was too much:

I never really got the hang of it? Then I guess I wasn't that
confident at using it then. [02:28]

Others could see the advantages of mastering the technology, which would
allow them to do networked learning within work time rather than accessing
from home:

> I want NHSnet on my desktop so that I can do more of this
> because it does intrude a bit into my family life .... [05:277]

There was the problem of who might be reading the messages other than the
intended recipients. Some where confident they just needed to alter names:

> Although I changed the names, if it got into the press, it wouldn't
> matter would it? That's the beauty of the Wisdom Reflect, it's
> completely confidential and no-one else can get on it. [05:139]

Others were not so sure:

> I think I would always have thought twice about what sort of
> content went out.   I was even slightly nervous about
> anonymised patient stuff in case anything ... you know, giving
> false ages and areas because everybody know where I practise,
> and it's just an issue for me about secure it is as a discussion
> place. [04:67}

Access to the discussion group and supporting material on the WISDOM
website clearly required a computer and the skills to use it.

One well-recognised disadvantage to the e-mail approach was the exclusion
of those who did not have a computer yet were perceived as educationally
needy:

> the ones that should be doing probably reflection and portfolios
> are probably the ones that don't have computers. A {networked
> learning } environment is probably not at this stage fully
> appropriate to them. [10:83]

Time pressures were universal:

> My contributions to the reflection thread I think were overall relatively minimal and part of that was simply a time issue for me. The thread was running over time that I'd ... because of my commitments as well as clinical commitments was extremely busy [10:25]

Many had problems following the discussion thread because of the e-mail technology:

> the problem with e-mail messages is that they come at all sorts of different times and at times you lose the thread and I'm sure you find this - you post a message or you don't read your e-mail for three or four days and then you're posting a reply to the message and when you go to it next everyone's gone past. [7:32]

In particular there was a recognition of a need for skills as participants in small group learning as well as possession of computer skills to read, store, and reply to messages. There was the notion of a preparatory course for new users:

> if you've got, say, fairly new doctors coming, or old doctors who've been fairly set in their ways of how they learn, then you are far better face-to-face with those, initially until you can see they've got an understanding of what it's all about, then just do it through the medium (of e-mail) itself. [16:172]

There were problems of interpretation of the messages because of the absence of the usual visual clues:

> what seemed (relatively) easy in a room with people I knew with a possibility to explain and receive immediate non-verbal as well as verbal feedback has felt much more difficult on-line. [17:109]

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There was a problem of getting to know the personality of people with whom no face-to-face contact had been made. Most people felt this important:

> I did feel a bit - at different times I felt I was beginning to get to know a persona; I was conscious of an e-mail persona which was very interesting. You know it's different from other personas ... with the individuals. [21:135]

There were a number of suggestions as to how this might be overcome. One doctor suggested he

> would have found it very useful to have had a photo because sometimes you picture people as being completely different ... to have had a photo and thumb nail sketch so you know a little bit about the person. [10:143]

There was much variation in IT skills of the doctors at the outset of the course and this had a large effect as to how they ultimately experienced the learning materials. Consequently, there was much variation in how they handled their mail, deciding what to reply to, what to read more carefully and what to discard:

> To start with I saved them all and this is a very bad idea. And then I started just saving the ones I thought were interesting. And in the end most of the ones I saved were ones that had resource things on them. [17:37]

Some doctors saved messages to think about them later, others printed them off preferring to read them on paper. Some preferred to hand write them and then type out an e-mail. In sending messages some prepared messages with a word processor before e-mailing it as an attachment. Others replied directly to a message as they read it on screen. Some wrote messages that they never sent. Most felt these skills in handling the messages improved over the duration of the course. In those who were competent at IT at the outset, or whose skills improved as they participated the decisions on what they read

and replied to were governed by the perceived educational value of the material. In particular there was perceived value in being able to consider messages of interest over a period of time and to contribute at a time when they thought they had something to say. There was the:

> opportunity to actually sit down at a time in the day, download
> stuff and read, and reflect and then feed back when I think I've
> got something to contribute. I like the contributions from the
> other group members and find them interesting and stimulating.
> [04:07]

8.4 Impact of learning on practice

The assessment of the reflective writing course was perceived as looking for learning outcomes where there had been a change in practice. For those who reported positive outcomes from the project there were benefits both personally and for their patients. Participants found it difficult to be sure which features of the course had the biggest impact on changing aspects of their practice, and to what extent their practice had changed. Consequently, the data reported relates rather to processes of patient care rather than outcomes of care. Much of the reported change was thought to be the result of doing a course on reflective practice. For example, one doctor reported that his experience of writing creatively as if he were himself a drug user had been very helpful:

> I think it's led to a sort of richer communication with them really,
> a greater awareness that they're coming from somewhere,
> something I was aware of before but now I feel definitely much
> more deeply aware of their coming from a different culture, what
> their experiences are. [21:33-33]

Such reflective discussions provided material for those in the electronic group who would not meet in face-to-face groups through choice or lack of opportunity. This change in perspective was reported in differing ways, but was seen as positive and important:

it can be difficult to move past one's own emotions and think constructively about problems or experiences. If the group did not get me to write at least it got me to think-this is progress.[18:47]

Others found this change of perspective brought about by being more reflective surprising to themselves and allowed them to attend to their own feelings in an improved way:

> Yeah, that's a different way of looking at it. Perhaps I do feel like this not because I'm upset but because I'm angry. Why am I angry? Who am I angry with? [19:49]

For example, doctors reported using techniques of reflection with patients:

> Yes, it raises my 'index of suspicion' - to think about giving patients a bit of time and encourage them to look at what's going on from a different angle. [17:44]

Others felt that they had reached a greater understanding of themselves through writing as a reflective practitioner had. One doctor facing new responsibilities within a primary care group saw his 'diaries' as having been:

> of great benefit to my personal growth and improvement. I don't think I could have "survived" without my first diary. [05:1701]

For those who had more extensive contact with face-to-face learning and support networks there was little to be gained from e-mail discussion.

> If I'm going to spend some time with other GPs, wouldn't it be nicer to be in a room with them than stare at a screen?' You spend a lot of time on your own - you've got a patient there - but professionally you're on your own, aren't you? [19:334]

Others were able to use material from the discussion groups for their portfolios, which they were building with their local continuing medical education tutor for accreditation for postgraduate training allowance. Among participants who intended to submit portfolios, networked learning was seen as a useful tool to support the face-to-face portfolio (c.f. Challis, 1997, Mathers, 1999) for a variety of reasons. Keeping in contact with fellow learners by e-mail was better 'because people don't seem to want to go to meetings and they seem to get cancelled.' [ibid].

The learning material was thought stimulating in helping do a portfolio but this was generally seen as a separate activity to the course:

> Yes, I think so. I think you get a lot of ideas. You see what other people are doing. I saw the completed portfolio that you've got on the website and I thought that was very good but I never got the feeling that there were completed portfolios being presented on-line, via e-mail. [07:158]

What was also clear was that for many participants portfolio-style learning was a difficult concept to grasp, even for doctors who were also tutors:

> For everyone really because it's a learning process for the tutor or the mentor as well. When we first started portfolios I was very careful to point out that I was on as steep a learning curve as they were. [11:283]

For some, a benefit in taking part was the discussions around clinical issues and the motivation to look things up on MEDLINE as part of the discussions. This had improved their ability to search for information related to practice problems:

> I've used MEDLINE more and found it useful in particular situations and I feel I've got a more confident feeling of when it

will be useful and when it would be a waste of time using that method; it's better to try some other way so I don't bang away not getting anywhere as much as I used to. [21:51]

9. Discussion

I will now reflect on the issues that emerged from observing the course on reflective writing, delivered through a virtual classroom, bearing in mind the action research questions I set out on page on section 4.1.

9.1 The experience of promoting reflective practice through networked learning

The action research approach used in this analysis demonstrated variations between individual accounts of what it was like to be in an electronic discussion group. The particular educational strategy employed in this case was to use the model of 'writing as a reflective practitioner' to achieve the aim of furthering professional development for a group of doctors. Many of the GPs in this study showed themselves capable of adapting to the challenges of Internet-based learning but ultimately the decision to participate was because of their own learning styles, what they felt was relevant to learn, and their preferences for learning formats. This supports findings from studies examining GPs' experience of continuing medical education events in face-to-face settings (Campion-Smith et al, 1998).

The participants were well motivated and in the main had good skills and knowledge of e-mail. Many were also experienced at learning in face-to-face small groups, and readily able to compare the differences between face-to-face learning and networked learning, as they perceived them.

The GPs were proactive in their own learning and development, learnt in response to their own educational needs, and were facilitated by a tutor expert in educational techniques (Knowles, 1990) rather than in medical knowledge.

There were a number of additional benefits of networked learning compared with learners' previous experiences of face-to-face learning. Participants valued highly the ability to engage with this form of education at a time, place, and pace suitable to themselves, with supportive colleagues. Consequently many of the doctors within Wisdom-Reflect were able to have valued discussions both on challenging clinical topics as well as personal issues such as life events in a supportive and encouraging environment, over a

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sustained period of time. They felt such an experience unlikely if offered face-to-face. Some were able to include research evidence from MEDLINE searches to support and continue their discussions.

There were a number of learning outcomes for the Wisdom-Reflect course. Some GPs reported changes of attitude to practice in areas such as drug misuse and in bereavement. Some GPs were able to use the educational material towards a portfolio for accreditation for the postgraduate education allowance.

What was demonstrated in this case study was that a course adapted from a face-to-face delivery could work over an electronic network, and produce a similar experience and evaluation as might be expected from a face-to-face course in reflective writing (c.f. Bolton, 2001). This action research adds to the work by Fowell and Levy (1995) that an andragogic approach to teaching and learning for professionals can work within a virtual classroom. Such a learning network can provide a range of learning resources, and an educator can use the medium to engage learners in individual goal setting, problem posing and problem solving in a sustained way, to enhance the capabilities of the learner to move towards self-directed learning (cf. Mezirow, 1981).

This study adds weight to the view that e-mail discussions have significant strengths: learners can work in a social environment; they can receive and reflect on the views of others; they may become exposed to new information and the process of writing is a powerful "scaffold" to thought (McConnell, 1994).

However there are also significant constraints on learners access to technologies, pedagogy and course organisations, attitudes of learners, at times a reticence to participate, and the nature of the medium which gives flexibility but makes it easy to opt out (Mason and Bacsich, 1998). Some of the reservations expressed about wisdom-reflect concerned whether the particular model of reflective practice encapsulated in 'reflective writing' used was useful to them, or helped them learn from their own experience. Of those GPs who dropped out of the group, the reasons were personal, or related to a

lack of clinical focus, or a lack of educational focus related to how they saw the requirements of a portfolio.

Much of the learning demonstrated in wisdom-reflect embodied the principles of reflective practice (c.f. Bolton, 2001). The course evaluation data highlighted the difficulties in deciding what are appropriate learning outcomes of any course based on reflective practice which are satisfactory to learners, course organisers and all of the educational stakeholders within medical education.

Seven of the 17 GPs eligible for postgraduate education allowance were able to use the material in this case study as part of their existing portfolios. The data from those doing or considering portfolios suggest that there were concerns about the different assessment criteria. That is whether extracts from the "e-mail dialogue" and stories posted by e-mail would be accepted within a portfolio for PGEA purposes.

Networked learning has its own challenges for would be on-line educationalists. The study also demonstrates that many of the difficulties in networked learning works concern not only computer-related issues but also managing the learning process.

No particular examination of costs was made in this study. However, some general conclusions can be drawn to inform future examinations of the cost-effectiveness of this form of learning. The important factor seems to be the level of facilitation provided. One of the temptations for educational providers to go down the distance learning route was a higher learner to facilitator ratio. In this group, there were contradictory findings. For accredited learning, there is a need for greater facilitator support bordering on mentorship, and therefore numbers within a group might be no more than within a face-to-face group eg eight to ten. Others felt a larger group offered more interest and variation, and perhaps saw the job of the facilitator merely to provide regular stimulation of the list. For this type of course, approximate costs would appear similar to the first case study where around thirty learners could be accommodated per weekly session of facilitator time.

9.2. The role of facilitation in networked learning

This study suggests that for one particular set of learners there needed to be emphasis on:

- 'good' facilitation;
- learning support;
- the aims and objectives of the course;
- learners' learning needs;
- an assessment which is appropriate to the intended learning; and
- reasonable computing skills of all participants.

9.2.1. Good facilitation

This study suggests there are a number of processes that can ensure e-mail is an effective learning medium for GPs. In particular a facilitator who should:

- Be supportive and offer feedback on all substantive contributions;
- Be motivating but realistic about time pressures on busy professionals;
- Be able to coach learners in reflective practice;
- Help develop a sense of being in a group with real people;
- Encourage a sense of commitment to the group;
- Establish clear aims and objectives for the group balancing in the needs; of those who regularly contributed with those of 'silent observers;
- Have reasonable knowledge of the common technical difficulties with thecomputer software required for networked learning;
- Encourage the participation of silent observers or lurkers;
- Be respectful of the normal rules of behaviour GPs would conform to in a semi-public space;
- Support an appropriate and transparent assessment procedure; and
- Have a clear understanding of the mechanisms of accreditation for Postgraduate Education Allowance, including the necessary documentation

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Given the facilitator's and this researcher's clear commitment to the process of "reflective learning," all the participants' efforts can be interpreted in terms of Kolb's (1984) learning circle and his identification of the barriers of learning or Mezirow's (1981) definition of andragogy. Thus, those learners who said they wanted the facilitator to be more directive were yet to make the move to self-autonomy. Those that wanted material that was more clinical were not confident to negotiate with the rest of the group what the content of group learning should be. They failed to conceptualise that they needed to bring material for their own learning to the group and get comments back from the group.

However, one also needs to consider in what ways the course failed to get such participants to enhance their own capabilities. Within Wisdom-Reflect, the facilitator was perhaps constrained by an approach, in which "anything can be brought to the group" and "you know you won't feel bad about it afterwards." Thus, the facilitator dealt with all inquiries from participants within the public space of the discussion group rather than using private e-mail with the learners. Not all learners were happy to see all of their remarks forwarded to the rest of the group with comments added. However, if the bulk of messages were sent privately with the facilitator mentoring the learner, then there would be few messages to stimulate public discussion, and in effect no group discussion.

9.2.2. Facilitating course aims, objectives and assessments

There are lessons from this formative evaluation, which contribute to an understanding of how summative assessment would work. The aims, objectives, and assessment criteria of learning outcomes needs to be established with the accrediting body before the course is offered for continuing professional development. In the case of accreditation of on-line courses for professional development, there needs to be clearly understood quality criteria. Learners who embark on a course of reflective writing should be confident that if they complete what is realistically expected of them in the time they commit to the course, they would receive prompt accreditation and feedback from the institution where they took the course.

However as in face-to-face learning, learners still manage to lose documentation, or not to have read it or have time pressures. Learning via e-mail does not alter these observations, and whereas the vicarious learner perhaps arriving late or missing a session can catch up, in e-mail there is more of a difficulty in catching up, leading to a temptation to disengage.

Whether learners have questions to be answered or needs to be met depends on which epistemological position is adopted to view the problem. Clear aims and objectives of a course designed to help a learner move educationally from being needy to being satisfied is at one end of the spectrum of reflective practice. At the other end is the notion that a course should provide a supportive environment in which learners can put questions, the facilitator providing a breadth of learning experiences with which learners can interact in a rich learning environment.

If educators provide a breadth of learning experiences, learners will usually find something to engage with that is useful to them. For participants, learning needs are not fixed or changeable only by negotiation with the tutor. Rather they are questions or problems that need to be solved arising out of continued reflection on the material that is presented in the learning environment.

The facilitation in Wisdom-Reflect was of the latter type, encouraging reflection-in-action and on action rather than seeing aims and objectives. Learners were provided with learning resources, and were given specific writing tasks. They were offered reflective pieces by other learners to write and comment on. They were offered critical incidents, diaries, and some participants' reflections on their learning plans for portfolios. Learners experienced in small groupwork, based on adult learning principles, were able to assume what might be the likely learning outcomes of the course. Those unfamiliar with small group learning needed much more explanation, guidance and support for them to grasp the message of what reflective learning is.

9.2.3. Overcoming the barriers to learning

Nearly all of the support for the learners was gained from the facilitated group discussions. There was little in the way of private e-mails between group members. In general, this was a group of experienced learners familiar with the technology. The most common requests for support were problems with the software, such as sending documents as attachments, or accessing e-mail from both home and work. However, there were unmet support needs amongst those that either left or were less active in participation. In particular, they suffered from a lack of confidence, less so with the technology but rather with being able to be "open" with more experienced colleagues. They were uncertain about how the learning could be accredited. This was compounded where some learners were not able to access the website advice on completing a portfolio. They were anxious about the time commitment and uncertain how to manage their messages to give a sense of being in a group or classroom. Some felt the group moved on to quickly, and that there had become an 'inner circle' within the larger group that felt exclusive.

For this group of people there was a need for fairly intensive support to allow them to overcome the obstacles that were in their way. However, the group itself was unable to identify who were struggling or to offer any specific support. Without any visual clues there was a problem in differentiating between an interested reader saying little, and a learner who was struggling and saying little.

However, from the facilitator's view such additional support would be time intensive, and further e-mail did not seem not the most effective way of doing providing it. Such intensive support was not within the facilitator's brief. If a high level of personal support is needed, numbers in a group that could be networked would be reduced. Learners need to be clear about the skill level required to do a course, and some may be encouraged to do basic courses before joining an advanced course.

9.2.4. Mentoring

This research suggests that some of the roles of the facilitator in networked learning overlap with that of the mentor. As Murray and Owen (1991) point out, it would appear that there needs to be careful matching of mentors and learners for recognisable mentoring to take place. This research confirms that mentoring is unlikely to arise spontaneously and needs to be structured. There are great difficulties in fitting 'a personal relationship' into a modular course structure. Rather it appears that mentors would need to be found within the wider action learning community and that the skills to be a mentor have to be learnt. As Murray and Owen (*ibid*) programmes for coaching mentors also need clear aims and objectives if projects that rely on mentoring are to be successful.

9.3. Portfolio-based assessment

Several of the GPs, who were eligible, were able to use the material as part of their portfolios of learning to be submitted for PGEA accreditation to the Sheffield CME office which uses the portfolio system described by Challis et al, (1997) and Mathers et al, (1999). This suggests that one of the roles of a networked learning environment may be may be to support portfolio based learning, offering an extension of the educational role of GP tutors, who need to ensure that future learners use the Internet to manage their portfolios. This point is expanded on more fully in the third and final action research cycle (see chapter 7).

One of the aims of the course was for participants to produce a portfolio. An underlying assumption of Wisdom-Reflect, never explicitly stated, was that if you learn about reflective practice, then because portfolios are underpinned by reflective practice, you would know how to do a portfolio. The portfolio is a demonstration that the learner has moved to independence in learning. This assumption proved problematic and there was a clear difference between what was acceptable for a portfolio by the participants and what was intended in the course objectives. Some learners saw portfolios as a 'thing,' that is a book or a document, which required that they needed lessons in how to

complete a portfolio. The technically sophisticated saw the portfolio as a series of files on their computers. Others saw the portfolio as a process, which was a way of thinking about professional development in terms of rationalising the many questions that arise out of general practice and answering the worthwhile questions. Only a small amount of this process would need to be accredited for postgraduate education allowance. This way of seeing the portfolio as process was more likely where the learner had done face-to-face portfolios previously. Documentary evidence to support the portfolio was seen as useful, but time consuming.

Some participants had very different expectations of what doing a portfolio on-line would be about. The needs-aims-objectives type of educational intervention may be better suited to a more competency-based approach. The role of facilitation in helping learners achieve a specific skill is very different from coaching them in becoming a reflective practitioner.

Whatever the type of portfolio, the facilitator would need to spend much more time on a one-to-one basis to do a "diagnostic appraisal," to ensure a sensible set of learning needs. Learners would need formative assessment half way through to see how they were doing. They would need to negotiate criteria for assessment, seeking accreditation from a postgraduate adviser in general practice. This system (c.f., Challis, 1999) would entail a much more intensive role for the facilitator, particularly in terms of working with individuals to produce, support, monitor, and assess individual learning plans. Within face-to-face portfolios, it is claimed (Challis et al, 1997, Mathers et al, in 1999) that the role of the facilitator is shared amongst the group and this process of co-mentoring allows various participants to contribute elements of the facilitator role such as being supportive, motivating and encouraging reflection. Within Wisdom-Reflect, there was some evidence of co-mentorship. It may well be that to encourage the production of a learning plan and other elements of the portfolio as described by Challis (1999) requires a much more directive kind of facilitation. In this research, learners got little sense that others were in anyway sharing their own learning needs and plans. There seemed a tension between the needs of the group to explore difficult

areas of practice and be reflective and the needs of the portfolio system to have statements of learning needs and a learning plan.

It is paradoxical that portfolios could be construed as a 'positivist' tool or at least appear pedagogical rather than andragogical (cf. Jarvis, 1995), given the emphasis on the importance of being reflective. The rigour of the theoretical steps in completing portfolios is an attempt to demonstrate the validity and reliability to those educational stakeholders from a more traditional and positivist background. It may well be once more evaluation is done that in 'practice' doing a portfolio involves something different, looser and more reflective. Further research to bridge this gap between "theory" and "practice" of portfolios is needed.

Of the six people who intended to submit portfolios for PGEA accreditation, it was apparent that previous experience of doing portfolios face-to-face was important. These learners were more likely to use the material in Wisdom-Reflect as part of their learning plan in a face-to-face portfolio. Thus, the networked learning environment had become an acceptable source to provide evidence of learning rather than a place to learn how to do a portfolio electronically. Yet even amongst these, there was an uncertainty of whether time spent struggling with computers was worthy of the hours claimed for PGEA. There was also uncertainty and perhaps a lack of trust that the somewhat looser, more reflective portfolio containing critical incidents of a more personal nature and pieces of creative writing would be acceptable to fellow professionals.

9.4. Barriers to becoming a reflective practitioner

The barriers to doctors in becoming 'reflective practitioners' relate to a number of factors

- There may be a gap between the 'theory' and 'practice' of reflective practice for the participants in this action research cycle;
- Scepticism that there is a relationship between reflective practice and clinical practice;

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- An uncertainty as to how reflective practice can be captured for accreditation for PGEA;

- The differing ways individuals separate the professional from the private person and the stage of career of the doctor;

- Feeling safe in the learning environment; and

- Learner expectations

9.4.1. Theory/practice gap

Assessing the learning needs of learners is possibly more problematic in a networked learning group compared with a face-to-face group. Listening to participants in wisdom-reflect at interview, there was not the sense that they had specific learning needs. It was more a case of 'Lets do it and see'. [18:07]. With such vague learning needs it is difficult to be objective and confirm whether at the end of the intervention the participants had met their needs. This invites the question of whether learners have clear cut learning needs, challenging the premise of which Hollis (1994) was critical, that human beings are considered fixed enough to have definite needs but changeable enough to have them satisfied. The learners in wisdom-reflect were at the stage of exploring the process, as one participant put it as a 'vehicle for actually starting to use what for me was a new way of communicating'. [04:07] Questioning the evidence that learners have defined learning needs is related to the puzzle of 'how do we know what we don't know?' Many of the participants in this study suggested that although they did not know what their learning needs were initially, they became more certain as they interacted with the material from the course. It was clear how important it was for participants to get comments at this stage from other members of the group or from the facilitator. Learners were much more sensitive at the beginning of the course and more likely to drop out if this positive feedback was not received. The more experienced were more likely to take responsibility to ensure that they did get comments back. Most viewed it as the facilitator's responsibility to give this feedback where people had posted something substantial. Some of the problem may lie in learners needing to be taught the use of educational jargon, or needing to learn about the required "thinking

skills". That is they do not admit to specific learning needs because they do not really understand what they are.

In this study, learners displayed a general need to make sense of their experiences in general practice. They are more likely to express confidence in particular tools to generate questions about their practice that they think worthy of answering through further reflection, such as the use of a critical incident or writing a creative piece from the perspective of the patient. So perhaps rather than learning needs, learners have a series of questions that arise from their practice that they want answering. By reflection, they work out which are the most important. They then refine the question to get nearer to what they actually want answering. Because of the constraints of time and the current system of accrediting learning, they limit themselves to three or four major questions. They experiment with the tools at their disposal to see which is more likely to give an answer. For those for whom networked learning was an acceptable style, the tool of facilitated e-mail discussions to support the writing of "critical incidents" offered future opportunities.

Even where participants had done portfolios face-to-face before, it appeared new and perhaps difficult for them to accept that some of their learning needs might need to be compromised by what the group as a whole wanted to learn about. Some perceived a lack of relevance of "reflective writing" for their own learning needs.

Because of the steep learning curve required of learners on this course, they may have only addressed the stages of familiarity with the medium and learning "how to learn," without moving on to learning needs related to, for example, patient care.

This research demonstrated the problems of achieving mentoring of learning in a networked learning environment. Most of the GPs in this research saw mentoring as a private and personal one-to-one relationship, which they intuitively felt, would not work on-line.

9.4.2. Stage career of doctor

Perhaps the nature of the group was about GPs reaching a natural reflective point in their lives, trying to make sense of their work as they got older and moved to mid- career and beyond. Such needs as these would be hard to

operationalise so that an evaluation would demonstrate clear learning outcomes. Rather, at this stage I am left with a sense of learners feeling that something worthwhile went on that they would have had little opportunity to do otherwise, but that they needed more experience of networked learning to make any comparative judgement about how valuable this method might be.

9.4.3. Learner expectation

Expectations of potential learners are clearly heightened by publicity and marketing material for any course. Subsequent enquiries by e-mail or telephone need to be dealt with openly and honestly to ensure learners are responding to actual rather than "felt" needs, particularly with regard to innovations. Where the safety of the learning is paramount, as in a course on 'reflecting writing,' it is important to manage the learning environment, as set by the requirements of the course outline.

9.5. Technology and the learning experience

In this research, the learning package was a booklet describing the course's aims and objectives. Although available as a download from the website or as an e-mail attachment it had not been significantly redesigned to appear in a web format. Rather it was presented as a document that had to be printed off and then read. This method seemed largely unsatisfactory to most of the participants, and consequently the material may not have been read. Most of the learning appeared then to be "vicarious", that is at second hand from the virtual classroom discussion. Clearly more thought has to be given to making web-based resource materials as attractive and interactive as possible and not just relying on downloading in what are in effect lecture notes or handouts designed for a face-to-face course. Learning packages need to have an element of being standalone, that is they can be interacted with, without much in the way of direct guidance from the facilitator.

In the e-mail discussions, participants found it difficult to grasp at times who had said what, which would not happen in a face-to-face group. Mastering the technology, particularly in the storage and retrieval of messages helped resolve these difficulties. Some of the messages containing long reflective pieces were considered pertinent to the sender only as most participants felt

the pressures of time. The issue of gaining access and maintaining access to the Internet was a complex issue. Many participants reported problems at one stage or another. With only minimal technological support available, some participants used hours going through their own computers self diagnostic software to try to identify and solve problems.

10. Conclusions

Developing a course to be delivered by networked learning is no different from any 'good learning' approach. It requires an emphasis on clear aims, objectives, and appropriate assessments. As with other educational initiatives, much depends on GPs own learning style, what they feel is relevant to learn at the time and their own preferences for a learning format. E-mail discussion groups have the potential of being used as a medium for learning by GPs, which could contribute to personal learning plans. Medical educators may need new skills to realise the potential of e-mail discussion for professional development, but these are mainly educational. This research demonstrates that if such technologies are to be fully exploited to support the CPD of healthcare professionals, the complexities of networked learning need to be acknowledged and subjected to further research.

11. Reflections on the research methodology

This research anticipated that all the learners would have produced a portfolio in good time. Because largely the participants of Wisdom-Reflect were not motivated by the need for accreditation, evidence in the shape of a portfolio was not available for scrutiny. It was also apparent that the documentary evidence for accreditation of portfolios may be written up several months or more than a year after the educational event. How can we know if the participants of Wisdom-Reflect achieved any thing worthwhile educationally? A second option in the absence of portfolios was to look for evidence of completed learning circles (cf. Mathers, 1999., Challis, 1999). However, this method is not without its problems. If a learner says about Wisdom-Reflect, 'It wasn't useful for me', in response to a question in the evaluation, would we take that attitude at face value? Rather we would need to examine the rest of his/her "story" to determine whether or not he was able to demonstrate both reflecting in action and upon action and in particular whether the learning was applied in his or her workplace. From a methodological viewpoint, this fits in with qualitative research approach and in particular with action research. However, the generalisability and transferability of the conclusions of the study are very limited. This makes such interpretative outcomes as completing learning circles relevant locally to the particular course evaluated. This is perfectly acceptable from an internal organisational perspective (cf. Rowntree, 1987) but not for an external evaluation, which would require quality criteria for evaluating learning outcomes to be established across a region or nationally. In this action research cycle, I was more interested in a formative evaluation; that is, 'How can I make this course better?'

The results of this type of study should be interpreted with caution, as it is based on a small sample of GPs who in volunteering for such a pilot may be idiosyncratic in their approach to innovation. The methodology used draws out the stories of individual participants and emphasises the self-reflexivity of the researcher (Bolton, 1999). As such the findings related to learners' progress may not be immediately generalised to other groups of learners with other facilitators in other settings. However, the study does add a greater understanding of the methodological approaches that may be helpful in

evaluating networked learning. It also provides useful information to guide further refinements to the model of a networked learning environment suitable for medical settings. The study demonstrates the difficulties, even within an environment committed to reflective practice, of operationalising some of the educational concepts used in reflective practice. For example, it is up to the evaluator with all his/her own personal experience and worldview, to decide whether a particular piece of data demonstrates a learner's preference for adhering to the traditional model of learning, or demonstrates the beginnings of reflection in action for a learner moving away from dependence on his/her teachers. Given the dominance of traditional medical teaching, it is perhaps not surprising that many medical practitioners struggle with the nature of andragogy. Their first task becomes one of unlearning what they had previously held to be true and then learning how to learn. Within a networked learning environment learners first have to learn the technology, then learn how to learn and finally get down to doing some work on whatever there learning needs might be. The progress of learners who are working in full time service commitment and looking for around 30 hours per year of education is understandably slow. Given the natural scepticism of the learners from medical backgrounds, it perhaps not surprising that medical evaluators from reflective backgrounds will feel a certain sensitivity to charges from those evaluators from more traditional backgrounds that there is little in reflective evaluations to demonstrate either effective or efficient learning in an adult learning based course. I feel confident however that the course worked and as such could be counted a success, albeit flawed. However advancing learning innovation is about risk and uncertainty. The educator needs to follow the same learning curves as those suggested for his/her learners, and to research his/her own practice to add to the body of theory in his/her teaching and learning community.

Chapter 7 - The third action research cycle

This third action research cycle is largely developmental, but I wish to ensure rigour in the cycle of planning, acting, observing and reflecting "more carefully, more rigorously than one usually does in real life" (Kemmis and McTaggart, 1992:10). Consequently, this chapter is structured a little differently from a traditional 'discussion' concluding a thesis. This allows this action research to be future-orientated (c.f. Waterman, 2001) and point to the next cycle of action research. The analysis in this chapter goes beyond the microanalysis of data using a grounded approach which aims to generate theory that explains patterns of behaviour (c.f. Strauss, 1987). Rather, this action research works towards more extensive change (Kemmis and McTaggart, 1992:22-25), developing critiques of ideas or institutions which in turn might lead to more general reforms of system-wide policies and practices. I started with small cycles of planning, acting, observing and reflecting, in the first two cycles of this thesis. As the work progressed, once the issues, ideas and assumptions of CPD supported by information technology had been more clearly defined, I wished to define more system-wide questions with a wider community of participating action researchers.

This chapter takes the principles of a networked learning environment, portfolio-based assessment and the management of learning and discusses how these might be integrated into a comprehensive strategy for educational institutions providing continuing professional development in primary care. The developmental work in this chapter forms the basis of my own ongoing work locally (Roberts et al, 2002), and across a consortium of researchers (Hammond et al, 2002) engaged in managing learning environments to support portfolio-based reflective learning in higher education settings. For the purpose of this thesis, I will describe how critical reflection with a like minded community of fellow professionals (c.f. Kemmis and McTaggart, 1992) engaged in supporting learning and teaching with communication and information technologies has produced a shared understanding of the strategic principles involved in managing learning environments (c.f. Everett, 2001). In the following report, I will illustrate with a couple of scenarios how I

apply these generic strategic principles to continuing professional development in primary care.

Thus, this action research cycle describes the planning of a strategy which has the purpose of managing the learning environment to promote CPD, with IT support, and using portfolio-based assessment within the context of primary care. The implementation and evaluation of this strategic vision is out with the scope of this study.

1. An action research framework

By 1999, at the end of the second action research cycle, I had not reached so far in my thinking. My action research collaborators and I had refined our shared vision of how networked learning could support continuing professional development for primary care health professionals. At the same time, we had aspirations of how we could promote change to achieve that vision both locally and at a national level.

1.1.   A shared vision for the virtual classroom

Our vision of Networked Professional Development (NPD) described the approach of professionals who were engaged in continuing professional development through the medium and process of computer-based networks. This approach situated learning (c.f. Brown et al, 1989) in relation to the needs of healthcare professionals that arise from their workplace. Learning must be relevant to the circumstances and career stage of health care professionals, be they a hospital-based GP registrar requiring a clinical update on treatment of a patient on her ward, or a general practice manager grappling with issues of patient record confidentiality. It acknowledged the wide range of skills already possessed by a professional, but recognised that sometimes what is needed is a capacity to reflect on those skills and how they might be developed (Boud, 1996). The learning is often "just-in time", that is the professional learns by moving from "knowing how" to "showing how" (c.f. Miller, 1990). The stimulus to learn is often provided by experiences

within the workplace, driven by a desire "to do it better next time", for established professionals and "doing it right for the first time" to those in vocational training. Learning is often an arduous and challenging experience, and learners need careful facilitation for its success (Heron, 1989).

Whilst the right technology can support this approach to learning, educators delivering courses through networked learning still need to provide intensive learner support (Mason and Bacsich, 1998). I will adopt the convention of prefixing educational activities in networking learning environments with the letter 'e' followed by capitalisation of the word. Thus, I describe a mentor in face-to-face learning situation as a mentor. I will describe a mentor in a network learning situation as an 'eMentor.' This method is far from perfect but illustrates a future where certain characteristics of 'good' learning may be much more enabled by technology than it is now.

In common with face-to-face learning, virtual courses should be underpinned by clear aims and both content and process learning objectives. Learners in a virtual classroom (eLearners) need to have access to learning materials (eLearning resources) which are relevant and valid for the task in hand. Quality eLearning resources, for example an interactive CD-ROM on the network, is expensive to produce and needs to be accessed by good numbers of learners to ensure value for money (Laurillard, 1993). Any one single all-encompassing curriculum or a set piece of courseware is unlikely to meet the needs of all learners with their variety of different starting points and learning styles. For example in health informatics, one CD-ROM is unlikely to meet the needs of the entire NHS staff. To provide local "ownership," e Learning resources must have the flexibility to be customised to the anticipated learning needs of the target audience. As with traditional adult learning, programmes of study using the Internet should have assessments that contribute to learning, rather than remaining as hurdles to overcome and then discount (Rowntree, 1992). It is likely that for professional development, many of these will be self-assessments, set inside an agreed quality framework (Boud, 1996).

As this research demonstrates, virtual classrooms have their own peculiar dynamics, and these must be addressed for the success of this kind of curricular delivery. This is in line with research by those exploring networked learning in mainstream education.

Many of the early on-line teachers were dazzled by the new opportunity of group communication with students at a distance. Because unlimited, interactive, time-independent discussion was technically possible, both students and tutors expected it would happen. The fact that educationally beneficial, dynamic and all-inclusive discussions are far from commonplace events in face-to-face teaching, should have prevented the growth of this unreal expectation for the on-line environment, which almost all early adopters experienced. Whilst the technology tends to support a certain degree of egalitarian participation, and does allow users the freedom to input messages at their convenience, the conditions which are needed to produce good educational discussions are far more complex, more people-dependent and more educationally determined than mere technology will ever influence vary significantly (Mason, 1998).

The medium of electronic communication makes it all too easy to remain a silent observer, or "lurker". While any good teacher would encourage the quieter members of a group to participate, in a virtual classroom, it is far easier for the silent to remain silent. For some, this is a perfectly good means of learning; for others, it may denote a failure to engage with the topics under discussion, or the breakdown of technology and consequently, a failure to learn.

Facilitating a virtual classroom is an art, and while experience in the face-to-face classroom is probably a necessary attribute for an eTutor, it is not necessarily sufficient. The reasons for this may be predicted by examining the

model of the adult learning circle. The facilitator's role in any educational pursuit is to help the learner complete the learning circle (Jarvis, 1995, Knowles, 1990):

- Identify a learning need (a problem or a gap in knowledge or skill);
- Turn this need into a learning objective;
- Formulate a learning plan to address the objective;
- Undertake relevant learning;
- Evaluate learning outcomes; and
- Review the learning process and identify any further needs.

Whilst the Internet is an excellent resource for undertaking relevant learning, current technology is some way from supporting the formulation of a learning plan electronically.

Finally, there are a range of issues that are almost so fundamental to networked learner support that they are easily overlooked. Access to a virtual classroom means both access to the relevant hardware, and time and opportunity for this access to be productive as a learning experience. Many NHS professionals remain woefully un-networked, and in primary care, this applies particularly to professions allied to medicine. Health service libraries will play a part in meeting this need, and librarians will need to re-think their own role. Initial connection into a virtual classroom may have to be facilitated by time-consuming face-to-face training and by "trouble-shooters" prepared to visit on site. Nurses and administrative staff must have good access to networked computers if they are to play their full part in the search for quality (NHS 1999c).

1.2. Evaluating progress

How far in terms of this research had I and my collaborators progressed in terms of implementing the vision of Networked Professional Development (NPD), a particular brand of eLearning, within our own area of North Trent? This is action research with an emphasis on a cyclical process of planning, acting, observing and reflecting within a collaborative partnership between

researchers and researched (Kemmis and McTaggart, 1992). Therefore, it is worth reflecting back on the aims and objectives of the first two action cycles stated on (chapter 5.2.4) and (chapter 6.4.1). In the first action cycle, there had been a brainstorming of ideas amongst all of the stakeholders in the project. For example, we had multiprofessional learning; a self-reporting of competence in essential informatic skills; portfolio-based assessment; pedagogic research issues around the relationship between evidence based practice and reflective practice; and so on. Understandings were gained of how to run a virtual classroom next time around and areas for new research identified. Additionally experience had been gained with a methodological approach, which in future projects could be refined to identify specific learning outcomes. In the second cycle, there was a focus on teacher-practitioner research at the micro-level of the issues in teaching and learning about reflective practice but within the added complexity of a virtual classroom. I gained a deeper understanding of the issues of facilitation, mentoring and the reaffirming of the importance of basic educational principles of purpose, aims and objectives, assessment and evaluation in this setting, rather than technological concerns over the structure of the virtual classroom.

The multiprofessional aspects and encouraging portfolio-based assessment had been problematic. I remained strongly interested in portfolio-based assessment but whilst I gained an understanding of how learners could produce a portfolio that could be accredited by professional bodies, I hadn't demonstrated the process happening to any large degree. I had seen professionals using the material from the virtual classroom studies as part of their own professional development, but not to the level which would encourage me to suggest widespread implementation of ePortfolios. The momentum towards making portfolio-based assessment the basis of revalidation (c.f. Pringle, 1999) gave an extra urgency to developing a model of a virtual learning environment that supported CPD and included an ePortfolio system.

The requirements for an ePortfolio system in this context were beginning to emerge. Firstly, there was the need for specific software for the ePortfolio. It

had to be convenient to use for both learners and tutors. For example, health care professionals must be able to conveniently add, delete or update material to their secure personal file. EMentors might wish to view selected mentees' ePortfolios and add additional comments. The second broad requirement for the ePortfolio system was the development of a networked learning environment that would enhance the process of doing portfolios, which should include appropriate self-assessment tools and eLearning resources. Finally, there was a need to nurture an eCommunity both as a possible learning resource and as a reservoir of potential candidates to commence ePortfolios at some future date.

Within WISDOM, we could see the need for a more sophisticated approach than the virtual classroom approach: the Networked or Virtual Learning Environment (VLE) approach (c.f. Britain and Liber, 1999). Consequently, the WISDOM virtual classroom evolved into the WISDOM Centre for Networked Learning, an attempt to develop a home-grown version, rather than use a commercial product (c.f. Cook 2001). From the one original virtual classroom, more virtual classrooms were added to deliver different types of courses. A networked conferencing facility was added, where keynote materials from experts in the field were commissioned and used as the basis of eConferences on issues such as clinical governance. Plans were made to develop a web-based formative assessment engine so that professionals could design and build formative tests using multiple choice questions, and short notes questions. Plans were developed to develop back-end databases that could allow registration of learners and the ability to complete a personal learning plan on-line: an ePortfolio. Whilst we explored the potential of commercial virtual learning environments such as WebCT, there was no product that was capable of being adapted to meet the needs of postgraduate education in primary care. These commercial systems had largely been developed to support modular higher education courses. We spent a lot of effort liasing with the health informatics community and the professional education community to encourage interest, participation and feedback, on the evolving WISDOM networked learning environment (NLE).

However, I felt something was wrong with our model and it did not occur to me for some time what that might be. We had worked so hard to develop WISDOM. There was great interest in the website and active participation in discussion groups but we were frustrated that there seemed a very clear barrier to its further uptake by other educational stakeholders with larger resources. After some considerable reflection, the answer seemed so obvious.

1.3. Revising the action research plan

The virtual classroom approach and to an extent the virtual learning environment had been conceived of as existing in some otherworld, cyberspace, as some viable alternative to face-to-face delivery of education (c.f. Hiltz, 1994). It was the wrong approach. I was sure that the vision for Networked Professional Development was still achievable but the approach was wrong. In my reflections, there were two main themes: one educational, the other technical.

Some of my long time research collaborators were part of the University of Sheffield education community with a strong interest in networked learning. Under David McConnell, they had developed a Masters in Networked Learning with an approach to developing self-assessments in networked learning environments (1997) using on-line discussions. This course had received good external and internal evaluations. I was using a very similar pedagogic approach in developing WISDOM. At first I had thought that the success of the Masters was due to the higher level of motivation of higher education learners as opposed to health care professionals engaged in professional development as a requirement of their jobs. This was partly true, but more importantly the Masters course was embedded within the teaching and learning approaches of the University as a whole. That is, it attracted the credibility, the marketing, the quality assurance systems, and the learner support etc., of the University. The University was managing the learning environment for all students, and McConnell's networked learning environment delivered the specific course. Appreciating this concept (see Chapter 3.1.2.4) of the Managed Learning Environment (Everett, 2001) in

which the networked learning environment was integrated within an educational provider was a big step forward in my thinking.

The second theme to my reflections was on a more technical basis in developing a process of educational software development. The objectives for the University of Newcastle's networked learning environment (NLE) project for supporting undergraduate education for healthcare professionals had emerged collaboratively between the students, staff, as well as being informed from the emerging literature from other higher educational settings (Jordan et al, 2001). The ethos of the team creating the technology of the Newcastle NLE was encompassed in an 80:20 rule. For developing working software, 20% of the effort is to develop the software itself, whereas the other 80% was about describing and refining the information systems as they already exist within the institution. In practical terms, this meant that any new software development should begin by getting the requirements of the system, i.e. what it is supposed to do, from the educational institution. This contrasts starkly with projects where software is installed and institutions have to change the way they work to use the software. WISDOM had been sensitive to learners needs but had aligned itself to future policy, i.e. delivering educational material on the clinical governance agenda rather than supporting any existing educational organisational strategy. It had tried to stand alone as an eLearning Centre.

1.4. Action research as a model for organisational change

The challenge for this cycle of action research was to describe what a managed learning environment (MLE) for continuing professional development for professionals in primary healthcare would be like. Additionally, to identify the barriers to implementation across the North Trent region in order to come up with a strategy to promote change. Such action research would appear to have high relevance to a National Health Service where the commitment of quality through the governance of clinical activities is central (NHS, 1998, 1999a). In order for NHS organisations to meet the targets set by the requirements of clinical governance, the continuing

professional development and continuing medical education of its workers have been identified as essential. This emphasis is recognised in the commitment to life long learning, and the appraisal and revalidation of all clinical staff to sustain standards and address under-performance (NHS 1999b), and including the revalidation of all doctors (Parboosingh, 1998, Pringle, 1999). Ways in which technology might support the governace agenda were evolving. For example, the National Electronic Library for Health (NeLH) would be part of a series of on-line technologies, which harnessed with the virtual classroom approach (Nestor et al, 2000) could deliver formal and informal educational programmes of learning (NHS 1999c).

The hawk inside my head of reflecting-in-action (c.f. Bolton, 2001) was already demanding why not make the theme cycle of this action research multiprofessional? In a sense, it was already, because my collaborators where multiprofessional, and I was applying our shared understanding of networked learning to CPD in primary care. In truth, any progress in this direction was blocked by a complete lack of an integrated teaching and learning strategy for postgraduate multiprofessional education. My action research was now about supporting a well developed teaching and learning strategy in medical CPD with IT, not trying to create a multiprofessional agenda through IT. For example, my action research asked how could a model be developed that merged the WISDOM project with the North Trent GP Network? How could change be promoted to try to achieve this?

2. Action research Methods

Zuber-Skerritt (1996) described a model of emancipatory action research for organisational change, which is the basis of my approach to promoting organisational change. The full cycle of research is outlined in fig 7.1. This third action research cycle deals in detail with the shared vision, and provides a brief outline of the remaining stages for completion.

Managerial interventions	Action research
Clearly (re) define a business plan	Planning a shared vision collaboratively
Develop a shared vision	
Provide strong leadership	Acting within a host organisation eg a regional postgraduate organisation to implement the strategic vision.
Spread shared vision to all departments	
Institutionalise revitalisation through formal policies, systems and structures	Observe the impact of the strategy on the institution, its staff and its clientele
Get feedback on draft policies, systems and structures	
Monitor the whole revitalisation process	Reflect on the lessons learnt for institutional learning and dissemination
Reflect on the results and draw conclusions	

Figure 7 1 A model of action research for organisational change

(after: Zuber-Skerritt, 1996)

The model given in fig. 7.1 represents a model of emancipatory action research as organisational change 'best practice.' It fosters both organisational learning and the move towards a problem-orientated, task-driven action learning organisation (Zuber-Skerritt, 1996:102). The model I

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have presented in linear form is cyclical. Most organisations will have a business plan and to redefine this in terms of a managed learning environment (MLE) requires its own cycle of reflection. This chapter provides one model of how strategic principles for establishing a managed learning environment that provides support for portfolio-based learning and assessment might look. I adopt the headings of the action research protocols used in the first two cycles of research, to ensure I am being systematic in my reflection.

2.1. Action research aims of the third cycle

This action research cycle aimed to analyse, plan, and develop a strategy for promoting institutional change towards an integrated teaching and learning strategies with a networked learning environment (NLE) to give a managed learning environment (MLE) in the context of CPD for primary care.

2.2. The primary action research objective.

What are the important factors in managing the learning environment to support portfolio-based assessment of the continuing professional development activities of primary health care professionals?

2.3. Secondary research objectives.

1. What are the characteristics of an electronic portfolio-based assessment system that would support CPD in primary care?
2. What are the characteristics of a networked learning environment that would support the clinical governance agenda in the context of CPD in primary care?
3. What are the barriers for educational institutions providing CPD for healthcare educators wishing to develop a managed learning environment?
4. What are the criteria for establishing a managed learning environment which meets the teaching and learning strategy of the host educational organisation?

5. What are the 'staff' professional development issues in developing and maintaining a managed learning environment?

2.4. Setting

This action research is set mainly in the context of providing CPD for primary care doctors in the NHS.

2.5. Collaborative partners

The collaboration in this action research cycle involves a range of colleagues over a number of different networked learning projects. We share in common a set of values where teaching and learning is enhanced at all levels by the emerging technologies of networked learning environments. They work both within the Universities of Sheffield, Sheffield Hallam, Leeds, Dundee, Nottingham, Newcastle, and Sydney. We meet as groups, seminars, swap e-mails, and call each other up on the telephone.

2.6. Data collection sources

The data on which this study is drawn comprises an eclectic range and includes:
- a reflective diary;
- original data and research reports of action cycles one and two;
- e-mail conversations often stored and archived;
- seminar notes;
- meeting notes;
- internal project documents;
- published project reports;
- dissemination events, for example conferences;
- participant observation in networked learning conferences;
- critical reflection on the appropriate literature; and
- critical reflection on the raw data collected for the first two action research cycles.

2.7. Validity of the research

There is a commitment within this research of establishing a shared understanding within a wide community of action researchers. As Titchen (1995) notes, projects such as this one have validity built into the action research process with its emphasis on critical reflection on the cycle of planning, acting, observing and reflecting, and validity is enhanced through establishing validity collaboratively.

2.7.1. Clear exposition of process of data collection methods

In this research the processes of the enquiry are available in my own personal reflective log, within the research teams minuted project meetings, within the research teams publications, within reports furnished by the research team to the appropriate bodies and within the data analysis within NU*DIST.

2.7.2. Clear exposition of data analysis

The strategic vision for managed networked learning environments has developed iteratively through the natural scepticism of colleagues and would be recognised as a true account of our shared understanding (Kemmis and McTaggart, 1992).

2.7.3. Reflexivity

The action research process is driven by planning, acting, observing and reflection within a community of self-reflective people seeking self enlightenment about a social phenomenon (Kemmis and McTaggart, 1992). The participants own the problem and feel responsible and accountable for solving it through teamwork and through following a cyclical process of:

- strategic planning:
- implementing plans:
- observation, evaluation and self evaluation:
- critical and self critical reflection on the results of the first three stages; and

- making decisions about the next cycle of action research- that is a revised plan (Zuber-Skerritt, 1996).

2.7.4. Attention to negative cases

There was a conscientious search for and presentation of issues that were inconsistent with the emerging analysis (Murphy et al, 1998). This is driven by an action research process that demands critical examination of the understandings gained to further refine the understanding of the phenomenon (Kemmis and McTaggart, 1992).

2.7.5. Fair dealing

Fair dealing is inherent in the principles of action research, but efforts were made to understand the phenomenon of a managed learning environment from a range of different perspectives (Murphy et al, 1998). The action research was intended as emancipatory. It aimed not only at providing technical and practical improvement for participants and change within their institution's existing boundaries but also aimed at providing a model for changing the system itself or those conditions which impede the desired improvement in the institution (Zuber-Skerritt, 1996).

2.8. Ethical issues

No particular ethical issues were expected in this action research cycle, as no subjects were involved. In general the principles set out by (Winter, 1996) were used (c.f. chapter 6.8.2).

3.   Analysis and discussion

3.1. CPD and the personal learning plan in primary care

I will begin my analysis with an illustration, which describes how a primary care professional might direct his or her own learning in the coming year.

A general practitioner, Lottie, finds that on a daily basis she all too readily identifies gaps in her knowledge when dealing with patients. So as not to be overwhelmed, Lottie reflects carefully on which of these many gaps would be most usefully filled to enhance her patient management skills. Following a particular patient she had seen where she had noted a gap in her knowledge, she accepted that it was unrealistic to expect herself to manage immediately the cutaneous manifestations of sarcoidosis, for which she would make a referral. She reasoned that implementing research-based recommendations in the management of secondary prevention of heart disease would benefit more of her patients and the development of her primary health care team. Following a lecture in cardiology advancements from the local consultant, she concluded that what she really needed were the skills to ask the right questions and bring the research evidence to her own desktop.

Such a learning need may be met by a course in evidence-based practice (EBP) which includes the use of the Internet for database searching. She reasons confidence at searching Internet databases for her own practice generated clinical questions allows her to become more competent and self-confident as a doctor. She recognises that she is unlikely to do this alone, and will need support from a mentor.

Figure 7 2 Scenario 1: Lottie plans her learning

3.1.1. The learning theory

In what ways could Lottie's educational pathway be facilitated in the future? In what kind of educational institution could this scenario happen? Most health care professionals would surely wish for protected time from their patients in which to sit down with a skilled mentor and go through a diagnostic appraisal (Rowntree, 1987). Mentoring is most useful at the initial stage, providing a kind of diagnostic appraisal and focusing precious time set aside for learning

about things that matter. Further mentoring would be needed to help identify outcomes (for example, the critical appraisal of a search strategy following a problem consultation or the development of a clinical guideline for the practice). The mentor would need to help ensure that Lottie was realistic about her learning and identify what further skills could help them in their clinical work. Finally, the mentor needs to ensure that the evidence for the learning is presented in such a way as to satisfy any accreditation procedures in existence (PGEA) or proposed revalidation.

However, where time and resources are in short supply, there may be some benefits for Lottie in becoming an eLearner. Is it possible for an appraisal, construction of a learning plan, researching some of the learning objectives within that plan, and feedback on that learning plan to take place in an on-line environment? Might Lottie gain from a web-based course led by an experienced eFacilitator? The action research in both the first and second cycles suggests that elements of this type of learning would be supported. However, from an educator's point of view is any benefit for Lottie worth the effort, i.e. is networked learning efficient? Is Lottie alone or is there likely to be a demand from other professionals? For a typical postgraduate network based in a local trust hospital, these and a host of questions need to be answered to make eLearning feasible for GPs. For example, what about staff training of the GP tutors network? What are the most important learning outcomes for the GPs? Is it to be a reflective practitioner and evidence that progress in an ePortfolio or is it to develop, update, or evaluate clinical skills in a more competency-based approach? How can the two approaches be combined? What are the resource issues in providing mentorship as against facilitated small group learning? The answers to such questions can only come from national consideration of the purpose of GP continuing professional development. I have repeated the adage that assessment drives learning (c.f. Rowntree, 1987). As the assessment process of revalidation comes closer to implementation (GMC, 2002), there will be need to be a re-examination of the purpose of GP continuing professional development, a sense of curriculum, appropriate learning methods, and appropriate

assessments. Once that purpose is clarified only then can the shape of the networked learning environment to support CPD be designed, and implemented with appropriate resources.

In transferring the portfolio system to a networked learning environment, it is important to capture the educational purpose of the portfolio. However, the strength of portfolio-based assessment is its flexibility. The 'curriculum' for continuing professional development (see chapter 1.3) is established by expressing learning objectives in a specific way. For example portfolios can support a competence-based model as in nursing, evidencing the achievement of competencies (c.f. Benner, 1984). They are equally suitable to the achievement of more reflective outcomes as in much general practice education (c.f. Snadden et al, 1996., Challis, 1999).

In Sheffield in 2001, the CME office had plenty of completed portfolios but there has been little published on the individual experience of completing a portfolio. However, in reflecting on both my own personal experiences of completing portfolios for my own professional development and the experiences of my colleagues (from interview data), I can shed some light on the relationship between an ePortfolio and a typical face-to-face portfolio.

In Figure 7-3 I have married the typology for doing portfolios provided by Challis (1999) and explored the ways in which networked learning could support portfolio-based learning. This begins to explain how the principles of completing an ePortfolio could be managed using a networked learning environment.

Portfolio Learning	Networked Learning
Learning theories,	
A framework and documentation for a portfolio based on the concept of the reflective practitioner	Flexible design of the learning environment is possible but must be coherent and relate to the educational institution providing accreditation
Supporting open learners	
Introduce portfolio to learners Establish means for supporting the learner during portfolio development through CME tutor and portfolio group Develop individual action plan	"How to do an ePortfolio" tutorial- interactive web pages eMentorship for individuals doing portfolios Possible eFacilitation for portfolio groups
Learner use of media	
Encouraging documentation with the use of a folder or word processing package	At a simple level documentation with the use of a folder on the computer desktop. Specific ePortfolio software will be web-based.
The open learning "learning package"	
Encouraging self directed research of learning objectives through wide variety of media, eg patients, staff, library etc. Identify sources of evidence of learning appropriate to identified learning needs	Develop and enhance search skills both of the Internet and specific databases such as MEDLINE and Cochrane to research learning objectives Encourage the use of validated web enabled learning packages.
Course design and assessment	
Assess/review portfolio Gather and document evidence of learning Monitor progress	ePortfolios available on the web (but password protected with space for comments from staff or fellow eLearners). Review ePortfolio by the eMentor on one to one basis or eFacilitator (and eCo-mentors within portfolio groups). Gather and document evidence of learning within web based forms stored in a database
Evaluation and quality	
Report results to appropriate bodies	ePortfolio system has considerable advantage of avoiding 'paper chase' of lots of paper portfolios by managing data with IT
Cost effectiveness	
[Not yet reported on]	[Not yet reported on]

Figure 7 3 A model of networked support for portfolio learning

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The table (fig. 7.3) demonstrates ways in which the process of portfolio learning can be enhanced by information technology support. Not everyone is convinced of the added value of supporting the portfolio process with IT. For example, one local CME tutor said of an early version of an ePortfolio system (available at http://www.wisdomnet.co.uk/plphome1.asp: last accessed 23/4/02):

> I have had a look at it but I don't see the point, it's just the same
>
> as the paper version [JS: 1201].

I would agree that for many learners there is little point, with little personal gain. To store information electronically or on paper, or in a folder is individual preference, and there is a skill to be learned to be able to do so successfully, at a cost. However from the educator's viewpoint, there are huge opportunities for educational governance, because data is stored in such a way that it is searchable. Data that can be manipulated electronically is very valuable because much information can be gained on all of the quality assurance aspects of any assessment system. Any paper-based portfolio system (c.f. Davis et al, 2001) generates large amounts of paper and associated administrative problems of chasing paper. Certainly, the University of Dundee is actively looking to develop an electronic system that can manage their undergraduate portfolio system (Davis, 2002, personal communication). Perhaps as more individuals learn how to use web-based forms for booking tickets, purchasing books, (a form of situated learning (c.f. Brown et al, 1989)) ePortfolios will become more attractive to learners?

In the face-to-face setting, the writing of portfolios develop on a continuum from simple logs of activities to reflective journals (Al-Sheri, 1995). For first timers, substantial support is needed. However after a GP has done a portfolio once or twice, the *process* of doing a portfolio becomes ingrained in the way he/she thinks. The emphasis moves away from 'learning how to learn' to 'learning how to do', for example a new skill or gain new knowledge. Once practitioners have acquired the necessary 'thinking skills,' they may well find the convenience of an ePortfolio very tempting. The learning resources to support portfolio learning could also be internet-based. GPs will no longer have 20-30 kg of glossy printed educational material on their shelves or

floors, waiting to be read. They will access learning resources on a 'just in time basis' from their nearest networked computer. Data from this research suggests that the majority of professionals, for the next few years, will find they prefer doing a face-to-face portfolio but will use the Internet to a greater extent for eLearning resources to support their portfolio.

3.1.2. The electronic portfolio system

To implement a successful software solution for an ePortfolio system, there are three outstanding issues. Firstly, the development of technological solutions to confidentially collect, store, update, archive, assess and accredit a large number of individual learning records. Secondly, there is the issue of the degree of support that learners need to be able to use the ePortfolio system effectively. Thirdly, there are the issues around developing a widely acceptable method of assessing portfolios which is commensurate with the type of learning objectives within the learning plan.

In Fig 7.4 I have summarised the steps for implementing an ePortfolio system on a wider scale which are based on the model (Challis et al, 1997, 1999, Mathers et al, 1999) used in the context of this action research. The rest of this section (3.1), expand upon and discuss aspects of this framework.

What to do	How to do it	Who should do it
Develop a framework and documentation for portfolio	Models using differing pedagogical approaches need to be evaluated as pilots within regions before rolling out the 'best model' nationally.	A national framework needs to be customised at institutional level. A technical solution to give a 'seamless' user experience needs to be developed at regional level.
Establish means for supporting the learner during portfolio development	Encourage eLearning communities where participants can network around the issues of continuing professional development.	eLearners can to be assigned an eTutor by the educational provider eg Postgraduate Network. Facilitated ePortfolio groups may be effective and efficient.
Introduce portfolio to learners	Uses an interactive web-based tutorial that learners can work through, including completed examples of ordinary portfolios.	Regionally produced 'package' which is customisable locally and supported by local eTutors.
Develop individual action plan	Specific learning objectives can be developed as part of a group discussion. Could be negotiated following a 'diagnostic appraisal.' Self-assessment tools e.g. PUNS and DENS will be part of NLE	eTutor, eCo-mentors, eMentors. Such individuals are likely to be informed by their experience in face-to-face education.
Identify sources of evidence of learning appropriate to identified learning needs	The NLE in which the ePortfolio system is embedded will contain a number of learning resources which reflect the collaborative input of the educators and learners e.g. self -directed web based patient based learning cases, information on face-to-face courses, web-based medical/nursing databases e.g. MEDLINE, CINHAL	Self directed but supported by eTutor, eCo-mentor, eMentor, Librarians, Information Officers, web based search engines Quality multimedia and distance learning resources are best produced regionally or nationally
Gather and document evidence of learning	Technological solutions will allow learners to keep a secure personal learning record on the web.	The learner supported by either the eMentor or peers (eCo-mentors) and the ease of use of software.
Monitor progress	Technological solutions will allow progress to be looked at by appropriate parties e.g. peers or tutors by tracking activity.	Progress with learners can be monitored by e-mail exchange with eTutors and accessing eLearners' portfolios.
Assess/review portfolio	Standards for assessing portfolios can be set locally depending on the context. National and regional educational stakeholders will inform local criteria.	eTutor with the learner. The eTutor will be informed by a framework of quality assurance developed regionally or nationally.
Report results to appropriate bodies.	Technology should allow automatic electronic transfer of completed ePortfolios with the appropriate validation by eTutors to centres of accreditation.	Databases of accreditation may be held in geographic locations depending on the context e.g. sub regionally for PGEA. The technology may allow solutions that are more creative.

Figure 7 4 Implementing an ePortfolio system

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3.1.3. Technological solutions for ePortfolios

There are a number of software solutions in development capable of supporting portfolio-based assessment which have been evaluated elsewhere (Nestor et al, 2000). Particular solutions examined during the course of this research included:

- MOCOMP (Parboosingh, 1998): a programme for continual medical education in Canada

- A web-based System for the Development of Personal and Academic Records (PARS) in higher education (available on http://info-pars.ncl.ac.uk/)

- A range of commercial software that generates a sense of a virtual learning environment (eg for a description of WebCT see Goldberg et al, 1996).

Their protagonists argue for and against the varying features of such software systems. From the individual learners point of view, ePortfolio software needs to be simple to use and intuitive. The learner requires an easy web-based interface that allows him/her to view and update his/her eLearning records. On-going support is needed particularly in the early phase of learning. It is recommended that differing software options be modelled as pilots on a regional basis, and the evaluation process inform future strategy on ePortfolios. An important issue for primary care however is that many of these solutions can only be accessed whilst connected to the Internet. This has a potential cost implication unless all healthcare professionals are guaranteed free access at work (see chapter 3.2.1). A second issue is the cost of training staff to use the software to access the learning environment.

3.1.4. Developing a framework and documentation for ePortfolio:

There are four elements to consider in providing a framework to establish an ePortfolio system within for example a regional primary care postgraduate education network :

- a networked learning environment in which the ePortfolio is embedded;
- developing eLearning communities of professional engaged in CPD;

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- decide an appropriate provider e.g. eLearning Centres (c.f. chap 7.3.1.14)
- Integration with existing postgraduate network structures and processes.

For an ePortfolio system to be successful across a region, it needs to appeal to both educators and learners alike. It is likely that ePortfolio systems will be 'plugged' into existing or developing networked learning environments. The flexibility of networked learning allows learning environments drawing on a variety of educational processes to be designed, implemented, assessed and evaluated. For primary care professionals there needs to be a balance of both structured learning activities around generic and specialised skills, aimed at increasing competencies as well as the coaching for personal and professional development as reflective practitioners. That way the ePortfolio will reflect the ethos of the host educational institutions. A basic virtual classroom approach (see Chapter 5.1.2.2) is capable of being enhanced with an ePortfolio system for small-scale use.

An eLearning community is a loose network of people committed to communication around particular issues. Every professional with Internet access can be a member of an eLearning community. They can meet in an eLearning Centre such as WISDOM. There are many other health care communities such as gp-uk@mailbase.ac.uk or evidence-based-health@mailbase.ac.uk or lis-nursing@mailbase.ac.uk. Professionals can dip in and out of various discussion groups depending on the conversational threads going on. In general, academic discussion groups are not facilitated, rather there are usually several self-appointed experts in the medium who conduct and control the discussions (Roberts and Fox, 1998, Roberts 1996).

The eLearning Community does not exist in isolation. To begin with, it is rooted in the face-to-face networks of a particular region, as WISDOM was rooted in the postgraduate and primary care networks that already existed in North Trent. For example, GP trainers and course organisers were able to gain skills and encourage other members of their own networks to get

involved in eLearning. Thus, the eLearning community in theory provides a cascade of learning.

An eLearning Centre may be part of an established higher educational provider of CPD or may be an independent organisation. Within an eLearning Centre there is an emphasis on supporting the teaching and learning strategy of the host institution. For a commercial organisation strategy may be based on market considerations.

The documentation for ePortfolios should seek to collect the same data as the documentation that is used in face-to-face portfolios, since they should reflect the same assessment strategy.

3.1.5. Establish means for supporting the learner during portfolio development

At recent conference aimed at the higher education networked learning community it was said:

> Nobody should pretend that Networked eLearning is easy
>
> (Laurillard, 2002)

My findings from the first two cycles of action research confirm the findings of others (Mason and Bacsich, 1998) that learners new to eLearning need a high degree of support and I have suggested ways in which this might occur in chapter 5.3.3 and chapter 6.9.2. In reflecting on the wealth of strategies that could improve eLearning, these enhancements on their own are unlikely to provide the necessary degree of learner support. The wider eLearning community can provide some support for professionals engaged in portfolio learning for example acting as a learning resource. More importantly, it is the degree of institutional support for learners, for example the perceived way of accrediting learning and the quality assurance systems. Those participating as learners in the first two cycles of action research ultimately could not trust how they could convert their experience into accredited learning.

Although the host educational institution is likely to have a number of strategies to support learners and prevent them from failing to complete the course, many will offer mentorship. Within this research one role of mentors is

conceived of as helping someone else to "learn to learn," particularly in the context of eLearning. Facilitation is seen as helping some one else to "learn to do" something. It is acknowledged that there is often considerable overlap of roles (see chapter 1.2.5), and much depends on the experience of the learner in being able to complete personal learning plans electronically.

Where there may be a number of professionals wishing to explore a topic together or where there are specific "learning packages," for specific training needs, it is recommended that learners "meet" as an eLearning set. Here, the eFacilitator can use many of the principles of adult-based small group learning (see chapter 1.2.4). Learners gain not only from the support of the eFaciliator but also from their peers.

3.1.6. The role of the educator in an eLearning Centre

WISDOM evolved into a regional Centre for Networked Learning and the experience gave some insight into what might happen if eLearning Centres were to spring up to provide CPD at a distance. There are a number of roles which educators can take up in a networked learning environment, which have many similarities with face-to face teaching and learning but some which are different. There are at least three distinct roles:

1. eMentors;
2. eFacilitators; and
3. eLearning Co-ordinators.

In a regional centre, the role of eLearning Co-ordinator is at the level of Course Director. He/she needs to oversee the teaching and learning strategy of the eLearning Centre. In particular his/her brief will include the quality assurance of the networked learning activities, overseeing course development, issues of learner support etc. eFacilitators are akin to course tutors who run specific modules or courses. eMentors have the specific role of teaching and coaching colleagues in the processes of networked professional development. This includes additional support for novice learners to networked professional development. In small organisations, the roles will overlap considerably.

3.1.6.1. eMentoring and eCo-mentoring

In face-to-face mentoring, one travels to meet an individual at a location at a mutually arranged time. In working towards accreditation of the CPD activities, there will usually be some supporting documentation (c.f. Rughani, 2001). The model the mentor may adopt is to support, challenge, and provide vision for the mentee (c.f. Daloz, 1986: 215-35). On the Internet, it may be possible to spend the same couple of hours over a period of several weeks exchanging one-to-one e-mails. It may be possible for a mentor to take a higher case load of mentees because of savings in travel; communication occurs asynchronously (i.e. not at the same time) at times of personal preference; and communications may take just ten minutes, replying to an e-mail. Clearly substantive issues are always better dealt with face-to-face or at least on the telephone.

There are possibilities for confusion of tutor roles in eLearning. For example, where an eMentor with several eMentees may encouraged his/her eMentees to e-mail each other as a group, and eCo-Mentoring might occur. Is there a difference in dynamics between such a group and small group with an eFaciliator? As long as these process objectives are made clear to participants then confusion should be minimal. For example, in the second cycle of research it was anticipated that eCo-Mentoring would occur, i.e. group members would co-mentor each other. It did not because the rules of the eFaciliator (Gillie Bolton) were "that the group is everything." In other words, e-mail discussion between individuals was discouraged. The first cycle of action research tried to use the model of co-mentorship as outlined by Challis et al, (1997, 1999) and Mathers et al (1999). This largely failed to work in the electronic environment. The principal reason appeared to be a lack of structure in the mentoring programme (Pringle et al, 1998), a dearth of suitable eMentors, and the lack of resources to pay them within the project. Electronic mentoring programmes in the United States suggest that eMentoring can be made to work on a large scale. Single and Muller (1999) describe MentorNet, a structured electronic mentoring system that provides

training, coaching and community building opportunities for women following a scientific career path. In theory, a structured mentoring programme may well work across primary care.

3.1.6.2. Structured eMentoring

Drawing on the lessons learnt by Single and Muller (*ibid*); structured eMentoring to support ePortfolios in primary healthcare would need to have a number of characteristics:

- A multi-disciplinary approach can be taken provided careful matching takes place;

- Mentors need to be carefully matched with learners. The match could be on educational grounds e.g. a medical teachers might match with a nursing teacher, or topic area e.g. a consultant physician might match with a GP around hypertension. The match could be on job roles e.g. practice managers together;

- Training for mentoring could be developed either face-to-face or using short networked learning courses, depending on the learning style of the would-be eMentor;

- Quality is assured by evaluating the adherence to the aims, objectives and intended outcomes of the mentoring programme;

- Facilitation and supervision of mentoring relationships is by the hosting educational institution;

- Continuous feedback from consulting users would refine the system;

- Co-mentoring where one or two mentors may run a group of four to eight mentees;

- Embedding of the eMentoring system in the networked learning environment;

- Newsletter (or webzine) updating all participants and keeping communication channels open; and

- Confidentiality of information offered: self evident but needs stating

Probably the resources of a large organisation are needed to provide such a complex scheme.

3.1.7. Introduce portfolio to learners

Initially, at least learners will come to ePortfolios with some experience of adult based learning in groups from having done a face-to-face portfolio or learning plan. These people will be confident educationally but need a foundation course on computer skills. Others will come to ePortfolios skilled in computers but whose education was of a traditional didactic nature. These people may need a "learning how to learn course." In catering for the different learning styles, an interactive tutorial package (eLearning resources) on the steps required to do a model portfolio, including completed portfolios done by other people, can be available on websites. Whether the learner is experienced or not with the Internet, one role of the eMentor is to discuss with the learner whether this way of doing it will satisfy his/her learning needs.

In the future the undergraduate medical curriculum will have a large component of networked learning (Cook, 2001) and a learning outcome of a university medical education will be the process of lifelong learning supported by networked learning environments.

3.1.8. Develop individual action plan

There needs to be a balance between the needs and wants of individual learners for high levels of personal support and the resources available to provide them. It makes sense to adopt the small group approach to developing learning plans as an economy of scale. In a portfolio group, the common denominator is usually that there are groups of people who come together to and apply the principles of portfolio learning to a range of personal, organisational and clinical situations.

The most important part of this process is the settling of an appropriate learning plan with the help of mentorship. As a participant in e-mail discussion groups, there were a number of barriers to overcome in constructing a learning plan, and getting feedback from the rest of the group. Once the group has formed, the learning plans of other members of the group can be a learning resource. The mathematics suggest that if each member of a group of eight has three learning objectives then the group has access to 24 pieces

of study. In larger groups of, for example, a group numbering 20 selecting three learning objectives each, there would be access to over 60 pieces of study, which is overwhelming. Realistically, there would only be individualised feedback on learning plans if the task was shared amongst the group. This action research suggests that learners are not so egalitarian. Learning is self-directed and ultimately selfish. Learners did not get their learning plans commented on by other members of the group, did not feel supported and consequently either expected eMentoring from the eFacilitator or disengaged from the learning. Some learners are reluctant to share learning plans in the public domain.

Supporting this process of constructing learning plans is difficult by e-mail alone. It can be anticipated that ePortfolio software will, in effect, provide a personal website for its learners, containing all of the information that one would expect in a paper version. This will be much easier to manage both many individual learners and for tutors responsible for facilitating several learning plans, providing adequate security restricting access is in place.

3.1.8.1. Learning needs assessment

Often professionals do not know what they need to know. A number of educational tools have proved helpful to the learner in reaching a self-assessment of their learning needs. Many healthcare professionals will have been encouraged to identify gaps in their own knowledge at some stages in their vocational training or planning for CPD (Rughani, 1999). Thus short formative Multiple Choice Question (MCQ) tests, a learning matrix, confidence rating scales, significance event analysis or "PUNS and DENS" (Patients unmet needs equals doctors educational needs) may help both the directions of self-directed learning and as a formative assessment for the mentor/facilitator/trainer/supervisor to plan further levels of support (Grant et al, 1999). Modern technology can allow the design, implementation and evaluation of such formative self-assessment to be much more efficient and effective. For example, in a networked learning environment, Lottie could select a formative MCQ test to test her clinical knowledge in hypertension and

heart disease to identify gaps in her knowledge. For educators there will be an attractiveness in computer-based marking, for example of confidence rating scales. For medical education researchers, there is the opportunity to collect data on the performance of such self-assessment tests with the view to refining them and gaining useful information about the progress of cohorts of professionals.

3.1.8.2. Potential learning needs of eLearners

Face-to-face CPD tutors may know the professionals and the issues for learning in their local geographical patch quite well, and have a fair idea as to what is needed educationally, because they are part of the learning community.

Distant eLearning Centres may need to establish what the anticipated learning needs of its target populations are, and how many of these learning needs can be appropriately met within a networked learning environment. It may be acceptable to collect such formative data from e-mail or web based questionnaires or trying to use e-mail discussion groups as a kind of focus group to establish a consensus. However there is no reason why traditional postal surveys should not be used as has been done to determine educational needs for other groups e.g. GP non-principals (SCOPME, 1998).

3.1.9. Identify sources of evidence of learning appropriate to identified learning needs

An undoubted strength of eLearning is that it allows rapid access to huge collections of medical resources, such as the proposed National Electronic Library of Health (NHS, 1998). Many networked learning environments such as WISDOM have developed their own library of learning resources. On-line libraries are useful resources for eLearners to look for material related to their learning plans. As an example, Lottie searches an educational database such as Trent-net (available at http://www.trent-net.org.uk) for material on "menorrhagia." What comes back might be-details of a talk from Miss Jones at the local postgraduate centre or a CD-ROM interactive package or a web based course on evidence-based gynaecology, or an all day course in a

regional centre. Lottie can consider the learning method she feels most appropriate to her learning plan, perhaps consult with her eMentor and proceed accordingly.

3.1.9.1. eLearning resources: the learning packages

Many networked learning environments in health care, and including those used in this research are currently text-based. As the pace of Internet-based technologies improve it is easier to include still and moving images to enrich the learning experience (Coiera, 1997). For example teaching and learning around musculoskeletal medicine could have, in addition to text-based problem-solving clinical scenarios, pictures of affected joints, x-rays, and a video clip of an examination conducted by an expert. As such resources are expensive to create, they need to be done in collaboration with a commercial partner. It would make sense if such learning resources were commissioned so that they could meet the needs for different types of user. The current jargon for this concept is re-usable learning objects (Harden et al, 2002). Thus using musculoskeletal skills as an example, medical students would have problem-based cases around rheumatological conditions, supporting learning resources (web addresses of rheumatological educational sites, and key evidence-based rheumatology full-text journal articles) and access to video clips of the perfect expert examination of a knee joint. They would have the opportunity to discuss their work electronically with colleagues and tutors on the problem-based scenarios. General practitioners and registrars might use the material to enhance primary care skills as part of a learning plan. Interested nurses may use the material to enhance their specialised role within a primary care team. By constantly being in active teaching and learning use, the learning material can be more rapidly updated year on year than with paper-based or textbook based learning.

3.1.10. Gather and document evidence of learning

The participants in this research were not comfortable with the level of documentation required to produce a portfolio. Clearly a minimum standard of documentation is required. Technology may help some professionals with information management. There are a number of technological solutions

already available and evaluated technological solutions that automate the process of accreditation of learning, for example the MOCOMP ® program of the Royal College of Physicians and Surgeons of Canada. They claim to have experience with 31,000 records and 1500 physicians in Canada and other countries (Parboosingh, 1998). Within the UK work is in progress to develop Internet Personal and Academic Records of Achievement (PARS), an interactive student learning record, to provide a learning record of learners engaged in learning about health informatics within a NHS Virtual Classroom (P. Drummond: personal communication).

3.1.10.1. Enhancing the ePortfolio

The ePortfolio needs to be flexible enough to track informal reflections, critical incidents, evaluations of taught courses, and to provide a flexible template for accreditation. Many professionals will wish to undertake courses of study for which they do not need accreditation, but would like a record of achievement. Their ePortfolios might be a convenient place to collect data to use for other purposes, for example creating a curriculum vitae or information as the basis of appraisal, or to support a promotion application.

In a region where there may be a central register of all healthcare professionals, it is possible for web technology to link databases containing clinical governance data to the ePortfolio system. Using web-based technology, clinical governance information from the database such as details of practice size, number of telephones, number of staff, automatically appear in the ePortfolio record. Learners need to have confidence that their records are held securely and they themselves control who has access. The technological problems are solvable with today's technology. It is the social and political processes that need to be resolved before real progress on a vision to integrate clinical governance and CPD data to this level.

3.1.11. Monitor progress and assessing the portfolio

The same criteria for quality assurance of ePortfolios can apply as it does in traditional face-to-face portfolios. The same assessment criteria as developed for face-to-face portfolios also apply. However, there is a steep learning curve

involved in both computing skills, and learning how to do an ePortfolio. eLearners need to be confident that although it may take many hours to achieve modest skills in this field, they will be recognised and accredited.

3.1.12. Report results to appropriate bodies

Currently all of NHS Trent region has a facility for accrediting ePortfolios (P. Lane: personal communication) and many tutors in the postgraduate network in North Trent have had training on some aspects of eTutoring. However, much work remains to be done in turning the results of this action research into service development so that significant numbers of ePortfolios are submitted for accreditation. Real progress will only be made when the region formally adopts a comprehensive assessment system for accreditation of CPD linked to appraisal and revalidation (c.f. Rughani, 2001) and the appropriate networked learning environment which is rooted in that strategy.

3.1.13. Evaluation and quality

As increasing numbers of courses and modules come on stream to support portfolio learning, the requirement for agreed standards of quality becomes paramount. Quality applies to a number of aspects of any eLearning programme. Firstly, in terms of developing learning materials, there needs to be a continuous process whereby eLearning resources are evaluated formatively, summatively, and perhaps most effectively integratively as suggested by Draper et al (1996). The Quality Assurance Agency has produced guidelines which "are being provided as a resource for universities and colleges to use in regulating their distance learning programmes" (QAA, 1999). The problem for any eLearning centre is finding the resources to apply such guidance to its own programmes.

3.1.14. Cost Effectiveness

Commissioners of ePortfolio systems would do well to consider the development costs, maintenance, support and training of the solution they choose. To be cost-effective, software solutions need to involve a large number of users; and solutions should have undergone rigorous evaluation

before being rolled out. There seem to be four models for an eLearning Centre for primary care professional development as part of:

- the NHS Virtual Classroom programme (Nestor, 2000);
- the distance learning arm of higher education establishments;
- the distance learning arms of postgraduate organisations for healthcare education; and
- commercial organisations.

The eventual provision will be mixed. Proper economic analysis of the costs required for networked learning await a formal mechanism for revalidation of general practitioners and their primary health care teams, and a greater understanding of how opportunities for networked learning relate to the CPD structures that already exist. They may well be ripe for change. Boucher (1998) and Bacsich et al, (1999) have rehearsed the economic issues for the higher education sector (c.f. chapter 3.3.6.). The principles they have established may well form the basis of a model on which to base costings of networked learning in the NHS.

3.2. Teaching the generic skills of clinical governance

From the generic issues of supporting portfolio-based learning and assessment with IT in the context of CPD, I will move on to discuss some of the issues of supporting teaching and learning around clinical governance (Pringle, 1999a, Fox et al, 1999a) with IT.

How can networked learning support an educational framework for clinical governance? I will illustrate my analysis with a future orientated health informatics scenario, based on the concerns of a general practice.

The GP James comes along to the CPD tutor, wanting to set up his GP computer system so that the practice can audit the number of patients with ischaemic heart disease that are on appropriate medication. James is dismayed that despite his efforts the practice seems to have recorded far fewer ischaemic heart patients than expected. Following discussion between the tutor and the GP, and a bit of research, the problem appears to be that some of James's partners are entering data in the notes but not on computer. The tutor recommends that James might like to undertake a web-based learning resource entitled "Developing an IT strategy for Primary Health Care Teams". James dedicates 12 hours of his personal learning plan with the aim of improving his knowledge and skills. He dedicates a further 12 hours to the process of implementing with his team, the plan he has devised. The final hours of his learning plan are conducting the audit. The plan has been executed over one year.

Sarah, the practice nurse is doing a face-to-face course on clinical supervision as part of her PREP portfolio but the nearest health library is 10 miles away. The computer in the practice treatment room is linked to the NHSnet. She has attended a face-to-face course in "How to use CINHAL (nursing database) " and is keen to download some of the articles she needs for her study direct to her workplace. One of James's partners is concerned this is not part of her core nursing duties as he has already sanctioned attendance at the course

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Figure 7 5 Scenario 2: CPD and an IT strategy for primary healthcare teams.

The focus of clinical governance (see chapter 2.2) is "team work, partnership, communication," making it everyone's business in the NHS. It will mean the creation of a systematic set of mechanisms that will support staff and develop all health organisations to deliver a new approach to quality (NHS, 1999). For James, clinical governance entails the application of best practice, requiring personal skills, professional clinical skills, as well as organisational skills in their practice. For Primary Care Trust (PCT) managers, clinical governance requires both leadership and the organisational and management systems for service delivery monitoring, the power to address poor performance, and quality improvement in a culture which acknowledges errors and acts quickly to ensure they do not recur. Underpinning many of these processes is the need for high-quality information, and the skills to use it effectively.

3.2.1. Evidence-based practice

High quality clinical information about patient management should come from the evidence-base. Traditionally, health care practitioners will have accessed expertise within their own profession and visited the local health care library. In networked professional development, this is equivalent to the expertise within the eLearning community and the eLibrary. Nevertheless, the eLibrary has so much information that you need to learn how to look for it yourself and the cycle of evidence-based practice (c.f. Sackett et al, 1997) is a reliable way of doing it.

If seeking high quality information to answer clinical or management-related problems is done collaboratively in James's practice team, then it could be a form of action research. I have taken the steps of action research (Zuber-Skerritt, 1996) and the steps of evidence-based practice (Sackett et al, 1997) in fig. 7.6. to illustrate this.

Evidence based practice	Action research
form clinical questions so they can be answered	plan
search for the best external evidence	act
critically appraise that evidence	reflect in action
apply it in clinical practice	observe
evaluate one's performance as a practice team	reflection on action

Figure 7 6 Evidence -based practice as a form of action research

Looking at the scenario again (fig 7.5) in action research jargon, a group of patients are being changed or emancipated from inferior care by the collaborative self critical reflections of a practice team informed by best practice (c.f. Carr and Kemmis, 1986).

Sackett will certainly not have called for reflection-in-action and on action (Schon, 1983) as part of evidence-based practice, but in my experience the model fits. The evidence base is a resource for learning and external evidence is accessible to "learners" through a number of channels at national level including:

- Cochrane Library;
- The NHS Centre for Review and Dissemination (CRD);
- The National Research Register;
- The National Institute for Clinical Excellence (NICE);
- The National Electronic Library for Health;
- The NHSnet "Learning Zone" website; and
- OVID databases eg MEDLINE, CINAHL.

These important national resources can be embedded in a networked learning environment whose specific purpose is to support CPD in the context of clinical governance.

Thus by putting these 'learning' resources into Figure 7.7, there is a scalability of the model of networked learning both to regional and national level within the NHS.

Elements of Networked Learning	Local Initiative	Regional Initiative	National Initiative
eLearners	The eLearning Community of professionals committed to develop both their own skills and the evidence base		
Learning resources	Local tutors/librarians assisting with access, searches etc Local web based "collections" of resources	Regional data base of resources eg Trent-net	Cochrane, CRD, NeLH
Teaching methods	Adult learning based CPD facilitated by local tutors	Accredited courses with specific content eg evidence base or health informatics	Self-directed access to high quality information
The place to learn	Local CPD courses, portfolio groups etc	eLearning Centres eg WISDOM	NHSnet Learning Zone, NHS virtual classroom project.
The proof of the learning	Personal learning plans, ePortfolios eLearning Records		Set by national policy eg Royal Colleges, Medical Standards Board.

Figure 7 7 Scaling up the Networked Learning Model

(after Nestor, 2000)

3.2.2. Health informatics

There is no particular career pathway or much training for professionals like James and Sarah to expect them to have any particular expertise in health informatics. In the document "Learning to Manage Health Information" (NHS, 1999d), the UK informatics community has worked hard to accommodate the needs of major educational stakeholders for nationally agreed criteria with the anticipated health informatic learning needs of busy professionals.

The document (*ibid*) sets out several strands, which form the basis of a "curriculum" for life-long learning in health informatics:

- Communication: the writing, reading, and coding of health information within teams;
- Knowledge Management: the use of evidence-based practice and information technology;
- Data Quality and Management;
- Confidentiality and Security;
- Secondary Uses of Clinical Data and Information;
- Clinical and Service Audit;
- Working Clinical Systems; and
- Telemedicine and Telecare.

Not every GP has to be like James in the scenario and lead health informatics projects in his team; it might be more appropriately done by the practice manager or nurse practitioner depending on the structure of the team. However, by being aware of the steps in the successful managing of change (computing is no different), and considering an action research model (Zuber-Skerritt, 1996) the GP will have more ownership of the changes that are recommended to him by other team members.

At a more basic level of achieving progress, a professional may want to be more competent at producing documents on a word processor. For a novice eLearner, a learning outcome might be a perfectly produced curriculum vitae, but for his/her mentor such an outcome might represent a fundamental shift in attitude towards information technology. The accreditation system needs to recognise that the steepness of the learning curve for this learner, and the attitudinal shift are just as important and worthy of accreditation as the GP who conducted a computer-based audit. This flexibility of accreditation can be monitored as local tutors gain experience in assessing learning plans, and get a feel for the levels of quality that should be expected.

3.2.2.1 Practice development plan - the role of IT

At one level the health informatic agenda can been seen in traditional education terms as a 'field of knowledge' (c.f. chapter 1.1.2.1) with its own curriculum as might be expected in any science. However, it is possible for practitioners or practice teams to collaboratively set learning objectives in relations to health informatic problems related to their work. Zuber-Skerritt's (1996) concept of action research for organisational change (see chapter 4 fig 4.2) provides a model for understanding why the practice in the scenario is not a learning organisation and why the professional development of individuals such as the nurses are blocked. At an individual, team or organisational level their barriers to learning (*ibid*) are through failures to plan properly, failing to implement agreed policy or procedures (to act), failure to get feedback on draft policies (observe) and failure to reflect on the results of the implementation. James, having found his partners did not use the computer to the same standards as he, needs to work collaboratively with his team (and maybe patients) to identify the problem, to research it collaboratively, for example encouraging the nurse to do the searches, reflect on it as a team, and collectively present a plan which has involved the whole team. The plan can be implemented because the communication has made everyone own the plan and see the wisdom of it. When the team look to see whether the plan worked (reflection) they can see that the information they get from the computer is now useful. It helps in face-to-face management of patients because the practice can see at a glance who is not on aspirin or a cholesterol-lowering drug that should be. Patients have genuinely gained. Having gained confidence in the process, the practice may be happy to include health informatics as part of the Practice Development Plan. Several of the staff could tie in their own personal development plans to include elements of data entry, data quality and audit using the computer. The nurse can demonstrate her learning in her PREP portfolio as can James for his

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PGEA, but grounded in clinical governance and to the clear benefit of patients.

The CPD tutor had not just helicoptered in with a bag full of tools to help. He had kept up his own professional development throughout. He had recently completed an on-line "change management course" delivered by the distance learning section of his local university and was looking for a project to try his new skills on. He stays in touch by e-mail with other CPD tutors and a loose eLearning Community of people interested in health informatics. He is able to bounce ideas off and share what was happening in his project with others. The Primary Care Trust for which they all worked in has found some money to support an initiative to put health informatics facilitators into practices. Taking account of work done of Teasdale (1997), the Primary Care trust could aim to improve the quality of data put in and information extracted from GP systems by using facilitators to help practices learn how to use their computers to meet their own information needs.

A practical application of such a scenario could only occur where the overall strategy for delivering on clinical governance issues is linked to CPD and supported by an appropriate use of IT. Progress is being made linking CPD, revalidation and the clinical governance agenda (c.f. Rughani, 2001), but what of the support with a networked learning environment?

3.3. Embedding the networked learning environment within an institution

My strategic vision for an organisation wishing to support CPD in primary care with IT involves two separate but parallel stages:

1. To develop and implement a clear teaching and learning strategy for CPD which takes account of the clinical governance agenda; and

2. Develop a networked learning environment in which the teaching and learning strategy is integrated.

If portfolio-based assessment is a major plank of the teaching and learning strategy, then the networked learning environment will have an electronic portfolio system embedded within it. The combination of a clear teaching and learning strategy and a bespoke networked learning environment gives rise to the concept of a Managed Learning Environment, where the role of IT is to manage all aspects of learning (c.f. Everett, ·2001). This is represented graphically in fig. 7.8.

3.3.1. Preparing to implement a managed learning environment

In planning a cycle of action research (c.f. fig, 7.1), there are a number of common issues which inevitably arise in building a managed learning environment. These are:

- Overcome barriers to change;
- Creating the networked learning environment that reflects the teaching and learning strategy;
- Staff development issues across the organisation; and
- Developing structures and processes to manage the change.

3.3.2. Overcoming the barriers to institutional change

Networked learning to promote professional development is not a cheap option. In any region, educational institutions need to collaborate to provide a

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learner experience of a learning environment, which is seamless, as they move from undergraduate to postgraduate education. However, much work needs to be done to develop a common teaching and learning strategy to promote professional development across traditional interfaces, for example, between undergraduate and postgraduate training, between professionals from differing disciplines.

The barriers for any educational institution wishing to support CPD with eLearning would appear to be in three broad categories

- a teaching and learning strategy which is undecided about both its learning outcomes and the appropriate assessments to drive the learning towards the intended outcomes;

- an information technology strategy which fails to support the teaching and learning strategy; and

- a lack of investment of resources, both financial and organisational, in any integrated way.

3.3.3. Creating the Managed Learning Environment (MLE) for CPD

The criteria for establishing a managed learning environment revolve around resolving these barriers and looking to see what additional resources are available to the institution to help in overcoming these barriers. These will include:

- collaboration with other CPD provider institutions who have developed examples of best practice to share expertise;

- ensuring that any networked learning environment (NLE) solution chosen conforms to emerging international standards for distributed learning in particular the recommendations of Instructional Management Systems (IMS), and JISC (Joint Informations System Committee, c.f. Everett, 2001);

- identifying any pockets of expertise within the organisation.

Once the barriers to change have been identified, then resources need to be identified to support the change. Only then are the institutional leaders in a position to formulate a strategic plan with a view to implementation and

consider the quality assurance as part of the evaluation of the plan (Johnson and Scholes, 1997). The teaching and learning strategy needs to take account of the clinical governance agenda and other NHS policy directives in particular multidisciplinary learning. It makes no sense to have massive investment in IT support based on uniprofessional training. Equally, it is senseless to commence IT investment in multi-professional education without a clear strategy on which to base it. The criteria for establishing a Managed Learning Environment which meets the teaching and learning strategies of the institution are:

- A clear teaching and learning strategy towards clear learning outcomes; appropriate levels of assessment and learner support; and flexible learning methods;

- The web enabling of the teaching and learning strategy through the networked learning environment. For example if learners are able to set their own learning objectives in association with a chosen mentor and need to produce a portfolio, the networked learning environment should reflect and facilitate that process. If learners are encouraged to have core competencies set and a self-assessment learning record that logs courses, training events and exposure to clinical situations then the networked learning environment should reflect that. The networked learning environment is not a virtual world where learning is somehow different from the learning that occurs in the face-to-face world.

- An investigation of both commercial systems and homegrown solutions to developing the right networked learning environment. In particular the NLE needs to be able to 'talk' to the database system that runs the registration system of learners within an organisation;

- The connection between the management information systems of the institution and the chosen networked learning environment is crucial. Only then can the potential of the NLE be harnessed in terms of manipulation and re-use of the learning objects (c.f. Harden et al, 2002).

- Making the use of the networked learning environment part of the continuing professional development of teaching and managerial staff of the institution;

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- Providing opportunities for special populations of users for example novice and disabled people;

- Ensure the organisation reflects in a feedback loop from the quality assurance data and modifies the structure accordingly (Zuber-Skerritt, 1996);

- An investigation of quality assured web enabled learning packages developed elsewhere, for example health informatics, evidence based practice, teamworking, communication skills, palliative care in the community etc;

- An investigation and establishment of guidelines on access through learning centres, personal digital assistants, desktop computers, and individual workstations etc;

- Addressing issues such as intellectual copyright on educational materials produced, data protection act, encryption of personal details, secure fee payment systems where appropriate etc; and

- Costings analysis over a 10 year period
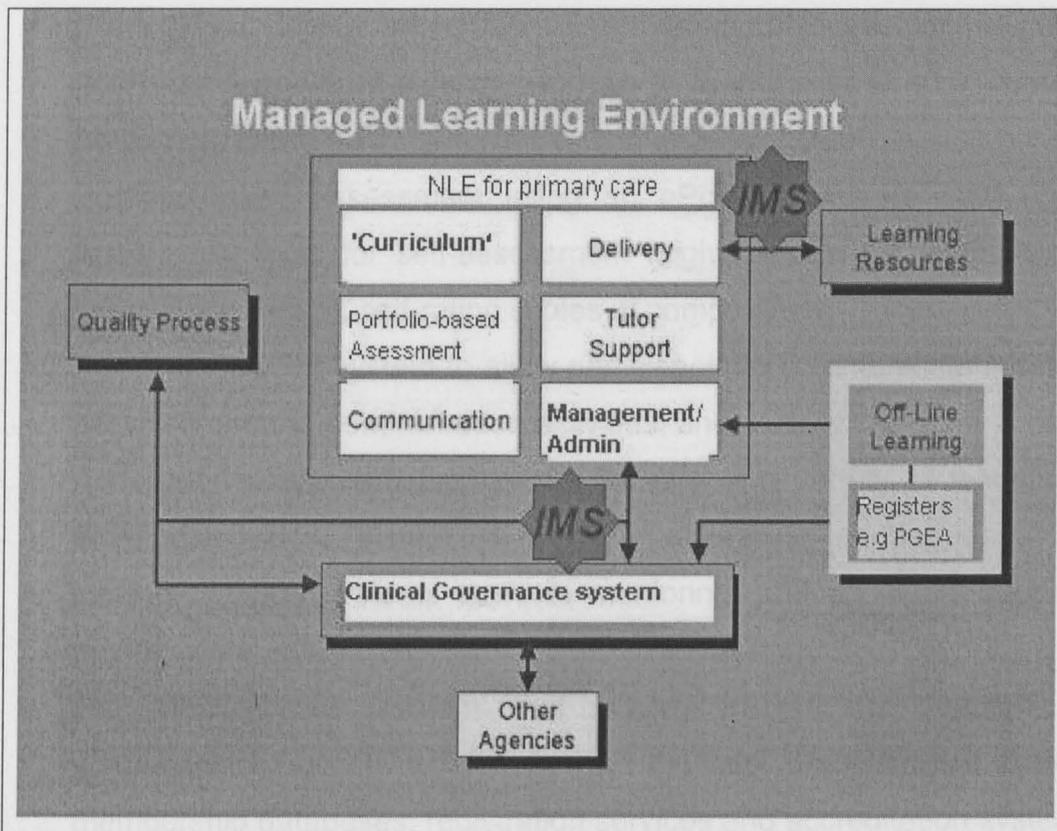
Figure 7 8 A generic model for a managed learning environment for institutions providing CPD.

(after Everett, 2001)

3.3.4 Staff development within an NLE: the Learning Organisation

The widespread use of an NLE requires staff to acquire new skills. However the use of any form of IT can act as an additional barrier to change for staff (Fox et al, 2001). A well structured, integrated and adequately resourced staff development programme is essential to address this. In practice, these activities are often provided on an informal individual basis driven by need.

3.3.5. Developing the Networked Learning Environment

The managed learning environment in fig 7.8 represents an integration between the networked learning environment and the systems of the host educational institution. A networked learning environment to support CPD activities of primary health care professionals would have the following features:

- Curriculum mapping: an accrual of the learning objectives of thousands of participants would be expected to map to from the basis of a 'curriculum' for primary care;

- Portfolio-based assessment using an ePortfolio system (see fig 7.4). Additionally tools for self-assessment might include for example, MCQ tests of knowledge, self-rating scales of competence;

- A communication system to allow participants to communicate in teaching activities, around administration activities, and socially;

- A delivery mechanism that allows delivery of a variety of teaching and learning activities. This will link in with an eLibrary of learning resources.

- Learner support systems such as mentoring, and additional support for novice users; and

- An administration system that allows tracking of learners. The administration system will link in with the host organisations system of membership databases, registration services and accreditation systems.

Educational institutions will need to decide whether to use commercial systems for example WebCT or Blackboard, or whether to develop a home grown one (c.f.Cook, 2001).

3.3.6. Managing institutional change towards an MLE

A newer, potentially large provider of e-learning will be the NHS University, which claims that a central hub and local resource centres will deliver a wide range of educational, training and mentorship for all NHS staff across a wide range of subjects (DOH, 2002).

However, much of the wisdom within the networked learning research community on promoting system-wide change has been gained in the Higher Education sector (c.f. Jordan, 2001). A number of generic principles have emerged which if acted upon can help embed a networked learning environment within an educational organisation. For example, within any organisation there may well be champions of developing a networked learning environment. In order to promote change:

Networked learning champions should:

- demonstrate the benefits to potential teachers and learners at workshops to raise awareness;
- offer a practical support service to those contemplating a start-up;
- treat health care educators as fellow learners; and
- show sensitivity to individual tutor's and teacher's perceptions

Any networked learning environment will require learning resources. **eLearning resource providers** should:

- choose software which will work across a number of platforms;
- minimise features which require expensive new or upgraded computers for users;
- provide learning packages in small modules so that teachers/tutors can select appropriately;
- build formative evaluation to refine future versions of the software;
- offer on-line support to teachers/tutors using the software;
- specify in what ways the software can be customised or added to by the teacher/tutor;
- encourage a collaborative approach to the design of eLearning resources; and
- ensure design on recognised educational principles.

Individual eTutors engaged in networked learning should:

- include training in networked learning as part of ongoing professional development;
- use national or regional databases of teaching and learning resources;
- form local eLearning resource use and development teams;
- evaluate (and research) their own teaching; and
- undergo appraisal mechanisms as part of their educational organisation.

eLearning centres (or the eLearning arm of traditional educational providers) should

- recruit, train, support and develop staff with the necessary skills;
- treat eLearning resources as publications;

- ensure that costs of virtual education are affordable to the individual or post graduate organisation;

- promote change towards providing a generic multi-professional curriculum for CPD;

- provide training for clinical governance e.g. risk management, informatics, audit etc; and

- be part of a steering group of key educational stakeholders in CPD for primary care.

Institutional management should underwrite support services in:

- Networked support - the promotion and maintenance of access to on-line learning;

- Information Officers - the promotion of on-line information searching, retrieval and storage of health related information;

- Creating, modifying and updating suitable eLearning resources;

- Co-ordination of capital investment in training centres for networked learning; and

- Encourage collaboration with commercial partners.

Funding and quality assessment bodies should:

- Encourage standards for hardware and software;

- Negotiate copyright of funded eLearning resources;

- Underwrite the development of proven Learning resources; and

- Fund regional and national databases of learning eLearning resources and disseminate methods for its effective application.

3.3.6.1. A business plan

Looking back at action research model for organisational change see (fig 7.1), the shared vision for primary care needs to be embodied in a business plan. Any business plan for establishing a managed learning environment (MLE) needs to reflect the teaching and learning strategy of the educational organisation, for example the Deanery within a region. There also needs to be

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shared ownership (Zuber-Skerritt, 1996) before implementation can be carried out. This can be achieved collaboratively by sharing the vision throughout the organisation and with those who have a stake in the outcomes of CPD in primary care.

3.3.6.2. Leadership

The objectives of the MLE are to meet objectives of the teaching and learning strategy of the institution. A leader is required who shares the vision, and is able to drive through change supported by a management group which involves the main stakeholders in the institution. The leader must have access to appropriate resources to manage the change

3.3.6.3. Dissemination

The MLE policy will need to be spread to all aspects of the organisation (Zuber-Skerritt, 1996). Because the policy will have been developed in consultation with all the major stakeholders, it should be sensitive to both local contexts and towards more strategic imperatives of fitting in with clinical governance agenda.

3.3.6.4. Evaluation

An evaluation strategy naturally evolves as part of the action research cycle. The quality of data informing the evaluation should be enhanced by the affordances of the networked learning environment.

4. Conclusions

In this third cycle of action research, I have developed the virtual classroom model proposed in the first cycle towards the concept of the Managed Learning Environment based on a critical reflection on my own experience, that of my action research collaborators and the emerging literature. This clearly sets the responsibility of developing an integration of networked learning environments with the teaching and learning strategy of the host institution as opposed to trying to deliver change through a local 'eLearning' agenda.

4.1. A new action research plan

The model presented in this action research is capable of managing the learning environment to support portfolio-based assessment of the continuing professional development activities of primary health care professionals. It is up to others to take this action research agenda forward.

4.2. And finally

Finally, I end with the quote with which I began describing Schon's (1987) notion of a professional practicum where:

> In order to be credible and legitimate, a practicum must become a world with its own culture, including its own language, norms and rituals. Otherwise, it may be overturned by the academic and professional cultures that surround it. But, if it succeeds too well in establishing its own culture, isolated from the larger worlds of university and practice, then it may become in the pejorative sense an artifice (Schon, 1987).

In part of this research I created and evaluated a virtual world using communication and information technologies to encourage primary healthcare professionals in their growth as reflective practitioners. As I reflect on what I have achieved in this thesis I believe there are a number of broad issues:

1. My analysis challenges some of the assumptions about how primary healthcare professionals learn. In particular, models of evidence-based practice do not seem to fit with the data. Continuing professional development models may promote one-dimensional learning in certain aspects (Eraut, 2001). More pedagogical research is needed to enhance understandings. However impending moves for revalidation of the medical professionals will change the purpose of portfolio-based assessment.

2. There has been a good illustration of the challenges of teaching and learning in the clinical governance agenda, particularly health informatics and evidence-based practice.

3. I have described a model of portfolio-based assessment which is sufficiently flexible to accommodate differing educational purposes, and is capable of being transferred to the web.

4. I have described the potential of supporting the portfolio-based assessment of CPD learning activities with an IT system, the networked learning environment. Whilst the complexity of this model is readily acknowledged there is now a critical community of action researchers who are developing and advancing these understandings (Hammond et al, 2002).

5. I have described a strategic vision for future action for the primary care educational community where educational institutions are seen as Managed Learning Environments, where there is an integration of the teaching and learning strategy (which may include portfolio-based assessment) with a networked learning environment.

Fundamental shifts in the way education and training are delivered take a long time and the hardest lesson has been that a change such as 'managing a learning environment' to support CPD in primary care probably has a ten-year cycle. That has proved beyond the scope of this thesis. However, the process of planning, acting, observing and reflecting is life-long

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Appendices

A.1. Wisdom Flyer

WISDOM
An opportunity to see 2000 AD
NOW

Are you a member of a primary health care team?
(DOCTOR - NURSE - MANAGER)

The NHS Executive IM&T (information management and technology) group have awarded a grant to pilot a fresh, innovative approach to learning about the handling, assimilation and use of information in Primary Care - here in North Trent. This is the first major initiative from the Institute of General Practice and Primary Care to be launched and we hope you will enjoy a few months on the "frontier".

You will be assisted in designing your own learning objectives and these will be met during a series of interactive tutorials. A full evaluation of your own development and that of the course will be conducted by the Pilot Advisory Group and by an external body.

Who can participate? -   Anyone from your team - but numbers are limited to 50 from North Trent.

How much will it cost? -   There is no course fee - but you will need to obtain access to a computer with a modem - your contact with your co-learners in North Trent.

When will the course commence? - 1st May 1997 - for 5 months.

What training will be available? - This course is for all levels i.e. novice to 'nerd'.

How much time will I need to invest? -   This is up to you - the tutorials will be one hour each week but travel is limited to the site of your computer.

There will be opportunities for face to face learning - "getting on line etc." but the majority of your activity will be in a "virtual" environment assisted by the course tutors and fellow learners.

PLEASE RETURN THE ENCLOSED REPLY SLIP

WISDOM

If you are interested in being involved in the WISDOM project please return this completed reply slip to:

> **Dr Chris Roberts, Project Facilitator**
> **c/o April Widdop**
> **Quality in Practice**
> **Oakwood Hall**
> **Moorgate Road**
> **Rotherham**
> **S60 2UN**
>
> **Telephone: 01709 838073 or**
> **e mail April_Widdop@ROTVTS.Demon.co.uk**

The WISDOM Project team consists of

Dr Pat Lane	*Director of Postgraduate GP Education North Trent*
Dr Chris Roberts	*Department of General Practice*
Dr Nigel Mathers	*Department of General Practice*
Dr Nick Fox	*Department of General Practice*
Dr Phil Levy	*Department of Information Management*
Mr John van Loo	*Sheffield Health (Librarian)*
Mrs Amanda Hunn	*Trent Focus*
Mr Mick Hammond	*Adult Education*

Contact Name: ....

Job Title: ....

Contact Address: ....

....

E-mail Address   ....

Telephone/Fax No. ....

The WISDOM project

Computing for Primary care

return to

Dr Chris Roberts
Quality in Practice
Oakwood Hall
Moorgate

Please return as soon as possible

The WISDOM project

Introduction

The aims of the WISDOM project are to evaluate networked learning for professionals in Primary Care using an electronic discussion list WISDOM@SCHIN.NCL.AC.UK

The questionnaire is designed to identify your individual learning needs as a basis for
- developing a personal learning plan with help from the course facilitator Dr Chris Roberts
- evaluating the WISDOM course

Completing the questionnaire

The questionnaire can be done in 15-30 minutes.
All the information will be treated in the strictest confidence.

Dr Chris Roberts M.Med.Sci MRCGP
Institute of General Practice and Community Care
North Trent

About you

What sex are you?   Male ☐   Female☐

How old are you?

How long have you been qualified   years ☐☐

Please state your main job title

```
[                                                    ]
```

Is the post: Part time ☐ Full time ☐

Do you hold any other professional posts?

```
[                                                    ]
```

Please list any professional or university qualifications that you hold

```
[                                                    ]
```

If you are not based within General Practice, please turn to the next page.

How many partners are there in the practice?   [   ]

What is the practice list size?   [   ]

In what kind of setting is the main practice based?

Inner city ☐   urban ☐   rural ☐   mixed ☐

Does your practice currently take GP registrars (trainees)?

yes ☐   no ☐   don't know ☐

Does you have easy access to a health services library or resource centre?

yes ☐   no ☐   don't know ☐

About your Computing Experience

For approximately how long have you personally been using computers, prior to this course?

Never before   < 5 Years   ☐   6-10 Years   > 10 Years ☐

Please rate the extent of your computing experience with the following types of software.

Software Type	Unaware of	Aware of but unable to use	Can use	Can use and teach
Word processing				
Databases				
Spreadsheets				
Electronic-mail				
Interactive CD-ROM				
Operating systems				
Windows				
Statistical Packages				
Medline				
Web Browser				

Please list any computer software that you use on a regular basis that was not included in the table above

Please rank the following to show which have helped you most in developing the computer skills that you have now. Start with 1 to show which helped most, 2 to show which helped slightly less and so on. Please put 0 for any which did not help at all.

	computing magazines		electronic discussion groups
	self taught using software		in house computing professional
	family/children		in house non computing professional
	taught by a work colleague		conferences
	taught by friends		medical publications
	formal computer courses		other
	learning on the job		please specify ....

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About Electronic-mail

Have you used computer discussion groups before?

Yes ☐ No ☐ Don't know ☐

If **Yes**, please tell us which one it was and what you found most valuable about taking part.

```
                                                                 

                                                                 

                                                                 

                                                                 

                                                                 

                                                                 
```

If **Yes**, please describe any disadvantages of taking part in the discussion group

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```

Why have you chosen this course, which uses an e-mail discussion group, as a method for your learning?

```
                                                                 

                                                                 

                                                                 

                                                                 

                                                                 
```

Evidence Based Practice

Evidence based practice is a method of using research findings as the basis for decision making. Please rate your current experience in performing the following tasks.

	Unaware of	Aware of but need to know more	Can do	Can do and teach
From a practice problem, can you formulate an appropriate question to explore further				
Locating sources of information relevant to the problem				
Evaluating the value of the information found				
Implementing useful information into practice				

Which methods do you use to keep up to date with current knowledge and practice?

METHOD	
Lectures	
small group tutorials	
professional journals	
Medline	
Internet	
Workshops	
Discussion with colleagues	
Consulting experts	
Other: Please specify	

Which one of the above methods do you *prefer to use most* as the method of keeping up to date with current knowledge and practice?

METHOD: ....

Personal learning needs

Please describe _any_ concerns that you may have about participating in this course.

```


```

What topic areas, clinical or professional would you like to cover during the course

```


```

Have you used an educational learning plan before?

Yes ☐   No ☐   Don't know ☐

If **YES,** please describe any ways in which the experience changed your learning.

```


```

Have there been any obstacles which may have prevented you from developing your computing skill further

Yes ☐   No ☐   Don't know ☐

If **YES,** please describe those obstacles

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Have there been any obstacles which you feel may have prevented you from continuing to develop your professional practice skills.

Yes ☐   No ☐   Don't know ☐

If **YES,** please describe those obstacles

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Please describe any activities in which you are currently involved, apart from this course, which you feel contribute to your continuing professional practice

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How might the WISDOM course change your professional practice?

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How might the WISDOM course change your own continuing professional development?

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Thankyou for completing this questionnaire

A.3. Initial learning needs of participants: case study one

Participants were asked to suggest any clinical or professional topics which they would like to see covered during the case study one.

The following answers were received:

- Evidence based medicine (I'm a cynic). Current affairs pertaining to general practice. Law and medicine. Common (or rare) clinical problems. Discussions re: new products / treatments
- Clinical controversies: atrial fibrillation and anticoagulation, hyperlipidaemia and its treatment. Referral guidelines - which to use
- Any clinical or teaching skills
- Any chat might bring a 21 years qualified GP more up to date (i.e. no areas excluded)
- Haven't given it dedicated thought yet. Probably 'go with the flow'. Will decide on areas as I progress
- General computing skills. Teaching skills
- Common GP clinical problems
- The place of the different anti-arrhythmics. Use of databases, statistical packages
- Prescribing, practice management
- Using IT more in the practice and beyond
- Exploration of how professionals learn and change using electronic media. How to link the discussion through to changed behaviour (rather than just increased knowledge)
- Medical education, teamwork
- Clinical: Different ways of coming to decisions-- inductive, deductive, heuristic. Professional: GP help with management of time - I am single-handed
- Advances in HRT - management of osteoporosis. Multidisciplinary learning
- Practice computing, practice management of dyspepsia and GORD in relation to new guidelines. Management of change and administration/office systems
- Managing patients with coronary heart disease
- The application of evidence based techniques to the development of IT as a management tool
- Clinical: anticoagulation / general medicine / therapeutics. Professional: Management / Development practice-based information systems
- I would like to learn how to formulate protocols to be used on computer at work. I am also interested in easy ways to record information and store it electronically
- Improving e-mail skills, typing ability, computer usage
- Commissioning
- Modern GP developments including evidence based practice. Innovations in practice. GP Commissioning
- Nursing developments in Primary Care clinical and managerial. Child health - health visiting - nursery nursing roles. Post natal depression. Health Visitor caseload profiling
- How to write a paper for publication. How to use the Internet
- I feel that my management skills are sound but a 'health care' gap in my knowledge limits their application - specifically relating to planning development of: pharmaceutical / prescribing, nature of factors influencing prevalence of disease etc. / experience of models of primary healthcare team deployment -

effectiveness measures etc. Healthcare metrics / outcome measures
- Co-ordination of practice policy - protocols, clinical and integration of primary healthcare team. Mental health problems - presentation / management - resources, especially psychosomatic illness / Depression / Anxiety
- Anything to do with information technology - shared NHS database. Health needs assessment and how small practices like ours could do this effectively
- Learning more about computing in primary care, data management, searches, searching MEDLINE, operating systems
- Cardiovascular

A.4. Post Intervention Questionnaire

1. Computing Experience

Information Technology supports the capture, storage, retrieval, communication, analysis and presentation of data and information.

Please rate your current skills with each of the following types of software (one tick once for each software package)

Software Type	Unaware of	Aware of but unable to use	Can use	Can use and teach
Word-processing				
databases				
Spreadsheets				
electronic mail				
Interactive CD-ROM				
Operating systems				
WINDOWS				
Statistics Packages				
Medline				
Web browser				
Other please state		.		

Which computer skills would be useful for you to learn about next and why?

```



```

Please demonstrate ways in you have been able to put your new computer skills into practical use.

```



```

Which activities within the WISDOM project were most useful to you personally in developing your computer skills?

1= no use   2=some use 3=fairly useful   4= very useful   5=extremely useful

(Please tick once for each activity)

Activity	1	2	3	4	5
WISDOM Tutorials					
Reading WISDOM discussion list					
E-mail contact with members of WISDOM list					
E-mail contact with others outside of WISDOM					
E-mail contact with the facilitator					
WISDOM web pages					
Self taught using the Internet					
Self taught other than the Internet					
Face to Face contact with WISDOM members					
Other learning sources please specify					

Acknowledging the pressure of work on your time, what were the main obstacles to you developing your computer skills during WISDOM?

2. Electronic Mail

The Wisdom project uses an e-mail discussion group supported by the WISDOM web pages to create a virtual education centre.

Can you explain what was useful for your own learning within the WISDOM discussion group?

In what ways could the discussion group have been made more relevant to you?

```




```

Please describe any problems you had in taking part in the discussion group.

```




```

How do you propose to use your e-mail and Web abilities over the next year?

```




```

3. Evidence Based Practice

Evidence based practice is a method of using research findings as the basis for decision making. Please rate your current experience in performing the following tasks.

	Unaware of	Aware of but need to know more	Can do	Can do and teach
From a practice problem, can you formulate an appropriate question to explore further				
Locating sources of information relevant to the problem				
Evaluating the value of the information found				
Implementing useful information into practice				

Please describe what you needed to know more about at the start of WISDOM to use evidence-based practice in your job.

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Please describe any ways in which your new evidence based practice skills are of practical use?

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Acknowledging the pressure of work on your time what were the main obstacles to you developing your evidence practice skills during WISDOM ?

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Which elements of the WISDOM project were most useful to you personally in developing your evidence based practice skills?

1= no use 2=some use 3=fairly useful 4= very useful 5=extremely useful

Activity	1	2	3	4	5
WISDOM Tutorials					
Reading WISDOM discussion list					
E-mail contact with members of WISDOM					
E-mail contact with others outside of WISDOM					
E-mail contact with the facilitator					
WISDOM web pages					
Self taught using the Internet					
Self taught other than the Internet					
Face to Face contact with WISDOM members					
Other learning sources please specify					

What do you propose to learn about next in the field of evidence based practice?

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4. Personal learning needs

A portfolio is a record of your LEARNING OBJECTIVES and evidence to support that these have been met. Not everyone on the WISDOM project has used the Internet exclusively for his or her learning. In this section we are looking at your wider learning activities, i.e. not just those related to Wisdom.

Can you explain how the WISDOM course matched up to your expectations?

```



```

Do you intend to submit a portfolio at the end of the WISDOM course?

Yes ☐   No ☐ Unsure ☐

If no what were the reasons you felt unable to submit one?

```



```

If yes, how do you compare the experience of completing a portfolio with other methods of learning?

```



```

Please describe the most useful learning activities under taken during your portfolio.

```



```

Please describe learning activities in your portfolio which were not useful.

```



```

Please compare how many of your original learning objectives were met in your portfolio.

```



```

For any learning objectives not achieved, what were the possible reasons why?

```



```

How would you propose that your portfolio could be improved?

```



```

Thank you
Please return in the pre-paid envelope by 21 November 1997.
Thanks once again from the WISDOM team.

A.5.Sample of Portfolio handbook

WISDOM

INDEX

A.6. Interview schedule for Case study one participants

1. What went well for you during the course

2. What didn't go so well

3. Is there anything that could have been done differently

4. Have you any plans for what else you would like to learn about

5. Did you manage to get any help with the clinical or professional problem areas you started the course with

6. Has the course in any way changed what you do with patients

7. Are you working on any development projects as a result of being on the WISDOM course

8. What do you feel about networked learning as a means of learning

9. Have you gained any new computer skills since you started the course?

10. Could you tell me something about the principles of evidence based medicine

11. Did you learn anything useful to you about evidence based medicine on this course

12. What do you think about the controversy over evidence based medicine.

A.7. Topic Areas Covered by Joint Working Group Documentation (1996)

Topic Area 1	**Data in Clinical Practice** What is data, why keep it, and what is it used for? Where does data come from? How is data collected and stored? Who analyses data and how? How secure is your data? Potential benefits of IT for patients and practice
Topic Area 2	**Information Use- Principles for Best Practice** Introduction to using information effectively Data Quality Data entry policies Security policy and the Data Protection Act 1984 Health and Safety Legislation Legitimate uses of aggregated data Information flows Monitoring good information practice
Topic Area 3	**The NHS Information Environment** National projects Local projects
Topic Area 4	**Software** Introduction to software Word-processing and desktop publishing software Spreadsheet software Presentation software Database software Statistical software Financial software
Topic Area 5	**Introduction to Quality** The audit spiral Added value Data quality in clinical audit Clinical guidelines
Topic Area 6	**Data Handling** Data handling- an overview Clinical coding Practical aspects of clinical coding Structured data entry Electronic implementation of clinical guidelines Targeting groups of patients
Topic Area 7	**Data Reporting** Searches and reports on clinical systems Use of other computer software for clinical audit Preparing, presenting and interpreting results of reports MIQUEST
Topic Area 8	**Other Sources of Data and Information** The Health Authority and other agencies On-line health specific reference information

Topic Area 9	**Sharing Data and Information** Confidentiality and security Multi-professional practice and shared records Interface audits Electronic networks
Topic Area 10	**Strategic Uses of Information** Health Needs assessment Health gain Casemix management and HRGs Resource management Purchasing for quality

Each of the topic areas is broken down into Modules such as

Heading 1	• **What is data, why keep it, and what is it used for?**
Aim	• To promote understanding of what data is, why it is kept and what it is used for
Learning Outcomes	• Defines data as distinct from information • Describes the role of data and information in patient care • Describes the role of data and information in the care of patient groups • Describes the role of data and information in administration • Identifies basic medico-legal issues concerning data
Possible Training Methods	• Brief introduction and explanation of data and its transformation into information • Examples of uses of information in patient care, both individual and group, and in administration • Explanation of medico-legal issues concerning data

A.8. WISDOM Drop-Out Interview Schedule

The WISDOM project has now completed and we would appreciate if you could spend just 5 minutes to answer some questions concerning your experience of it ...

What were the reasons for your original interest in this project?

- IT
- EBP
- Educational

What did you actually expect from the project?

- On the job IT training
- PGEA
- Accreditation
- Communication with peers
- Other benefits

Why did you not continue with your participation?

- Insufficient time
- Expense
- Not the right time
- Not meeting expectations

What changes could have been made to ensure your continuing participation?

- More face-to -face support
- Topic areas
- Initial technical support

Please describe any other ways by which you could learn about the areas you are interested in

- Workshops
- Journals
- Formal courses

Thank you for your time

A.9. Mid-Way Interview Schedule

Prior IT, EBP and PLP usage:

IT - ACTIVITY AUDIT

Where usually access electronic mail from -home or work

Ease of access to network

How to improve any problems accessing network

Favourite time for using network

Type of software used for e-mail and net browsing

How often log on to check electronic mail

Approximately how many messages a week received?

Approximately how long spent browsing the web site each time?

Methods of reading messages

Methods of storing messages, print delete, store in folders?

Factors in choosing messages -length?

E-mail audit

- Replied to individual or list of individuals

- Replied to WISDOM group

- Included previous message in reply

Web Audit

- Access to WISDOM website

- Access any other websites

Used computer for any other new things since WISDOM, patient care, home? Any local computer support-Home/work

Value of IT tutorials? Value of discussion related to IT?

Any changes to patient care related to WISDOM discussion.

Problems in using computer?

What would you like to inform the rest of the course and how best expect to achieve this?

EBP

Identified any practice problems for which you've wanted to review available evidence

Transformed any of own problems into searchable questions

Done any of own searches-manual or computer

Found any articles of interest

Applied any research findings in patient care

Found EBP tutorials useful

Found discussion re EBP useful?

What want to learn from course re: EBP and how best to achieve this

PLP

What are your set learning objectives?

What was most useful in setting objectives?

What support in setting learning objectives?

What resources used related to objectives

Changed any of original learning objectives?

What helped in modifying learning objectives<

Views on face-to-face learning.

PROGRESS

Participated in beginners group PROGRESS in summer?

Participate in group discussion re on-line basic informatics?

Thankyou

A.10. Samples of Course Materials

A. Seminars

The following seminars were presented during the 5 month intervention period, and subsequently published on the web site.

- Introducing E-mail

- Collaborative and Networked Learning

- An Introduction to Evidence-based Practice

- EBP Seminar 2: The basics

- EBP Seminar 3: Databases

- EBP Seminar 4: Literature Searching using Medline

- EBP Seminar 5: How to evaluate the evidence

- EBP Seminar 6: From evidence to practice

- The WISDOM Portfolio for Accrediting Learning In Informatics

- Towards Quality Assurance with Information Technology in Primary Care

- Model Portfolio

- How to write a web page in HTML

B. Web site Library

The WISDOM web site included a library, which provided links to a variety of Internet sites. The library was established from use of general Web search engines, correspondence on e-mail discussion lists including WISDOM and from other indexes. All sites were evaluated for their relevance to primary care informatics collaboratively by the project team. The site was up-dated throughout the project.

At the end of case study one, the library was arranged in seventeen sections and provided links to 123 resources. The sections were:

- Bio-medical Research (1 site)
- Clinical Audit (1 site)
- Clinical Material (10 sites)
- Colleges and Academic and Professional Bodies (6 sites)

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- Evidence Based Practice (28 sites)
- Guidelines and Protocols (1 site)
- Electronic Journals (30 sites)
- Malignant Disease (2 sites)
- Medical Informatics (20 sites)
- Medical Statistics (3 sites)
- MEDLINE Sites and other databases (6 sites)
- Mental Health (1 site)
- Nursing (1 site)
- On-line Text Books (4 sites)
- Sites offering help with research (2 sites)
- Travel and Tourist Health (2 sites)
- Other primary care sites (7 sites)

A.11. Wisdom-reflect (second action research) course outline

Introduce the plan for the nine months at the beginning:

1. Initial period for:
   - getting to know you and general discussion
   - getting more used to the medium
   - getting more used to the feel of expressing yourself on-line

2. Introduce introduced gently so that new participants are not frightened off) process of:
   - portfolio creation
   - writing reflective stories as well as reflective and co-operative 'conversation'

3. timing of ending clear, with support for:
   - winding up portfolios
   - evaluation
   - a proper sense of ending (so participants do not have 'stuff' left over)

Model of portfolio halfway between set way (Sheffield Continuing Medical Education) of working towards one, and more loose collection of stories and reflections and research!

A.12. Wisdom-reflect interview schedule

1. What was your overall impression of wisdom-reflect?

2. Any particular incidents you remember from the discussions?

   - Any reflections?

   - Any changes as a result for you?

3. Thinking about e-mail discussions as a method

   - How did you find it?

   - What was it good for?

   - What problems did you have using it?

   - In what ways might e-mail discussions be made more useful?

4. What was your motivation for taking part in wisdom-reflect?

5. What do you recall that you initially expected?

6. How did you get on with completing a portfolio

   - What helped?

   - What hindered?

   - What help and support would make it easier for the future?

   - PGEA accreditation?

7. What about the role of the facilitator (GB)?

   - What was good

   - What was unhelpful

   - What would make things better?

8. What was your sense of being in a group discussion?

   - What was good?

   - What not so good?

   - How could sense of being in a group be improved?

9. What use did you make of any of the other resources :

   - on the WISDOM website

   - face to face

   - any other?

10. Anything else you would like to add? **Thankyou !**

A.13. Glossary of terms in Networked Learning[i]

Accessibility: A characteristic of technology that enables people with disabilities to use it. For example, accessible Websites can be navigated by people with visual, hearing, motor, or cognitive impairments. Accessible design also benefits people with older or slower software and hardware.

Application: Software a user activates to work on a computer; also called a *programme.* There are many types of software that fit into the category of application..

Asynchronous - this term relates to electronic communication, where participants send messages to others for reading at another time. Most electronic communication software supports asynchronous communication.

Bandwidth - the amount of information that can be sent (across the Internet) in a given time. Large files are either slow to download and view, or require greater bandwidth to open quickly

Bookmark: A saved link to a Webpage that is stored in a browser for quick and easy retrieval.

Computer-assisted learning (CAL): a learning method that uses a computer system to present individualised instructional material.

Computer-based learning (CBL): a generic term for the various kinds of stand-alone (that is, non-networked) learning applications that involve computer software.

Computer conferencing: the use of a central computer to receive, hold and distribute messages among participants' computers.

Computer-mediated communication (cmc): in the context of teaching and learning, the use of electronic mail, computer conferencing and the World Wide Web to deliver learning material and provide learners and teachers with opportunities for interaction; learning via cmc is an older but alternative term for 'networked learning'.

Courseware: Any type of instructional or educational course delivered via a software program or over the Web.

Cyberspace: The nebulous "place" where humans interact over computer networks. Term coined by William Gibson in *Neuromancer.*

Database: a collection of data fundamental to an operation, organised in some pre-defined structure; typically held on computer.

Delivery: Any method of transferring offerings to learners. Variants are instructor-led training, Web-based distance learning, online laboratory, CD-ROM, and books.

Discussion list - a means of sending messages by email to many people. Discussion lists are usually maintained by special services, and messages are archived and can be accessed on the Internet. The main provider in the UK for higher education discussion lists is JISCmail.

Digital: information stored in the form of 0s and 1s; digital information may include video, audio, graphics and text.

Download: The electronic transferring or copying of a file from one computer to another. Files may be downloaded from another connected individual computer, a computer network, a commercial online service, or the Internet.

E-learning: Covers a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet, audio- and videotape, satellite broadcast, interactive TV, and CD-ROM.

E-tutoring: Tutoring taking place through the use of the Internet. In contrast to "normal" tutoring, the tutor and the student(s) are not in the same location.

Electronic mail (e-mail): the exchange of information from one computer to another using software that is designed to store and forward messages received or sent.

F2F (face-to-face): Used to describe the traditional classroom environment.

Homepage: A document with an address (URL) on the World Wide Web. Maintained by a person or an organization, it contains pointers to other pieces of information.

Hypertext mark-up language (html): the protocol used to create documents for publication and distribution on the World Wide Web; html consists of tags, added to text documents, which format and create links to other www resources.

IMS (Instructional Management System) Global Learning Consortium: Coalition of government organizations dedicated to defining and distributing open architecture interoperability specifications for e-learning products.

Information Strategy: A strategic plan to exploit information resources in the broadest sense. This will often be part of an hierarchy of strategies under an institutional strategy or business plan; in turn an information strategy may include an Information Systems or Information Technology strategy.

Internet: A world-wide group of networks using a common protocol, the Internet Protocol (IP) so that services such as email and the World Wide Web can be provided seamlessly. JANET is part of the Internet.

JANET: Joint Academic NETwork. This links all higher education institutions, Research Council sites, many FE colleges and other bodies with a legitimate interest in working with the higher education and research community.

JISC: Joint Information Systems Committee. JISC promotes the innovative application and use of information and communications technology in the UK further and higher education community.

Just-in-time: Characteristic of e-learning in which learners are able to access the

information they need exactly when they need it.

Learning centres: sometimes called access centres or regional centres; offices or buildings maintained by open and distance learning programmes in order to provide localised delivery of learning materials and support to learners.

Learning environment: Domain where learning occurs. Learning takes place at a number of places other than the classroom: personal interaction with teachers, other students and staff on campus outside, via the Internet etc. Such factors can be critical to motivation to learn.

Learning object: A reusable, media-independent chunk of information used as a modular building block for e-learning content. Learning objects are most effective when organized by a meta data classification system and stored in a data repository.

Learning resource: This could be a web page, an image, an audio or video clip, an assessment test, text, an activity, a book, an artifact etc., It does not have a learning objective

Listserver: an e-mail system that automatically sends messages to all subscribers on specific mailing lists, especially interest groups.

Metadata: This is simply "data about data". Metadata is the information about a data source, for example, a book contains information, but there is also information about that book such as the author and publisher - this is the metadata.

Managed Learning Environment (MLE): The terms is used to include the whole range of information systems and processes of an education al institution (including its VLE if it has one) that contribute directly, or indirectly, to learning and the management of that learning

Multimedia: learning technologies that involve the whole range of audio, visual, text and graphics media available, integrated into a package that has been effectively designed from an instructional point of view.

Netiquette: Online "manners." The rules of conduct for online or Internet users.

Networked learning: a type of learning in which learners and instructors use computers to exchange messages, engage in dialogue and access resources; the interaction can occur in real-time (synchronously) when learners and instructors are communicating at the same time from different places, or in delayed-time (asynchronously) when they are not linked at the same time.

Networked Learning Environment (NLE): The use of networked communication and information technologies in support of learning activities.

Online: The state in which a computer is connected to another computer or server via a network. A computer communicating with another computer.

Online learning: Learning delivered by Web-based or Internet-based technologies.

Plug-in: An accessory program that adds capabilities to the main program. Used on Webpages to display multimedia content.

Repurpose: To reuse content--by revising and restructuring it--for a different

purpose than it was originally intended or in a different way.

RLO (reusable learning object): Learning objects are the core concept in an approach to learning content in which content is broken down into "bite size" chunks. These chunks can be reused, independently created and maintained, and pulled apart and stuck together like so many legos.

Seamless technology: Technology that is easy to use, intuitive in nature, and is not the focus of the learning experience. Also called transparent technology.

Scalability: The degree to which a computer application or component can be expanded in size, volume, or number of users served and continue to function properly.

Scroll: To move text and images on a computer screen in a constant direction--down, up, right, or left.

System requirements: The technological conditions required to run a software application. Includes the operating system, programming language, database, hardware configuration, bandwidth, processing power, and so forth.

Synchronous - when applied to computer-mediated communication, this relates to software that supports discussion between users of the same system at the same time. Chat rooms, MUDs and MOOs are all examples.

Thread: A series of messages on a particular topic posted in a discussion forum.

Vicarious learning - learning by observing others and noting their responses.

Virtual: Not concrete or physical. For instance, a completely virtual university does not have actual buildings but instead holds classes over the Internet.

Virtual classroom: The online learning space where students and instructors interact.

VLE - Virtual Learning Environment, describes "online" interactions of various kinds e.g. tools for managing teaching and learning online, combining Web authoring tools with electronic communication tools, computer-aided assessment, and a means of managing student records. The term is used synonymously with an NLE (networked learning environment).

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[i] This reflects a compilation from numerous web-based sources e.g.
http://www.learningcircuits.org/glossary.html
http://www.col.org/resources/startupguides/glossary.htm
http://www.jisc.ac.uk/glossary/index.html
http://www.ltsn.ac.uk/genericcentre/glossary/glossary_nq.asp