NOTTINGHAM TRENT UNIVERSITY

FACULTY OF EDUCATION

DOCTORATE IN EDUCATION

Developing professional competence through problem-based learning: an action research approach

RESEARCH REPORT

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"Like all young people
I set out to be a genius,
but mercifully laughter intervened"

Adapted from Clea, Lawrence Durrell, (Chalmers, 1982)

A special thanks to my family, friends, colleagues and students for their support and intervention !

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Abstract

A problem-based approach to learning (PBL) aims to foster an enthusiasm for lifelong learning. The corner stone of the approach rests with the presentation of issues that stimulate students' quest for discovery.

This Doctorate journey took an action research approach to explore the experiences of a small group of mixed-ability, work-based students following a PBL programme. The research initially stemmed from a genuine desire to improve the teaching in National Vocational Qualifications (NVQ) and Key Skills for Modern Apprentice (MA) hairdressers. The author was concerned that a focus on competence-based education and training (CBET) was stifling professional workplace competence. The action research cycles were structured around a set of client case studies. Each cycle was designed to include a range of PBL activities. Content analysis was employed to capture themed data and triangulation was used to validate the participants' experience of PBL.

These research findings show that this application of PBL supported the active participation of all learners and tutors. PBL facilitated the natural integration of course 'theory' and development of Key Skills. The role of the facilitator was crucial in gaining maximum benefit from the approach. Reflexivity and responsiveness to the needs and wishes of individuals and the group were an important hallmark of a skilled facilitator. Expert subject knowledge was also perceived by the facilitator to be advantageous in this context. Students experiencing learning difficulties were able to fully participate in the PBL activities with additional support from the facilitator. The shift to student-centered learning in PBL with an increased workload was not valued by the work-based participants and was perceived to be de-motivational. It was noted that PBL was strongly influenced by group dynamics, seating arrangements, the learning style of the students and their view of knowledge.

The author proposes that a PBL approach can contribute to the development of professional competency. Furthermore, it possesses the potential to address the imbalance in developing professionally valued competence brought about by a focus on achievement of CBET outcome statements.

1 Introduction

1.0.1 This chapter introduces the reader to the aims of the research and provides an understanding of the context in which these aims emerged.

1.1 Research Aims

1.1.1 The following research question presents the two main strands of this inquiry:

How can I improve the teaching of 'theory' in vocational qualifications using a Problem-based approach to learning?

Action research was conducted with the aim of improving my teaching using a problem-based learning (PBL) approach as the change agent. At another level, I also sought to evaluate PBL. By intervening with a PBL approach to sections of the curriculum, I hoped to discover how it contributed to the development of a competent practitioner.

1.2 Competence and the need for experiential learning

1.2.1 Experiential learning was the focus of my research. I identified the need for working with and relating to students in the context of their work environment. PBL is only one approach of many experiential learning methods that I could have chosen to implement as an intervention tool. Being a student-centred learning method, its objectives claim to develop a structuring of knowledge for use in context, and aid self-directed learning, reasoning and motivation. These characteristics matched the type of learning approach that would develop professional competency in apprentice hairdressers at the training centre (Billett, 1996).

1.3 Context

1.3.1 A key objective of my work is the development of competent, professional hairdressers. A candidate who wishes to train as a hairdresser chooses from a number of different routes. One way is to enrol on a full-time hairdressing course at a college of further education. A second option is to follow a work-based training route on a Modern Apprenticeship (MA) programme, funded by the Training and Enterprise Council (TEC) and lasting two to three years.

1.3.2 The organisation I manage provides hairdressing education and training for approximately 30 students annually. The majority of these students are Modern Apprentices employed and based in various salons. Depending on their location and stage of progression, they attend the training centre at least once a week. Students at the centre are 'taught' using a variety of methods that include demonstration, simulation, lectures, worksheets and portfolios, tutorials and project work.

1.3.3 My original research proposal (Appendix 1) identified the need to investigate the PBL approach and apply it to teaching hairdressing 'theory' with MA hairdressers following National Vocational Qualifications (NVQs), levels 2 and 3. This initially arose due to my concerns over students' lack of motivation for certain sections of the course, which was further fuelled by the compulsory implementation of 'Key Skills' into the vocational programme.

1.3.4 In order to attain the full MA qualification and attract the output related funding, an important income for the centre, students have to achieve Key Skills. The six Key Skill areas required are as follows[1]:-

- Communication;
- Application of number;
- Working with others;

[1] The Key Skill requirements for the Hairdressing MA framework were changed in August 2000 by the lead body (Hairdressing and Beauty Industry Authority) to the following minimum achievements: Communication level 3, Application of Number level 1, Information Technology level 1.

- Improve own learning;
- Information technology; and
- Problem solving.

1.3.5 With the added onus of Key Skill assessment, within and in addition to the vocational qualification, there was a danger that the learning focus could become increasingly narrow and irrelevant in order to meet qualification criteria, rather than developing and assessing the vocational competency of the learner (Ainley, 1996).

1.4 The nature of competency in the workplace

1.4.1 Training centre meetings, involving colleagues from the workplace, allowed me to explore practitioners' perspectives of professional competency. Hager (1999) has suggested that professional competency is intertwined with the process of making judgements. A judgement is a decision based upon the use of process and content knowledge. If a student can ask the right questions, revealing understanding of the process of their aim and judgements, then they are one step closer to the achievement of professional competence (Coherence and Integration Report 2:47).

1.4.2 In the early stages of the Doctorate course, I reflected on my concerns about the shift towards an increasingly paper-based emphasis of 'competence' for vocational practitioners and how the NVQ resulted in the development of atomistic competencies (Coherence and Integration Report 1:7). My initial research ideas were informed by observations of apprentices in the workplace and the training centre. I was becoming increasingly concerned about the awarding body's mandatory written tests. Typically these tests contained questions on the relevance of health and safety laws in the salon, the chemistry of hair structure changes during permanent waving and colouring, and the correction of technical faults. Written tests, for the majority of students, were repeated twice and often three times before a successful outcome was

achieved. It was my perception that students were trying to memorise 'content' information for the purposes of the tests without, in some cases, really understanding the process or connecting the practice and the 'theory'. I began to question my approach to teaching these 'scientific' topics. Did students have the necessary knowledge to enable them to succeed at these tests? Were they able to relate to, or transfer this new 'knowledge' to their own work? I realised from discussions with students, that part of the difficulty was the use of language in tests, which did not reflect the language of the industry (Coherence and Integration Report 1:52). Dearing (1996) and Beaumont (1996) identified this disharmony in their reviews of NVQs. So, was failing to pass a written test the first time a reflection of vocational incompetence, a misunderstanding of the language of the questions or an inability to transfer content or process knowledge?

1.4.3 I was drawn to reflect upon the effect of different educational approaches on students' learning (Coherence and Integration Report 2:3) and identify those that would facilitate process rather than content learning (Coherence and Integration Report 2:4). Despite the variety of methods and resources I have used over the years, I was unconvinced that the teaching methods applied in the centre developed an independent, competent professional. This was particularly evident in the technical areas of permanent waving and colouring, which required significant consultation skills. A PBL approach offered a means of redressing the balance between content and process knowledge in order to develop professional competency. The reason I adopted a PBL approach was my belief that this approach would facilitate the development of competency more effectively than the conventional approach applied in the training centre. PBL also presented a challenge, as its educational objectives seemed to turn 'conventional' practice and my personal teaching on its head.

1.5 Identifying key research issues

1.5.1 In reflecting on and refining my research question four main issues emerged:-

- As a vocational teacher, I was concerned with the development of *'useable knowledge'* (Elliot, 1991a:24) and not just knowledge designed for recall (Boud and Feletti, 1997);
- Improving the links between theory and application of some fundamental concepts, such as permanent waving and colouring science which the students found 'boring';
- The need for Key Skills development, despite no additional funding being available[2]; and
- Questioning my educational objectives and the nature of my work. I was frequently asking myself, 'Why?' I couldn't see the relevance of many of the Key Skills as stand-alone qualifications or their contribution to the development of competent professionals. I felt the aim of my training centre was the development of competency within a chosen vocation and I was responsible to these young people as regards their career progression (7.3.1 / 7.3.2).

1.6 Influences

1.6.1 Due to the personal nature of the research issues, with respect to my teaching practice and context, I realised that it was infeasible to conduct the research as an outsider in my own classroom. Furthermore, time restrictions inherent within the Doctorate course made the use of an outside observer impractical. Discussions with Professor Griffiths and my course colleagues during the Research Methods element of the course (spring term, 1998) made my role as a fully involved participant a tenable and valid option. I experienced a shift away from the objective 'scientific' approach and explored alternative

[2] Key Skills are certificated individually from the vocational NVQ qualification. However, no additional funding has been available for their registration or assessment. This has proved to be considerably time consuming and costly for training centres. This may account for the number of low achievers in MA which was nationally estimated in September 2000 to be 10% (Hair and Beauty Industry Authority-HABIA) whilst NVQ achievers on the same MA programmes were 50%.

methodologies. This made my emerging ideas accessible and of relevance to my work in the classroom, as well as to the strands of enquiry (1.1.1).

1.6.2 The initial research question was 'How can I?', or rather 'Should I change my current practice to meet the changing needs of the industry?' I began by reflecting upon which aspects of my work I could change and what 'outsider limitations' I was subject to (1.7). I also needed to consider my own role and the impact that I, as a tutor and leader, could have as part of any change or intervention.

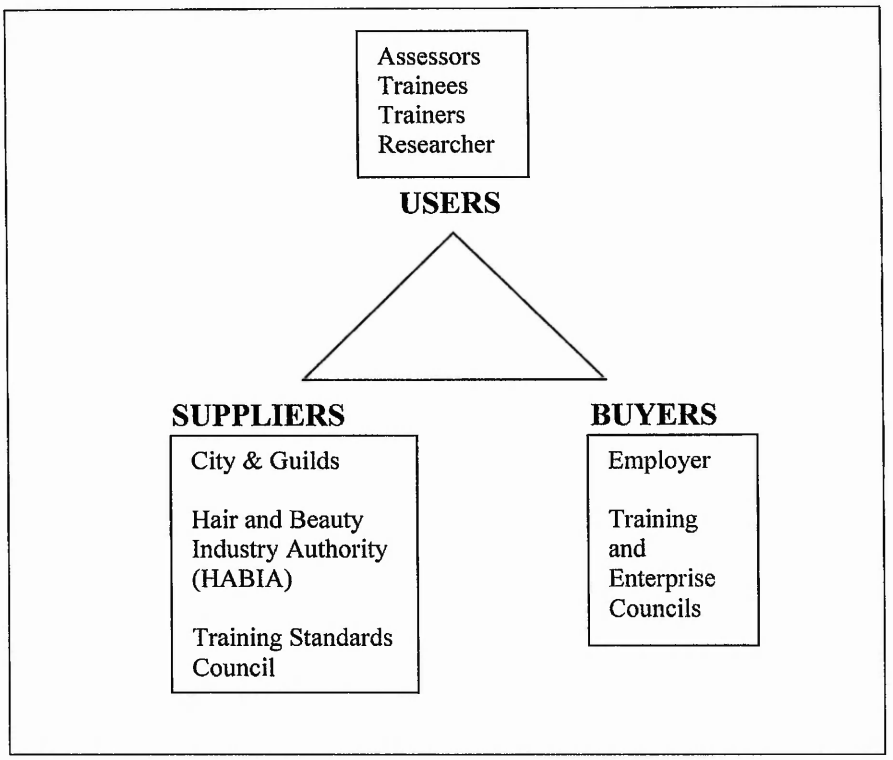
1.7 Outsider limitations and the role of stakeholders

1.7.1 One technique I employed to analyse outsider limitations was a stakeholder analysis (Figure 1). Although I was familiar with this management technique in a business context, I was interested to see it utilised and discussed during the Doctorate programme as a method of recognising gatekeepers of research (Andrew Bloom, Management of Change, Year 3, Autumn term 1998). I identified two levels of stakeholders that the training centre was subject to, first order 'direct' stakeholders and second order 'indirect' stakeholders. First order stakeholders were the direct users of the centre, such as the students and training staff. This group also included the employer and the City and Guilds (awarding body) who bought services from or supplied the centre. Second order stakeholders were identified as those who influenced the centre indirectly through their role as strategic policy makers. These were bodies such as the:-

- Qualifications & Curriculum Authority (QCA) who dictated government policy;
- Training Standards Council (TSC), the Inspectorate body for training and assessment;
- The fashion industry which influenced the input requirements of the training programme;

- The Careers Service who recommended candidates to apply to the centre;
- Other providers of hairdressing training who provided competition; and
- The economy in general.

Figure 1: Stakeholder Analysis



1.7.2 As NVQs form the basis of training in the hairdressing industry, I am obliged to use these standards. NVQs are generally accepted by the industry and are the qualifications upon which funding from the TEC is negotiated. I recognise that by legitimising NVQs I am contributing to their claim to truth (Marshall, 1997). However, without an awarding body affiliation or funding, I couldn't operate my business. These tensions have been recognised nationally (Helsby, 1996; Ball 1997). This research was not intended to influence second-order policy makers, nor change the structure of the NVQ. Although, one way of overcoming the acknowledged constraints associated with NVQ use is being aware of the behaviouristic limitations (1.4.2) that are so often associated with

their implementation[3] (Hyland, 1997). The focus of the research was on influencing practice through a first order intervention. I choose to review the 'theory' element of the training course and research alternative ways students could be developed, in order to improve their professional competency in the workplace.

1.8 Research Questions and Issues

1.8.1 From my initial research and interviews, the idea emerged that PBL, which encourages an active student-centred approach to development of essential knowledge and understanding (EKU), would develop a more competent, motivated learner for the workplace than is currently developed from conventional teaching approaches.

1.8.2 I felt that PBL, as an intervention (1.2.1), offered opportunities to address the research issues (1.4.2) and recognised the need for my own personal development. The aim of the research began to refine itself into the question identified earlier (1.1.1) and reflected the shift of emphasis away from the scientific approach (1.6.1).

1.8.3 Bassey, (1999: 48) warns of the dangers of scientific generalisations that state with certainty:-

"Do y instead of x and your pupils will learn more'...Teaching is such a complex activity that such simple statements just do not exist."

The research question (1.1.1) is not intended to reflect a scientific generalisation as it evolved from and relates to my work context. Furthermore, it focuses on how the process of learning contributes to competency, as opposed to simply regarding the outcomes of competent assessment.

[3] A personal deeper understanding of these limitations has been developed and recorded throughout previous Coherence and Integration Reports, Years 1 (1997) & 2 (1998).

1.8.4 Implicit within the two strands of the inquiry (1.1.1) are further research questions I wish to address:

1. Would PBL objectives correspond with my own educational objectives?

2. Can a PBL approach to learning develop a more competent learner for the workplace than the conventional methods currently used in the training centre?

3. Would PBL 'fit' the ethos of the NVQ and its approach to the development of competence?

4. Would a PBL approach facilitate the natural development and integration of vocational 'Key Skills', which are now a mandatory requirement of work-based training programmes such as the MA?

5. How can I develop and improve my own teaching skills in order to implement a PBL approach?

6. When implementing PBL, at what stage of development is it most beneficially introduced into the curriculum?

1.9 Ethical Considerations

1.9.1 Ethics is an increasingly important consideration of all research, particularly in social and educational contexts where people are the main participants and interpretative research methods are being employed. There is a common consensus of many ethical principles underlying action and participative research. These can be summarised as follows:-

- Observe protocol and obtain authorisation before observations, examination of files, correspondence or other documentation and using

quotations (Robson, 1993; Cohen and Manion, 1994; Griffiths, 1998; Anderson, 1998);

- Involve participants and negotiate descriptions of other people's work, accounts of other points of view, include reporting for various levels of release with those affected (Robson, 1993; Cohen and Manion, 1994; Griffiths, 1998; Anderson, 1998);

- Report progress and retain the right to report the research conducted (Robson, 1993; Cohen and Manion, 1994; Kemmis and McTaggart, 1988; Anderson, 1998);

- Accept responsibility for maintaining confidentiality (Robson, 1993; Cohen and Manion, 1994; Anderson, 1998); and

- Ensure that the principles of procedure are understood and known (Robson, 1993; Cohen and Manion, 1994; Griffiths, 1998; Anderson, 1998).

1.9.2 Although Anderson (1998) points out that the risks to participants are outweighed by the anticipated benefits of the research, I wanted to eliminate any risks to participants from the research. As a fully involved participant, researcher and leader of my own organisation, where the research was conducted, I addressed the ethical dilemmas that came to the fore. Given that I was using action research, a mode of inquiry that was 'new' to me as a researcher, I decided to adopt the ethical principles outlined above (1.9.1). This demonstrated my commitment to genuine participation that is inherent in collaborative action research. Some situations were anticipated and discussed as part of the research proposal prior to the implementation of PBL (Appendix 1/ 15). Others were identified as part of the research process (3.5.2).

2 PROBLEM-BASED LEARNING (PBL): AN OVERVIEW

2.1 Aims

2.1.1 This section aims to provide an overview of the literature on PBL. The following aspects are considered:-

- The origins of PBL and its underlying values;
- The relationship between PBL principles and my personal and professional educational values and beliefs;
- The justification for PBL as an intervention in the current research context;
- Identification of key themes that represent educational and professional values in the research;
- A framework of key PBL themes within which to locate issues identified from each of the action research cycles.

2.1.2 This account documents the development of the research as it evolved, rather than being compiled prior to the research implementation. Thus, the overview is not detached from the research as it seeks to focus on significant questions that arose during the process.

2.2 The impetus for the research

2.2.1 Previous course reports (Coherence and Integration Reports 1 and 2) testify to the growing disenchantment I felt teaching National Vocational Qualifications (NVQs) and Key Skills as a means of developing competent practitioners (1.3.3, 7.3.1, 7.3.2). The main conflict lay in my belief that the NVQ was a functional system, where knowledge and understanding are perceived as inputs which lead to a competent output (Wolf, 1989; Hyland, 1997). My own belief of learning and competence developed beyond this 'input-output' view. I valued the process of

learning as a means for developing personal attributes and skills (Appendix 2: 1.2, 1.2). This belief mirrors that of Albanese and Mitchell (1993) in their study of medical educators, which suggested there has to be a better way to train practitioners than to make them sit through endless hours of lectures and then test their ability to recall bits of trivia. Dr. Burdett (1999, Appendix 3: E2) offers one explanation for why the Manchester Medical School adopted a PBL approach:

"One of the reasons that we went the way that we have gone (i.e. adopted PBL) *is to try and develop those things* (knowledge, skills, attitudes and competencies) *rather than pay lip service to them like we used to do in the old course... ".*

2.2.2 His perspective reflects my own view of the importance of education as a developmental process grounded in society, as opposed to a collection of qualifications (Appendix 2:1.5). As my perception of competence evolved, my research journey opened up the viability of PBL as a means of developing professional competence and matching my view of education. It was comforting to know I was not on my own in recognising the need to develop student-orientated approaches to teaching and learning (Young et al., 1997).

2.3 PBL: A Learning Approach

2.3.1 There is a growing wealth of literature regarding PBL and problem-based methods of teaching. The general principle behind PBL courses is that students begin with exposure to problems rather than with an exposition of subject-based knowledge. PBL is a learning method in which knowledge arises from studying work-based problems. In contrast, I taught by presenting work-related knowledge which students used to solve work-based problems. With PBL, the problems themselves act as the stimulus and focus for student activity. Students are moved through a staged sequence of problems (generally presented as a case) together with associated learning resources. Barrows' (1986) taxonomy aimed to categorise a range of learning methods described as PBL. Although there is no

universally agreed set of PBL course practices, it is clear from the literature that PBL is more than simply adding problem solving activities to otherwise discipline-centred curricula (Boud and Feletti, 1997).

2.3.2 PBL, as it is currently recognised, evolved during the late 1950s and early 1960s in North America from innovative health science curricula. It developed as a result of medical school educators who became dissatisfied with conventional methods of teaching and learning. One of the forerunners of PBL was the Medical Faculty at McMaster University in Canada. Faculty staff began with the introduction of the tutorial process as central to their multi-disciplinary, student-centred educational philosophy. Other hybrid forms, such as the Harvard Medical School model, have since emerged which use a wide range of instructional methods and strategies around weekly themes (Boud and Feletti, 1997).

2.3.3 Albanese and Mitchell (1993) note that it is as difficult to define what constitutes a conventional method, as it is to define what PBL is. This difficulty reflects the problem encountered when describing the variety of teaching and learning practices within my own industry. However, conventional medical education, as in hairdressing, traditionally consisted of basic science lectures, followed by an equally exhaustive clinical teaching programme. This system continues to be delivered in some institutions. Boud and Feletti (1997:15) have criticised these curricula as '*overloading students with an excessive emphasis on memorisation*'. Dissatisfaction with the conventional medical school teaching approach emerged from a realisation that, although generally effective for building a body of knowledge, it was ethically questionable for two reasons:-

- It was described as inhumane because of information overload; and
- It was becoming ineffective in developing the type of practitioner required by the profession (Dornhurst, 1981).

2.3.4 Bishop (1983:18) summarises these concerns in the following way:

> *"What emerges are physicians without enquiring minds, physicians who bring to the bedside not curiosity and a desire to understand, but a set of reflexes that allows them to earn a handsome living".*

In this way, Bishop (1983) identifies motivation ('*curiosity and a desire to understand*') and a desire to improve their own learning ('*enquiring minds*') as two qualities that the medical profession valued. Like Hyland (1994), in relation to the NVQ model and the current competence-based education and training (CBET) policy, Bishop (1983) rejects the behaviourist development of a set of reflexes or competencies in supporting the notion of a motivated, reflective practitioner.

2.3.5 Given the advances in medical information, new technology and a rapidly changing environment it was apparent that courses stressing the importance of fact accumulation, as opposed to the development of personal skills for lifelong learning, were liable to only develop the set of competencies that Bishop (1983) discards. Bishop's (1983) dissatisfactions mirror my own concerns regarding the development of vocational competence voiced in previous Coherence and Integration Reports. One of these was that the NVQ, delivered in a similar manner to conventional medical training, was developing a functional practitioner who was often unable to apply their body of knowledge to the workplace. The General Medical Council (GMC, 1993) sought to address this emerging imbalance. Recommendations were published strongly encouraging medical schools to adopt a problem-orientated approach in their undergraduate medical courses. This move endorsed PBL as a learning approach capable of redressing the functional dimension in medical training. It was with this endorsement in mind that PBL was considered as a suitable approach to teaching within my own sector.

2.4 Defining PBL

2.4.1 The popularity and uptake of PBL has led to a wide diversity of its usage and interpretation. A consequence has been controversy surrounding the nature of what constitutes PBL (Boud and Feletti, 1997). Despite various interpretations highlighted in Barrows (1986) taxonomy, the ethos of PBL remains in that it attempts to link professional practice to humanistic education:

"Problem-based learning at its most fundamental level is an instructional method characterised by the use of patient problems as a context for students to learn problem-solving skills and acquire knowledge about the basic and clinical sciences".

(Albanese and Mitchell, 1993:53)

2.4.2 Vernon and Blake (1993:550) have defined PBL in the following way:

"*Problem-based learning is a method of learning (or teaching) that emphasised 1) the study of clinical cases, either real or hypothetical, 2) small discussion groups, 3) collaborative independent study, 4) hypothetico-deductive reasoning, 5) a style of faculty direction that concentrated on group processes rather than imparting information*".

2.4.3 Boud and Feletti (1997) have identified six common features that characterise a PBL approach. Given the appeal of PBL in its various contexts and interpretations, these features provide a more flexible approach for defining PBL. These features are as follows:-

1) *"Using stimulus material to help students discuss an important problem, question or issue;*
2) *Presenting the problem as a simulation of professional practice or a 'real life' situation;*

3) *Appropriately guiding students' critical thinking and providing limited resources to help them learn from defining and attempting to resolve the given problem;*
4) *Having students work co-operatively as a group, exploring information in and out of class, with access to a tutor (not necessarily a subject specialist) who knows the problem well and can facilitate the group's learning process;*
5) *Getting students to identify their own learning needs and appropriate use of available resources;*
6) *Reapplying this new knowledge to the original problem and evaluating their learning processes".*

Boud and Feletti (1997:2)

2.4.4 These definitions (2.4.1, 2.4.2, 2.4.3) reflect the context and models of PBL in practice (Barrows, 1986) and recognise the use of the case as the stimulus for learning. Albanese and Mitchell (1993:53) refer to the '*learning of problem-solving skills*' with the emphasis on the acquisition of knowledge in an instructional context, which implies a behaviourist perception of PBL. Alternatively, Boud and Feletti (1997) present PBL as a process whereby the student, initially stimulated by the case, uses critical thinking, explores information and reflects on the learning process. This perspective reflects my own view of PBL as incorporating both behaviourist and cognitive aspects of learning. The role of the teacher ranges from 'instructional' (Albanese and Mitchell, 1993) to that of a guidance agent (Boud and Feletti, 1997; Vernon and Blake, 1993). There is recognition of collaboration and group processes, as well as independent study. Consequently, there seems to be little consensus on some of the underlying values associated with PBL. Ambiguities exist and were identified as follows:-

- The extent to which PBL is perceived as a behaviourist or cognitive model of learning;

- The extent to which PBL is perceived to involve the development of inductive or deductive reasoning; and
- The extent to which PBL is supported by instructional or discovery forms of learning.

2.4.5 The rationale for Barrows' (1985) proposed theoretical basis for PBL follows Bruner's (1979) educational theory of discovery learning. The values and beliefs that encapsulate discovery learning, and it is suggested those of PBL, are found in constructivism (Ryan, 1997). Constructivism is an educational theory, based on a subjective view of knowledge, in which the existence of a 'real' world beyond the individual knower is acknowledged and personal meaning is rooted in experience. According to this theory, it is the learner who actively constructs the knowledge gained and the strategies used to acquire it. This is opposed to an objective view of knowledge, where meaning in the world exists outside of personal experience. Constructivism recognises that cognitive structures are utilised (and changed) during the learning process which bring personal meaning to an individual's experience. Bruner (1979:88) suggests that:

"...the degree that one is able to approach learning as a task of discovering something rather than 'learning about' it, to that degree there will be a tendency for the child to work with the autonomy of self-reward or, more properly, be rewarded by discovery itself".

2.4.6 Self-reward generated by discovery learning was a value reflected in my own educational beliefs. I perceived discovery learning to be motivating and thus encouraging the development of lifelong learning skills. Furthermore, a constructivist approach to learning in my workplace supported my own belief that the workplace, and therefore its' learners, are grounded in, and cannot be understood outside of their environment (Billett, 1996).

2.4.7 The process of discovery learning has been described by Child (1993) as involving both induction (using critical incidents to develop a case) and errorful learning (using trial and error to generate an acceptable generalisation). There exist two main forms of discovery learning, '*free*' and '*guided*' (Child (1993:105; Swanson et al., 1997). Guided discovery is characterised by structure, careful sequencing of learning experiences and specific learning objectives identified by curriculum developers for each problem, which the students may or may not be aware of. Free or open discovery is enquiry conducted with little participation from the teacher. Boud and Feletti (1997:16) suggest that PBL is an example of guided discovery learning and claim it is:

"... quite different from some of the garbled versions of discovery learning which imply that students are supposed to invent knowledge which is already known".

They recommend that the knowledge students use in guided discovery learning needs to be identified and applied in context. Walkin (1990) also suggests that problem solving guided by a teacher is more beneficial for students as it avoids a lot of time and effort employed in trial and error learning.

2.4.8 Discovery learning has been criticised for its ambiguous nature (Child, 1993). The confusion concerns whether the term is intended to imply the means (process) or the end product (content) of discovery. PBL, as a guided form of discovery learning, is subject to the same criticisms. Whilst the importance of the end product is acknowledged for contextual (1.3) and stakeholder reasons (1.7), this research seeks to evaluate and focus on understanding the experience of the learner during the PBL process. Vernon and Blake (1993:550) claim that PBL involves '*hypothetico-deductive reasoning*'. This is refuted by Gillies (1993), who suggests that this model of reasoning ignores both the inductive and intuitive aspects of discovery learning.

2.4.9 One reason for implementing PBL was that I felt it offered a more integrated approach to designing the curriculum, and would improve and reflect learning in the workplace. Features of PBL, with regard to curriculum planning, that mirror my own beliefs include:-

- The opportunity for learners to contribute to their own learning experience by raising issues that were of importance to them;
- The use of realistic (often real) case studies that could be related directly to the workplace;
- An emphasis on active rather than passive learning;
- The use of relevant working knowledge rather than learning for the sake of recall; and
- The need to work and communicate with colleagues in order to discover an appropriate solution to a case problem (Boud and Feletti, 1997).

2.4.10 Whether PBL is perceived as a behaviourist or cognitive model of learning, an instructional or discovery form of learning or involving inductive or deductive reasoning is dependent on the method of PBL employed (Barrows, 1986). Therefore, it is important for anyone claiming to engage in a PBL approach to clearly identify the method used. As educational institutions exist in many different environments they value different approaches to PBL. This is supported by the fact that Harvard Medical School, a large, traditional institution, chose to implement a '*hybrid*' model of PBL rather than following the McMaster Medical School model, the latter being more suited to the smaller institution (Boud and Feletti, 1997). My current research has been identified as small institutional research.

2.5 PBL: A taxonomy

2.5.1 Barrows' (1986) taxonomy of PBL methods warrants specific mention as it has been widely referred to within the literature. He analysed various educational practices that used problems in an instructional sequence and the term PBL. He concluded that the different methods of PBL employed by institutions served to address different educational objectives. Barrows (1986:481) classifies the educational objectives that can be accomplished with a PBL approach in the following way:-

(a) " Structuring knowledge for use in clinical contexts, enhances retention recall and application of knowledge (SCC);
(b) The development of an effective clinical reasoning process 'consultation' (CRP);
(c) The development of effective self-directed learning skills, 'lifelong learning' (SDL); and
(d) Increased motivation for learning (MOT) ".

2.5.2 Barrows' (1986) taxonomy maintains that the extent to which these educational objectives can be met is directly related to three factors. These are graded on a scale from 0 (least effective) to 5 (most effective) and summarised in Table 1. The first factor is the sequence in which the problems are offered and the information acquired. Sequences range from lecture-based case method to closed-loop problem-based method. The second factor concerns the design and format of the PBL problems. These can be presented in one of three forms:-

- Complete case or vignette;
- Partial problem situation; or
- Full problem situation (free inquiry).

The third factor is the degree to which learning is:-

- Teacher-directed learning;
- Partial-student and teacher; or
- Student-directed learning.

Table 1: Barrows' (1986) Taxonomy of PBL

PBL Method Variety	PBL Approach-Sequence in which problems are offered and information acquired	Structuring of knowledge in context (SCC)	Critical reasoning process (CRP)	Self directed learning (SDL)	Motivation (MOT)
A	Lecture-based cases	1	1	0	1
B	Case-based lectures	2	2	0	2
C	Case-method	3	3	3	4
D	Modified case-based	4	3	3	5
E	Problem-based	4	4	4	5
F	Closed-loop problem-based (reiterative)	5	5	5	5

Reference: Adapted from Barrows (1986:483)

2.5.3 Barrows (1986) describes the differences between PBL methods in the following way:-

A Lecture-based cases (*teacher-directed / complete case or case vignette*); Lectures presented by the teacher provide students with information. This is then applied to one or more cases to demonstrate the relevance of the information.

B Case-based lectures (*complete case or case vignette / teacher-directed*); The teacher presents the students with complete cases or vignettes before the lecture to highlight the information covered.

C Case-method (*complete case or case vignette / partially student and teacher directed*);
Students are provided with research and a case study for a teacher facilitated class discussion.

D Modified case-based (*partial problem situation / student directed learning*);
Client problems are presented in small tutorial groups and students are instrumental in deciding on their actions of inquiry.

E Problem-based (*full problem situation / student-directed learning*);
This method of presentation simulates the client's problem, which allows the students free exploration of the case issues. This is teacher guided and facilitated to engage the students' prior knowledge.

F Closed-loop problem based (*full problem situation / student-directed learning*);
This approach extends the problem-based method (E). It involves the student following up the presentation of the simulated problem and its exploration with a period of independent study. Students evaluate the resources they used and show how they could have approached the problem more efficiently.

2.5.4 Barrows (1986) also identified additional factors that affected the achievement of the educational objectives of PBL. These were categorised as being either '*unplanned*' or '*planned*' (Barrows, 1986:484) and were instrumental in either increasing or decreasing the effectiveness of PBL. Planned variables were described as:-

- The extent to which formation of the knowledge was presented prior to the problem (decrease in PBL effectiveness);

- The parallel opportunity to work with real clients allowing practice and transfer of knowledge (increase in PBL effectiveness); and

- The techniques and methods of student assessment, which can inadvertently limit the focus of study (decrease in PBL effectiveness).

The main 'unplanned' additional variable was identified as the skill of the teacher. The impact of this factor is reinforced by other PBL advocates, such as Dr. Keith Burdett (1999, Appendix 3:E2) of Manchester Medical School, who stressed the importance of the training and effectiveness of the teacher as 'facilitator'.

2.5.5 Barrows (1986) highlights the importance of curriculum design in relation to the achievement of expected outcomes of PBL. His PBL taxonomy illustrates a range of methods, which can be drawn upon by the teacher to develop a variety of associated educational outcomes. The reiterative approach is based on the presentation of a case with no prior expert knowledge, which students can apply to solve the problem. The assumption underlying reiterative PBL is that no prior expert knowledge is required for students to be able to solve the problem through self-directed learning, discussion and facilitation of the PBL process. This contrasts with educational psychology theorists who suggest that if one has no fund of knowledge, one cannot operate cognitively (Child, 1981; Eva et al., 1998). As such the role of prior knowledge within PBL is a source of ambiguity in the PBL literature.

2.5.6 Elliot (1990) presents two models of curriculum planning. He describes these as the product model and the process model. The product model, or curriculum-focus model, can either be project-based or cross-curricular. It is subject based, but with co-ordinated studies. The NVQ is an example of a curriculum-focussed model. The process model (project model) can be approached two ways. The teacher can begin with the educational objectives and plan projects in a cross-curriculum, interdisciplinary way. Alternatively, the project could be planned in

an interdisciplinary way and then considered in relation to the learning outcomes that might occur as a result of these experiences.

2.5.7 The development of the PBL curriculum reflects the process model. It is based in the socio-cultural environment, there is a holistic approach taken to the teaching of theory and no attempt is made to unitise the curriculum. Although the process model still results in products, the focus is on the students' experience and not solely the achievement of the outcomes or targets.

2.5.8 Within the process model, Swanson et al. (1997) locate the two main types of PBL curricula: guided and open discovery. These reflect, to a large extent, the PBL continuum upon which Barrows (1986) based his taxonomy. Guided discovery is reflected in methods A, B, C and D (2.5.3), becoming progressively more open (Table 1). Methods E and F (2.5.3) are less directed by the teacher and are therefore indicative of open discovery (Table 1).

2.6 Educational objectives desired within hairdressing and medical education: a comparison of contexts

2.6.1 Engel (1997) and Barrows (1986) root their work within a medical context and thus the educational objectives they describe reflect this environment. It might be suggested that their educational objectives have little in common with those desired by hairdressing educators. However, this section aims to provide the reader with an understanding of the many similar aspects found in their respective professional environments. These similarities serve to justify the use of PBL as an appropriate learning method to develop common educational values for hairdressers and medical practitioners.

2.6.2 In terms of course content requirements the medical and hairdressing professions have relatively little in common. However, from an historical perspective it can

be seen that there are many commonalties between the professions that make the medical educational objectives relevant to hairdressing. Prior to the establishment of our current societal system of medical practitioners the barber was recognised as the community alchemist. This is symbolised by the traditional red and white striped sign, still often found hanging outside many barber shops in Britain (the red representing the blood and the white the purity and cleanliness of being healthy).

2.6.3 Many commonalties still exist between the medical and hairdressing professions such as the need for 'on the job' training to develop skills in client consultation, assessment of problems (diagnosis and prognosis), decision making and technical skills training. Reference to clinical cases and patient problems can be interpreted within my own context, as hairdressing salon 'clients' and 'customer problems' respectively. Hairdressing theory can be interpreted as basic and clinical sciences. Student groups in my training centre are by necessity small, due to the size of the training facilities. When teaching practical hairdressing skills, the focus at the training centre is on developing the skill of the individual rather than the group and models act as clients for student hairdressers. Each student consults with his or her client on an individual basis. To this extent, in keeping with the PBL definition, the '*faculty*' style remains student-centred as opposed to teacher-directed (Vernon and Blake, 1993).

2.6.4 My previous work (Coherence and Integration Report 2:48) discussed the nature of professions in relation to competency. I concluded that many occupations, like hairdressing, are not '*pure*' professions (Watson, 1986:187). They are often referred to as professions, however, due to features such as long periods of training, the presence of an expert and the provision of a service in exchange for a fee. In order to demonstrate professionalism, one must be capable and it is at this point that professionalism and competency are inextricably linked. It is an unfortunate consequence of CBET that professional competency standards have

become linked with NVQ competency standards, as the latter are deemed to be incoherent and epistemologically flawed (Tarrant, 2000).

2.6.5 Evidently, differences between the professions do exist. Medical students are exposed to longer periods of training. Decisions are generally of a complex nature, as medics are required to connect symptoms in and between body systems, and propose treatment. They cover more body systems than hairdressing students do. However, less complex decisions, such as diagnosing the common cold and broken limbs, are also required on a daily basis.

2.6.6 The General Medical Council (1993) in an article entitled '*Tomorrows Doctors*' identified the goals of undergraduate medical education. The article states that students should acquire knowledge and understanding; become proficient in skills; acquire and demonstrate attitudes necessary for high standards of practice. These goals are not dissimilar, in my opinion, to those identified in the current structure of the NVQ in Hairdressing which require the demonstration of related skills and the development of EKU (1.8.1) underlying performance (see Figure 2).

2.6.7 The Hairdressing and Beauty Industry Authority (HABIA) compiled the most recent Hairdressing NVQ in consultation with industry. It was presented to the QCA (1.7.1) in 1998 for approval and accreditation. Both the GMC and HABIA goals reflect the popular classification of educational objectives devised by Bloom (1956). Bloom (1956) classified educational objectives into three major domains: cognitive, affective and psychomotor. The cognitive objective encompasses remembering, reasoning, concept formation and creative thinking. The affective objective emphasises emotive qualities expressed in attitudes, interests, values and emotional biases. The psychomotor objective is concerned with muscle, motor skills and manipulation. Although the NVQ, as a competence -based qualification, was conceived as an assessment qualification, the section covering EKU has been the focus of significant changes following NVQ reviews (Dearing, 1996) and academic critics (Hyland, 1994; Hodgkinson and Issitt, 1995).

Originally presented as a set of statements, the NVQ has been developed to include educational objectives reflective of Bloom's classification, illustrated in Figure 2.

Figure 2: Extract taken from Hairdressing NVQ Level 1 (City and Guilds, 1998:61): Unit 102A

Element 102A.3 *Add temporary colour to hair*
Essential knowledge and understanding requirements. **You will need to understand:** 1. The effects and potential effects of temporary colour on hair. **You need to know the methods of:** 2. Applying temporary hair colour. **You need to know:** 3. Why it is important to follow instructions during the temporary colouring process and what might happen if they are not followed.

2.6.8 It can be seen that the educational values underpinning both professions, as expressed by the lead bodies, have many similarities. In my opinion, these similarities are sufficient to warrant my use of a PBL approach for the purposes of this research in my workplace. The values that have been identified from the PBL literature, NVQ requirements, and values I identified as being of particular importance for the education of competent, professional hairdressers are listed in Appendix 3:E6. These have been developed alongside the criteria of anticipated behaviour of PBL participants identified in Table 6.

Table 2: PBL research themes

PBL research themes	Origin and importance of theme in relation to the researcher
1. Motivation	• Potential educational objective of PBL (MOT), Barrows (1986). • Valued as part of a personal educational belief in lifelong learning and reflective of a quality educational experience (Appendix 2: 1.5, 2 .1, 4.4).
2. Teamwork	• Teamwork skills are valued as part of the professional work role of the student. • Valued as part of a personal educational belief (Appendix 2: 1.2, 1.3, 2.2, 3.2, 4.3, 4.4). • Key skill required to be assessed as part of the MA programme in hairdressing.
3. Communication (group)	• Communication skills are valued as part of the professional work role of the student. • Valued as part of a personal educational belief (Appendix 2: 1.1, 1.2, 1.3, 2.2, 4.2, 4.4). • Key skill required to be assessed as part of the MA programme in hairdressing.
4. Knowledge-based development	• Potential educational objective of PBL (SCC), Barrows (1986). • Valued as part of a personal educational belief (Appendix 2: 1.1, 1.3, 1.5, 4.4). • A body of work-related knowledge is required for students to operate as professionals in the work place.
5. Application of knowledge to context	• Potential educational objective of PBL (SCC), Barrows (1986). • Valued as part of a personal educational belief (Appendix 2). • The appropriate application of a body of work related knowledge is required for students to operate as professionals in the workplace.
6. Consultation/ enquiry skills (1:1)	• Potential educational objective of PBL (CRP), Barrows (1986). • Consultation skills are valued as part of the professional competency of the student. • Valued as part of a personal educational belief (Appendix 2: 1.1, 1.5, 2.2, 4.3).
7. Improve own learning (resources)	• Potential educational objective of PBL (SDL), Barrows (1986). • Key skill required to be assessed as part of the MA programme in hairdressing. • Valued as part of a personal educational belief (Appendix 2: 1.1, 1.3, 1.6, 2.2, 4.5).
8. Information technology skills (IT)	• Key skill required to be assessed as part of the MA programme in hairdressing. • Valued as part of a personal educational belief in lifelong learning skills (Appendix 2: 1.6, 3.1).

2.6.9 It is proposed that if a PBL curriculum is appropriate for the development of the medical profession, its adoption in the hairdressing profession, should potentially generate many of the desired attributes that both professions value in their

practitioners. These attributes reflect many values important to me as an educator and which I wish to ameliorate in my teaching.

2.7 Motivation

2.7.1 It has been claimed that students following a PBL curriculum are highly motivated (Barrows, 1986; Bishop, 1983; Albanese and Mitchell, 1993). This aspect of PBL was attractive, as motivation was a value that I wished to enhance in my teaching (Table 2). This section explores the relevant issues of motivation as they evolved from the data:-

- Learning styles;
- PBL as part of discovery learning;
- PBL motivators and de-motivators.

2.7.2 There are a wide variety of learning and cognitive styles that have been identified and studied. Without an understanding of the learners and their preferred learning style, it is unlikely that the teacher will be able to design a curriculum that will motivate students (Curry, 1999; Shatzer, 1998). Cohen and Manion (1989:57) state that:

"...if an individual is to learn , then he (she) must be motivated to do so".

2.7.3 Kolb (1984) identified four types of learners (divergers, assimilators, convergers and accommodators) within his theory of experiential learning and concluded that each category of learner demonstrates different attributes and preferred styles of learning. Pask (1978) has also described learning styles called serialist and holist. He claims serialist students prefer to learn in a sequential manner whilst holist students prefer to learn in a hierarchical fashion. Cognitive styles refer to the preferred way an individual processes information. Field independence versus field dependence is a well-known cognitive distinction and refers to a tendency to

approach the environment in an analytical, as opposed to global fashion (Witkin, 1962). Witkin's (1962) theory asserts that field-dependent students perceive their environment in a unified way or gestalt manner of thinking, whereas field-independent students are able to separate their centre of interest from the background. It is suggested that field independent learners are assertive, better cognitively, and independent thinkers who are suited to spatial tasks. In addition, the work of Pask (1978) suggests that some people are good at sequencing sub-problems (serialists) whilst others are good at seeing the whole picture (holists). Serialists would get an overview of a case study before trying to solve it, whilst holists would prefer to follow aspects of a case in detail before getting an overall picture. Implications for the teacher are:-

- Field-independent individuals are likely to learn more effectively under conditions of intrinsic motivation; and
- Field-dependent individuals, are influenced by social reinforcement and work better in a group.

2.7.4 From the literature it could be implied that the learning styles of students suited to a PBL approach would be primarily those of a field-independent learner with a holistic or accommodative style. This is because this type of learner is more likely to respond to intrinsic motivators. One of my concerns using PBL as an intervention was that some students, with learning and cognitive styles incompatible to those ideally suited to PBL, may become disadvantaged learners. The literature is not clear as to how learning styles of students experiencing learning difficulties are incorporated into PBL. Taylor and Burgess (1997) indicate that PBL enables non-traditional learners to integrate their learning and manage the impact of disjuncture inevitable in education. During the research, and given the profile of the research group (Appendix 4, Table 13), I became aware that some of the learners may experience a sense of disadvantage due to their learning styles. This became apparent, as participating in PBL demands a certain minimum level of oral and written skills. Group work highlighted learners

who were at times uncomfortable with PBL. However, in keeping with the ethics of social justice (Griffiths, 1998) there was no intention to treat students differently, or that any student would be denied opportunities for learning and experience during the research (1.9). Accordingly, facilitator intervention had been identified as a means of addressing these concerns.

2.7.5 It is important to identify individual learning and cognitive styles and match them to an instructional method. Students enrolling on a course at an educational institution, choose to submit their autonomy as learners to the organisation. There is an expectation that teachers will enable students to develop their skills and abilities and become professionally competent. It can be inferred that should students find themselves unmotivated by their educational experiences they could choose to withdraw this autonomy and cease attendance. This may occur as a result of not meeting students' learning needs with the instructional methods employed. Introducing an enquiry approach to learning, such as PBL, implied that I could increase students' motivation. This in turn would contribute to improving the retention rates of training centre students. I identified the retention of students as a key organisational issue at the beginning of the Doctorate course (Coherence and Integration Report 1). Whilst retaining students who can potentially achieve NVQs is still an organisational issue, in practice the centre enrols a range of student abilities. These include students, like Student B, who are unlikely to achieve a qualification (Appendix 4: Table 13). In these circumstances 'dignity' values are maintained (Ball, 1997: 269). My experiences testify that it is not necessary to be literate in order to function in society (Marshall, 1997), although I do recognise the added value of literacy skills.

2.7.6 Teaching relies on extrinsic (incentives) and intrinsic (self-reward) sources of motivation (Child, 1993; Cohen and Manion, 1989). Intrinsic motivation is determined by a person's own nature or internal state in relation to a reward, such as satisfaction or pleasure, generated by an activity. Intrinsic sources of motivation foster lifelong learning values. Extrinsic motivation is established

externally by the teacher in the form of incentives and rewards, it engenders short-term learning values. PBL encourages self-directed learning (Barrows, 1986). Thus, the focus in PBL is towards fostering learners' intrinsic motivation in preference to extrinsic motivation by encouraging student-orientated inquiry learning. Bruner's (1979) description of the autonomy of self-reward resulting from discovery learning reflects an intrinsic source of motivation, even though in guided discovery learning, the autonomy of the learner remains considerably influenced by the organisation. Consequently, it has been found (Norman and Schmidt, 1992) that PBL does have a large and potentially long lasting impact on self-directed learning skills. In their studies of medical school graduates, Norman and Schmidt (1992) claim that the role of PBL in students' motivation appears fairly conclusive, as students found the learning environment more stimulating and humane than that of conventional medical school graduates, as revealed in comparative studies.

2.7.7 Learning in educational institutions, including my workplace, is largely driven by external awards (1.7.2). Research by Helsby (1996), as demonstrated that not only does extrinsic reward steer learning, it may reduce intrinsic interest and make studying the subject matter less interesting. The nationally recognised external and extrinsic reward in my industry is the NVQ. If students understand their learning process solely in terms of achievement of outcomes (NVQ), it is likely that the potential intrinsic motivations of implementing PBL may be lost. A teacher can contribute to the promotion of long-term or short-term motivators by the manner in which they portray the importance of achieving qualifications at the expense of advancing intrinsic motivators. At the beginning of the Doctorate in Education course, I was aware, as a teacher, how the NVQ influenced my development of work-based curricula (7.3.2), which resulted in unmotivated students (1.3.3). Care was needed in addressing this factor. For example, in the PBL process, if a teacher, acting as facilitator, intervened in the tutorial groups' case discussion with the intention of always redirecting students towards meeting

pre-ordained outcomes, this could be interpreted by the students as valuing extrinsic rewards. The consequence may be de-motivation of students.

2.7.8 I do, however, acknowledge the importance of achieving outcomes, both for the student and to attract funding for the centre (1.7.2). I also believe that due to the student/ teacher relationship and the submission of autonomy by the student to the teacher, the teacher has a moral obligation to emphasise the value of learning as a lifelong process that does not end with the achievement of an outcome, such as the NVQ. Learners need to be aware of their long-term contribution to the development of their community in order for that community to change and progress. This encompasses the constructivist perspective of the dynamic relationship of both the learner and the teacher to society, expressed by the interpretive paradigm (Table 4).

2.7.9 Environments that are conducive to motivating learners and meeting their learning needs and cognitive styles are also likely to nurture reflective practice. Boud and Feletti (1997) describe an enquiry approach, such as PBL, as facilitating the development of critical reflection skills. Reflection will not take place unless a learner is motivated to articulate and reflect on their tacit knowledge. The development of these skills is central to making professional decisions.

2.7.10 My decision to implement PBL was intended not only to raise my awareness of my own practice but also to meet the needs of the learners that I was working with better than the methods I was using. PBL also offered the opportunity to evaluate a learning system which claimed to maintain the quality of learning experience for the trainee whilst performing and conforming to external constraints. In this way, it seemed that the external stakeholder requirements were also met (1.4, 1.7).

2.8 Team working and communication

2.8.1 The collaborative aspect of PBL was appealing as teamwork was an educational value that I wished to nurture in my teaching (Margetson, 1997). This section explores the relevant issues of teamwork as they emerged:-

- Characteristics of the group and how it affected teamwork and communication;
- How the PBL method used, affects teamwork and communication; and
- The role of the facilitator in contributing to good teamwork.

2.8.2 PBL focuses on the performance of the group as well as individuals. The tutorial group is an essential part of a PBL curriculum. When a group is working well, group members are motivated, listen to one another's views and contribute information (Barrows, 1986; Boud and Feletti, 1997). Child (1993) suggests that both co-operation and competition within a tutorial group are valid motivators. However, competition between students is not a value I promoted as a teacher. I believe that all individuals have their own contribution to make to society. PBL values a collective, collaborative approach to learning. Encouraging internal competition was seen to be divisive, rather than collaborative. I took the decision not to grade student case reports in order to minimise competitive values evolving.

2.8.3 The relationship between students following a PBL programme is one of collaboration. Margetson (1997) claims that this is a main feature of the success of PBL. The focus on collaboration was also a key factor why PBL was chosen as an intervention over other educational methods which emphasised the independence of the learner (Montessori, 1989). However, if the learner's needs are not met through collaborative work, de-motivation of individuals is a likely probability, particularly given the presence of the following influential factors:-

- A dysfunctional tutorial group;
- Poor case studies, which do not challenge or stimulate group discussion; and
- Poor facilitation from the teacher, resulting in students' needs not being met.

2.8.4 Little research has been conducted on dysfunctional, problem-based learning groups. Dolmans et al. (1998) conducted research to explore motivational and cognitive influences on tutorial group processes. They considered the following motivational aspects:-

(a) Motivation (group members encouraging peers in order to maximise their effort);
(b) Cohesion (developing a group spirit and desire for the group to succeed);
(c) Sponging (letting other students do the work);
(d) Withdrawing (reducing contribution to the tutorial group's activities);
(e) Interaction (the degree to which students learn from one another); and
(f) Elaboration (takes place when students ask one another questions).

2.8.5 Dolmans et al. (1998) found that motivation played a central role in influencing a tutorial group's productivity. A tutorial group's success is strongly dependent on interaction and the group's motivation. There are two implications:-

- Problems should be developed that stimulate students' motivation and provide opportunities for interaction; and
- Teachers should be well trained in stimulating group interaction and in motivating students by encouraging a tutorial group's team spirit.

2.8.6 The PBL literature points to an ambiguity between the development of self-directed, independent learners (Barrows, 1986) and research that suggests PBL students become dependent on working in a team, thereby lacking the skills or confidence to solve their own problems (Albanese and Mitchell, 1993). One aspect of professional competence is, in my opinion, to be able to make

independent decisions based on evidence. Yet, another aspect of professional competence is the ability to be able to recognise when to seek another opinion. This judgement would be based on the nature of the problem being faced, which may be viewed as the ability to recognise it as being complex or straightforward. In my own profession, both team working and self directed learning skills are required. It is not clear from the literature what factors may contribute to dependency, but it is implied that the complexity of the problem being solved is a contributory factor.

2.8.7 Margetson (1997) implies that within a PBL approach there is a greater respect for the individual participants than within a conventional, lecture type approach where 'power' or the autonomy of the learners remains with the teacher. He also emphasises the collaborative nature of PBL and mutual 'respect' of participants in the generation of 'new' knowledge. Both Barrows (1986) and Engel (1997) underplay the collaborative nature of PBL highlighted by Margetson (1997). Collaboration is an educational value I wished to foster in using PBL as it reflects the ability to work as both a team member and as an individual in the workplace. I was aware that, within the research group, I was not only dealing with a wide range of learning styles but also a variety of personalities. Due to the emphasis on discovery learning, PBL has the potential to promote and facilitate long term, intrinsically motivated, reflective learners (Barrows, 1986). It was established earlier that in the pedagogical relationship, the teacher has a moral obligation to facilitate the motivational and learning needs of individuals and the tutorial group. These factors contributed to the success of the team of students working collaboratively. The role of the teacher in facilitating good teamwork and communication skills is explored further in 2.12.

2.9 Knowledge-based development

2.9.1 It has been claimed that students following a PBL curriculum may be better able to learn and recall information (Coulsen, 1983; Eisenstadt et al., 1990; Tans et al.,

1986; Barrows, 1986). This aspect of PBL was a value that I wished to enhance in my teaching to facilitate the development of competent practitioners. The following factors are relevant:-

- Types of knowledge as discrete or integrated;
- Development of knowledge in PBL;
- The role of facilitator as expert or non-expert; and
- The use of different assessment formats to test knowledge.

2.9.2 Knowledge can be perceived and classified in various ways. A full discussion of my understanding of the role of knowledge is provided in Coherence and Integration 2 (1998:52-55). Many classifications reflect Descartes' dualism theory of a clear separation between the physical and metaphysical reality (Stevenson, 1998). Some of the dualisms referred to in this research are listed in Table 3.

Table 3: Dualisms and continuums of knowledge referred to in the current research

Origin/ Reference	**Positivist Approach**	**Interpretive Approach**
Decartes (in Stevenson, 1998)	Physical	Metaphysical
Pearson (1984)	Habitual	Intelligent
Colin Fisher (1998)	Product	Process
Child (1993:92)	Behaviourist	Cognitive
Norman et al. (1989)	Dispersed	Elaborated/compiled
Taba (1962)	Structure orientated	Task orientated
Boud and Feletti (1997)	Disciplinary based	Cross-curricular
Section 3.8.9	Discrete	Integrated

2.9.3 From Table 3, a common theme or pattern emerges with relation to the perception of these dualisms of knowledge. This pattern is reflected in the epistemological and ontological assumptions of the origins of knowledge and the nature of reality. The positivist approach perceives the world in an objective manner where the knower can stand outside of what is to be known. The interpretive approach acknowledges the knower and the known to be interdependent. Some of the themes listed in Table 3, such as Norman et al.'s (1989) perspective of knowledge, represent continuums rather than dualisms (2.9.6). These dualisms and continuums are explored further in 3.2 and at appropriate stages throughout the research investigation.

2.9.4 The knowledge developed within a PBL context is grounded in an interpretive, constructivist view of the world. Thus, it is inextricably linked with the student's work environment. As the development of competent professionals is the aim of vocational learning, the PBL approach is seen to be appropriate, as it remains firmly rooted in the socio-cultural environment (Birtwhistle and Johnson, 1997). This supports a Gestaltian approach to learning (Jarvis, 1995). PBL aims to develop students' construction of a body of knowledge that can subsequently be applied in the workplace. Thus facilitating the formation of professional, competent practitioners.

2.9.5 Pearson (1984) distinguishes between what he refers to as 'habitual skill knowledge' and 'intelligent knowledge' to highlight the notion of competency. Habitual skill knowledge is described as that which enables a person to perform certain necessary routines unreflectively. The development of this type of knowledge is the result of knowledge and understanding being perceived as inputs (Wolf, 1989) which produce isolated competencies and a task view of competence (Hager and Gonczi, 1996). Pearson suggests that although this habitual know-how is necessary, it is not sufficient to imply competence. Intelligent knowledge involves the exercise of capacities for discernment, discrimination and intelligent action. Pearson's (1984) view reflects my own view and that of Hager and Gonczi

(1996) that competence involves the integration of cognitive skills, interpersonal skills, affective attributes, technical and psycho-personal skills. As such it is holistic, rather than atomistic and predictable as Wolf (1989) would imply. In a holistic view of competence quality assurance is not dependent on the effectiveness of a system to objectively predict the performance of an individual against a pre-specified standard or output. Rather, it depends on the ability of the individual to act intelligently in relation to their situation. This view of competence is based on the quality of human values realised in social transactions between people.

2.9.6 Norman et al. (1989) claim that learning progresses through a series of levels as expertise develops. They identify these levels of expertise as:-

- Dispersed knowledge - lists of isolated facts with little conceptual integration;
- Elaborated knowledge - facts, principles and information richly organised to support use in problem solving; and
- Compiled knowledge - clinical cues and contexts are instantly recognised and processed.

The novice learner has '*dispersed knowledge*', whilst more advanced learners possess '*elaborated knowledge*'. At the highest level of expertise, knowledge is '*compiled*' and condensed. The recognition that learning progresses through stages, reflects a similar categorisation by Piaget (see Child, 1993:159) which relates to a child's cognitive development. The existence of stages would seem to indicate that a novice learner would benefit from exposure to a lower level PBL method of than an expert learner, who has already developed a body of intelligent knowledge and is able to quickly apply and process it. Barrows (1986) refutes this, claiming that when a case is presented to students after exposing them to work-related knowledge, this does not constitute PBL in its most effective form. Therefore, he does not distinguish between students at different stages of learning with regard to the appropriateness of the PBL method implemented. Barrows

(1986) implies that the most effective form of PBL for all learners is the reiterative, closed-loop model.

2.9.7 It has already been established that in order to motivate students, case problems should be developed which stimulate and provide students with opportunities for interaction (Dolmans et al., 1998). The development of case problems is thus of central importance in PBL, as they provide the stimulus for cognitive processes. Dolmans et al. (1997:185) suggest that:

" Cases are the driving force behind students' independent study in problem-based learning...the nature of student learning is to a large extent dependent on the quality of cases presented to students".

2.9.8 Dolmans et al. (1997:185) developed seven principles for effective case design. These have been adapted to reflect the current research:-

1. *"The case contents were adapted well to students' prior knowledge.*
2. *A case contained several cues that stimulated students to elaborate.*
3. *Client cases were presented in a context that was relevant to the future profession.*
4. *Relevant basic science concepts were presented in the context of a client problem to encourage integration of knowledge.*
5. *Each case was designed so as to stimulate self-directed learning by encouraging students to generate learning issues and conduct literature searches (Midgley and Le Rougetel, 1994).*
6. *Each case should enhance students' interest in the subject matter, by sustaining discussion about possible solutions and facilitating students to explore alternatives.*
7. *Cases matched one or more of the faculty objectives".*

2.9.9 Most studies regarding case studies in PBL have investigated the relationship between student-generated learning issues and faculty objectives. However, little research has focussed on the underlying features of effective cases, which for example, affect discussion in the tutorial group and individual study. Dolmans et al. (1997:185) state that,

"...designing cases should no longer be exclusively centred on experience-based knowledge, but also rely on evidence-based knowledge".

2.9.10 Many of these principles have been recognised by Hafler (1997:158) who researched the development of cases at Harvard Medical School:

"There was consensus among the authors...that all good cases were written from professional and personal experiences, developed from either real situations or written to reflect a situation. This gave a case relevance and thus made for a powerful teaching tool. Good cases contained a puzzle which helped the students develop problem-solving skills."

2.9.11 One issue that presents a challenge when writing cases is the selection of appropriate information for the students. A case needs to maintain a multi-disciplinary (cross-curricular) theme but avoid a multiple-themed story. It is accepted that leading students off on a tangent risks confusion even though most real cases contain red herrings or irrelevant information (Hafler, 1997). Cases were subject to a validation review by the case writer's peers, prior to being included for use in the curriculum.

2.9.12 The process of institutional case validation gives rise to the question of ownership of knowledge. Whose knowledge is the case based upon? Whose approval must be sought to implement it? Finally, who owns the knowledge being generated? This uncertainty is reflected in the Foucaultian power and knowledge relationship (Marshall, 1997). If the case study is developed by the institution, by its very

nature, it could be used as a political tool in order to generate specific knowledge as directed by the owners of the knowledge, i.e. the institution. Not all cases have been developed by institutions. This supports the decentralisation of academic institutions as the sole source of knowledge (Morrison, 1995). Joson (1996) has shown that students themselves are capable of developing case materials. Within the current research, the cases were based upon my own work-based experience and took account of the learning objectives required by the examining board. However, it is clear that even student-orientated PBL is open to the kind of power and knowledge abuse implied earlier. Furthermore, if the facilitators of learning are uncomfortably challenged by the collaborative aspect of PBL, they may resort to more directed, didactic means of 'sharing' their knowledge. This would result in a contradiction of both the inquiry element of PBL and the constructivist epistemology by denying the learner the mutual respect intended. The extent to which this equality of power relates to the learning relationship varies with the type of PBL implemented and is potentially strongest in the reiterative model (Barrows, 1986).

2.9.13 There are two perspectives that one can take when reflecting upon assessment within a PBL approach. The first maintains that the role of PBL is the acquisition of problem-solving skills applicable to a wide variety of situations. If these problem-solving skills are independent of knowledge they can be assessed separately. The alternative view is that PBL is about knowledge learned in a context that will hopefully transfer to new contexts. From this perspective problem-solving skills are not independent of knowledge and therefore it is impossible to gain any useful information about students' abilities from assessment of a few cases. The middle ground acknowledges the latter perspective but also recognises that, as knowledge and problem-solving skills are closely related, students exposed to a PBL approach should have some relevant knowledge (Norman, 1997). The main concern is to find the most effective way of assessing knowledge gleaned from a PBL experience and discover what the impact of acquiring that knowledge is on learning (Norman, 1997).

2.9.14 Barrows and Williams (1987) and Van der Vleuten et al., (1996) assert that assessment techniques can inadvertently limit the focus of study and thereby decrease the effectiveness of PBL. Another disadvantage to assessment is that it reinforces the development of surface, short-term learning rather than deep learning. Comparative research studies between PBL and non-PBL students has indicated that PBL students are unlikely to excel in knowledge-based assessment compared to non-PBL students. However, they are more likely to retain knowledge for a longer period of time (Tans et al., 1986). In contrast to these findings, Coles (1990) asserts that PBL students are surface learners rather than deep processors, since they see interconnections and links between different knowledge areas and can therefore retrieve their knowledge more easily due to multiple routes of access. Deep processing is said to occur when students understand the meaning of what they are learning rather than merely memorising what they study.

2.9.15 Swanson et al., (1997) recommend that the most appropriate focus for assessment is elaborate knowledge (2.13.4) as opposed to either dispersed knowledge (as novices will not have developed the conceptual integration of PBL) or compiled knowledge (as this level of expertise is developed over a longer period of time). A main focus for this research was to evaluate and assess the process of PBL (1.1). Swanson et al. (1997) categorise process oriented methods of assessment in the following way:

(a) Tutor, peer, and self ratings;

Research has shown that these carry little measurement information and have poor validity.

(b) Unobtrusive methods;

These include techniques where students are requested to keep logs, or diaries summarising their learning activities. However, as it is difficult to capture and

standardise the information, these techniques are more commonly used for curriculum evaluation.

(c) Learning Exercises;

These are learning exercises which encompass both process and content elements of assessment and the student is expected to solve them in a similar manner to that which occurred during the PBL process. Exercises take place under controlled and standardised conditions, and the students' skills are then rated.

2.9.16 Swanson et al., (1997) conclude from their review of instruments for process assessment, that most of the techniques are psychometrically suspect and reliance on their results for decision-making should be avoided. In contrast, they claim that techniques for outcome-orientated assessment such as multiple-choice questions (MCQ), are well developed. They also claim that if constructed and used appropriately, MCQ's are an effective and efficient assessment method. Content-based assessments such as MCQ's are used widely within PBL, but are limited to the extent that they only assess students' acquisition of knowledge. However useful these assessments are in determining the knowledge base of the student (Swanson et al., 1997) they cannot assess those other skills that PBL claims to develop, such as problem-solving, self-appraisal or communication skills (2.5.1). Norman (1997:266) asserts the need for the introduction of assessment methods that will:

"*...assess these objectives in a meaningful, reliable and valid fashion*".

2.9.17 City and Guilds (1998) hairdressing NVQs include a mandatory written assessment that students are required to sit (1.4.2). I would describe this outcome-orientated test as primarily content-based, but it does include many aspects of vocational application. There are drawbacks in using the test such as the difficulties encountered with the use of language (Coherence and Integration

Reports 1&2). The phrasing of questions is often ambiguous, forcing students to guess what the test requires (Swanson et al., 1997).

2.9.18 Swanson et al. (1997) highlight the use of essay examinations, as a popular choice of learning exercise assessment, as it can provide an in-depth assessment of problem-solving skills. It was with this in mind that I designed an essay examination, using a case study as a basis, for students to take at the end of their course alongside the mandatory written test. In keeping with PBL as a learning exercise, the case study assessment was designed as an open book examination method.

2.10 Application of knowledge to context

2.10.1 It has been claimed that students following a PBL curriculum may be better able to integrate basic science knowledge into solutions that are presented to them in clinical cases (Barrows, 1986). This aspect of PBL appealed to me as an educational value that I wished to include in my teaching (7.3.2). One of my concerns as an educator implementing PBL was the gap between theory and practice in the workplace. In order to bridge this gap, I believe that students need to be able to transfer knowledge from theory to practice using problem-solving skills in various contexts. This section aims to clarify the nature of problem-solving skills and whether they need to be taught as part of PBL.

2.10.2 Margetson (1997) stresses that students must learn not only the products of enquiry but also how to pursue enquiry. Hager and Gonczi (1996) add that problem-solving skills must be developed in context and contribute to competence. This supports the need to learn problem-solving skills as identified by Albanese and Mitchell (1993) and Klein (1997). Norman and Schmidt (1992), however, suggest that the notion of a general problem-solving skill that can be taught and learned is not a particularly useful construct.

2.10.3 Polanyi's (1969) work on problem solving and knowledge has advanced my understanding of the problem-solving process within PBL. According to Polanyi a person has access to knowledge because of a three-way relationship between the subsidiary (background), the focal (foreground) and the knower. The knower controls what is figural by focussing attention on and choosing to bring objects from the subsidiary to the foreground. Polanyi's central theme is that no knowledge can be completely focal. He suggests that all knowing is based on tacit understanding. Polanyi perceives problems as a special case that aids in understanding tacit and focal knowledge. This is due to the increasing intensity of the subsidiary aspect of the knowledge relationship, when faced with a problem.

2.10.4 The role of tacit (unarticulated) knowledge when problem finding and solving is that it provides the clues the knower relies on to indicate the nature of, or to solve the problem. These clues form part of subsidiary rather than focal knowledge. In order to understand the problem one needs to understand the context that surrounds the problem. This approach to developing understanding is used by PBL through the use and discussion of work-based case studies. By immersing themselves in the situation, and searching for clues, students have the opportunity to anticipate what is not fully understood at the beginning of the case. This immersion is facilitated by the student context, as they will have accumulated explicit (from previous course units) and tacit (from their experiences in the workplace) knowledge. Students develop focal knowledge in deciding what the issues of a case are, which when articulated become more explicit.

2.10.5 Polanyi (1969:24) suggests,

"... articulation does not merely make us better informed: it enriches us more by increasing our mental power over the given piece of information.".

Articulated knowledge not only increases our ability to understand what is observed, but also aids our ability to use our tacit knowledge. Thus, in producing individual written reports of the PBL cases, and written reflections, students were encouraged to articulate and reflect further on their explicit knowledge (3.6.6). The way that PBL knowledge is invoked recognises that reality is multi-constructed and shapes events in many ways. These values reflect those of the qualitative paradigm (Table 4).

2.10.6 The manner in which reality is perceived also impacts upon the way in which the individual's learning style incorporates problem-solving skills. PBL encourages the development of problem-solving skills through discovery learning. Research suggests that students use different strategies in order to problem-solve (Bruner,1979; Schmidt et al., 1990). Bruner (1979) identified the commonest tactics employed by students during problem solving as scanning and focussing of attributes of the problem. Scanning involved hypothesis testing and was a strategy used to solve everyday, straightforward problems. Focussing involved inductive reasoning by testing the significance of various attributes in order to reach a successful outcome. It is implied by the literature that focus problem solving occurs in PBL as it is based on inductive as opposed to deductive reasoning. There are two types of focusing:-

- Conservative focusing (changing one attribute at a time); and
- Focus gambling (changing more than one attribute at a time).

Schmidt et al. (1990) have provided evidence suggesting that three entirely different strategies can be used in a problem solving approach:-

- Understanding the underlying processes or concepts;
- Invoking relatively fixed "illness scripts" containing signs and symptoms of a particular disorder; or

- Simply recognising that the problem is similar to the other problems previously encountered.

They suggest that the last strategy is the approach most used by the experts. Thus, one could conclude that low correlation across performances of problems might simply reflect different choices of strategy.

2.10.7 The literature implies that the complexity of the problem encountered by the student is an indicator of the tactics employed by the student in problem solving. The more complex the problem the more likely that focusing will be utilised, particularly focus gambling. In addition, Ryan (1997) claims that having sufficient time to solve complex problems is a necessary factor, which obviously has resource implications.

2.10.8 There is general acceptance that one of the differences between medical novices and experts is the extent to which their problem solving skills have developed. Consequently, PBL assumed that the development of these skills took precedence over the accumulation of knowledge. Eva et al. (1998) explored the etiology of content specificity. While recognising that this notion is now axiomatic, they were concerned with what they perceived to be untenable conclusions derived by other medical research. Eva et al. (1998) claim that the difference between experts and novices is not their ability to problem-solve, but is a measure of the content of their extensive and integrated knowledge base. They point to the immeasurable impact that these findings have had on medical education curricula such as PBL, and particularly assessment. From these results it seems that, contrary to the PBL belief, mastering knowledge does not seem to be secondary to problem solving. As a result, much more attention has been given to the sequence and mastery of knowledge within a PBL approach.

2.10.9 Norman et al. (1996) conducted research to test the low correlations found in the studies referred to by Eva et al. (1998). They assembled four problem cases

(containing a series of ten clinical problems) across two speciality areas, cardiology and rheumatology. The cases were presented using simulated patients to 10 specialists, 10 second year residents in medicine and 10 second year clinical clerks. One of the clinical problems was presented twice. The encounters were videotaped. At the end all participants completed a multiple-choice test. If the earlier studies had validity, Norman et al. (1996) expected to show that problem solving was driven by content. As such there would be a high correlation across presentations of the same problem. However, the correlation of performance across the same two problems was low (with the exception of diagnosis). Further, there was no association between performance on the test and diagnostic accuracy. From the results one could conclude that factors other than knowledge must be invoked in solving problems and that content specificity on its own is an insufficient explanation for differences between experts and novices. Eva et al. (1998) proposes that, unless the aspects of the case that are suppressing the correlation are identified, no advance can be made. However, in order to identify these aspects it is necessary to understand more about the problem-solving process.

2.10.10 Lyotard (1984:51) claims that the most important advantage for solving a problem is to have the capacity to *'actualise the relevant data... and to organise that data into an efficient strategy.'* Accordingly, where problem solving is required, he advocates the promotion of student learning (as in PBL) as opposed to teaching.

2.10.11 The literature points to the importance of invoking problem-solving skills in encouraging expertise. This should occur alongside an accumulation of knowledge. The way in which learners perceive their environment indicates the strategy they take to solve problems. In addition, how persons understand the complexity of problem also contributes to the choice of strategy used and indicates whether individuals see themselves as problem solvers or as solution providers. A problem solver provides one solution for a case whereas the solution provider offers a range of options in conjunction with the preferred

solution. PBL literature supports the development of problem solving skills rather than indicating that these skills can be taught (Bruner, 1979; Montessori, 1989). Dr Burdett (1999, Appendix 3: E2) indicates that it is not the accumulation of knowledge that makes an expert but the way in which the knowledge is applied. As application of knowledge changes in different contexts, it is important for students to reflect upon and develop their problem-solving skills in order to enable a transfer of knowledge to be made.

2.10.12 Barrows (1986) claims that the opportunity to work with real clients allows practice and transfer of knowledge. This reflects my own conviction. Transfer is implied from PBL educational objectives (Barrows, 1986) and supports its implementation in my workplace. Norman and Schmidt (1992) envisaged that one role for PBL is the mastery of general principles as opposed to a general skill to facilitate transfer. Within PBL, as indeed with education as a whole, the issue of transfer is of central importance. How do students, who have learned concepts and facts (content) in one context, then learn how to access and apply (transfer) these concepts and facts to the solution of a new problem in the same, or different, context? Child (1993) claims that there is evidence for believing some skills can be transferred and suggests that the curriculum can facilitate this. Prior to the research, I developed the curriculum for a topic by beginning with the individual needs of the students, both in the training centre and in the workplace. I then identified the learning objectives required by the awarding body for a unit and developed relevant materials around those objectives. Finally, I imparted what I perceived to be the relevant 'knowledge' in an appropriate manner. This approach was successful in developing content knowledge but less so in developing process skills.

2.10.13 Subject specialisation can lead to problems with transfer of knowledge because attributes, such as problem solving, analysis and pattern recognition, are seen to be highly context specific (Hager and Gonczi, 1996). Coles (1990) proposes that PBL equates to a contextual learning theory, consisting of three time-dependent

phases: context, information and relationship. He claims that in PBL the context is established with the client problem, the information is received by the learner's cognitive structure in a meaningful way, and then new information is related to existing knowledge. Schmidt (1983) also suggests an information processing orientation to PBL and claims that encoding the problem facilitates the transfer of knowledge. As current learning is affected by the past, Schmidt (1983) recognises the importance of prior knowledge and context in contributing to successful transfer.

2.10.14 Theories of transfer fall into two main areas: abstract induction and conservative induction (Eva et al., 1998). The former assumes that students learn to extract principles and concepts from problems, making general rules independent of contexts. The latter assumes that the student does not separate the rule from context and presumes the principle is available in multiple-problem contexts. For the PBL practitioner it is held that conservative induction transfer occurs. For the conventional educationalist, who advocates the teaching of knowledge first, abstract induction is a necessary requirement, as it is assumed that the decontextualised knowledge will be available for use in solving new problems. Both the context and level of abstraction of the problem domain impede analogous transfer. Evidence from memory experiments proposes that recall of information is optimal when subjects are tested in the same physical setting as that in which they originally learned the material (Norman, 1988). This would support the NVQ policy of work-based assessment as is applied in the hairdressing industry. Transfer of knowledge between problems in the same domain is more likely than when the context has changed, requiring a transfer of knowledge across domains. Such shifts in context and level of abstraction may prevent transfer of knowledge.

2.10.15 A concern for PBL advocates is that some psychological literature has discovered that transfer is much more difficult and occurs much less frequently than might be imagined (Eva et al., 1998). A considerable amount of this literature has focussed

on analogy as the principle process involved. It follows that if an analogy is recognised then transfer occurs and if there is no recognition or the analogy fails, there is no transfer.

2.10.16 Much research on transfer has been devoted to finding necessary factors for transfer to take place (Child, 1993). Needham and Begg (1991) provide a summary of factors required for use as an analogy in solving a target problem. Child (1993) also warrants mention of four factors which affect 'positive' transfer:-

(a) Transfer is possible where there are common factors in the content or procedures adopted in carrying out two tasks;

(b) There is a better chance of transfer where the learner is made aware of the possibility of transfer;

(c) The more thoroughly the first task is learned, the more likely it is that transfer will occur; and

(d) The ability of the learner, which enables them to recognise the relationships between tasks.

2.10.17 'Negative' transfer occurs in instances where the second task possesses content or procedures in conflict with the first task and as a result learning is hindered and transfer impeded. Child (1993) points out that transfer of training has much in common with the behaviourist's concept of stimulus generalisation. However, within a PBL approach, a cognitive process of knowledge transfer is also required in order to solve the problem presented. Thus, PBL goes beyond a behaviourist approach indicative of the NVQ philosophy.

2.10.18 Successful transfer of knowledge has been linked to the concept of surface and deep process learning (Marton and Säljö, 1976; Vu et al., 1998). Boud and Feletti (1997) suggest that a professional type of learning should reflect 'deep processing'. This is said to occur when students understand the meaning of what they are learning as opposed to merely memorising what they study. It is suggested that surface learning is useful as a means of gaining a holistic overview of a situation (Romanyshyn, 1989). Empirical studies, however, do not provide a clear theoretical explanation of the educational mechanisms that induce one approach as opposed to the other. Evidence does exist that deep processing students are less successful than those students who see the interconnections and links between the different knowledge areas i.e. the surface learners (Coles, 1990). The tendency to be a surface, or a deep-process learner has been connected to age and learning style (Aaron and Skakun, 1999). The more extensive the linkages and routes of access to the stored information the more likely will be its retrieval and use (Broadbent, 1975). Boud and Feletti (1997:315) highlight that:

"... successful clinical reasoning is dependent upon having access to an appropriately structured memory comprising a deep, rich knowledge".

2.10.19 If successful PBL is dependent on such an attribute then the next question would be how best to develop this. Also implied within this latter approach to problem solving is that the knowledge already exists and has been formed. However, as previously stated, Barrows (1986) identified the extent to which prior knowledge was formed as decreasing the effectiveness of a PBL approach. The literature is, therefore, ambiguous in regard to the appropriate sequence for the introduction of knowledge-based learning and the development of problem-solving skills within PBL.

2.11 Developing Consultation skills

2.11.1 It has been claimed that students following a PBL curriculum develop effective client consultation skills (Barrows, 1986). This aspect of PBL was an educational value that I wished to foster in my teaching. Boud and Feletti (1997:15) claim that PBL offers:

"...a means of developing learning for capability rather than learning for the sake of acquiring knowledge".

With the focus on capability rather than knowledge acquisition, PBL has become increasingly popular across a wide range of professions, and not only in health care. However, Boud and Feletti (1997) do not clarify what they purport to be capability.

2.11.2 Elliot (1991b) supports a holistic, integrated view of the competent practitioner. His view of competence or quality assurance depends on the ability of individuals to act intelligently in relation to their situation. PBL recognises the human value intrinsic in social transactions encountered in real life situations. PBL participants are encouraged to work together as a team with the support of a tutor. Participants (students and teachers) are encouraged to be open minded, reflective, critical, and pay due respect to themselves and others as individuals with knowledge, understanding, feelings and interests, who come together in a shared educational experience (Margetson, 1997). These values reflect many of my own views on education, such as the equality of opportunity (Appendix 2: 4.5), and education being a learning process and not simply a behavioural change (Appendix 2: 1.5), as well as my own role as facilitator of a quality learning experience (Appendix 2: 2.1). I believe that, because of these values underpinning PBL, it facilitates all students in realising their potential (Appendix 2: 2.2).

2.11.3 Earlier, reference (1.3.3, 1.4.3) was made to my concern with developing professional competency in the workplace. Hager and Gonczi (1996) view the concept of competence as being more than just fulfilling a series of tasks. They propose three conceptions of competence: a task-based view, a generic approach and an integrated conception of competence. The task view omits any higher level contingency competencies from the standards. This perspective leads to a narrow focus for training and assessment and would reflect many of the behaviouristic criticisms of competence based qualifications.

2.11.4 The possession of a series of desirable attributes reflects a generic approach to training and assessment focussing on strategies in each of the separate attributes. This approach reflects the traditional academic approach to subject specialisation and makes no attempt to integrate or apply the concepts being taught (Barrow and Woods, 1988). It is good at capturing the less predictable work roles. Hager and Gonczi (1996) describe attempts to teach attributes, such as problem solving, outside of their context, as being largely misconceived because they believe them to be highly context specific. This supports a constructivist perspective.

2.11.5 The final concept of competence is that of an integrated approach where competence is conceptualised in terms of knowledge, abilities, skills and attributes displayed in realistic professional tasks at an appropriate level. Tasks central to the practice or profession are selected and the main attributes required for the competent performance of each task are identified. This is conducted in relation to affective attributes, cognitive and interpersonal skills, technical and motor skills so once again reflecting Bloom's (1956) taxonomy of educational objectives (2.6.7). Following an integrated approach to competence Hager and Gonczi (1996:15) claim the '*holistic richness of the profession*' is captured, and this in turn helps to specify the kinds of training and assessment situations suitable for effective learning and assessment to take place. They propose five claims for the acceptance of their richer, integrated conception of competence:-

- Integration of general and vocational education;
- More holistic than its rivals;
- More helpful for teaching and assessment;
- Allows for flexibility in work performance; and
- It encourages high quality work.

2.11.7 The features of the integrated system described above reflect the competency desired by a PBL approach. Pithers and Soden (1999) suggest caution when making claims on the basis of the integrated concept of expertise. They argue that the level of a person's skills may differ depending on that person's grasp of the knowledge with which the skills are to be combined. Ultimately it is the experience of the individual learner that should dominate learning and assessment (2.8.7). This concept is politically correct in the current political, post-compulsory educational climate at the time of writing. The TSC Inspectorate is keen to stress that the experience of the learner impacts on the overall grading of an inspection. If one accepts that experience is subjective, then the TSC approach is well intended. However, it is open to question as to whether the real essence of individual learning experiences from a variety of contexts can be captured and graded simplistically. Furthermore, if the student learning experience is truly central to the justification of public funds then, one could question the necessity for creative, practical hairdressing apprentices to sit mandatory written exams, and spend long periods of time preparing portfolios for examiners who may or may not request to examine them.

2.11.8 Barrows and Tamblyn (1980:287) describe PBL as

"...the learning that results from the process of working towards the understanding of, or resolution of a problem."

The use of the word 'problem' has negative connotations which, in my view, is not compatible with many of the positive educational values associated with the

use of PBL (Barrows, 1986). Bawden (1997) criticises PBL as he claims it encourages the division of complex situations into convenient problems. These reduced problems then become questionable, as they become detached from the real world in which they have evolved. Bawden's (1997) research implied that learning how to improve a situation was more constructive than learning how to solve problems. Furthermore, he suggested that presenting PBL as a learning approach resulting in a solution to a given problem could be deemed to have behaviourist undertones. It has already been established that PBL is not a behaviourist model of learning but is concerned with learning as a process. As a result, some disciplines have rejected the term 'problem' and replaced it with enquiry, action learning or issues-based learning (Boud and Feletti, 1997). Subsequently, during my classroom research, I have tried to avoid using the term 'problem' with students during case discussions, preferring to call them 'issues' instead.

2.11.9 A value that I encouraged students to realise was that some client problems or situations may not have solutions, only options. Ultimately, it is the client who is the decision-maker. Thus, an important value to foster in students was the need to perceive themselves as solution providers, rather than problem solvers. In this way the consultation with the client became a collaborative process rather than directive action. Students also needed to recognise where they could, and could not, contribute to the improvement of a situation. In this way the notion of a solution provider rather than a problem solver challenges the idea of an ultimate truth. Modernism assumes a truth exists to be uncovered (Leigh, 1992; Bush and West-Burnham, 1994). Postmodernism does not cling to the notion of truth claims, and suggests truth claims should always be met with caution (Stewart, 1997; Edwards, 1994; Derrida, 1982). Postmodernism does not accept modernist attempts to describe the world in rational, empirical and objective terms. Edwards (1994:428) describes the essence of postmodernism as:

"...the attempt to break down the hierarchical barriers between high and popular culture, art and everyday life.....Diversity of knowledge, development and culture are each dimensions of postmodernism".

By recognising and acknowledging a diverse range of options for the client, the solution provider identifies a postmodern perspective of the client situation.

2.12 Improve own Learning

2.12.1 It has been claimed that students following a PBL curriculum may be better problem solvers and self-directed learners (Barrows, 1986). This aspect of PBL was an educational value that I wished to foster in my teaching as self-directed learners are lifelong learners. The key aspects of this issue, identified by the data analysis are:-

- Role of facilitator and other resources in supporting students' learning, including information technology; and
- Resource implications of PBL in terms of cost and time.

2.12.2 There is general consensus in the PBL literature (Boud and Feletti, 1997; Wilkerson and Hundert, 1997; Taylor and Burgess, 1997) that an essential factor of effective PBL is the skill and attributes of the tutor. At the beginning of the Doctorate course, I identified that one of my roles as an educator was to facilitate a quality experience for students. In implementing PBL, I endeavoured to ensure a high quality experience for students, which would not disadvantage them as a result of my own misconception of the role. Whilst I was unable to work alongside or observe PBL teachers 'in situ', I developed my understanding of what a PBL tutor entailed from interviewing a PBL tutor, (Appendix 3: E2) and reading relevant literature.

2.12.3 Becoming a PBL tutor involved re-framing my view of the educational process, which changed in emphasis from direction to facilitation. In this mode the teacher is not perceived to be the ultimate source of knowledge. Wilkerson and Hundert (1997) have identified five characteristics of teaching that are commonly required to be re-examined. These have been summarised as follows:-

(a) PBL teachers are responsible for designing appropriate activities, observing learners at work, and guiding their progress through questioning and feedback. A successful PBL teacher must learn to trust the learners to do the work of learning. With the emphasis on learning through discussion, the teacher will often feel outside of his or her 'comfort zone' in terms of expertise.

(b) PBL teachers use their expertise to assist learners in forming connections between ideas, rather than covering all the content to be learned. They need to ask themselves what are the critical learning objectives that students need to cover.

(c) The relationship between the teacher and the student changes from an expertise/ novice model to a partnership model where the teacher is a participative learner. Teachers come to know students individually, with differing needs and abilities.

(d) The emphasis of group work within PBL creates a spirit of team co-operation rather than individual competition. The teacher, as part of the team, becomes attentive to the needs of individuals and the health of the group.

(e) The greatest challenge for the PBL teacher is the ability to reflect on one's practice (Schön, 1987) and to develop an increased level of professional and personal awareness of self in relation to others.

2.12.4 Little (1997) contends that the major difficulty in implementing PBL is the teacher's inability to understand the extent of the role change from lecturer to facilitator. She suggests that failure, confusion or resistance to PBL by students may be the result of a teacher's expectation that students will move straight from teacher-directed learning to student-directed learning themselves. Consequently, she supports the need for students to be 'led' into autonomy (Heron, 1993; Albanese and Mitchell, 1993). It is clear that the role of the teacher within PBL is pivotal. PBL teachers, in addition to their role of educational evaluators and information disseminators (Little, 1997), act as mentors (Winsor, 1997), a resource (Ryan, 1997) and facilitators (Taylor and Burgess, 1997).

2.12.5 Prior to the implementation of this research, Dr. Burdett (1999, Appendix 3: E2), a PBL practitioner, indicated the importance of my role as tutor. Without the benefit of being able to observe a PBL tutor in operation, as had originally been intended by the research proposal (Appendix 1), the literature has been useful to me in identifying the ways in which my own role, as tutor would have to change.

2.12.6 In a curriculum which is based on disciplinary subjects, teachers necessarily must specialise in their given subject area and are generally perceived to be experts in their own field by colleagues and students. The assumptions underlying the use of a subject specialist as tutor are that the generation of content knowledge and truths are given prime importance in the fostering of competent practitioners (Eva et al., 1998). The disadvantages are that the idea of the teacher as a central resource of knowledge is maintained rather than fostering the partnership model (teacher as learner). Furthermore, discussions are likely to reflect the knowledge of the tutor, who may guide the students to interpret all the issues of the case with respect to his/ her own specialist knowledge.

2.12.7 A PBL curriculum is cross-curricular and therefore PBL tutors are not necessarily going to be experts in all areas of the curriculum. The advantage of a non-expert tutor would be the development of process (problem solving) skills, which are

focussed upon nurturing competent practitioners (Boud and Feletti, 1997). In this approach, students are encouraged to view the case as a whole, rather than its constituent parts. The teacher is not perceived to be the source of all knowledge and a collaborative model of learning which is student-centred, is formed. However, the disadvantages of this approach is that without a wide knowledge base, the teacher may not have the experience to be able to guide the students into identifying the key learning objectives for a particular case, nor be able to support their individual learning requirements. In this scenario, the team can be frustrated in its attempts to solve a case, and these anxieties may backfire.

2.12.8 PBL literature is somewhat unclear on the requirements of tutors' subject expertise. There are advocates for using an expert as a PBL tutor (Schmidt et al., 1995) and there are others that support the use of a more general facilitator (Engel, 1997). The need for expertise is linked to the students' level of prior knowledge. Schmidt et al. (1995) recommends that facilitators possess a balance of expert subject knowledge and personal qualities. For the purposes of this research, I had no option but to approach the case studies as a perceived expert tutor. However, the PBL literature was useful to me in identifying the disadvantages in the expert role and minimising the inherent pitfalls. I also felt that I could gradually reduce the students' dependence upon the teacher-centred approach, by becoming increasingly participative, and by acknowledging that I could not provide answers to all their questions. In this way, I was able to take on aspects of the non-expert tutor role. The PBL literature, however, does not provide for tutors acknowledging both roles. The role of the PBL tutor has been personally challenging.

2.12.9 Resources have already been identified earlier in the text as raising issues for PBL. These issues fall into two areas: operational and political (in terms of faculty). Boud and Feletti (1997) refer to one characteristic of PBL as the provision of limited resources. In a PBL approach, where the emphasis is on student-directed learning, inadequate provision of resources results in

demotivation and, therefore, affects learning. Ryan (1997) recognised the role of the tutor as a resource when directing and supporting students in finding information. Ryan's research indicated that PBL tutors adopted different strategies in order to support learners in adapting to a PBL approach from a teacher-directed curriculum. Ryan contends that in the PBL process it is essential that the tutor find the right balance between direction and facilitation. This is because students who demonstrate a sequential learning style may favour more directive rather than guided solutions. Thus in the initial stages of Ryan's (1997) PBL programme, tutorial discussion was often focussed around the process of enquiry. Later in the programme, the balance between content and process was tipped in favour of a discussion of more in-depth knowledge issues. In this way the quality of the students' knowledge and their process skills were developed side by side. As students progress, they should become more confident with their own enquiry skills and self-directed learning.

2.12.10 The definition of 'limited' resources is not quantified by the literature and is left open to the interpretation of the educators, and the curriculum. Dr.Burdett (1999, Appendix 3:E2) describes his experience of PBL as resource-intensive with a constant need to update materials. This was a demanding task. Ryan (1997) has listed the insufficiency of resources as one reason why some nursing students did not develop a sufficiently in-depth understanding of knowledge issues. It would seem that 'limited' should be interpreted as plentiful if PBL is to be implemented successfully. The necessary resources for PBL should be identified during curriculum planning, and subsequently provided, to enable students to access the information necessary to solve the problem.

2.12.11 Some political implications of policy makers have been identified in Chapter 1. In a PBL curriculum, the emphasis is on small group work, which in practice is labour intensive. However, in the current economic climate, with cut backs in funding for educational institutions, a learning approach that is student-orientated as opposed to teacher-directed may appear to be an attractive proposition to policy

makers. From this perspective, PBL should not be misconstrued as supporting a reduction in teaching time or resources, or be used as a control tool of the elite (Friere, 1973).

2.12.12 The exploitative relationship between power and knowledge has previously been explored (2.9.12). Paradigms are not simply different perspectives of our world but are infused with the workings of power and knowledge inextricably linked (Scott and Usher, 1996). Educational strategies such as PBL need to acknowledge this link as there may be a '*hierarchy of different constitutions*' operating (Habermas, 1972). This can be illustrated by reference to resources as a form of knowledge referred to above. If students have unlimited access to any type of resource then the postmodernist concerns (Edwards, 1994) with regard to power and knowledge abuses (Derrida, 1982) can be disregarded. However, we live in a world where resources are limited, subject to budgetary constraints, often selectively chosen to satisfy the requirements of a course and are targeted at the students they are likely to be used by. It is not the end user (students) who decides on policy and a course budget. Rather, it is policy makers who are in effect gatekeepers of knowledge in PBL to the extent that they provide sufficient resources.

2.13 Reflective remarks

2.13.1 It is clear from the literature overview that PBL is a complex process, influenced by many factors. The issues explored were considerably broader than originally anticipated.

3 Research Design: Methodology and Methods of Enquiry

3.1 Aim of the chapter

3.1.1 The aim of the chapter is to guide the reader through my personal reflections, experiences and subsequent interpretation of methodologies and application of methods. In particular, the following aspects of the research will be discussed:-

- How the ontological and epistemological perspectives underpinning the interpretive and positivist paradigms relate to my educational beliefs and research;
- Identification and consideration of ethical, moral and philosophical issues;
- Action research and it's application;
- The case study method and its relevance;
- A general plan of the research;
- Justification of the data collection methods selected;
- An explanation of triangulation and how it was used to validate case data material; and
- The process of data analysis.

3.1.2 During the preparatory period of the research and its early implementation, the composition of the research question was a focal point. The original proposal (Appendix 1) embodied the practice-based nature of the intended research. It was reformulated and refined to incorporate my role as a reflective, participant practitioner (1.6):

How can I improve the teaching of 'theory' in vocational qualifications using a problem-based approach to learning?

The question also recognised the need to evaluate the PBL approach in my work as a new teaching and learning method.

3.2 Methodological Approaches: Positivist or Interpretive ?

3.2.1 Having decided on a PBL intervention (1.2.1), subsequent decisions concerned which methodology to draw upon in order to evaluate the change process and which methods would best capture the data required. Hitchcock and Hughes (1995) suggest that the overall character of research is fundamentally affected by the choice of research design. Thus, it was important to choose the most suitable design in order to address the research question, as well as reflect the values of the research. During the Doctorate course there was ongoing reflection of a variety of research methodologies. Close attention was given to the philosophical postulates underpinning different research paradigms. These were of particular interest and challenge to me, never having studied philosophy. Detailed study of key texts and articles (Cohen and Manion, 1994; Edwards and Talbot, 1994; Scott and Usher, 1996; Robson, 1993; Griffiths, 1998) nurtured a deeper understanding of many aspects of research that I had previously accepted without question, such as the nature of knowledge, objectivity, bias and ethics.

3.2.2 Two of the main research approaches are the positivist and interpretive (phenomenological) paradigms. Maykut and Morehouse (1994) provide a useful framework with which to identify the postulates of these paradigms (see Table 4) and explore the assumptions underlying my research. It was possible, therefore, to identify the paradigm within which the current research could be located.

3.2.3 Initially, at the beginning of the Doctorate course, I understood that these two research methodologies were quite discrete. Maykut and Morehouse (1994:10) support this radical position on the nature of interpretative (qualitative) research and its relationship to traditional research:

"... arguing that qualitative research is based upon a fundamentally different set of postulates than is the dominant or positivist tradition on research".

Table 4: Postulates of the research paradigms

Questions	Postulates of the positivist approach (the dominant paradigm)	Postulates of the interpretive approach (an alternative paradigm)
1. How does the world work?	Reality is one. By carefully dividing and studying its parts, the whole can be understood.	There are multiple realities. These realities are socio-psychological constructions forming an interconnected whole. These realities can only be understood as such.
2. What is the relationship between the knower and the known?	The knower can stand outside of what is to be known. True objectivity is possible.	The knower and the known are interdependent.
3. What role do values play in understanding the world?	Values can be suspended in order to understand.	Values mediate and shape what is understood.
4. Are causal linkages possible?	One event comes before another event and can be said to cause the event.	Events shape each other. Multidirectional relationships can be discovered.
5. How viable is generalisation?	Explanations from one time and place can be generalised to other times and places.	Only tentative explanations for one time and place are possible.
6. What does research contribute to knowledge?	Generally, the positivist seeks verification or proof of propositions.	Generally, the interpretivist seeks to discover or uncover propositions.

Adapted from Maykut and Morehouse (1994:12)

3.2.4 Denzin and Lincoln (1994:3) present a more liberal perspective, highlighting the diversity of qualitative methodologies:

"Qualitative research... privileges no single methodology over any other. ...It has no theory, or paradigm that is distinctly its own ... multiple theoretical paradigms claim use of qualitative research methods and strategies, from constructivism to cultural studies, feminism, Marxism, and ethnic models of study".

3.2.5 Some authors choose to retain an ideological opposition (Hitchcock and Hughes, 1995; Scott and Usher, 1996; Maykut and Morehouse, 1994) whilst others accept an 'underlying unity of purpose' (Robson, 1993; Denzin and Lincoln, 1994). I accept the latter approach, recognising that benefits are gained from the application of methods from both ideologies, rather than mutual exclusivity. However, the debate surrounding the underlying postulates of these different point of views continues to evolve.

3.2.6 I had previously conducted research rooted in the positivist paradigm. My own experience of this scientific approach was that, whilst it facilitated counting and measuring, it was limited to the extent that it captured meaning, except those interpretations imposed by the researcher and participants themselves. The positivist view claims that the focus of research is on the collection of facts, formulation of hypotheses, their subsequent testing and the search for causality and generation of fundamental laws. Although research questions had evolved (1.1.1, 1.8), the purpose of the enquiry was not to prove or disprove the questions but rather explore their meaning.

3.2.7 The taught element of the Doctorate course exposed colleagues and myself to a wider and deeper perspective of the nature of research. Further reading developed a clearer understanding of the philosophical concepts of the two methodologies. Whilst I am aware of the theoretical and philosophical postulates of each paradigm, in practice, I believe that each piece of research should relate and justify itself in methodology and method with respect to the context in which it is conducted.

3.2.8 One assumption of the positivist perspective is based on the concept that there exists an external world, which is absolute in determining the one and only correct view, independent of a process or context. In contrast, both the PBL approach (Boud and Feletti, 1998) and my own view of education (Appendix 2: 1.1, 1.2, 1.3) emphasise the development of the individual through their learning experiences. These values are not compatible with a positivist perspective. In addition, when advocating the interpretive approach for

educational research, Hitchcock and Hughes (1995:25) stress the limited value of the scientific method:

" *... the complexity of education demands the use of very many different research techniques and models... The most productive approach... is a qualitative one".*

3.2.9 The positivist paradigm emphasises the perception of the world as external and objective, where the researcher is independent and value free. My understanding of the nature of objectivity developed following course discussions which challenged the 'true', value-free, factual aspect of the scientific approach (Griffiths, 1998). Furthermore, Polanyi's (1969) work on the interdependent relationship between the knower and the known influenced my thinking on this research postulate (2.10.3, 2.10.4, 2.10.5). Ultimately, I was able to recognise that the concept of objectivity was flawed, in that it's always liable to subjectivity, bias and interpretation. My roles as both a research observer and a participant 'facilitator' in this current research, may invalidate any claim to objectivity that was proposed. I recognised that my views would influence what I observed in the research context (1.3). The decision about which research paradigm to adopt needed to take account of the human element of the research, capture the experience of the participants and focus on understanding the change process. Within this context the positivist approach seemed incompatible.

3.2.10 Underpinning the interpretive enquiry approach is the perception that the world is socially constructed and subjective, with a researcher who recognises that he/ she is part of what is being observed (1.6.1). This takes into account the totality of a situation, ideas developed from data with a focus on meanings and understanding driven by human interests.

3.2.11 The PBL literature states that it works best with small groups (Boud and Feletti, 1997). The two groups in the current research (3.6.1) were comprised of five students. From the positivist point of view, the small number and size of the research groups was a negative aspect of the research and invalidated

the potential generalisation of any discovery (1.8.3). In contrast, from a qualitative approach, the small sample size enabled an in-depth study, providing a rich source of data. Patton (1990:184) comments that:

"... there are no rules for sample size in qualitative inquiry. Sample size depends on what you want to know, the purpose of the inquiry, what's at stake, what will be useful, what will have credibility and what can be done with available time and resources".

3.2.12 There was no intention to make sweeping generalisations about any research discovery that may be made from this research. Furthermore, as the research was practice-based there was no intention on my part to develop 'fix it' methods of teaching (Bassey, 1999) from the evidence-based outcomes. As the purpose of qualitative action research is not to make general discoveries, this approach remains consistent with the underpinning research values (Cohen and Manion, 1994; Charles, 1995). This small, in-depth study indicated that the PBL intervention would benefit from an interpretive research approach rather than a positivist approach as I was working with humans and my focus was to understand and capture the process.

3.2.13 One important common denominator of both strands of the research question, was their collaborative nature (2.8.3). Carr and Kemmis (1986) advocate collaborative working with others and allowing them to influence the research. Collaboration may be seen to be either 'insider' (myself, students) or 'outsider' (colleagues, critical friends, workplace assessors, course colleagues and other researchers). It is, therefore, incorporated in the research as part of the cyclical process through discussion and feedback. Collaboration helps to bridge the gap between theory and practice and is a significant component of practitioner research, as it reflects the value of all participants. Winter (1998:375) in exploring the gap between theory and practice proposes action research as:

"... a form of theory which is required for the full exercise of a citizen's responsibility in the workplace",

because:

" ...action research entails the integration of theory- in and for action. ...the action research process itself involves deciding how best to intervene here and now, in this situation, with these various individuals, in the light of these social and professional values, amidst the complex pressures of this organisational and political context".

Winter (1998:372)

3.2.14 According to Winter (1998) collaboration forms the basic premise upon which action research is founded. His comments echo my own beliefs with regard to the responsibilities of my role in education (Appendix 2: 2.1, 2.2). In addition, my role as a responsible citizen, professional and researcher was facilitated by action research and guided by ethical considerations which have been identified earlier (1.9). One aim of the research was to improve my own practice in the classroom and put 'I' at the centre of the research (McNiff et al., 1996). This view of action research was extended to incorporate a participatory and democratic approach. However, Winter (1998:373) warns of the political dangers of claiming integration and coherence in relation to action research recognising that it can work for and against the researcher:

"Action research...cannot be free of contradictions and ambiguities...one of its central themes 'collaboration', is notoriously ambiguous: collaborators may be friends or traitors-it all depends who they are collaborating with!".

3.3 Action Research

3.3.1 Action research is a research design that takes account of qualitative, naturalistic techniques to assemble data and information. It involves change (action), collaboration, reflection, and has a cyclical approach (Elliot, 1991b; McNiff et al., 1996; Edwards and Talbot, 1994; Kemmis and McTaggart, 1988; Hitchcock and Hughes, 1995).

3.3.2 McNiff et al. (1996) suggest three ways in which action research is characterised. They claim that it requires action as an integral part of the research process, it is focussed by the researcher's professional values rather than by methodological considerations and it is necessarily insider research, in the sense that practitioner's research their own professional lives. Furthermore, action research is underpinned by a democratic principle with regard to control and the ownership of knowledge (Appendix 2: 4.5).

3.3.3 Cohen and Manion (1994:194) state that action research is appropriate as a choice of research method when:

'...a new approach is to be grafted onto an existing system'.

This reflects the purpose of the current research, which explores the application of PBL within the vocational setting in order to more successfully bridge the gap between theory and work-based practice (1.4.2). The PBL approach itself is not new and has been used in other settings (Boud and Feletti, 1997). Winter (1998) acknowledges the appropriateness of action research as a means of integrating theory and practice in research. He adds that action research:

"... is a response to the many methodological dimensions of practical action in complex organisations profoundly influenced by external political forces".

Winter (1998:373)

3.3.4 Thus, whilst recognising I lead an organisation that is required to implement the NVQ (1.7.2), an action research approach offered a means whereby theory and practice could be integrated and reflect my own values as an educator (Appendix 2). These values represent the learning experience as being part of the world, as opposed to its largely objective representation by the NVQ.

3.3.5 Action research was appealing as a research design due to its grounding (Glaser and Strauss, 1967) in the classroom and direct involvement of the

teacher as researcher. Elliot (1991b:69) acknowledges the grounded nature of action research and defines it as:

"... the study of a social situation with a view to improving the quality of the action within it. "

3.3.6 Various typologies and models of action research have been developed to illustrate the variety of approaches that are in contemporary use (Hart and Bond, 1995, McKernan, 1996). These typologies were useful in distinguishing various aspects of action research. They helped me to select a style of working that seemed most appropriate in my context and particular phase of development (Hart and Bond, 1995). In his typology, McKernan (1996) describes Elliot's model as emphasising the importance of reflection in the natural unfolding of the research process and in facilitating the shifting of the general idea. Elliot (1991b) suggests that action research and reflective practice are equivalent. Hitchcock and Hughes (1995) consider the reflective aspect of action research as its most salient feature. Other authors, however, focus on the empirical data generated by action research techniques (Cohen and Manion, 1994).

3.3.7 Schön (1983), although never employing the term 'action research' links research and action in recognising that reflection is implicit in action. Reflection was important to me, not only for professional development but also for recognition of my own learning. Polanyi's (1969) work on the knower and the known emphasises the need to focalise and make explicit tacit knowledge before it can be reflected upon (2.10.5). Thus, the action research approach provided the means whereby I could reflect upon my teaching role as participant and observer. As the change in the role of the teacher is said to be crucial to the successful implementation of PBL (2.12.2), my role as facilitator was monitored for change and this reflection formed an important part of the action research cycle. In addition, ongoing reflection by participants on the processes taking place helped in addressing the research question (1.1.1).

3.3.8 Although aware of the restrictive dangers of placing too much reliance on prescriptive models, as they can only represent an individual's interpretation of reality, I found them an initial useful tool (Hopkins, 1993). However, I also recognised and sympathised with authors who claimed that, despite the proliferation of action research models, they contain more similarities than differences (Hopkins, 1993). The PBL approach to learning suggests that a variety of attributes are developed alongside a body of knowledge. Thus, change should be observable. The nature of change within Lewin's (1946) model reflects a mechanical change (replacing individual and discrete parts) rather than a morphogenic change that is reflective of the phenomenological postulate. Lewin's model was limited, in that it is reflective of a product model of curriculum planning due to its underlying functionalist values, and these were not compatible with either the PBL values or the process emphasis of this research. Elliot's model (1991b) was, therefore, used throughout the action research process, as this reflected a morphogenic nature of change.

"To change by morphogenesis is to change organically, with one subtle change affected by the next change in a connected and organic manner".

Maykut and Morehouse (1994:15)

3.3.9 Rather than taking one action step per cycle, as is implied by Lewin's model, Elliot (1991b) advocates undertaking a cluster of steps every cycle. He suggests that the research question should be allowed to shift following reflection and should not be rigidly controlled. Elliot's model (1991b) is cyclical like many others (McKernan, 1996). Unlike McKernan (1996), Elliot (1991b) does not include time as a factor and does not commit to how long it should take to complete a cycle, therefore, allowing the researcher more flexibility. Elliot's model encompasses the four features of action research (3.3.1).

3.4 Case Study

3.4.1 The first strand of the research question was mainly concerned with the process aspect of the research and the second focussed on outcomes (1.1.1). A useful exploration of both strands of the question was achieved through an action research, evaluative, case-study approach. The PBL approach required case studies to be devised that reflected the nature of the workplace (2.9.7). Given the importance of cases to the effectiveness of PBL (Dolmans et al., 1997; Hafler, 1997) much attention was give to their development within this research (2 9.8). Case study research has had a long tradition in both the social and medical sciences (Edwards and Talbot, 1994). The case has been described as a unit of analysis, within which a set of interrelationships exists. These both bind and shape it together whilst interacting with the external world (Edwards and Talbot, 1994). Stenhouse (1985:50) describes the purpose of an evaluative case study in the following way:

"... providing educational actors or decision makers with information that will help them to judge the merit and worth of policies, programmes or institutions".

The research evaluated the extent that the PBL approach developed the holistic competent hairdresser, in comparison with teaching and learning methods usually employed in the centre (1.3.2). The case study was used to allow an examination of the processes of change. Since the research primarily focuses on the process of a PBL approach, rather than the end products of enquiry, this particular feature is important.

3.4.2 Stenhouse (1978) provides a useful distinction between case study, case record and case data. Case data consists of all the evidence collected. The case record comprises an ordered selection of evidence from the case data. Elliot (1991b:88) describes the case study as essentially:

'... an analysis of one's experience to date'.

For the purposes of this research the case record and data were combined to produce a referenced archive of evidence (Appendix 3: E).

3.4.3 Bassey's (1999) work on case studies in educational settings inspired me to develop a clear, auditable system of referencing for the archive of evidence. All the data generated during this research is coded and referenced in the research archive. The archive includes the case record and case data evidence as identified in Table 7. The evidence was generated both whilst in the field and as a result of reflection on action (Anderson, 1998, Schön, 1983) (5.3.6). Elliot's (1990) discussion of the problems of variability within case studies highlighted the need to build into the case study research validation and reliability checks (2.9.11).

3. 5 Ethics

3.5.1 Many ethical issues arose in developing the methodology and methods. Anderson (1998) cautions against the danger of mixing management and evaluation due to the inherent conflict of interest in values. Whilst I recognise that this mix is present within the current research, it was initiated and proceeded at my own instigation, therefore, any external conflict of interest was minimised. However, I am aware of the significant ethical and moral obligations that could be abused in both managing the teaching process and facilitating the research. Accordingly, during this research I was guided by ethical principles as they apply to participative and action research (1.9).

3.5.2 In order to make the principles of the research procedure binding and known, to gain authorisation and retain the right to report my work, the following actions were taken:-

(a) Prior to the implementation of the research, the study was explained to all participants and its implications discussed (Appendix 3: E12). Students ranged in age from 16 to 30 years. Informed consent was sought from both students and their employer. Participants were advised that they

would have the choice to withdraw at any time during the research. All students signed a pre-research contract. It included my gaining permission to own and utilise information in students' evaluations of the PBL process at the end of the study (Appendix 3: E13).

(b) To ensure equality and fairness during the course of the study, I developed an induction to PBL. This was intended to familiarise students with the process and provided them with a demonstration of how to use the resources available.

(c) All test results remained private, in order to maintain confidentiality.

(d) As PBL is based largely on self-directed learning, any student experiencing difficulty was assisted. This was to ensure that students would not be disadvantaged by participating in the research (Anderson, 1998). One limitation of the research was the reliance of the research on students' attendance. The centre had no control over this, as the students were 'employed' apprentices. The apprentices, as the focus in this research, were gatekeepers. If they didn't attend the class sessions or decided to withdraw and no group remained, the research was directly affected by their absence. Prior to the research, students who did not attend a session were required by the teacher to compensate by completing the work required. It was the responsibility of the teacher to enforce this. With the introduction of PBL and the change in emphasis to self-directed learning, the onus was on the students to take measures to complete work in the event of non-attendance. This was explained during the PBL induction. Thus, a democratic approach to work was adopted and was intended to foster a more responsible, learning culture, reflective of PBL values and the workplace.

(e) A moral decision was taken to involve both groups of students affected by the research (Alpha and Beta) in a change process (Appendix 15). It was felt that non-PBL students (Alpha) might feel disadvantaged if they were

not part of the research. Smith (1989:149) suggests that action researchers should ask themselves the following ethical 'golden' question:

" If I were a participant, would I want this research to be done? ".

I perceived that involving only half the students in the research (Beta) was against the spirit of social justice described by Griffiths (1998:86) as:

"... the opening up, from the few to the many, chances of personal fulfilment, and of finding the rewards, prizes and enjoyments of living in society".

I recognised that it was not possible for all students to be part of the PBL process. However, by providing both groups with the opportunity to be part of a change in their education, any perceived disadvantage was negated and Hawthorne effects (Cohen et al., 2000) were minimised. In keeping with the spirit of qualitative research, there was no intention to make a comparison about the effectiveness of outcomes. The main focus remained on the PBL process and Beta group experiences.

3.6 Elliot's Action Research Model Relating to PBL Research

3.6.1 In order to structure and plan my research, I developed a training timetable (Appendix 3: E8) for the two groups of second year hairdressers (Appendix 15: p.3). The groups were already well established, having worked both separately and together at various points during their first year. Students and lecturers were familiar with the group names, Alpha and Beta, and were able to distinguish the groups easily. The groups attended a training day on alternate weeks. The morning comprised a 'theory' session and the afternoon session focussed on practical work. During the research, full attendance was not possible, since many of the students took holiday leave during the summer period when the research took place.

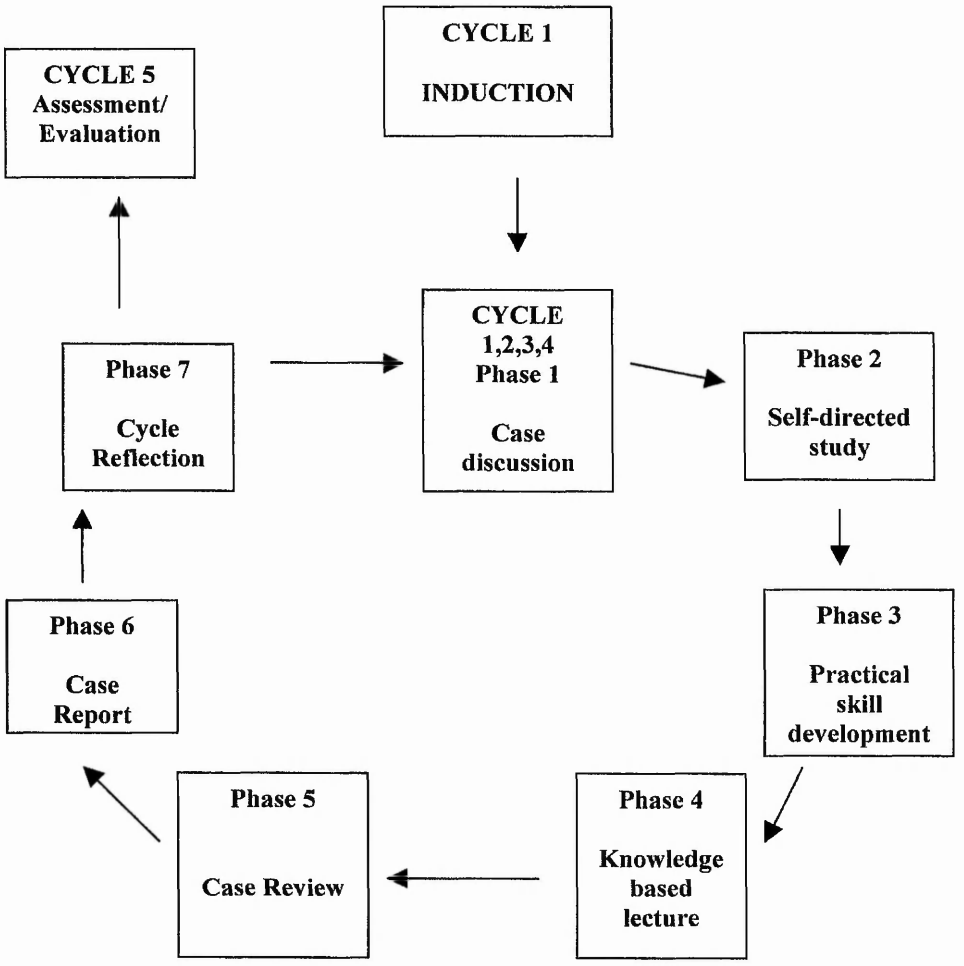
3.6.2 I prepared resources required for both groups, based on the essential knowledge and understanding requirements of the City and Guilds Hairdressing NVQ Level 2, Colouring Unit 206 (Appendix 3: E4, E9). For reasons of social justice (3.5.2, 7.2.6) both groups were taught by a new 'learning' method using new materials.

3.6.3 As PBL is used for formative development at Manchester Medical School, I interviewed Dr.Keith Burdett, Course Director of Medical Studies, in relation to their implementation of PBL (Appendix 3: E2). He provided me with course information and examples of course material. Some of these materials were used as a guide upon which to base the current PBL course materials (Appendix 3: E9, E11, E19).

3.6.4 For the Beta group, five PBL case studies were devised which were designed to designed to raise the unit's main themes of learning within the time available. Principles of case design recommended by Dolmans et al., (1997) were utilised during this exercise. The case studies were created with current knowledge gained from my experience as a practitioner, working in the field. They were then validated in terms of content and context by my teaching colleagues prior to the research being implemented (Appendix 3: E). Case studies were allocated different client names. Each case study covered a specific topic area and formed the basis of each action research cycle.

3.6.5 Figure 3 illustrates the components of the cycles. The sequencing of phases reflects my interpretation of Barrows' (1986) reiterative PBL model. Due to the grounded nature of PBL knowledge, phase 2 and 3 are not restricted to class sessions but continue to develop concurrently during the cycle. The sequencing of the phases within each cycle was adapted to suit the needs of the students. Cycle 1 commenced with an induction. However, due to absences, it was deemed inappropriate to feedback to students during cycle 1, so phase 7 was omitted. The first formal review was conducted with students during Cycle 2, phase 7.

Figure 3: PBL action research cycle framework



3.6.6 The format of the phases are described as follows:-

Phase 1: Case discussion

Following induction, students were presented with a client case that the team was required to solve. The team (tutorial group) was asked by the facilitator to allocate a scribe, in line with the PBL process (Engel, 1997). The scribe recorded the key issues identified by the team during the case discussion. For the purposes of this research, the scribe was also required to act as chairperson i.e., direct the discussion and ensure that everyone had an opportunity to contribute. The case contained a number of underlying issues, which the students were required to identify through discussion and brain storming.

Once the issues had been identified, students delegated one another to research them. The session took place in the administrative section of the training centre. I acted as facilitator during all phase 1 cycles.

Phase 2: Self-directed study period

Directly following phase 1, students researched their individual case issues. They had access to all the resources of the administrative training centre including:-

- Texts;
- Journals;
- Videos;
- Manufacturers' product knowledge;
- Photocopying facilities; and
- Computers.

The computers housed an interactive hairdressing CD-ROM programme. This programme was easy for students to use as it was structured in units reflecting a hairdressing textbook format. It also provided an auditory resource for students, as information was presented in both written and spoken formats. I was present, as facilitator, during this period to guide and direct the students on request. Students were expected to gather and summarise relevant knowledge on their research topics for presentation to the tutorial group. At the end of this session students were asked to reflect upon their learning experiences.

Phase 3: Practical skill development

During this phase, students were instructed on techniques for the application of products. These techniques were relevant to the case being studied. The outline for this session can be seen in the course timetable (Appendix 3:E8). Students practised on model instructional heads and on each other. This took place in a salon environment, with restricted access for the purposes of training.

Phase 4: Knowledge-based lecture

This phase involved a traditional teacher-directed lecture on key principles of learning, understanding and content knowledge required by practitioners in the workplace. Many of these principles were explicitly expressed in students' NVQ assessment books. These key principles were summarised in the course material given to the students during induction (Appendix 3: E9). This phase was perceived to be optional. Its incorporation in the cycle was dependent on the teacher's perception of the depth of content knowledge that the students had constructed. Although these lectures identified with some of the case issues, their purpose was not solely to illustrate the key principles of the case.

Phase 5: Case review

In this phase the tutorial group came together to pool their resources. Each individual student within the tutorial group was required to present their findings and share their ideas in order to solve the problem case. A facilitator was present during all case reviews.

Phase 6: Case reports

Following the group feedback, each student was requested to prepare and submit a report on their findings and decisions regarding the client case. This was then assessed (but not graded) and returned to the student, providing feedback of their development and understanding of the key issues.

Phase 7: Cycle Reflection

Students were asked to review their learning experiences during the cycle in terms of the research themes, facilitated by the tutor. The student feedback was later analysed by the tutor for critical incidences. The use of critical incidents provides a sharper focus on the events that occur (Miles and Huberman, 1994:113). They are defined as:

"...important or crucial, and / or limited to an immediate setting".

These incidents formed the basis of the shift in the '*general idea*' for action implemented during the next cycle (Elliot, 1991b:70).

3.6.7 Elliot (1991b:88) suggested that a case-study report of action research should include the following accounts:

- *"How one's 'general idea' evolved over time;*
- *How one's understanding of the problem situation evolved over time;*
- *What action steps were undertaken in the light of one's changing understanding of the situation;*
- *The extent to which proposed actions were implemented, and how one coped with the implementation problems;*
- *The intended and unintended effects of one's actions, and explanations for why they occurred;*
- *The problems one encountered in using certain techniques and how one resolved them;*
- *The techniques one selected to gather information about a) the problem situation and its causes, and b) the actions one undertook and their effects;*
- *Any ethical problems which arose in negotiating access to, and release of, information, and how one tried to resolve them; and*
- *Any problems which arose in negotiating action steps with others, or in negotiating the time, resources and co-operation one wanted during the course of the action research".*

3 6.8 Each cycle within this research is being treated as a case study and part of a process of progressive focussing as reflects the spirit of action research. The analysis of each case study cycle reveals both confirmation and inconsistencies of the research strands (1.1.1). It is intended that the data analysis and discussion of each cycle be reported using the above framework to take forward and develop the general idea to the next cycle.

3.6.9 The cycles were planned around the implementation of a case-based PBL curriculum (Table 5).

Table 5: Cycles, their respective case studies and activities

Cycle	Name of case study / Activity
1	Rose/ Phase 1-7 (see Figure 3)
2	Felix/ Phase 1-7 (see Figure 3)
3	Shirley/ Phase 1-7 (see Figure 3)
4	Gazza/ Phase 1-7 (see Figure 3)
5	Natalia -Case study assessment/ evaluation + Mandatory Awarding Body (City and Guilds) written exam

The curriculum was developed and compiled as the result of extensive investigations including:-

- Interviews with directors and students of existing PBL courses (Appendix 3: E1, E2);
- Reading numerous key texts and other relevant articles (see bibliography); and
- Meetings and interviews were conducted with trainers of students and salon personnel, where the students are in work-placement, in order to generate ideas for and validate case material (Appendix 3: E).

The implementation of each case study was monitored and reflected upon before progressing and revising the general idea.

3.6.10 A course booklet was introduced to the Alpha group, providing them with the notes of all the sessions prior to the course unit being studied (Appendix 3: E10). This non-PBL route reflected a mechanical intervention (3.3.8), as the course material was presented during teaching sessions in a similar manner to that usually adopted with this subject area.

Students from both groups were asked for feedback from their lessons (student reflections). This was studied and any necessary changes were incorporated at the next session.

The same case study, devised for cycle 5 of the research, was used for student assessment with both groups.

3.7 Data Collection

3.7.1 After planning the research cycles and the respective curricula, I decided upon the most suitable forms of data collection. I began by identifying some aspects of behaviour I expected to occur as a result of the PBL intervention. These were gleaned from my interpretation of the PBL literature and from interviews with a PBL practitioner and a PBL student recipient. The criteria (Table 6), although not exclusive, formed the basis of analysis for addressing the research question.

Table 6: Anticipated behaviour for PBL -taught students

Criteria of anticipated behaviours for PBL-taught students
I would expect to observe the following behaviour from students involved in a PBL approach:- • Working together as a team with a shared aim; • Delegation of tasks to team members; • Use of a problem-solving approach; • Brainstorming; • Devising questions; • Recording, writing; • Sitting in group clusters rather than spread out; • Requesting resources; • The development of good enquiry techniques, not just confident candidates; • A realisation that topics were broad and that not all questions could be answered; • Making full use of all the resources available; • Present good case-study summative reports, but not necessarily do well in the City and Guild's mandatory written test; • Possibly express frustration with not knowing all the answers; and • Frustration with the need for dependency on others, but this may change over time.

3.7.2 In considering how data should be collected, I identified that I could incorporate a variety of both qualitative and quantitative methods. The quantitative methods that were considered for analysing outcomes were questionnaires, patterns of attendance records and comparison of assessment results. Qualitative techniques such as interviewing, diary keeping, observation and semi-structured evaluation sheets also seemed appropriate, since students were already familiar with their use. Denzin & Lincoln (1994:3) indicate the range of methods available to the qualitative researcher:

"... Nor does qualitative research have a distinct set of methods that are entirely its own. Qualitative researchers use semiotics, narrative, content, discourse, and phonemic analysis, even statistics. They also draw upon and utilise the approaches methods and techniques of ethnomethodology, phenomenology, hermeneutics, feminism, rhizomatics, deconstructionism, ethnographies, interviews, psychoanalysis, cultural studies, survey research, and participant observation, among others".

3.7.3 Full descriptions of these methods, including the advantages and disadvantages of their use can be found in the following texts, which I refer to throughout: Hopkins (1993), Robson (1993), Edwards and Talbot (1994) and Hitchcock and Hughes (1995). I had implemented some of these methods in previous research and others, such as the use of video, were new. I favoured those methods that I felt would best capture the intervention process and the experience of the participants in the research. The research data was predominantly of a qualitative nature and was, therefore, open to interpretation. Thus, I planned a multiple-method of data collection with the intention of reducing uncertainty (Robson, 1993).

3.7.4 The next stage was to identify how to capture these potential changes effectively. In qualitative research the process of data collection and analysis are not separate activities but simultaneous and interactive (Hitchcock and Hughes, 1995; Miles and Huberman, 1994). Although my research would have remained tidier had these activities been conducted separately, the reflective aspect of the action research cycles necessitated that data collection

and analysis progressively informed each other. Subsequently, within each cycle these activities are treated as one interactive process.

3.7.5 Qualitative data collection involves three basic processes: -

- Observation;
- Interrogation; and
- Documentary and oral data collection (Hitchcock and Hughes, 1995; Robson, 1993).

In effect, the outcome is a collection of first and second order sources of data. There is certain disagreement in the qualitative tradition as to whether one should develop theories alongside data collection, or collect the data first and subsequently look for a fit between the data and the theories (Hitchcock and Hughes, 1995). Although it is claimed the latter approach reduces bias, the advantages of the former is that one is able to try out different explanations of the fit between data theory and ideas as the research progresses. This research utilises both of these approaches.

3.7.6 Prior to implementing the research, I interviewed staff who worked with students and observed both colleagues and students during class sessions. This reflective approach provided me with a better understanding of how competency is perceived in the workplace. As an employer, however, I was also aware that staff may only articulate what they thought I wanted to hear. In order to reduce this invalidating effect, I tried to ensure that during the interview no conflict of interest was apparent. This was achieved by having a clear interview guide and by announcing my intentions to the participants prior to the interview. In the event, the interviews did not raise any concerns. However, if they had, I would have asked a colleague to conduct them using the same interview guide. A record of the interviews would then have been analysed with the participants' permission.

3.7.7 In order to identify the key themes of the PBL process, that were relevant to my workplace, I worked from the anticipated criteria (Table 6). In this sense, I was developing theory alongside data collection (Hitchcock and Hughes, 1995). The key PBL themes I identified are grouped in Table 7 alongside the most apt data collection methods for the theme. These themes were validated using triangulation (3.9) with a critical colleague and the PBL literature. The methods were flexible enough to allow themes other than the original ones identified in Tables 2 and 7 to emerge. In this sense the data was collected prior to searching for a fit between data and theory.

Table 7: PBL themes and data collection methods

PBL Themes	***Data Collection Methods***
1. Motivation	Student diaries and evaluations/ Teresa Mullin (TM) field notes/ video recordings of sessions
2. Team work	TM field notes/ student diaries and evaluations/ video recordings of sessions
3. Communication (group)	Student diaries and evaluations/ TM field notes/ observation/ video recordings of sessions
4. Knowledge-based development	Examining Body (C&G) test results/ student case reports/ observation of presentations/ video recordings of sessions
5. Application of knowledge to context	Observation/ TM field notes/ student diaries and evaluations/ client feedback/ case study final assessment and student case reports/ interviews with students and work-based assessors
6. Consultation/ enquiry skills (1:1)	Client model sessions/ TM field notes
7. Improve own learning (resources)	Student diaries and evaluations/ observation/ TM field notes/ video recordings of sessions
8. Information technology skills (IT)	Observation/ student case reports/ video recordings of sessions

3.7.8 Data collection methods (Table 7) were chosen, as they were believed to be appropriate tools with which to capture the essence of the proposed research question and to enlighten future practice. By ensuring that each aspect of the research question was being addressed, however, there was a multiplicity of data sources from which analysis was to take place. Anderson (1998:150)

advocates this eventuality, as he suggests that validity in qualitative techniques:

"*...is improved through the use of multiple sources of data for each question*".

3.7.9 Table 7 records themes (1, 4, 5, 6 and 7), which Barrows (1986) refers to as being important aspects of the PBL process. In addition to these, I wanted to monitor themes (2, 3 and 8) that were of particular relevance to teaching a hairdressing MA course (see 1.3). These were important to me as they related to the development of some of the key skills required by the MA framework.

3.7.10 General agreement exists among action researchers about the usefulness of the diary or journal (Elliot, 1991b; McNiff et al , 1996; McKernan, 1996). Both the researcher and participants generally keep diaries. I was committed to the continuation of my research journal, which I expanded during the implementation of the research.

3.7.11 Elliot (1991b) provides guidelines that should be adopted when using diaries. He suggests that the contents of diaries should be dated and organised and this is also advocated by other practitioners (McNiff et al., 1996). Secondly, that there should be no compulsory 'collecting in' of diaries, as any disclosure should remain under the control of the author. Disclosures were negotiated and discussed in evaluation sessions. However, Elliot (1990) contests the supposition that an exchange of information can be equitably agreed between participants and researcher, due to the underlying power differentials inherent in collaborative work. Although Winter (1998) acknowledges this ambiguity, he suggests that it is an inescapable part of the action research process.

3.7.12 Students were asked to keep a diary (Berkeley, 1994). Diaries were not submitted for analysis, but students referred to them in reviews (phase 7) to discuss any learning experiences they had recorded during the cycles. In order to capture the PBL experiences from a student perspective, students were also asked to complete an evaluation sheet at the end of each cycle, which was analysed as part of the research (Appendix 3: E19, E36, E52, E71,

E84). Student evaluations were used to track their reflections on the amount and nature of progress made during class sessions and self-directed learning periods. It was anticipated that the evaluations and discussions would provide an insight into the development of key skills during the PBL process. General themes were also identified which enabled an overall account of the experiences of trainees and teachers, exposed to both approaches, to be monitored (Cohen and Manion, 1994).

3.7.13 Profiles *'... provide a view of a situation or person over time...'* (Elliot, 1991b:78). I envisaged that the use of profiles would be relevant in this research. One profile format provided an overview of the aims and objectives of lessons. The other use of the profile was similar to a vignette or small case study (Miles and Huberman, 1994; Edwards and Talbot, 1994). By using profiles as vignettes, I intended to illustrate my perception of the participants' experience of PBL as individuals. Students' profiles (Appendix 4) aimed to capture his/ her experience of presenting written case reports across the cycles alongside their eventual assessment result (Appendix 10). The use of profiles as a method of data collection and analysis raised some ethical issues. I was aware that a student profile would be my own interpretation of the group experience. As such, it would describe how I perceived each individual in the group. An ethical consequence emerged, in that, if I wanted to be constructively critical about students, I could not protect their personal feelings. Three options were considered in resolving this difficulty. Firstly, to use student profiles only if absolutely necessary and keep them confidential from the students. However, this would give the impression of a *'covert research'* approach (Scott, 1996:68). Alternatively, I could disregard the profiles and let readers draw their own conclusions about the experiences of group members from the data. Finally, the approach adopted involved discussing and agreeing profile entries with each student in an open democratic manner (Scott, 1996), omitting anything that caused personal conflict.

3.7.14 The use of profiles was deemed to be beneficial in accessing the personal experiences of the students and evaluating PBL from a student perspective.

One of my beliefs (Appendix 2) is that not all methods of learning are suited to all individuals and that it is important for each individual to have access to a means of learning which is personally appropriate. Thus, profile information was particularly important in determining and monitoring the impact on students of adopting PBL as the sole teaching approach.

3.7.15 During cycle 5, students from both the Alpha and Beta groups were assessed with material provided by the City & Guilds examination board. Results provided insight into the knowledge gained by students exposed to each learning method, whilst taking into account the learners as individuals. In addition, a case study format for further assessment was developed and implemented with both groups. It highlighted the application of student knowledge, as well as the presence of active learning.

3.7.16 The test results of the assessments were only of relevance in so far as they contributed to understanding the students' overall experiences of a PBL approach. Achievement of high scores in the tests was not the main priority of this research, since test results are not conclusive evidence of student ability. Poor test results, although indicative of incompetence, may not truly reflect the skills of the individual in the workplace. Thus, rather than distorting data, due to the small samples involved in this research, test results generated will remain in context and support the other naturalistic data (Ely et al., 1991).

3.7.17 As part of their practical work, students are encouraged to use photographic evidence for the purposes of portfolio assessment. Photographs were taken during this research to provide physical evidence of the room layout, pattern of social organisation during PBL and evidence of brainstorming activities during group discussion. The resulting photographic evidence was intended for use in evaluations and discussions with students at the end of each cycle. This form of evidence is recommended (Elliot, 1991a) for understanding patterns of behaviour in the classroom. During the research, I became aware that taking lots of photographs during discussions and other activities was inappropriate and distracting for the students and myself. Furthermore, the theft of the

training school camera, containing photographic evidence, restricted the use of this data collection technique.

3.7.18 Video recordings of PBL sessions were analysed in terms of the themes identified in Table 7. A critical friend (CF), acting as an external observer, validated all claims made from the observations recorded with this method.

3.8 Case Analysis

3.8.1 *"Analysing data is like walking through a maze. "*

(Anderson, 1998:157)

Many authors (Miles and Huberman, 1994; Robson, 1993; Edwards and Talbot, 1994; Anderson, 1998) working with qualitative data highlight the need for managing information to prevent it becoming unmanageable. Whilst my experience of data analysis during this research reflected Anderson's analogy, Miles and Huberman (1994) offered a perspective on data analysis that was useful in finding my way through the maze of data. They present an interactive model of data analysis consisting of three activities involving data reduction, data display and finally, conclusion drawing and verification.

3.8.2 Data reduction is:

"...the process of selecting, focussing, simplifying, abstracting and transforming the data that appear in written-up field notes or transcriptions".

Miles and Huberman (1994:10)

This process is continuous, occurring throughout the research cycles and after fieldwork, until a final report is completed. The purpose of data reduction is to organise data in such a way that final conclusions can be drawn and

verified. However, Miles and Huberman (1994) stress the importance of not stripping the data from the context in which it occurs. Although the data collection methods used were apt, it became evident that data reduction was required in order to make sense of the data. I was aware that during observation and recording of data, I was reducing the evidence, which was subject to my own interpretation in the first instance. This was further decreased by identifying critical incidents from the recorded data in each cycle, with respect to the themes being monitored (Table 7).

3.8.3 In selecting critical incidents, I was aware as a researcher, that I was condensing data and thereby potentially distorting data. Thus, during the initial stages of analysis, reliability and validity checks were built into the process before common themes and patterns were compared and examined.

3.8.4 One technique often used for data reduction purposes is content analysis (Haggerty, 1996). Data is coded and common themes emerging from the data are identified. Content analysis relies on the various themes and issues recurring throughout the data being used. These themes are pre-ordained in so far as the categories and codes for content analysis are developed by the researcher to reflect the research question. This method was suitable for this research because it had the advantages of being unobtrusive, subject to re-analysis and allowed reliability checks, and was relatively low cost (Robson, 1993). The disadvantages associated with the method are threefold:-

- documents may be limited or partial;
- documents being analysed may have been written for some other purpose and are being used out of context; and
- as Robson (1993) notes, there is the difficulty of assessing causal relationships between the social phenomena being researched.

3.8.5 My concerns with using content analysis were twofold. Firstly, the technique may result in a small 'uncoded' indicator, which may be of significant interest

to the research, remaining unidentified and being lost. Edwards and Talbot (1994:111) support this perspective:

" As case study is often used specifically to explore the meaning and local interpretations applied to processes within the case then it is imperative that these are not lost in the case".

3.8.6 Secondly, I was aware that by using pre-ordained PBL 'content' themes (Table 2 and 7) for data analysis, I was implementing an analytical strategy as opposed to a qualitative research approach where the themes would emerge from the data (Anderson, 1998). Discussions with colleagues and CFs led me to reformulate this initial analytical strategy and merge the two approaches in an appropriate form for my research. Thus, the data in each cycle was analysed according to PBL themes and then extended to examine other findings, not pre-coded. Information gathered from the data collection methods was initially subject to personal interpretation. Each cycle was analysed by identifying the critical incidents that had occurred, using the themes in Table 7. Other uncoded incidents were grouped under an additional category labelled 'other issues arising'. This allowed the flexibility recommended by Elliot (1991b). Both the expected (+) and unexpected (-) critical incidents of this research cycle helped me to reflect upon the general idea of how the PBL process was evolving. Furthermore it was possible to interpret some incidents from various perspectives (+/-). I was also aware that, as a facilitator, I was learning myself, having only read about and discussed the PBL process with other practitioners and users (Appendix 3:E1, E2). These themed, critical incidents were then subject to further analysis, and statements were distilled and validated by a CF.

3.8.7 The data generated was analysed on an ongoing basis to ensure that any issues arising out of the approaches implemented were addressed. This flexible approach is characteristic of action research. Thus, during the early stages of the research, although I had endeavoured to identify the methods of data collection that I would use, I was still aware that this had to remain flexible and responsive to the circumstances that were to occur.

3.8.8 Data display is defined as:

> *"...an organised, compressed assembly of information that permits conclusion drawing and action".*
>
> Miles and Huberman (1994:11)

For the purposes of this research, data display was used extensively in order to facilitate the analysis of data collected. Initially, raw data of resource use (Table 14), seating arrangements (Figure 12), and from the analysis of submitted case reports (Table 39), was summarised and presented in either a tabular form or an illustrative figure.

3.8.9 During Phase 5 of each cycle, each student was asked to submit a case report on how they would approach and solve their client consultation. The reports were not compulsory. They formed the basis of facilitator feedback for the students on their development of knowledge and decision making. The majority of students chose to submit reports. These reports were subject to content analysis in relation to the research themes (Table 7). The analysis provided a vignette of each student's progress in developing a body of knowledge.

The data categories are described as follows:-

- *Motivation*: this was reflected in the number of case reports submitted by each student.

- *Team Working*: this was reflected in the extent to which students acknowledged working in a team (the frequency with which students referred to 'I' and 'we' in their written report). Ideally, the type of learner developed for the workplace should be a team player who is able to make independent decisions.

Category	Implication for team working and decision making within PBL context
We	Indicates dependence on the group
I	Indicates independence from group
We and I	Recognises the group contribution (team approach) with independence in some decision making

- *Knowledge-based development*: this was reflected in the extent to which a student's analysis of case-study issues was discrete or integrated.

Category	Recognition and use of group issues, discussion and information sharing within PBL context
Discrete	The student used the group issues as a basis for discussion. Each issue was generally discussed separately. Indicated dependence on the group.
Integrated	The student integrated the case issues but didn't use them to structure the presentation of their case report. Indicated independence from the group

- *Application of knowledge to context*: this was the extent to which a student recognised the transfer of their knowledge from a PBL context to their work environment.

Category	Implication of relevance of PBL case to workplace
Recognition of transfer of knowledge	Indicated that the student can identify aspects of the case within the workplace and had reflected upon their relevance.
No recognition of transfer of knowledge	Indicated that the student cannot identify the case within their workplace.

- *Consultation skills (1:1)*: this was the extent to which the student perceives himself/ herself as a solution provider (offering a range of options for a client), or a problem solver (offering one option).

Category	Implication of range of consultation approach within PBL case
Problem solver	Indicated that the student can only perceive one solution for the client
Solution Provider	Indicated that the student perceived a range of options for the client but had one preferred solution

- *Improve own learning*: this was indicated by the extent to which the student moved from team dependency to being independent, indicative of developing lifelong learning skills.

Category	Implication for realism of the case within PBL context
Dependent	Representative of the students analysis of the case and decision making
Independent	Recognises students' dependence on the team for consultation and decision making

- *IT skills*: this was reflected in the extent to which the students used information technology in producing their case studies.

3.8.10 During each cycle the results of content analysis were displayed in the following formats: -

- Data analysis of critical incidents.

Data was analysed in terms of critical incidences that occurred during the cycle and grouped under the key themes being monitored in the research.

- Data analysis summary.

The data emerging from the critical incidences within each theme was then analysed to produce a summary of the key issues arising in the cycle.

- Research themes highlighting where data differs, agrees or disagrees.

The data summaries were then transposed to this tabular format. Mixed triangulation was used to discuss how these accounts differed (+/-), agreed (+) or disagreed (-) with either the literature overview or with themselves (Elliot, 1991b).

3.8.11 Conclusions about the meaning of data began to emerge from the outset of qualitative research. However, Miles and Huberman (1994) recommend that the researcher should remain cautious and not draw their final conclusions until the data analysis becomes more explicit and grounded (Glaser and Strauss, 1967). This avoids pre-figuring of the research outcomes from the early stages of the research. The meanings and conclusions emerging from the data were then tested for plausibility and validity through triangulation.

3.9 Triangulation

3.9.1 Triangulation is the process of comparing and justifying data from one evaluation method against that from another (Kember, 2000). Edwards and Talbot (1994) suggest triangulation as a means of both checking reliability and picking up multiple perspectives within case data. They describe it as:

"*... a three-point perspective on an event or phenomenon.* "

(Edwards and Talbot, 1994:46).

Triangulation is deemed important for the rigorous analysis of case- study research. It is particularly relevant to this research, as the data for analysis has a variety of sources. In my original research proposal, I advocated the use of triangulation to validate the multiple data collection methods that had been envisaged (Appendix 1).

3.9.2 The ideas underlying triangulation were developed by Elliot and Adelman (1976) in the Ford Teaching project. He provides the following explanation:

" *Triangulation involves gathering accounts of a teaching situation from three quite different points of view; those of the teacher, the students, and a participant observer. Who gathers the accounts, how they are elicited, and who compares them depend largely on the context. The process of gathering accounts from three distinct standpoints has an epistemological justification. Each point in the triangle stands in a unique position with respect to access to relevant data about a teaching situation. ... by comparing an account with the accounts from the other standpoints, a person at one point of the triangle has an opportunity to test and perhaps revise it on the basis of more sufficient data*".

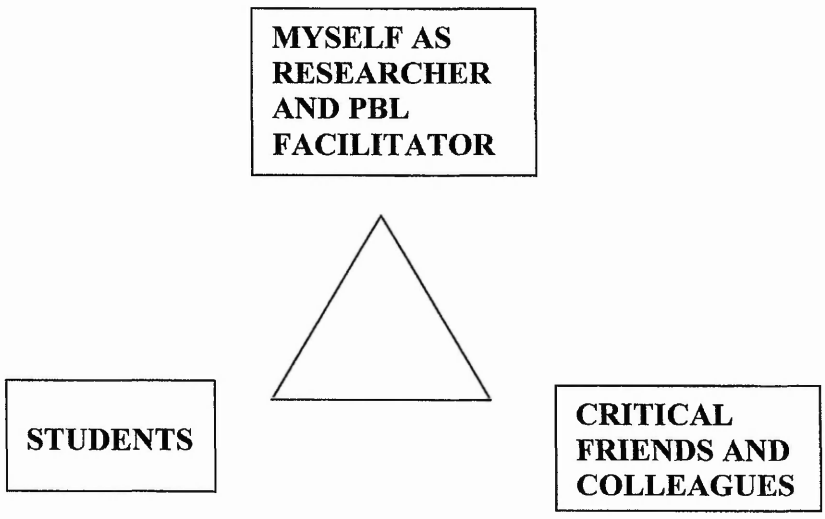
(Elliot and Adelman, 1976:4)

3.9.3 Triangulation can occur in several ways. Edwards and Talbot (1994:46) present four perspectives, although they acknowledge that these are not exclusive:-

- Participant - information is obtained from several participants;
- Researcher - more than one researcher is employed in the research;
- Methodological - a collection of different methods is implemented; and
- Mixed – a combination of participant, researcher and methodological perspectives.

As this is practitioner research, it uses a mixed triangulation approach (see Figure 4) which combines these views in order to gather a three-point perspective to the case data.

Figure 4: Mixed Triangulation as applied during this research



Reference: Adapted from Edwards and Talbot (1994:47)

3.9.4 The CF I had chosen to represent the third dimension of the triangle was a fellow professional with experience and understanding of the macro-world, i.e. education. According to Berger and Berger (1975), her lack of experience

within my teaching context was balanced by her own classroom teaching, as well as '*insight into the routines*' (Berger and Berger, 1975:16) and social structures of the educational environment. Validation of the research data was based upon her analysis of critical incidents from observation of recorded (video-taped) sessions. In this way, triangulation was used to validate my interpretations of critical incidents during the sessions. It supported the key themes and other patterns that emerged as:

" *Interpretation of data is also improved when multiple stakeholders are involved in reviewing its meaning.* "

(Anderson, 1998:150)

3.9.5 One constraint was that the CF was not present during teaching sessions and therefore interpretation and analysis was not based on personal experience of the sessions. My main concern was the extent to which she would be able to experience the context of the session, given the limited perspective provided by the recordings. Berger and Berger (1975:18) discuss the importance of experience in understanding the reality of the world:

"The micro-world and what goes on in it only makes full sense if it is understood against the background of the macro-world that envelops it; conversely, the background of the macro-world has little reality for us unless it is repeatedly represented in the face to face encounters of the micro-world".

3.9.6 However, after her analysis of the recorded sessions there followed a discussion of the differences in our respective accounts of recorded critical incidents identified during class sessions. One advantage of her contribution was her ability to provide an outsider view of my teaching, as she did not know the students. She also offered an evaluation and a professional perspective of my implementation of PBL.

3.9.7 Thus, during analysis, themes were identified from the various methods adopted and ultimately triangulated to check for validity and reliability (Robson, 1993; Cohen and Manion, 1994; Edwards and Talbot, 1994). As

both teacher and participant observer, I needed to ensure that the data collection methods were as varied as possible to account for and reduce any ambiguities that may arise. Elliot (1990) distinguishes between two forms of validation. Objective descriptions reflect a positivist perspective of knowledge, involving independent observers, and cross-checking observations. Experiential descriptions involve dialogue with participants in the situation being described and are reflective of the interpretive paradigm. I would agree with Elliot (1990) when he suggests that different modes of validation appear appropriate from within different research perspectives. However, both forms have been incorporated into my research triangulation. In the context that I am working, I do not perceive that validation by an independent observer (in this case a CF) reduces the democratic spirit or ethics of the current research and so I am content to pursue a mixed triangulation approach.

3.10 Research assumptions: Invalid participants?

3.10.1 One assumption underlying the initial research proposal was that the students had no previous exposure to a PBL approach. I had intended to question all students about the learning techniques that they had experienced at school prior to their commencement of the research and take their responses into account during the analysis. During discussions with various critical colleagues from the Doctorate course and from reading research articles, I discovered that the PBL approach reflected many similarities to other learning approaches used in primary education (Allen, 1990). Without being able to define a PBL approach as clearly distinct from other learning approaches (2.4), I decided that even if students had been exposed to a similar form of learning that this would not invalidate the research. Thus, I did not question students about their previous learning experiences.

4 CYCLE ANALYSIS

4.1 Student Induction to PBL

4.1.1 The Beta group students involved in the research were inducted into the PBL approach (E15) and centre resources. The aims of the research were discussed with participants to ensure that they understood the PBL process and had accurate expectations of their involvement (E12). The Beta student profiles are presented in Appendix 4, Table 13. Course manuals for the unit of study were distributed to the Beta group and explained (E9, E11). The group was then asked to read through NVQ learning objectives for the course unit.

4.1.2 Cycles 1, 2, 3 and 4 were each conducted over three consecutive days. Cycle 5 was implemented during a three hour, class session.

4.1.3 The frameworks presented below offer an overview of cycles and their component phases. Each cycle is summarised with evaluative remarks, which lead to action steps.

4.2 Cycle 1 Framework

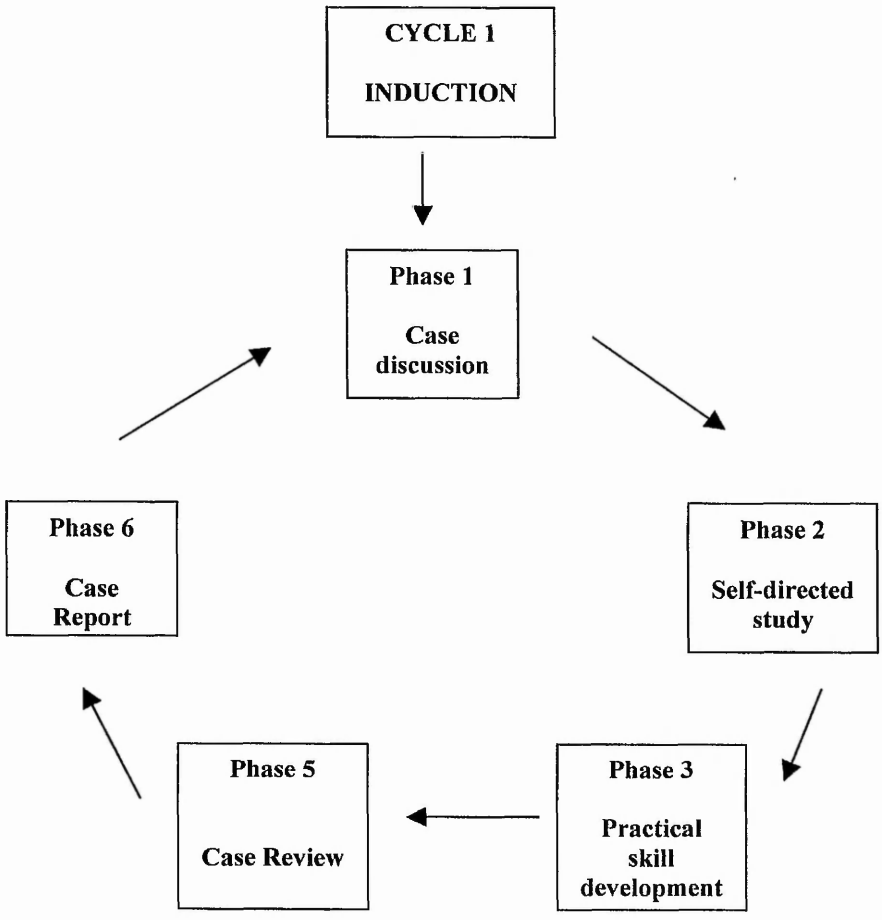
4.2.1 The reiterative model of PBL was implemented during this cycle (illustrated in Figure 5), as it was considered to be the most effective in fostering the educational themes of the research. Barrows (1986) claims that structuring formal knowledge decreases the effectiveness of PBL, therefore, a knowledge-based lecture (phase 4) was not included in this cycle. Phase 7 was also omitted. It was felt inappropriate to review teamwork in the light of student absences. The numbering system for phases is consistent with that used in Figure 3.

4.2.2 Following induction, students were presented with their first case, 'Rose'. During phase 1, three students were present, A, B and C. Student A was the scribe and

chairperson. All five students were present for phase 4 and all students submitted a case report.

4.2.3 Phases 1, 2 and 3 were conducted on Day 1, Phase 5 on Day 2. We agreed, as a group, that a written case report (phase 6) including a solution for Rose would be submitted on Day 3.

Figure 5: Sequencing of the component phases of PBL during Cycle 1 (Phases 4 and 7 were omitted)



4.2.4 Critical incidences identified from the data are shown in Table 16. Appendix 5 contains evidence of the data analysis for cycle 1.

Table 8: PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and participants in cycle 1.

Aspect of PBL being monitored in cycle 1	Differ (+/-)	Agree (+)	Disagree (-)
Motivation	TM reflected on the need to negotiate realistic deadlines in line with collaborative principles and a student-led programme.	Students enjoyed phases 1 and 2. Students recognised change towards a student-orientated approach. Students motivated by real world relevance of client case.	Case reports were submitted late. Students had not prepared information for feedback to group.
Team working and group communication	PBL favoured orally competent and confident group members.	Students aware of their contribution to the team effort and delegated tasks appropriately. All students contributed to discussion in phase 1.	Students expressed concerns about having to depend on 'weaker' group members for information.
Knowledge based development	TM aware of directing and guiding students towards certain case issues. Case reports reflected various depths of understanding. TM felt the need to have a facilitators guide.	Students able to direct their own learning and request support when required.	Students did not address all the case issues identified during phase 1 in their case reports. False knowledge circulated.
Application of knowledge to context		Students brought real world experience to phase 1.	
Consultation enquiry skill	Students used their knowledge of the workplace to relate to the case client.	Consultation issues were identified easily by students.	
Improve own learning	Students used resources, but only resources that they were familiar with or confident in using.	Students perceived one another, the tutor and other colleagues available in the real world as resources.	
IT skills	Students A and B found the CD-ROM programme a popular resource.		A lack in confidence prevented Student C from using computers.
Other issues arising	TM student reflection format did not sufficiently capture the research themes of PBL.		Student C expressed that PBL was time consuming.

4.2.5 Evaluative remarks for cycle 1, emerging from Table 8:-

- Students responded in different ways to the various phases.

- Students acknowledged the change in orientation from a teacher-directed to a student-led learning approach. In general, they valued the active participation and responsibility of reiterative PBL.

- Some phases of PBL favoured orally competent and confident students. Students acknowledged the differences in abilities within the group by delegating tasks appropriately. As facilitator, I felt that seating arrangements contributed to group cohesiveness and member participation. Phases 1 and 5 demonstrated the influence of different seating positions. In addition, during phase 5, concerns were expressed about the dependability of tasks conducted by weaker members. This served to diminish the team spirit.

- Students valued the realism of the client case. They demonstrated a considerable amount of both tacit and explicit knowledge and were easily able to relate to the client case as a real life scenario. Students demonstrated an awareness of team-working skills in their perception of one another as a resource.

- Some students demonstrated field independence in perceiving their environment. Others needed guidance and support in order to focus on the case's centre of interest. Students valued group-distilled case issues as a means of structuring their case reports and developing solutions.

- Students needed support when their lack of confidence prevented them from developing as a learner.

- The case review (phase 5) and case reports (phase 6) did not reflect the depth of knowledge I expected. Students had not requested more self-directed learning time during phase 5. I reflected upon my own role as a facilitator in guiding students and ensuring that all essential issues were identified during phase 1. If I didn't ensure that the relevant issues were raised and

subsequently researched, I feared that the students would be unable to solve their cases.

- PBL was more time consuming than initially anticipated. Students did not value the increased workload and case report deadline, even though they had agreed to them.

- Students were unfamiliar with articulating their reflections on their learning experiences in a written form. Reflections were mainly descriptive in nature, rather than analytical.

4.2.6 As a result of reflection and discussion, I took the following steps for Action Research Cycle 2:-

(a) Present a lecture on the key principles that students should have learnt during cycle 1;

(b) Monitor the student seating arrangements for effects on communication;

(c) Identify the learning objectives of the case, in order to improve my role as facilitator;

(d) Encourage all students to make full use of the resources available; and

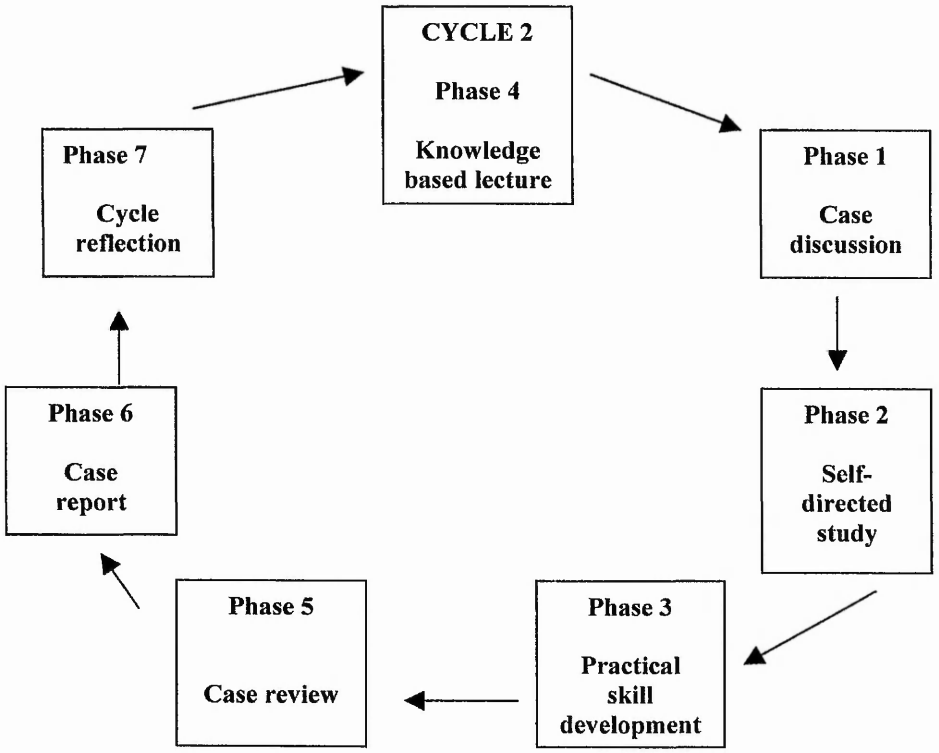
(e) Change the students' reflection sheets to a semi-structured format in order to encourage more explicit thinking about the PBL process.

4.3 Cycle 2 Framework

4.3.1 Cycle 2 began with phase 4. The PBL method implemented was a modified version of the reiterative PBL model (Barrows, 1986). I took the decision to

introduce a lecture on key principles that I felt had not been adequately demonstrated in the students' case reports from cycle 1 (Figure 6). I was aware that this input of 'formal' knowledge would decrease the effectiveness of PBL, but, I felt it was important to clarify any ambiguities regarding the students' development of knowledge (Eva et al., 1998). After the lecture, students took a break and the Felix case was circulated.

Figure 6: Sequencing of component phases of PBL during Cycle 2



4.3.2 The 'Felix' case depicted a number of psycho-social issues. The case was presented on Day 1. Following the late submissions of case reports in cycle 1, the time deadline was re-negotiated with students. Students A, B, D and E were present. Student C was on holiday. Student D acted as scribe and chairperson.

4.3.3 Phase 7 was included during cycle 2, as attendance had improved. I shared my perception of emerging themes from cycles 1 and 2 with students and encouraged them to reflect on this information.

4.3.4 The evidence resulting from the critical incidences of cycle 2 is presented in Table 21.

4.3.5 Evaluative reflective summary for cycle 2, emerging from Table 9:-

(a) My use of a facilitator guide led to increased teacher-direction that I was largely unaware of. I was unsure of when and where to intervene during PBL and to what extent a facilitator should '*stand on the outside of the discussion*' (Dr. Burdett, 1999, Appendix 3: E2) or see themselves as part of the group.

(b) Students' reflections remained mostly descriptive, but the semi-structured format encouraged more reflection. The language I used in developing questions as reflective prompts also induced students to describe their activities during cycle 2.

(c) The Felix case was perceived to be more complex than Rose. Students found it difficult to summarise their information. Large amounts of material were photocopied. Different strategies were used by different students to problem-solve. An inability to consider all the issues of the case indicated the perception of the learner as a problem solver rather than a solution provider.

(d) Certain aspects of PBL did not suit the learning styles of students who preferred and relied on teacher direction. Most students, however, were motivated by searching for and finding information (phases 1, 2 and 4).

(e) The scribe found it difficult to chair the discussion and concurrently record team issues.

Table 9: PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and with participants in cycle 2.

Aspect of PBL being monitored in cycle 2	Differ (+/-)	Agree (+)	Disagree (-)
Motivation	Student B's ability to contribute, observed in cycle 1, was not demonstrated in cycle 2.	Students A, D and E motivated by finding out 'new' information.	Student B experienced motivational difficulties. All case reports submitted late. Student E did not submit a case report.
Team working and group communication	Students acknowledged poor teamwork skills. Student C did not like presenting during phase 5. TM directing group too much during phase 2. TM unsure as to when to intervene in PBL phases.	Students aware that they were being monitored on research themes. Students acknowledged teamwork and individual tasks as part of PBL.	Student D found it difficult to act as scribe and chairperson. CF suggested that unconfident students would find it difficult to contribute to PBL. TM concerned with large number of case issues.
Knowledge-based development	Students E and D requested teacher direction on the right way to present case reports.	Students used their previous knowledge to solve case.	
Application of knowledge to context		Student D perceived her team role as a job.	Student did not make transfer of knowledge in the workplace with real client expressing similar case characteristics.
Consultation enquiry skill	Student A explained the reason consultation questions were needed in behavioural terms.	Student A recognised the importance of asking consultation questions.	Student E could not see the relevance of exploring the client's social context in solving the case.
Improve own learning	Photocopier used extensively.	Students requested support from TM.	TM perceived need to promote use of unfamiliar resources.
IT skills	Computer only used by Students A and E.		

(f) Observations suggested that level of confidence contributed to a student's motivation (phases 1, 2 and 4) and the extent to which he/ she engaged with the group (Fullan, 1991:174).

(g) Students' espoused theory did not match their theory in use. Student B's reflection on his phase 1 and 2 performance did not match observations recorded during class sessions. Despite further negotiation of deadlines, case reports were submitted late.

(h) Students began to develop a body of knowledge and used information gained in cycle 1 to solve the Felix case. This indicated that transfer was occurring, using problem-solving skills. However, one student demonstrated the difficulty in transferring knowledge between the training environment and the workplace. Despite the use of PBL, the context seemed to be a major factor in contributing to successful transfer.

(i) In phase 7, students acknowledged their poor teamwork skills during cycle 2. Strategies were identified which could improve teamwork. These involved engaging all students in discussions, changing seating positions and the use of questioning techniques.

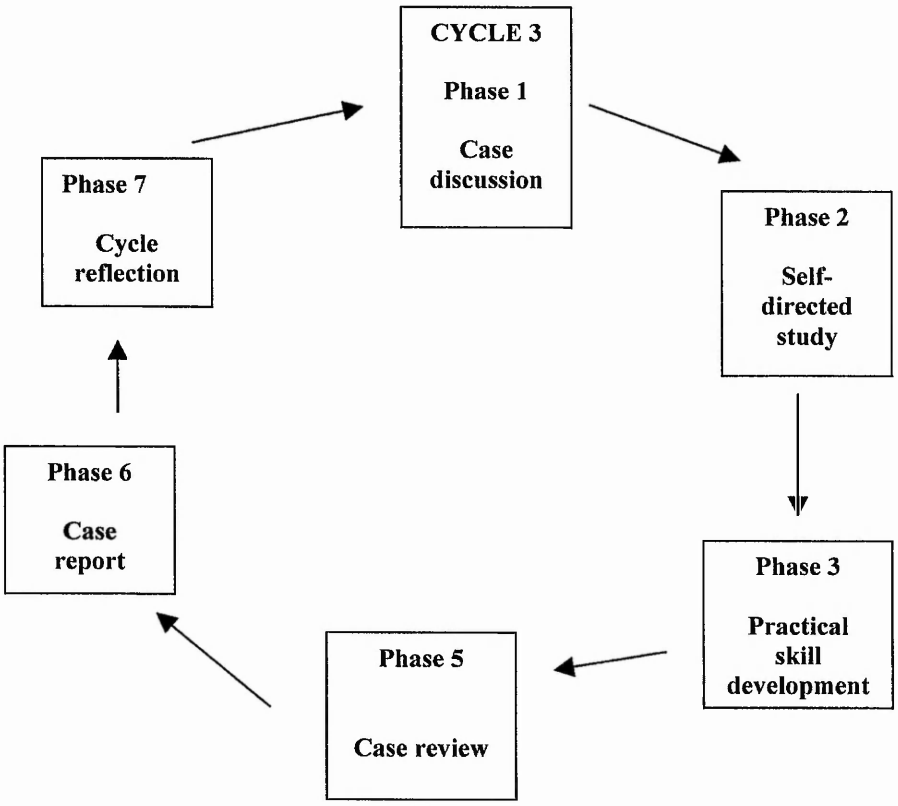
4.3.6 A number of action steps, for cycle 3, were taken in the light of my changing understanding:

1. I decided to continue using a facilitator's guide, but not to interrupt the case discussion;
2. Intervene when students were not engaged in phases that involved teamwork;
3. Continue to monitor seating arrangements for its influence on co-operative learning; and
4. Monitor the dual role of the scribe and chairperson.

4.4 Cycle 3 Framework

4.4.1 In cycle 3, students did not use phase 5 to re-evaluate the case with the knowledge they had circulated, thus a problem-based method of PBL was implemented rather than the reiterative model (Bårrows, 1986). The decision was taken not to include a formal lecture, as I felt the key principles were being adequately developed (Figure 7). Furthermore, this case required students to apply their knowledge of practical techniques and I was aware, from observing students in the workplace, that their practical skills were well developed.

Figure 7: Sequencing of component phases of PBL during Cycle 3 (Phase 4 omitted)



4.4.2 Cycle 3 began with phase 1 during which the case was distributed. Since students' case reports had been submitted late for cycle 2, I decided to leave the submission

date for cycle 3 open. Students who wanted feedback from their reports were asked to submit them prior to the commencement of cycle 4.

4.4.3 Students A, C, D and E were present during phases 1, 2, 3 and 5. Student B was absent for phases 1 and 2, but present for phases 3 and 5. Phase 7 was included in this cycle to encourage students' reflection on their performance.

4.4.4 The evidence emerging from the critical incidences of the cycle is presented in Table 26. Appendix 7 contains data analysis relevant to cycle 3.

4.5.5 Evaluative reflective summary from cycle 3, emerging from Table 10:-

(a) Students demonstrated their independence from myself, as tutor, by choosing not to pursue my suggestion related to improving teamwork. Individual students were also becoming more confident team members.

(b) Students found the CD-ROM interesting and used it to assess their developing body of knowledge. This motivated them to research more issues. There was a sense that the CD-ROM test was being used in lieu of teacher feedback, as there was little formal assessment and case reports were not graded.

(c) Student reflections continued to capture both reflective and descriptive aspects of the learning experience. This was supported by phase 7 reflections. Students demonstrated a gap between their 'in use' theory and espoused theory, since they did not implement agreed changes for improvement.

(d) I reflected that even though this group was an established working group, genuine team bonding only occurred during phase 7, when students were laughing together about their poor team performance during the cycle.

Table 10: PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and with the participants in cycle 3.

Aspect of PBL being monitored in cycle 3	Differ (+/-)	Agree (+)	Disagree (-)
Motivation	TM reflected that it may be beneficial to distribute cases before phase 1.	Students C, D and E found the CD-ROM quiz interesting.	Students B, C and D case reports submitted late. Students A and E did not submit reports. Students perceived phase 5 as a function, rather than a team process.
Team working and group communication	TM aware that she was over-directing, instead of guiding students. Team bonding occurred when all students were reflecting on their lack of team performance.	Students became more assertive and vocal during phases 1 and 2. Students A, C and D acknowledged group processes and individual tasks. Student C acknowledged her use of another student's work from a pervious cycle. TM suggestion to group not followed up.	Student C experienced difficulty in scribing and chairing phase 1. Dominant group members A, C and E led phase 1 discussion. Student E only acknowledged individual tasks. TM reflected that PBL encouraged individualistic rather than group values. Students did not implement any discussed changes to improve teamwork from cycle 2 phase 7 reflection Phase 5 was divisive rather than cohesive
Knowledge-based development	Students did little summarising of knowledge for phase 5. TM aware that she was influencing information overload by indicating to students that they should explore all case options.	During phase 1 the expert tutor was useful in facilitating student's consultation and knowledge progress. Students A and C were aware that they were researching topics at a deeper level than previously.	C recognised technical terminology as a barrier to learning in PBL. TM reflected that cases may be too broad resulting in information overload.
Application of knowledge to context	Students presented their case reports as either integrated or discrete knowledge.	Case reports showed clear links to workplace.	
Consultation enquiry skill	Student consultation was more interactive using facilitator simulation.	Students recognised the importance of understanding the client's social context.	
Improve own learning	Students were using a wider range of resources during phase 2.	Students C, D and E found CD-ROM useful.	PBL generated vast amounts of paperwork.

(e) Acting as an expert tutor, aided the students simulate a real consultation and helped to break down language barriers to learning.

(f) Some students were aware of developing a richer, deeper body of knowledge. Clear links to the workplace were being made during phase 6. However, students were still not summarising information for phase 5 and there was a sense of information overload. I considered that I had contributed to this by encouraging students to explore all avenues of the case, rather than identify critical incidences. An absence of summaries indicated that knowledge was being perceived as discrete (product) rather than integrated (process).

(g) Students chose not to re-evaluate the case and in doing so the PBL model changed from reiterative to the problem-based model. This decision demonstrated their independence from the tutor and lack of motivation for phase 5.

4.5.6 As a result of reflection and discussion, I took the following action steps in cycle 4:-

1. Change the seating arrangement, if the agreed reflective decision was not instigated by the students themselves;

2. Use a paired discussion group to feed into the main discussion group. This would give less confident members time to reflect and articulate their knowledge prior to being involved in a brainstorming activity in the larger group;

3. In order to encourage the students to reflect more explicitly on their experience, I once again changed the questions on the student reflection form;

4. Allow the group to decide on whether to use reiterative or problem-based PBL; and

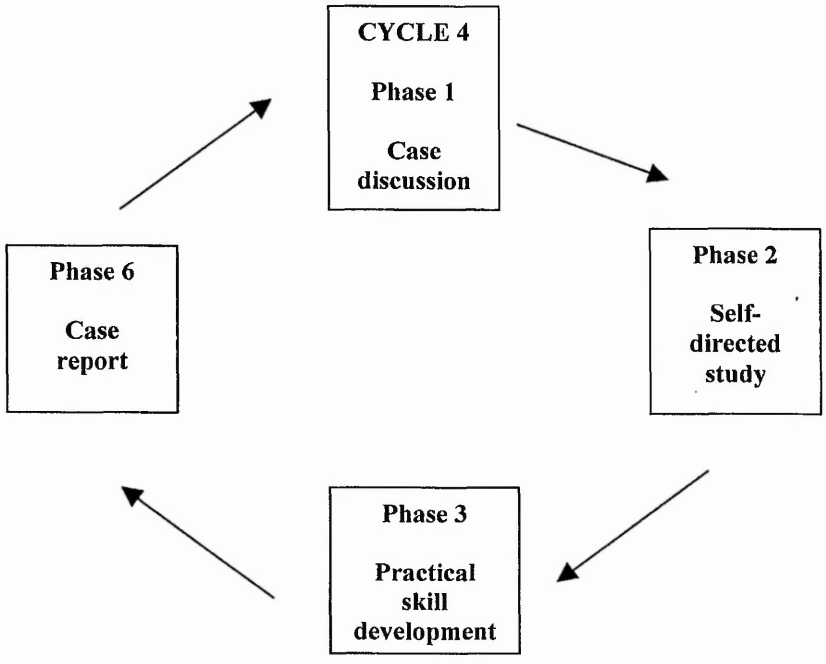
5. I decided not to use a facilitator's guide but to focus on the group discussion.

4.5 Cycle 4 Framework

4.5.1 Although the research had intended to implement the reiterative model, students chose to follow the problem-based PBL model (Barrows, 1986). No formal lecture was included during cycle 4, as I felt that most students had a good working knowledge of most of the key principles.

4.5.2 The case was presented to the students during phase 1, day 1. Once again, no submission date was negotiated. Students who wanted feedback from their reports submitted them prior to the start of the next cycle. Students A, B, C and D were present during phases 1, 2 and 3. Student E was on holiday.

Figure 8: Sequencing of component phases of PBL during Cycle 4 (phase 4, 5 and 7 omitted)



4.5.3 Cycle 4 was the final cycle. As students would not continue with the PBL process in the foreseeable future and would not be able to implement changes following a reflection on their performance, phase 7 was not perceived to be appropriate during this cycle.

4.5.4 The evidence emerging from the critical incidences of the cycle is presented in Table 32. Appendix 8 contains data analysis relevant to cycle 4.

4.5.5 Evaluative remarks summarising cycle 4, emerging from Table 11:-

(a) Students valued the guided discovery learning inherent in PBL. Searching and finding new knowledge was motivating.

(b) Students were aware that they were developing a deeper understanding of knowledge that had clear links to the workplace. However, some students still perceived this knowledge to be discrete whereas, other students were developing an integrated perception of knowledge and how it related to clients. Although there was no conclusive evidence, it was indicated that learners who perceived knowledge as integrated were more likely to be solution providers. Conversely, learners who perceived knowledge as discrete were more inclined to be problem solvers.

(c) As students became aware that some aspects of their research were repeated, they placed less value on phase 5, which re-evaluated the case. Phase 5 had become a functional feedback session. In order to benefit students in future PBL programmes, the format of phase 5 should be changed at this stage. I would suggest a discussion of students' decisions or a re-simulation of a client consultation with the facilitator acting as client and expert tutor.

(d) Teamwork and discussion was improved with the change in seating arrangements and group work instigated during phase 1.

(e) Student B required more teacher-directed support than other students did.

Table 11: PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and participants in cycle 4.

Aspect of PBL being monitored in cycle 4	Differ (+/-)	Agree (+)	Disagree (-)
Motivation	Non-reiterative PBL was more motivating for students when a body of knowledge had been constructed.	Students liked finding out about new information.	Student A was more motivated by being allowed to research the full case on her own rather than collaboratively.
Team working and group communication	TM instigated changes to seating plans as previously discussed by the group. TM reflected whether non-reiterative PBL decreased teamwork and communication aspects of PBL. TM reflected on the benefit of the user guide to her role, as one had not been used during cycle 4.	Students valued group work during phase 1.	
Knowledge-based development	TM reflected that providing students with all case studies would facilitate their self-directed study in cases of absence. TM supported Student B in scribe role. TM reflected on grading of phase 6 reports.	Students aware of building a deeper body of knowledge. Students had built up a considerable amount of knowledge from previous research and circulated information.	Students recording knowledge during phase 6 as largely discrete or integrated.
Application of knowledge to context		All case reports made varying degrees of links to the workplace.	
Consultation enquiry skill		Students A, C and D provided solutions for the client case along with their opinion. Students took a personal approach to writing the case study.	
Improve own learning	TM reflected that a considerable amount of time was needed to create a PBL class environment. TM encouraged computer use by ensuring they were turned on prior to classes.	Some student's self-assessment did not match facilitators observed records of performance. All students used a wide range of resources in phase 2.	Students did not use IT skills to produce their phase 6 reports.

4.6 Cycle 5 Framework

4.6.1 Cycle 5 was an assessment cycle. All students (both PBL and non-PBL students were asked to complete two forms of assessment. The first was the City and Guilds' mandatory examination. The exam was conducted under traditional closed book conditions. The second was a case study developed for the purposes of assessing the application of knowledge, in addition to content knowledge. The case study assessment was conducted with an open book format. Students could also request resources from the facilitator. I acted as facilitator during this cycle. Each assessment lasted an hour.

4.6.2 The information derived from the critical incidences of the cycle is summarised in 37. Appendix 9 contains data analysis relevant to cycle 5.

4.6.3 The evaluative comments below provide a summary of evidence from cycle 4, emerging from Table 12:-

1. Students who recognised the development of their content and process knowledge valued both forms of assessment.

2. Students referred to work-based resources in their case assessment.

3. Time was a factor that influenced the completion of the case assessment.

4. Students who scored highly on the mandatory test paper also scored highly on the case assessment. As aspects of the case assessment were content-based this is not surprising. Students who scored the highest marks perceived knowledge as discrete during their approach to case report writing.

Table 12: PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and participants in cycle 5.

Aspect of PBL being monitored in cycle 5	Differ (+/-)	Agree (+)	Disagree (-)
Knowledge-based development	Average case-study assessment marks between PBL and non-PBL groups were similar. 66% of students used their memory as a resource during the case assessment. 77% of students felt that the case study assessment was easier than the mandatory test paper. 44% of students responded that they would like to be tested in both assessment formats.	Students who scored highly on the mandatory test paper also scored highly in the case study assessment. Student C recognised the development of both content and process knowledge. 44% of students responded that they would like to be tested in a case study format in preference to the mandatory written test.	PBL students who scored the highest marks were students who largely perceived knowledge as discrete during cycles 1-4 case reports.
Application of knowledge to context		All students used the salon colour chart in their case study assessment (salon standard practice). All students agreed that the case study was representative of a salon situation. 66% of students felt the case study was relevant to them.	
Improve own learning	22% of students felt they would have completed the test but were constrained by time.	Students made use of a wide range of resources during the case study assessment. 55% of students claimed to have known the answers to the questions.	

5 Discussion on Research Themes

5.0.1 This section presents the findings in relation to the research themes (for ease of reference, evidence for each theme from Tables 8, 9, 10, 11 and 12 are re-tabulated across cycles in Appendix 12). The themes are inextricably linked, but for the purposes of this discussion are considered separately. I acknowledge as a holistic educator, however, that each theme must be understood in the context of where it evolved and its interdependence on other factors. The section concludes with a discussion of my personal development as a PBL facilitator.

5.1 Motivation

5.1.1 The literature claims that students following a PBL curriculum are highly motivated (Barrows, 1986; Boud and Feletti, 1997). It is implied that the PBL process motivates all students. The research findings (Appendix 12, Table 42) do not fully support this claim. It was evident that students found some phases of PBL more motivating than other phases. Students responded differently to different phases of PBL depending on their preferred learning style, the extent to which they valued the PBL process and whether they were extrinsically or intrinsically motivated.

5.1.2 One aim of implementing PBL was to motivate students through self-directed learning. PBL created a context-based learning environment where students took control of their own learning. Prawat (1989) suggests that the teacher should provide students with cognitive strategies for regulating their own learning. He describes this as a form of empowerment. As part of *'Research Methods in a Dynamic Context'* (Doctorate course, 1998), the use of the term 'empowerment' was discussed with my colleagues and Professor Griffiths. We concluded that, like other educational terms such as competence, the term has often been misused to represent hidden political agendas. In deconstructing the term 'empowerment' I applied Lum's (1999) system of analysis. Rather than focus on the aim of a

concept, Lum suggested it was more useful to analyse it's epistemological stance from it's methodological strategy. Using this perspective, it is the methodology of empowerment that is subject to scrutiny, not it's aim. As PBL is student-orientated, it aims to develop competence by maximising students' intellectual resources. Thus, it can be described as an empowering methodological educational strategy. There is a centric shift from minimising teacher activity to maximising student activity. This was recognised and expressed by one student who, I suggest, was experiencing empowerment of the type referred to by Prawat (1989):

"I like the idea of getting our own information together although it took a bit of thinking about to get into it".

(Appendix 3: E19, Student C)

5.1.3 If PBL is an empowering experience for students then conversely, it follows that a negative PBL experience may lead to the dis-empowerment of an individual. It could result in low self-worth. I was aware of this possibility during the research and was prepared to intervene, in my role as facilitator, to prevent it (1.9).

5.1.4 Phases 1 and 2, based upon the principles of guided discovery learning, were valued and enjoyed by students. Throughout the cycles, students reported their interest in all new knowledge. This finding confirmed that the PBL process was motivating, as portrayed in the literature. Student A described her cycle 2 experience of phases 1 and 2 in the following way:

"*Most of the lesson was interesting because I was finding out new information. It was stuff that we hadn't covered before, that is why it was more interesting...we worked out the key points of the case study and then we all decided which point we would look at".*

(Appendix 3: E36, Student A)

5.1.5 Students were aware that phases 1 and 2 were being monitored for the purposes of collecting research information. A certain amount of enthusiasm, noted at the beginning of the research, may be attributed to the novelty of the experience. In addition, some of the students' initial motivation may reflect the Hawthorne effect (Cohen and Manion, 1994:171), as the students were aware of their role as participants. These factors were taken into account in understanding students' PBL experiences.

5.1.6 Although the literature implies that PBL suits all learners, the data supports Dr. Burdett's (1999, Appendix E3: E2) experience:

"Out of any group of people there are going to be a number for which PBL will not be their way of learning. It is not their style..... they are too immature, too mature.....it's just not their way".

5.1.7 There was agreement that cycle phases 1 and 2 were motivating. However, critical incidents indicated that some aspects of PBL had a de-motivating effect on learners. Student B's experience of phases 1 and 2 varied from one cycle to another. In cycle 1, he engaged in the PBL activities, but it was observed in cycle 2 (validated by CF) that Student B was clearly experiencing difficulty:

"I'm lost!"

(Appendix 3: E34, Student B)

Student B was not able to identify with the problem situation or the work context within which the case was located. This was surprising, as Student B was specialising in male hairdressing and the case in question was male. There was little evidence of Student B using prior knowledge or transfer of learning during cycle 2. As a result, Student B required individual support during this period of research. My field notes recorded that:

"Although Student B had the smallest part of the group (work) to do, he was very de-motivated and negative which I feel came from his non-participation in the group discussion. After I prompted him to look in the texts, he still claimed there was nothing in there for him. However, he said that from the beginning without even looking."

(Appendix 3: E34)

5.1.8 This incident prompted me to search for factors that would explain Student B's level of input to the group during different cycles. The main differences between cycle 1 and cycle 2 were seating arrangements and the composition of the group. Seating positions had not emerged from the literature overview as an influence on motivation or group activity. I decided to monitor seating arrangements as part of the research. The CF feedback offered another perspective on Student B's situation:

" B has a confidence issue - he may have thought of some answers but didn't say them".

(Appendix 3: E37)

An explanation for his behaviour is offered by examining the psychological notion of the empty self (Cushman, 1990). Cushman (1990) suggests this emptiness is partly due to an absence of communal forms and beliefs. On this occasion Student B's initial lack of confidence during phase 1, cycle 2, exacerbated his inability to engage in the group's communal discussion. As a result, Student B was observed experiencing '*personal distress*' described as "*the pain of an individual who finds that he or she is unable to meet the requirements of form*"(Smail, 1993: 90). The form in this context amounted to the ability and confidence to engage with the group. The result was his 'lost', empty feeling. These events encouraged me to consider when I should, as facilitator, intervene to ensure all students are enabled to contribute to the group activities.

5.1.9 Critical feedback suggested that another contributory factor of Student B's changed performance was the increase in the complexity of the case during cycle 2. This resulted in more issues being generated. There was a full student attendance present, an occurrence which gave rise to an increase in the flow of communication within the group during phase 1. This caused confusion for Student B and '*disengagement*' from his peers (Fullan, 1991:174). When questioned Student B could not explain why he had not contributed to the group discussion, despite knowing some of the information needed (Appendix 3: E40). However, Fullan (1991) suggests that extreme sensitivity and self-consciousness in the presence of peers strongly inhibits classroom participation. I would describe B as an extremely sensitive learner. This is confirmed by colleagues (Appendix 3: E38). The CF feedback agreed with me that B was experiencing difficulty during cycle 2. However, Student B did not record this, or acknowledge the individual support he had sought and received, in his reflections:

"I worked with the group most of the lesson then went on my own to find out about the metallic colours."

(Appendix 3: E36, Student B)

5.1.10 It would seem, in this instance, that Student B's espoused theory differed from his theory in use (Argryis and Schön, 1978). It is my opinion that Student B is a field-dependent learner. His learning style has probably evolved from his experience of schooling in a teacher-directed environment, which encouraged student dependency. This dependency had been augmented by Student B's learning difficulties and need for learning support. In a PBL environment, Student B demonstrated that he could participate almost independently in many aspects of PBL, such as discussions. The advantage of Student B's experience of PBL, and that of other students experiencing similar difficulties, was the opportunity to articulate and reflect upon their existing knowledge. Increased reflection encouraged a move towards independence and the development of lifelong learning skills.

5.1.11 Other students were also affected by motivational factors. During the research, Student E emerged as a field-dependent learner who requested teacher directions. She became de-motivated by the lack of teacher-directed instructions on the presentation of a case report for phase 6. After her first attempt in cycle 1, she decided not to submit further case reports. It is not clear from the data whether this decision was taken as a result of her inability to apply problem-solving skills, or as a result of her perception of the case report as an intrinsic or extrinsic motivator. Other students, (A, D and C) submitted their reports late, despite the initial use of negotiation over deadlines. If the cases had been graded, then it could be suggested that phase 6 was extrinsically motivated. This was not the case. Both Mann (1999) and Child (1993) highlight the importance of feedback on performance as a critical aspect of goal achievement. It is implied that, without feedback, motivation is lost and ultimately goals are not achieved. Most students submitted case reports, although late, which indicates they valued the feedback process.

5.1.12 Insight into the varying degrees of motivation demonstrated by the students during different phases of each cycle can be gained by applying postmodern values to the evidence. Postmodernity celebrates pluralism, difference and complexity (Edwards, 1994). Phase 1 case discussions, which reflected these values in brainstorming activities, were valued by the students. Evidence suggests that other phases of the cycles, where students were required to produce rational, modernist accounts of their decisions, were deemed to be less motivating. This indicates that phases within the cycles are rendered unpalatable to students by their very nature and underpinning values. Furthermore, the extent to which students are repressed by these phases (Marshall, 1997) would deem the whole of the PBL approach as unethical. This is a radical assertion, which does not take into account the complexity of factors which can impact upon the learning experience. However, while I do not support it, the perspective provides a balanced contrast to the empowering potential of PBL that I indicated earlier (5.1.2).

5.1.13 PBL is based on mutual respect for the contributions of group participants (Margetson, 1997), and their experience could be described as co-operative learning. Thus, the PBL approach is underpinned by the value of equal opportunity for all participants. This supports my own belief that the opportunity of education should be equal for all students and should be determined only by their individual needs (Appendix 2:4.5). The group fluctuated in the extent to which it addressed Student B's needs. The degree to which PBL enabled Student B to manage the impact of disjecture, inevitable in education, varied (Taylor and Burgess, 1995). Overall, I believe that PBL was beneficial for all students, particularly Student B. Students came to realise that developing as a lifelong learner was equally concerned with the process of knowing and with the process and the content of learning.

5.1.14 In recognising students, like Student E, as autonomous individuals (Freire, 1998), I came to respect their choice, for whatever reason, to withdraw. At the same time I did not wish their decisions to be based on a poor quality learning experience at the training centre. Johnson and Johnson (1989) suggest that by working in a co-operative learning group, all members are empowered to act by feeling strong, capable and committed. As an example of co-operative learning, PBL had the potential to be used as a means of developing learning for all students including those identified as 'drop-outs' or 'at risk'. This aspect of PBL appealed to me as, working within a city centre, multi-cultural environment, I encounter a wide range of individual learners some of whom I would identify as 'at-risk' students. Many of the students that I teach are teenagers or young adults. Many have had poor experiences of education for either mental, social or societal reasons and could be described to be at risk to the extent that they fit Johnson and Johnson's (1989:41) description of '*at risk*' learners, who:

"...are in need of caring and committed peer relationships, social support, and positive self-images, as well as higher achievement".

Fullan (1991:186) identified the use of cooperative learning experiences as a means of addressing the needs of *'at-risk'* students. During some of the cycles, Student B exhibited attributes of learning that would identify him as being 'at risk'.

5.1.15 As a result of reflecting on the students' experience of motivation in PBL, I recognised that as all learners exhibit different learning styles it was unlikely that PBL would be a motivating learning approach for all students. Furthermore, the implication is that PBL should be used with caution as a design model for a whole curriculum. As a final comment, I turn to Dr. Burdett (1999, Appendix E3: E2) who reflects my own experience of PBL and many of the students:

"It doesn't always work well but when it does, it's exhilarating".

5.2 Teamwork and group communication

5.2.1 The literature identified the collaborative value underpinning PBL. This was appealing to me as it represented the co-operative nature of the workplace (Margetson, 1997). Collaboration also recognised an individual's development working within a team environment. The combination of collaborative and self-directed learning reflected the students' work environment, where team members discuss client needs with their peers as well as with the clients. Findings emerged from various critical incidences that occurred within the cycles. Dolmans et al. (1998) provide a useful framework for discussing the data in terms of cognitive and motivational influences on the group processes (2.8.4).

5.2.2 A. Motivation

5.2.2.1 PBL changed my own role from teacher to facilitator. This changed the power structures within the group and altered how the students perceived me. Students recognised the shift in orientation from a teacher-directed programme to a student-orientated approach to learning. I can recognise that a student's experience of PBL is linked to how they relate to this change. Some students adapted well to this shift whilst others struggled. There was evidence in the research data of the students encouraging each other to maximise their effort (Dolmans et al., 1998).

5.2.2.2 During cycles 1-4, students motivated each other to contribute to the phase 1 discussions, by asking one another questions. In phase 5 of cycles 1 and 2 students listened attentively to the feedback from their colleagues demonstrating mutual respect for each other. The value of mutual respect has been identified as a motivating factor of PBL. However, there was also evidence of group members discouraging their peers from full participation in group activities (Churchill, 1992). This became apparent as the cycles progressed and was demonstrated in the group seating arrangements. It was also shown in students' body language and the manner in which they spoke to each other. My instinct as a tutor was to intervene on occasions when I felt an individual of the group was being marginalised.

5.2.2.3 Acting as a facilitator, I was often unsure as to when and how intervention should be initiated without detracting from the PBL ethos of a student-led approach (7.4.12). In addition, I also valued the autonomy of the student as an individual learner (Freire, 1998) and respected his/ her needs (Appendix 2: 1.2, 4.3, 4.4). The literature implied that students, as a group and as individuals, would be motivated by a guided discovery-learning approach. Having reflected on the constitution of a student-led programme, I can now recognise that that a PBL approach can never be truly student-led in the sense that Barrows (1986)

maintains. I agree with Tubbs (2000) when he claimed that by simply enrolling on a course, students suspend their autonomy. In a truly student-led programme, students would not be required to suspend their autonomy as a learner. In PBL, the autonomy of the individual is surrendered to a certain extent to other members of the group. If the group do not work cohesively by supporting each other, with mutual respect, then tutors are ethically bound to take action and intervene when disengagement occurs within the classroom. It was in the light of this reflection, and to ensure social justice (Griffiths, 1998), that many of my interventions during PBL case discussions occurred. An example was a decision to support Student B during phase 3 of many cycles, when he requested support. Another example was when I paused the phase 1 discussion, during cycle 2. I had observed that Student D was having difficulty scribing the issues that were being directed at her. However, there was evidence of occasions when the group did support each other. This was seen in the group's fair distribution of the tasks. Tasks were automatically delegated according to the group's perception of a student's ability. Overall, the data shows that students valued the group work involved in PBL.

5.2.3 B. Cohesion

5.2.3.1 Motivation has been identified as a factor of PBL that can empower individuals towards more self-directed, independent learning. Dr. Burdett (1999, Appendix E3: E2) acknowledges the type of learning attributes that suit a PBL curriculum design:

"Independent workers ...but if they're too independent that's not good. They need to be independent and co-operative".

5.2.3.2 Some of the research findings show that students worked co-operatively. An example of this was the manner in which students supported the scribe and delegated the role of chairing phase 1 discussions. However, in contrast, findings

also illustrated poor collaboration. Furthermore, the group acknowledged that their team performance during phase 1 of cycles 1-4 was weak. They realised that being aware of other members' contributions and of the seating arrangements contributed to good teamwork and communication skills. However, despite reflecting on and articulating these factors during phase 7 of cycles 2 and 3, the group did not implement any improvements in cycle 4. This indicated that the team were experiencing a gap between their espoused theory and theory in action (Argyris and Schön, 1978). The data suggests that early PBL cycles (1 and 2) and phase 1 (cycles 1-4) were more cohesive than others. Phases 2 and 5 (cycles 1-4) were divisive rather than cohesive, as they focussed on individual activities. Some students demonstrated a lack of personal values in a few PBL phases by not submitting case reports (phase 6) and not fully engaging in peer feedback during phase 5. Furthermore this was affirmed when students voted with their feet during cycle 4 and requested a change in the method of PBL used.

5.2.4 C. Sponging

5.2.4.1 Dolmans et al. (1998) describe sponging as the extent to which students let others do the work. During cycle 1, individual students expressed concerns about having to depend on their colleagues for information. Although, this was said in relation to students' abilities in the group, the comment also articulated Student A's concern that there would be an uneven distribution of the workload. Her comments do not reflect the mutual respect of participants, in the generation of new knowledge that PBL claimed to nurture (Margetson, 1997). A similar observation was made by Lovie-Kichin (1997), who noted that there was occasional resentment when some group members did more than others.

5.2.4.2 Whilst I was aware of power differentials in the teacher-student relationship, I had not anticipated the strength of student-student inequalities that emerged during the PBL discussions. I interpreted Student C's reasons for requesting a change of PBL format, for phases 2 and 5 of cycle 4, as being based on her perception that

others in the group were unable to contribute sufficiently to the generation of new knowledge.

5.2.4.3 Student B sponged, but as a coping strategy to support his learning difficulties. He was observed copying notes from a co-operative Student C. In this way sponging from others could demonstrate a positive team spirit.

5.2.5 D. Withdrawing

5.2.5.1 Withdrawing has been described as reducing contributions to the tutorial group's activities (Dolmans et al., 1998). It can also be described as a student's decision to recall some of their autonomy from the group. This may be done for a number of reasons:-

- Dissatisfaction with the group performance; or
- A lack of confidence in their own ability which is not being supported by the group.

5.2.5.2 Two key incidences occurred during the research that could be described as withdrawal. Student E deciding not to submit case reports or obtain feedback from the tutor, and Student A's request to work on the cycle 4 case, phase 3, independently. Given these examples of withdrawal, it is an irony that Students A and E emerged as the dominant group members during phases when the group was expected to interact. In this research, withdrawing could be accounted for by students being uncomfortable with the collaborative values of mutual respect expected of them by their peers (Margetson, 1997). Tubbs' (2000) depiction of an equal subject-subject relationship can never exist in collaborative PBL, due to the unequal power differentials inherent in the relationship between teacher-student and student-student.

5.2.5.3 Within PBL, the knowledge and contributions that the student (and group) brings to the relationship are acknowledged. PBL is an educational approach where the learner (as consumer) is given greater importance than the educator (producer). This reflects postmodern educational values, as PBL recognises that:

'*...we are all producers of knowledge, but through immersion not detachment*'.

(Edwards, 1994:435).

5.2.5.4 Even without the presence of a teacher, the group designated leaders who were depended upon to provide the other members with *'truth'*, knowledge and guidance, a concept unreflective of postmodernity (Edwards, 1994:435). A CF comment confirmed this:

"Method lends itself to someone (implying student) *taking over"*.

(Appendix 3: E37)

5.2.6 E. Interaction

5.2.6.1 Dolmans et al. (1998) described interaction as the extent to which students learn from one another. The data from the research throughout all the cycles paints a picture of students' awareness of their developing body of knowledge. Students referred to each other's notes extensively during phase 5 case reviews, and in this way valued the new knowledge generated. Although interaction is a desired value, when used by students as a source of unquestioned dependence it becomes undesirable. An example was provided by the actions of Student C, a more mature student in comparison to the others in the group and perceived as a leader figure:

" Student C distributed the wrong information and some of the other students copied it assuming it was correct (true). "

(Appendix 3: E32)

5.2.6.2 This unquestioned dependence could also be attributed to '*social loafing*' (Dolmans et al, 1998:S22), described as the easy acceptance of other students' contributions to work.

5.2.7 F. Elaboration

5.2.7.1 Elaboration took place when students asked each other questions (Dolmans et al. 1998). Students were observed working cohesively during individual-orientated phases. They asked each other questions about how to use resources and share interesting information. During phases 1 and 2, findings suggested that PBL favoured orally competent and confident team members. However, as the cycles progressed, the data also indicated that the other members of the group became more assertive. The extent that students were willing and able to challenge each other on key principles, and resolve tensions and differences, determined the level of *'cognitive conflict'* that took place (Dolmans et al., 1997:S22). Evidence supports that this was limited in this research and varied during the phases of the cycles. One explanation is that, as the knowledge area was new to the students, they were content to become *'social loafers'* (Dolmans et al., 1997: S22). This concept is described as sponging (5.2.4.1). Another suggestion to account for this low level of cognitive conflict would be that the cases were not sufficiently challenging and students became easily bored. The use of more challenging cases (Dolmans et al., 1997) can facilitate the '*collaborative energy*' (Lomax and Whitehead, 1998: 459) that is needed to trigger the cognitive process.

5.2.8 Did they become dependent on working as a team?

5.2.8.1 One ambiguity identified in the literature indicated that students who were taught by PBL became dependent on the group for decision-making (Albanese and Mitchell, 1993). The data from the research is not clear as to whether this is supported or refuted in the current context. Analysis of phase 6 case reports (Appendix 10) seems to indicate that Students A and D moved from a team-dependent to independent approach in their decision-making. Student C had been identified as taking an independent approach from the outset, whilst Student B remained a team-dependent decision-maker throughout. It is suggested that factors contributing to the development or not of independence were:-

- The learning style of the individual;
- The extent of the body of knowledge constructed by the student;
- The students' perception of their knowledge; and
- The ability of the student to problem-solve.

5.2.9 Reflective remarks

5.2.9.1 If I were to conduct PBL research again with 'established' groups, I would not assume that they were established. This group of students only began to bond during cycle 3 after a group review session. In future, I would include team-building skills as part of induction.

5.3 Knowledge-based development

5.3.1 The literature claims that students following a PBL curriculum may be better at learning information (2.9). The claim is based upon the perception of knowledge, within PBL, developing in context. As a result, knowledge developed is relevant, applied and of value to students rather than being learnt for the sake of recall. Themes have emerged from the data, which indicate that students learned PBL

information easier. Instead of being teacher-directed, the responsibility for building a body of knowledge remained with the student. Evidence suggests that the construction of PBL knowledge was a slower, but deeper process. The data emerging from the research in relation to the development of knowledge can be seen in Appendix 12, Table 44.

5.3.2 Within the research cycles, students demonstrated skill in identifying the case issues for the client cases and grouping these issues into topics for research. As students had spent almost a year's experience in the workplace, much of this skill may have derived from their application of existing, vocational knowledge (3.6.1). This existing knowledge was derived from the experience of salon work and observation of colleagues and clients in the salon. Elliot (1991a:24) describes this as *'useable knowledge'*. It could be argued that students already had a partially developed body of knowledge that they may, or may not, have been aware of. For these students to engage in the level of client discussions that they showed during the cycles, they had to have a tacit understanding of the client situation and experience of the workplace. Evidence of the students' existing knowledge was also confirmed by an impromptu visit of a colleague to a phase 1 discussion. She was '*amazed*' by what she had heard in relation to the group's knowledge and depth of discussion (Appendix 3: E21).

5.3.3 However, the data also shows that not all students were able to identify with the client situation as easily. This indicated that there was a differential between workplace knowledge and theory. Furthermore, it suggested that some students were able to recognise this differential, but other students were not.

5.3.4 Schön's (1983) work suggests that where a situation demands immediate action, a reflection would be classed as 'reflection in action'. Fullan (1991) refers to this as intuition. Although I can appreciate the difference between the two types of reflections presented by Schön (1983), I do not find his terminology useful as he does not distinguish clearly between the two terms. I agree with Schön (1983)

that even in the workplace, the practitioner is still able to be reflective and that this reflection is closely linked to practice. However, whilst I appreciate that, for the researcher and practitioner thought and mind are closely related, in my own experience their simultaneous occurrence does not happen. It is my own understanding that one must precede the other in a cognitive process.

5.3.5 Further reading has allowed me to explore the perceived differential between theory and practical knowledge (2.9, 2.10). Polanyi (1969) claimed that reflection cannot occur unless tacit knowledge becomes articulated and explicit. Intuitive action (Fullan, 1991; Tubbs, 2000) is based on an unarticulated, tacit form of knowledge, whereas articulated reflections, as implied by Schön's (1983) in '*reflection on action*' and *'reflection in action*' are both mirrored in Polanyi's (1969) explicit knowledge form. Elliot (1991a) acknowledges the move from intuitive practice to reflection. It is not clear what differentiates these types of reflection.

5.3.6 Schön (1983) proposed that practitioners based their actions on application of '*intelligent skill knowledge*' as opposed to '*habitual skill knowledge*'. Pearson (1984) distinguishes between intelligent skill knowledge as involving the exercise of capacities for discernment, discrimination and intelligent action and habitual skill knowledge as technical know-how enabling unreflective performance. Schön (1983) uses the term *'reflection on action*' to denote a deeper reflection of occurrences without the need for immediate action. This type of reflection has personally occurred, away from the workplace in work related activities such as up-dating my research journal. It is my experience that the two concepts can be distinguished by the time they occur. Therefore, not only is all reflection subjective but, in addition, all reflection is '*on action*'. From a researcher perspective, however, there is a danger in perceiving all reflection in this way. This is because the reflective action may become a unit of analysis, giving the researcher a false sense of detachment and distance from the research and other participants. This may lead to claims of subject objectivity, which would be

unethical given the collaborative and participatory nature of action research. Following my contemplation of reflection in the workplace, I propose that the following analysis is appropriate. Intuitive action is based on tacit understanding but is both behaviouristic and cognitive in nature.

5.3.7 I have come to the following conclusions regarding the nature of reflective practice which are illustrated in Figure 9:-

(a) All action is based upon tacit knowledge (2.10.3);

(b) Action can be based on habitual learned behaviour or as a result of cognitive *'intelligent'* processes (2.9.5);

(c) Intuitive action is more than a habitual response as it incorporates the application of affective aspects of knowledge and thus implies the presence of a cognitive process;

(d) Polanyi (1969) suggested that reflection does not occur unless tacit knowledge has been articulated and made explicit (2.10.5). Therefore, in tacit knowledge, reflection and self-awareness are minimised.

(e) Schön's (1983) differential between *'reflection in action'* and *'reflection on action'* is not useful, as it not clear what *'in action'* refers to, when, or in what situation, it occurs;

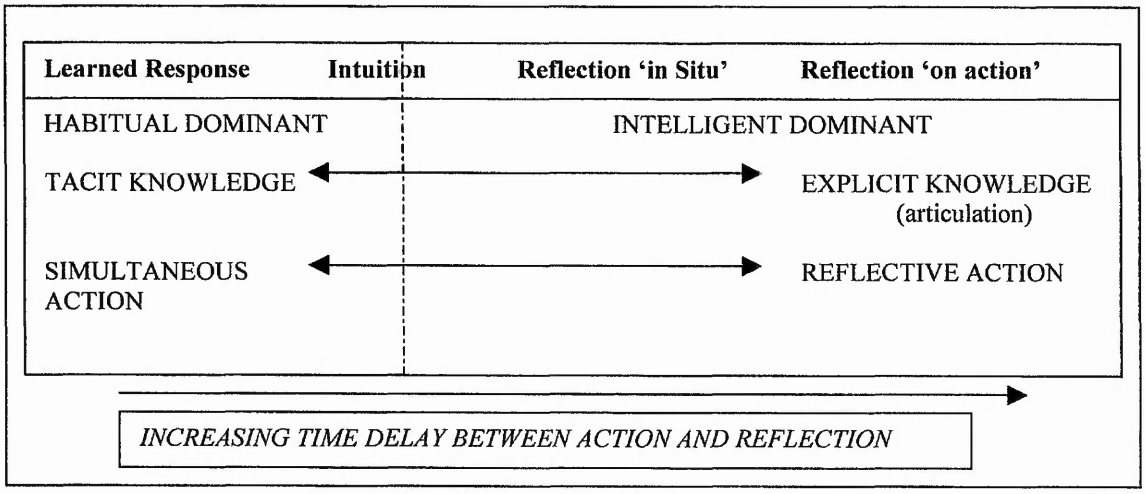
(f) *'On action'* suggests a significant time delay between the action and the articulation of the reflection/ knowledge, whereas 'in action' suggests a shorter time delay between action and the articulation of the knowledge;

(g) Reflection and action cannot occur simultaneously;

(h) Reflective practice overall implies a time delay between the action and the reflection, and therefore, all reflective practice must be based on explicit knowledge as a result of a cognitive process (Figure 9).

5.3.8 In order to more clearly distinguish between Schön's (1983) '*reflection in action*' and '*reflection on action*', I recommend that the term '*reflection in situ*' replace '*reflection in action*', as it implies that reflection is occurring in the classroom.

Figure 9: Theories of knowledge in relation to reflective practice



5.3.9 In order that a learner can progress and build a body of '*elaborate*' knowledge (Norman et al., 1997), they must become reflective practitioners. This must occur '*in situ*' (in order for their current knowledge to relate to the situation in hand) and '*on action*' in order that their body of knowledge can grow and evolve (Figure 9). Polanyi (1969) inferred that once knowledge is explicit, it could be reflected upon and applied in problem solving.

5.3.10 Case reports (phase 6) were intended to be one way of encouraging students to articulate their explicit knowledge. However, there was wide differentiation in the quality of work submitted, which suggested various factors were involved in the development of the knowledge base. I had initially expected that, following a

case discussion and review, all students would demonstrate an understanding of the case issues, with perhaps their individual research issue in more depth (Appendix 10: Table 39). I had expected this to be presented in an integrated form. In cycle 1, this did not occur and the students' case reports presented the case issues as discrete pockets of information rather than being integrated with the search for client solutions. Pithers and Soden (1999) inferred that students who were advanced in their practical skills would be likely to integrate this knowledge more ably with theory and subsequently articulate this in written and oral forms. The findings suggest that the level of articulation shown reflected the practical development of students (Table 13).

5.3.11 During the course of the cycles, students were aware of a deepening of their body of knowledge. For Student D, the deepening of her knowledge resulted in her presenting a more integrated report in an independent style. For Student C, the presentation of her report became increasingly concise and summarised. Student A moved towards a more independent presentation but still presented her report as largely discrete. Despite her awareness of a deepening of knowledge, the integration of the issues had not taken place. Student B was consistent in his presentation of his case report as being dependent on the team for information. He also perceived knowledge as discrete. Both Albanese and Mitchell (1993) and Ryan (1997) identify time as an important factor which contributes to the deeper exploration of some of the key principles of a case. Key principles are different to the key issues of a case. Key issues are case related and were identified by students during phase 1 for research in phase 2. Key principles may enlighten the student on aspects of a case but relate to the broader body of knowledge. Some students identified time as a limiting factor preventing detailed research of case issues and key principles.

5.3.12 The data suggested that as students developed and deepened their knowledge they progressed through a graded series of levels of expertise (Norman et al. 1997). Thus, Students C and D could be described as having developed elaborate

knowledge, Student B dispersed knowledge and Student B in between elaborate and dispersed (2.9.6).

5.3.13 Evidence shows that overall students who were not consistent in submitting case reports may have perceived this exercise as an assessment process. As the level of self-directed study combined with the preparation of case reports was significantly higher in PBL than the students' familiar level, this may have resulted in student anxiety. It is an accepted axiom that over-assessment leads to student anxiety (Mennin and Kalishman,1998). This explanation may account for the sporadic submission of case reports (Table 39). Assessments such as progress tests (true/ false) that are less threatening are recommended as a means of checking on the progress of students while impacting minimally on their PBL experience (Vu et al., 1998).

5.3.14 Swanson et al. (1997) proposed that the most appropriate focus for PBL assessment is elaborate knowledge. Given that Students C and D were identified as having developed an integrated body of knowledge, I would have expected these students to perform well in cycle 5. However, although they recognised that the case assessment was testing their application of knowledge as opposed to their content knowledge, they performed less well than students who perceived knowledge as discrete and content based. Given the potential invalidity of the case-study assessment paper, this research is unable to draw general remarks about the nature of knowledge development in PBL.

5.3.15 The generation of universal statements has not been the aim of this research. Rather, findings indicate that each individual student learns relevant knowledge within the activities generated by a PBL approach, and when this knowledge is reflected upon and articulated by the student it can be used in the workplace to develop expertise.

5.4 Application of knowledge to context

5.4.1 One characteristic of a professional practitioner is ability to demonstrate the use of intelligent knowledge (Pearson, 1984). This implies reflectivity on the part of the practitioner in identifying the relevant knowledge to bring to a situation. Reflectivity is followed by the use of problem-solving skills in order to apply the knowledge and transfer it to a new context. Previous Coherence and Integration reports (1 and 2) highlight my concerns over the notion of competency within the workplace. It was my experience that students could be classed as competent, without having developed the essential attributes of professional competence. Thus the competence developed in training centres, such as my own, had not transferred to the workplace. There existed a gap between theory and practice. This gap has been widened by current CBET policy, which focuses on the outcome of competence, rather than the process (Hyland, 1997; Lum, 1999). This antagonism was also recognised by Dr. Burdett (1999, Appendix 3, E2) who suggested that a lot of conventional pre-clinical training was perceived by hospital staff as a waste of time because:

"*none of the facts they teach you down there are worth much*".

5.4.2 Client cases were chosen to reflect typical salon clientele (2.11.9, 3.6.4). The cases were developed in line with effective case design principles (Dolmans et al., 1997). By helping students to recognise the *'realness'* of clients, it was intended to encourage factors which would facilitate transfer of knowledge (Child, 1993:144). Through students' articulation of tacit knowledge and explicit reflection of case knowledge, the client case study acted as the analogy required for successful transfer of knowledge (2.10.12, 2.10.13).

5.4.3 The research data emerging from the cycles relating to students' ability to apply their knowledge is shown in Appendix 12, Table 45. The data supported the view of PBL as a grounded approach that linked theory and practice. Students'

case reports made clear references to workplace practices. In addition, during phases 1 and 2, students recognised the relevance of the real world. They asked to meet clients and on one occasion asked the facilitator to simulate the role of the client. In addition, students conducted their own real world research by seeking out information for client cases from local health stores. These incidents reflected conservative induction (2.10.14) and indicated to me that transfer of knowledge between the workplace and theory had occurred, facilitated by PBL.

5.4.4 Shortly after the cycle 2 ended and prior to cycle 3 commencing, another critical incident occurred whilst working with Student A in the 'real' salon. This incident occurred during a client consultation that Student A was observing. My personal reflective journal records:

"Interesting situation with A one Saturday after Felix. Gent with highlights. She didn't make the 'transfer".

(Appendix 3: E44)

The Felix case in cycle 2 had emphasised the psycho-social context of the client. The real salon client expressed similar concerns. However, when I questioned Student A about whether she recognised the similarity or not, she was vague. It was only when I pointed out the similarities, as suggested by Child (1993), that she made the transfer of knowledge from the Felix case to the client. This incident indicated to me that theory classes, even using a PBL process and realistic client cases, can still be perceived as being distinct from the real salon. The difference between Student A's easy identification of the cycle 2 case issues and the salon client situation was the context where the consultation took place. It could be implied from this incident that knowledge developed in a PBL context may be subject to the same context-specific transfer problems as subject specialisation (2.10.13). However, being an isolated incident no further claim is made.

5.4.5 PBL promotes itself as learning which encourages problem-solving skills through the development of *'useable'* knowledge (Elliot, 1991a: 24). However, if the evidence suggests that the use of PBL does not facilitate successful transfer, then its value in enabling students to learn is reduced (Garrigan, 1997).

5.4.6 Successful transfer has been linked to the existence of surface and deep learning (2.10.18). Most students in the group realised that they explored their topics during phase 3 of the cycles at a progressively deeper level. In PBL the notion of deep and surface learning can be identified with other concepts such as the development of elaborate and novice knowledge (2.9.6), or content and process knowledge. During assessment of the case reports it was noted that, in general, students seemed to be able to identify and reproduce the factual aspects of the knowledge required. Some of the reports, however, made little attempt to apply the knowledge and reflect the process of client consultation. Students who offered factual information or a regurgitation of the distributed group information were largely reflective of those who took a specialist approach to problem solving. A specialist, or problem solving approach, is signified by the student providing the client with only one solution (2.10.11). In this approach to problem solving, attributes of the problem are deemed to be highly context specific (2.10.13). The research data identified Student A as one who perceived knowledge to be largely discrete or content based (Appendix 10). Her perception of knowledge as discrete may have influenced her inability to transfer her knowledge from the training centre context to the workplace, despite the similarities with the client case issues. However, as there are many other factors, which could additionally contribute to the understanding of the incident (5.4.4), no conclusive remarks are inferred.

5.4.7 The inference from the literature is that surface learning encourages the student to take a holistic overview of a problem situation. The findings support the development of both deep and surface learning during different phases of the PBL cycles. The case discussions encouraged the student to take a holistic view of the

case and could be described as surface learning. This allowed the student to develop multiple routes of access to stored information or tacit knowledge. Deep learning took place within the research during phases 2, 5 and 6 of the cycles. It provided the richness of knowledge that is required for expertise. If it can be claimed that surface learning allows the learner to see the holistic picture of the client situation, it is suggested that it is in this domain where problem-solving skills (2.10.6) such as focussing and scanning initially occur. The data showed that problem-solving skills occurred during phase 1 discussions, but the extent to which scanning or focussing was utilised by each student during each phase of each cycle is vague. Indications are that students who developed both deep and surface learning were the students who were able to provide a client with more than one solution for their problem (2.10.11).

5.4.8 The need to encourage both deep and surface learning raised the question regarding the stage at which PBL should be implemented in a course. Earlier I established that, due to different learning styles in the group, it would be unlikely that PBL could be used for designing the whole of my curriculum. So, should PBL be incorporated towards the end of course to encourage students to encourage students to link together their surface and deep processes? Or, alternatively should PBL be implemented at the beginning of a course to provide the student with a holistic overview of the problem situation upon which to research and develop specialisations? The literature was vague with regard to whether there was an optimal point within a course where PBL could be incorporated and only recommended full conversion to a PBL curriculum (Boud and Feletti, 1997). However, it could be implied that PBL would be most beneficially incorporated into a programme to facilitate the move from novice to elaborate levels of expertise (2.9.6). In my own context, this would imply implementing PBL after students had completed the first stage of their MA programme. PBL would be used, therefore, as a means of developing the attributes that characterize workplace professionals. These attributes would

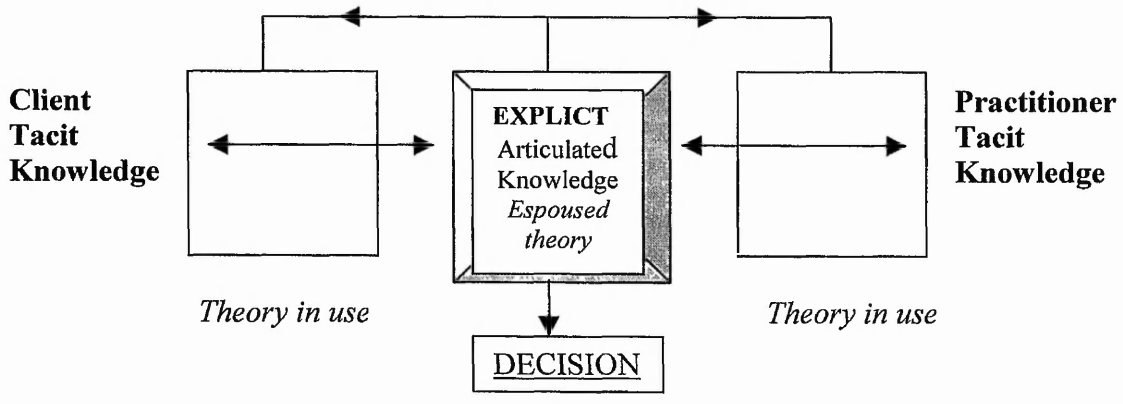
enable students to apply their body of knowledge and expertise to the continuous demands and multiple contexts of our complex environment.

5.5 Communication skills

5.5.1 The literature identified that students following a PBL curriculum develop effective client consultation skills (Barrows, 1986). The data emerging from the evidence supports this claim. It also shows that the development of these skills are influenced by the extent to which the learner is a reflective practitioner and whether their perspective on knowledge is discrete or integrated.

5.5.2 The client consultation process is essentially a collaborative process based on mutual understanding. This is represented in Figure 10, which suggests that the process is a reflection of a reflection.

Figure 10: The Client Consultation Process



Within this process, each party is encouraged to articulate their tacit knowledge to each other in order to reveal their individual views and opinions on the solutions under discussion and so arrive at a decision acceptable to all. It is my opinion that Figure 10 represents the '*holistic richness of the profession*' (Hager and Gonczi,

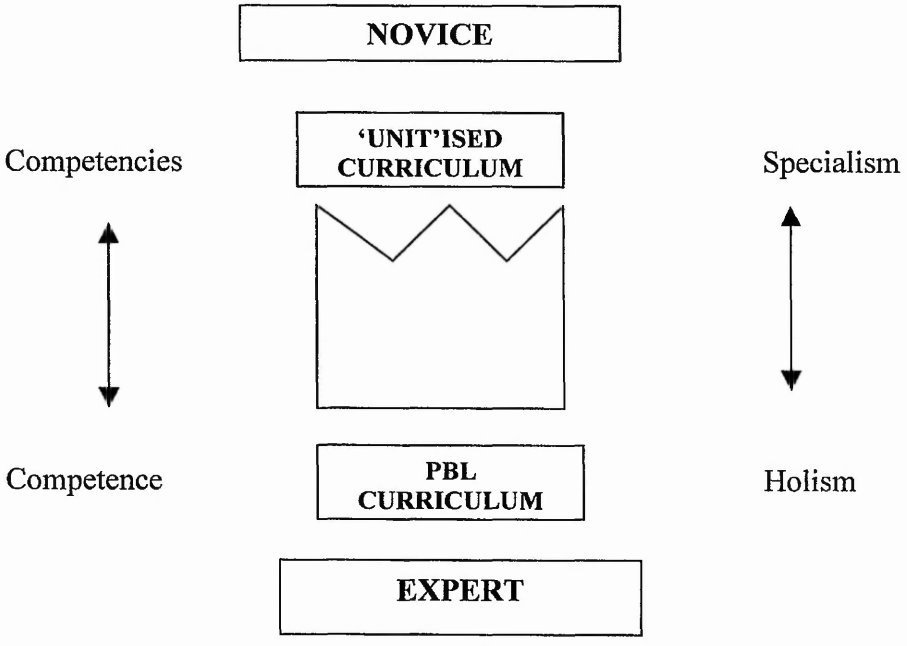
1996:15) and the convergence of professional and personal learning (Davies, 1997).

5.5.3 In order for students to become professional practitioners, they need to become sensitised not only to the '*espoused*' articulated requirements of the client but also be able to interpret the unarticulated indications of a client's '*theory in use*' (Argris and Schön, 1978). Theory in use is exemplified by the way a client is dressed, their mannerisms, reasons for change and social context. These indicators can be summarised as the psycho-social context of the individual. Likewise a client will scrutinize a practitioner for similar unarticulated messages. Without being able to interpret and reflect upon these indicators or signs, the participants in a consultation process remain in limbo. This has also been described as '*...the vision to see what is appropriate in a given situation*' (Ormell, 1996:67). Without reflecting on this vision the student will remain blinkered in their expertise and professional competence. PBL, through the use of client cases offers the student the opportunity to actively develop these attributes which are key to professional competence.

5.5.4 During the research cycles, students demonstrated an increasing curiosity to explore the psycho-social context of the client. This process began in cycle 1 with a desire to meet the client presented on the video shown to students. In cycle 2, the usefulness of exploring a client's unarticulated indicators was not perceived as relevant by Student E. Student A was unable to explain the importance of this process thus indicating that in the early research cycles students may have been responding simply in behavioural terms to the teacher's request. However, by cycle 3, students asked me to act as the client, so that they could explore these issues further. Simulation was a productive strategy in this situation as I used it to explore a range of issues with the students and assess their knowledge. The interactive process was motivating for the students who were unable to progress with their consultation without some client indicators (Westwood, 1994).

5.5.5 It was established earlier (5.4.6), that for a practitioner to become professionally competent, both deep and surface learning is required. Learning that encourages a focus on outcome statements, such as the NVQ, is suspect as it negates holistic (5.5.2) thinking and, therefore, cannot develop competence. Different perspectives of the competent practitioner have already been identified (2.11.2, 2.11.3). Figure 11 illustrates my reflections on the relationship between PBL and the development of holistic competence. It is useful as a summary of my discussion in this (5.5) and the previous section (5.4) and as an indicator of when to apply PBL to my workplace curriculum (5.4.8). This model assumes the development and use of appropriate technical and workplace terminology. The use of appropriate language is important in vocational education to facilitate collaboration between colleagues and clients (Figure 10). The recognition that language can act as a barrier to learning was made by Student C during cycle 3 and has been formally identified by Dearing (1996).

Figure 11: PBL model of professional development



5.5.6 Figure 11 implies that a novice programme is useful for building a body of formalised, deep learning. This can be developed in a relatively modular system. It is acknowledged that this process fosters the development of competencies. However, the development of competencies is complimented by surface learning which occurs in the workplace where students observe 'experts' at work and develop their tacit understanding of the work environment. When the novices have completed their basic studies, they are then encouraged to integrate their deep knowledge by using PBL. In this situation, PBL encourages students to develop their surface learning and problem-solving skills. The development of a formalised body of knowledge is not supported by the PBL literature (Barrows, 1986). The curriculum design, where formal knowledge building is nurtured prior to the integration of knowledge, is recognised as controversial and there is no clear evidence to confirm an optimal sequence (Patel et al., 1991). However, my own opinion is that the discussion and review phases of each cycle would be more exploratory if students had a basic understanding of some of the key issues. Lyotard (1984) supports this view by inferring that, having built a body of knowledge, students are able to become experts by developing the capacity to actualise and organise data.

5.6 Improve own learning

5.6.1 Reiterative PBL is a predominantly student-led approach to learning (Barrows, 1986). Due to the inherent differentials in the student-teacher relationship previously discussed, I have established that there can never exist a truly student-led approach to learning. However, evidence suggests that the change from a teacher-directed to student-orientated approach was recognised and valued by students within PBL. This was articulated by Student A (Appendix 3: E37), during cycle 2, who seemed to be adapting well to the change in learning approach:

"...also working off our own back more is better. It makes us find out things and take it on".

Berman Brown (1994) distinguishes between the use of the words learn and study to explore the dualisms of knowing and learning. Learning is described as gaining knowledge and acquiring skills. Studying is illustrated as being concerned with the engagement and activity of learning. In this application the latter reflects the values of the PBL approach. The extent to which students emerged as independent decision-makers reflected their perception of themselves as student rather than pupil. The evidence indicated that change took place in students' self-perceptions in this respect even in the short time span of the research (Table 39). This change was fostered by PBL.

5.6.2 It is claimed by the literature that students following a PBL curriculum may become better self-directed learners (Barrows, 1986). Student A's comment indicates the presence of self-directed learning. Other students recorded similar experiences. One manifestation of students becoming self-directed learners was the extent to which they chose to access the range of resources available to them (Tables 14, 19, 24 and 29). It has previously been suggested that the extent to which students become reflective learners is an indication of their capacity to develop lifelong learning skills. Another indication was the degree to which they were intrinsically motivated to submit case reports and gain feedback (Appendix 10). How learners identify with themselves as students or pupils will also impact on their potential to develop lifelong learning values (Berman Brown, 1994).

5.6.3 Initially during the PBL cycles, there was a tendency for students to use the resources they felt comfortable with or enjoyed using. The level of students' confidence was the main factor limiting their use of the full range of resources available. However, students were encouraged and guided into using new resources by the facilitator during the phase 2 class sessions. Furthermore, students requested support from myself as facilitator and from each other. This

had been expected following Dr. Burdetts's (1999, Appendix 3: E2) comments that '*members serve as a resource for each other*'. By cycle 4, students had developed into more self-directed learners as a result of their PBL experience. Their group decision, apart from Student B, to research the cycle 4 case by themselves could be interpreted as increased confidence in terms of self-directed learning:-

"I enjoyed using the books and the computer to ....find out about things. The books were good as they gave step by step instruction on what to do and how different effects are achieved".

(Appendix 3: E36, Student E)

5.6.4 Other factors impacting on the extent to which students improved their own learning have already been inferred and discussed within other themes. In particular, these are identified as students' learning style, the extent to which students experienced the change in the teacher-student relationship and their subsequent motivation by the phases of the PBL cycles. When the tutor did not meet students' needs and expectations, the research data suggests that extrinsically motivated students actively sought out replacement activities that would satisfy their needs. An example of this was the use of the CD-ROM programme. Student E had chosen not to submit case reports in order to obtain feedback of her perceived discrete knowledge (Appendix 10):

"I really enjoyed doing the STQ questions, testing what we have done and you can see what you have done and can understand what they mean".

(Appendix 3: E56, Student E)

5.6.5 It is clear that Student E used the computer programme to confirm what she knew. It is suggested that this occurred in the absence of any teacher-directed feedback. Her experience was different from other students as it reflected on the fun of the

CD-ROM activities and the usefulness of the information provided. Whilst, I acknowledge that it is unlikely that information technology can ever completely replace the richness of the student-teacher relationship, I recognise the current debate surrounding this issue (Heppell, 1999; Hughes, 1998). Berman Brown's (1994) analysis of dualisms highlights that this debate pivots on whether the teachers view themselves as teachers (to impart information) or as tutors (nurture knowledge). This has previously been explored in Coherence and Integration 2 and in *Ways of Seeing* lectures during the Doctorate course (Plant, 1997).

5.6.6 As a reflective remark, it is clear that the data supports the resource and cost implications that the literature identifies. This would deter educational establishments that wanted to implement reiterative PBL, but had limited funding. Dr. Burdett (1999, Appendix 3: E2) suggested that the resource implications only concern the setting up of PBL rather than the on-going costs. However, I would suggest from my own experience that, following the generation of paperwork during cycles 2 and 5, these resource costs would be ongoing.

5.7 My role as facilitator

5.7.1 A key factor that contributes to an effective PBL 'tutor' (Berman Brown, 1994), is the development of professional and personal awareness of self in relation to others (Wilkerson and Hundert, 1997). The concept of reflective practice, developed by Schön (1983; 1987), has become widely accepted as a model for professional development and a key component of action research (Leitch and Day, 2000). The assumption underpinning this assertion is that teaching and learning are complex processes, which reflects my own view of education (Appendix 2, 1.5). Schön (1987) described the ability of being aware as the hallmark of professional practice and for Elliot (1991b) reflective practice implied self-awareness (reflexivity). Both professionalism and self-awareness are evidently entwined. Action research, being based on reflective practice, offers a

means to overcome what is often perceived as a '*dysfunctional marriage*' (Budge, 2000a: 30) between the teacher and the researcher.

5.7.2 As a result of participating in an action research process, I am conscious of becoming more self-aware and have been encouraged to reflect upon my own beliefs and values (Appendix 2). In particular, I have more deeply and explicitly reflected upon the values I wish to foster in my teaching and how that manifested itself in a PBL process. Reflection led me to consider the PBL approach as an appropriate educational model for redesigning parts of the curriculum, as it not only reflects many of my educational values but also offered a means of bridging the gulf between theory and practice (1.2.1, 1.4.2, 7.3.2).

5.7.3 One issue that I reflected upon whilst implementing PBL concerns my functioning in the multiple roles of a teacher-learner-reflective practitioner-researcher. As a PBL tutor, I was aware of acting in a facilitative role. However, I often found functioning in multiple roles to be confusing, causing conflict in my belief and understanding of my role as an educator. One reason for this was my realisation that as a facilitator, adhering to the true spirit of student-led PBL (Barrows, 1986), I was unable to direct students to the key issues of a case. This challenged some of my educational values (Appendix 2: 2.1, 2.2, 3.1). However, students adapted very well to the PBL approach and required little guidance of this nature. Another reason for disharmony was that, as a reflective practitioner-teacher-learner, I found myself questioning the extent to which I perceived myself as an equal learner (5.7.7) compared to the students in the group, given that I had expert knowledge (5.7.8) that they required.

5.7.4 My role as facilitator changed the power structures within the group. Where previously, I had been the 'teacher' with all the answers, as facilitator and fellow learner within the group, I was not required to provide the right answer. Instead, I supported a range of options to solve the case studies discussed by the group. Nurturing dependency on a group for decision making, as occurs in PBL, has

already been identified and discussed. This change in role led me to consider whether the existence of a student-led as opposed to a teacher-led programme was possible.

5.7.5 PBL claims that it pays due respect to both students and teacher as people with knowledge, understanding, feelings and interests who come together in a shared educational experience (Margetson, 1997). This implies that for the teacher and students the PBL process is an equal experience. However, Tubbs (2000) suggests that in reflective models there is only an illusion of equality. Schön (1987) presents his view of the teacher-student relationship as a paradox of teaching and learning. In this paradox:

"...the student... and teacher are required to willingly accept the duality of certainty and uncertainty, or of power and trust, at least temporarily and to play out the dilemma of unequal power relationships".

Tubbs (2000:171)

5.7.6 Tubbs (2000:171) presents a radical perspective of the relationship between the student and the teacher. He claims that where the power relationship is said to be equal:

"...the dialogue itself is uneducational ...because it is subject to subject. ...A classroom is not subject to subject, it is teacher to pupil. If it is subject to subject, then the significance of the act of trust, the suspension demanded of the student is rendered insubstantial for it lacks its commitment to dependence and is without risk."

Furthermore he states that:

> *"It is arrogant and patronising of the teacher to think that the invitation* (to suspend their autonomy) *is theirs to give when...the freedom to do so requires a previous suspension of autonomy by the student."*
>
> Tubbs, (2000:171)

5.7.7 Tubbs (2000) argues that Schön's (1983) educational model of reflective practice is not genuinely comprehensive. Schön's (1983) paradox for the reflective practitioner is that, by risking the power inequalities of being a learner, they can eventually empower themselves as self-educators. However, Tubbs (2000) claims that the failure of the reflective practitioner to risk the negativity of self-relation within the dialectic of reflection reduces its educational potential and holds back the education of the philosophical consciousness. As an alternative to the reflective practitioner, he presents the concept of the comprehensive teacher who, not only recognises the power inequalities inherent in the teacher-student relationship but also recognises these inequalities exist in the teacher-reflective practitioner relationship. His representation of a comprehensive teacher as a reflective practitioner closely reflects my experiences as a teacher-researcher-reflective practitioner during this PBL research. This was demonstrated in my discomfort with perceiving myself as an equal leaner, when I felt I should be supporting students.

5.7.8 Contrary to Margetson (1997), and given the attributes of a comprehensive teacher, Tubbs (2000) implied that it is not possible for students and teachers to co-exist in an equal relationship. My experience of PBL as a tutor supports his claim and may be accounted for by my interpretation of my facilitative role as an expert tutor. Power differentials may be reduced in contexts where the tutor is a non-expert and therefore cannot provide students with the information or knowledge that they need in order to examine PBL cases. There are serious misgivings about the use of non-experts as tutors due to their potential inability to

guide the students in the right direction (2.12.6). Tubbs (2000) and Freire (1998) would acknowledge the need for an expert tutor for PBL on ethical grounds as they can facilitate the curiosity of the learner (Freire, 1998) which cannot be supported in a subject to subject relationship. As a result, in PBL, the teacher needs to remain aware of the power differentials and be committed to, and acknowledge, the dependence of the learner (Tubbs, 2000). During the research, this manifested itself in my intervention during the PBL process when I felt it was necessary, albeit against the spirit of true PBL:

"*Students seemed unchallenged by this last case study and indicated that they had circulated the main research topics around the group during previous cases. I felt it may be more appropriate to have a group discussion and then asked the group would they prefer to research the case individually using their existing knowledge. They responded positively to this suggestion, except for Student B whom I had already decided would need additional support whatever the decision of the group*".

(Appendix 3: E66)

5.7.9 Taylor and Burgess (1997:112) support this perspective of the role of the facilitator to '*engage students at risk of being marginalised*'. However, there were also times when critical feedback indicated that my intervention should have been earlier (Appendix 3: E38), other occasions when I intervened too often (Appendix 3: E37) and even occasions when I was deemed to have got it right (Appendix: E82)!

5.7.10 A key intervention during cycle 4 was my instigation of a change to the students' seating arrangements. It was my perception that the group was not functioning well as a group and that one factor contributing towards this was the seating positions. The group had also identified seating as an inhibiting factor in two reviews, but made no attempt to rectify this situation. Cohen and Manion (1989) and Budge (2000a) suggest that changes to seating arrangement should be

initiated by the teacher, so I persuaded the group to change their seating positions. I felt that for group '*engagement*' to occur, the facilitator must take responsibility to ensure that seating arrangements do not '*disengage*' individuals (Fullan, 1991:174). In cycle 2, critical feedback suggested that I should have intervened earlier in the case discussion on behalf of Student B, or at least made sure that the seating was different (Appendix 3: E38).

5.7.11 Seating had not been identified by the literature as a factor contributing to the success of PBL discussions. However, both management theory and educational theorists (Griffin, 1993; Cohen and Manion, 1989) would contend that seating is a potentially disengaging factor for group members. Whilst recognising that there is rarely an ideal layout, Cohen and Manion (1989) and Budge (2000a) assert that that seating arrangements contribute as effectively to overall success in class management as other factors. After reviewing observations of seating arrangements during phases 1 and 5 in the cycles, I would suggest that seating positions were an important consideration for ensuring that a PBL group works well. Following my intervention the group interacted and had a short discussion exploring the issues of the new case. Students had explored most of the issues and research topics in previous cycles and they felt that little new information could be gained from delegating tasks. Thus, Student A asked to use the information they had already developed as a group to explore the case independently. This shifted the reiterative model to a problem-based model of PBL. I reflected that in order for students to generate solutions for their case report, they would have to re-evaluate the case, albeit by themselves. Furthermore, as the request came from the students, and was not unreasonable in the context, I allowed the general plan to shift.

5.7.12 Underpinning my professional development has been my changing perceptions of the relationship between students and myself. Davies (1997) suggests that reflection is an essential part of the professional development process for both the

student and the teacher. Freire (1998:37) too, acknowledges the need to develop a reflective, critical capacity. It is his conviction that:

"...the difference between ingenuity and critical thinking, between knowledge resulting from pure experience and that resulting from rigorous methodological procedure, does not constitute a rupture but a sort of further stage in the knowing process. This further stage, which is a continuity rather than a rupture, happens when ingenuous curiosity, while remaining a curiosity, becomes capable of self-criticism. In criticising itself, ingenuous curiosity becomes epistemological curiosity as through greater methodological exactitude it appropriates the object of knowing".

He claims that the teacher who does not respect this curiosity of the student:

"...transgresses fundamental ethical principles of the human condition".

(Freire, 1998:60).

5.7.13 This holds with Griffiths' (1998) perspective of social justice, which instigated a considerable amount of personal reflection. Schön (1983), like Freire (1998) and Stenhouse (1978), acknowledges the role of the tutor as researcher. In PBL, particularly in the reiterative approach (Barrows, 1986), both students and tutors are required to become reflective practitioners. Students are obliged to reflect upon the PBL case issues and, drawing from their tacit or experiential workplace knowledge, to reflect upon what knowledge is required to examine the case both individually and as a group. The tutors in the PBL process are required to reflect continuously upon their role as facilitators, ensuring that they direct the group to identify the case issues and intervene only at appropriate times to guide, not direct, the group. The tutor is also required to ensure that all group members participate in the PBL process. In order to interpret and reflect upon action required, teachers, like their students, must also draw on their tacit and explicit

knowledge. Without tutor reflection, the PBL case discussions can easily revert to a lecture style, teacher-directed session. During cycle 2, I became aware of this occurring. A CF comment confirmed my self-awareness:

"Instead of facilitating - leading too much".

(Appendix 3: E37)

During cycle 3, I wrote the following on the top of my field notes to remind myself not to direct the class:

' Don't interrupt, Teresa. '

(Appendix 3: E49)

5.7.14 Evidence showed that the expert tutor was a contributory factor to learning (Schmidt et al., 1995). They found that, in situations where students had no prior knowledge, the content expertise of a tutor made a difference. Accordingly, in Figure 11, the PBL model of professional development proposed would benefit less from an expert tutor than the current research.

5.8 Reflective remarks

5.8.1 Dolmans, et al. (1998) implied that tutors should be well trained in stimulating student activity and in motivating them to encourage a team spirit. Whilst I recognise that my experience of a PBL facilitator has been my own interpretation of that role, I feel that both the students and myself have fully engaged with the process and spirit of PBL. I can also acknowledge occasions in the research when my enthusiasm or panic (when running overtime) led me to become more directive. My inexperience as a facilitator will no doubt have impacted upon the experience of the PBL students. I feel that given the chance to revisit this research scenario, I would have sought out possibilities to visit PBL

establishments in addition to Manchester University Medical School. This might have provided me with the opportunity to observe a PBL session and the role of an experienced PBL facilitator. This was not an option, due to the close working relationship of the tutorial groups. However, ultimately, it is the tutor's responsibility to interpret and apply PBL within his/ her own context. Given the occurrence of many 'incidents' that I experienced, and those of participants I interviewed (Appendix 3: E1, E2), I now realise that greater familiarity with the workings of PBL, in advance, would have been worthwhile. Unfortunately, this was not possible in the real world!

6 Conclusion

6.1 The Doctorate: a challenging collaboration!

6.1.1 The Doctorate course has been a challenging experience both professionally and personally. I commenced the course with little idea of how deeply it would influence my thinking and expand my mind. The initial stages of the course were spent in collaborative discussions with engaging colleagues. We debated many educational areas of current interest including, the key merits of postmodernism and modernism, the philosophical underpinnings of epistemological and ontological paradigms and the attributes of various research methodologies. The research element of the course has been both of interest and of use to me. My experience of the research process and PBL as a learning method has encouraged me to articulate and explore more deeply some of my own educational values and beliefs. It also offered me the opportunity to implement some of the theories I had discussed as part of the course. It also challenged me to instigate change to my own work practice and workplace.

6.1.2 My original research question was identified in 1.1.1:

" How can I improve the teaching of 'theory' in vocational qualifications using a PBL approach to learning? ".

This presented two strands of enquiry: how to improve my own professional practice, and an evaluation of how PBL contributed to the development of a competent practitioner. The underlying theme that has emerged and which addresses both of these strands, has been the increased awareness of students and myself as reflective practitioners. A thorough exploration of reflection, from various perspectives, has formed the core of the research. The collaborative nature of PBL demanded a reflective exploration of the nature of the student-

teacher relationship. Furthermore, the necessary requirement to put '*I*' at the heart of the research (McNiff et al., 1996:17) has inevitably centered the research on my own reflective practice.

6.1.3 As a practitioner-researcher, I am more aware that my exposure to action research as a method of inquiry, has encouraged me to apply my thoughts laterally in the identification of concepts and links with the data and existing body of knowledge. This has often given me the sense of existing in circles within circles (Ely et al., 1991).

6.1.4 Furthermore, the practical aspect of the Doctorate course was important to me as it brought together the theory and practice of education in a unified process. The nature of theory and practice has been reflected on, discussed and referred to throughout this work. The reflection as to how I could contribute to change using a PBL method was a key motivator to conducting the research. It was the interaction with students and a belief that I could contribute to learning that brought me into teaching and that remains my mainstay. This research has facilitated my own self-awareness and professional progression. The investigation has a strong developmental flavour. This was anticipated given the relatively short time available[1].

6.1.5 Whilst I have concluded that PBL can never claim to be a student-led as opposed to a teacher-directed approach to learning, I recognise that PBL is liberating for participants in the following ways:-

- It is more student-orientated than previous approaches to learning I have used; and
- It respects the suspended student autonomy by the very nature of the intervening facilitator who recognises this suspension and takes reflective action.

1 Doctorate in Education, Course Handbook, Nottingham Trent University.

6.1.6 At the beginning of the research, I identified research questions and issues that related to the research (1.8.4). At this stage of the research journey, I can provide the reader with my conclusive remarks regarding these questions and issues. These remarks have been explored more thoroughly in the main text:-

1. Can a problem-based approach to learning develop a more competent learner for the workplace than the conventional methods currently used in the training centre?

Evidence confirms that a PBL approach can contribute to a more competent learner. However, this is dependent upon the existence of a number of factors. These include how the learning style of the individual is met by the PBL experience, how the learner perceives knowledge and how reflective the learner becomes.

2. Would PBL objectives correspond with my own educational objectives?

With very few exceptions, the values underpinning PBL correspond with my own educational values and beliefs (Appendix 2). These have been examined more fully in the literature overview and as critical incidents emerged throughout the action research.

3. How can I develop and improve my own teaching skills in order to implement a PBL approach?

I have explored the ways in which my teaching skills have improved as a result of increased awareness in two main sections (5.7 and Chapter 7). These explorations are not exclusive. Other teaching developments are identified and discussed where appropriate.

4. Would a PBL approach provide a natural development and integration of vocational 'Key Skills', which are now a mandatory requirement of work-based training programmes such as the MA?

Evidence suggests that PBL can provide a means of integrating key skills. However, the extent to which these develop and are integrated is subject to the expertise of the facilitator. The PBL literature indicates that students who are working towards the achievement of specific outcomes become limited in their ability to freely inquire (2.9.14). Therefore, integrating key skills and PBL for the purposes of assessment may occur but at the expense of developing some of the attributes of a professional practitioner. The attributes of the professional practitioner have been discussed in 5.4 and 5.5. Where a more specialised approach is taken to learning (Figure 11) the values fostered in learners relate to the perception of knowledge as discrete. This develops a set of specialised competencies rather than a holistic, professional competence. If this is the educator's aim then, PBL can support this integration. However, this would be against the spirit and ethos of PBL as a learning approach.

5. When implementing a problem-based approach at what stage of development is it most beneficially introduced into the curriculum?

The literature recommends that PBL be implemented in the whole curriculum to maximise the benefits for the student experience (Boud and Feletti, 1997). However, I concluded in 5.4 that the evidence suggested that incorporating a different PBL sequence would be more beneficial in my workplace. This was to provide the link between novice and elaborate levels of expert knowledge (Norman et al. 1989). These differentials are explored in 2.9.6. Figure 11 provides an illustrative summary of this reflection.

6. Would a PBL approach 'fit' the ethos of the NVQ and its approach to the development of competence?

This final question warrants a fuller examination of the underlying ethos of how PBL corresponds to the NVQ in reference to its approach to developing competence. According to Engel (1997) the adoption of PBL is expected to achieve two main aims. The first is to use PBL:

"...as a method that will assist students towards achieving a specific set of objectives, that is to become capable in a set of competencies that will be important to them throughout their professional life".

Engel (1997:18)

These competencies are described as personal skills such as critical reasoning, collaboration, and reflective skills. The second aim is to use PBL as:

"...the method of choice because it is particularly suitable to support the conditions that influence adult learning".

Engel (1997:18)

Examples of these are described as active, integrated and cumulative learning and learning for the sake of understanding rather than for recall of isolated facts. Both Engel (1997) and Barrows (1986) are explicit in their concern for the development of personal skills. Engel (1997:18) is primarily concerned with the relationship between PBL and the creation of what he describes as '*capable citizens for the next century*'. The concern with this description is it seems incoherent. On one hand he stresses the integrated nature of PBL whilst simultaneously equating this with the achievement of isolated, identifiable objectives and sets of competencies. This perspective raises some fundamental contradictions as to the nature of competency, which I have discussed at length in

previous reports (Coherence and Integration Reports 1 and 2). A behaviourist view of competence implies competency can be captured through objective, scientific analysis, represented by outcome statements in current CBET policy models such as the NVQ.

6.1.7 PBL as a learning model incorporates both behaviouristic and cognitive learning. Educational objectives that are associated with the use of PBL have been identified (Barrows, 1986). These educational objectives can also be assessed as outcomes. Quantitative assessment methods which emphasise the learning outcomes and objectives of PBL courses, may be unsuitable in capturing the full essence of some of the subjective outcomes of PBL. Subjective outcomes, such as team building, are difficult to assess using quantitative methods (Hopkins, 1993). Scott and Usher (1996) contest the extent to which all subjective aspects of competence can be captured, given the limitations of all current methods available to the researcher. It is my opinion that competency is more than just a set of competencies. This has been discussed previously (2.9.5, 5.4.1, 5.5) and is illustrated in Figure 11. The set of competencies that Engel (1997) attributes to a capable citizen does not imply that the citizen would be holistically competent. Holistic competence can only occur when the learner integrates these individual competencies in context. This constitutes professional competency (Figure 11). Bawden (1997:327) describes *'holistic competency'* as a:

"...dynamic praxis- an evolving set of interrelationships with the whole (praxis) being different from the sum of all it's interdependent parts (theory, practice and experience".

6.1.8 If PBL is based upon the achievement of a specific set of competencies (Engel, 1997), it could be interpreted as just another example of a behaviourist model of competence. If this were the case then there would be little point to the current research. This is because the research has emerged from dissatisfaction with the

influence of current CBET policies in directing and focusing my workplace curriculum (1.4.2, 7.3.2). Lum (1999:406) suggests that:

"We need to be clear, therefore, about what it is that constitutes both necessary and sufficient conditions for an educational approach to be identified as 'competence-based' ".

6.1.9 Furthermore, he recognises the inadequacies of current CBET policies and the use of outcome statements in the following way:

"...if there is one feature which characterises CBET.....it is the singular assumption that the educational enterprise can be unequivocally, accurately and sufficiently delineated by means of such statements".

Lum (1999:409)

Tarrant (2000:83) also identifies the inadequacies of behaviourist CBET policies and in addition regards any development of the capable citizen in this mode as unethical:

"The whole matter of demanding a preparation for work at the expense of citizenship, conceptual development and a wider conception of the person than that of an employee, is entirely controversial and arguably, unethical".

6.1.10 Lum (1999) provides a useful distinction between educational aims and methods, which addresses this issue. He claims that it is the perception of the link between aim and method, which characterises CBET. Competence strategists such as Jessup (1991) fail to see any difficulty between educational ends and strategies, which are merely labelled, as ends or outcome statements. Rather than making the '*concept of competence*' the focus of attention, Lum (1999:406) chooses to distinguish between competence as an educational aim and the '*critical construct of competence*' (or construct inferred from the consequences of CBET's

methodological strategy). He claims that CBET and the NVQ are flawed in both aim and methodological strategy. PBL differs because it does distinguish between the aim of producing competent practitioners and the method in which these aims are facilitated. Thus, in this research, I facilitated learning through guided discovery (2.4.7). Given this distinction, it can be seen that although both PBL and the NVQ have the educational aim of competence, PBL is not an example of CBET. In addition, PBL respects participants as reflective practitioners (Margetson, 1997). These aspects of PBL reflect my own educational beliefs and values (Appendix 2).

6.1.11 Competence can be accepted as the educational aim of the NVQ and PBL whilst using the PBL approach as my methodological strategy in place of outcome statements. Given Lum's (1999) distinction I do not envisage a conflict with using the NVQ outcome statement as an assessment tool in this research. The achievement of objectives was an issue that was of concern for me in my research, as I was mindful of my responsibility to ensure that the learning objectives of the NVQ unit being studied were covered. If not covered, students would have been disadvantaged on being given the mandatory test. To disadvantage students in this way would have been unethical.

6.2 Conclusive Remarks

6.2.1 Research findings suggest that within this context, the PBL approach addressed the research issues and questions raised in 1.1.1, 1.5.1 and 1.8.4. Furthermore, an analysis of the evidence concludes that PBL can prompt a richer quality of learning experience for students within my workplace. The PBL approach:-

- Supports active participation of all learners;

- May not optimise learning for all learners, particularly those with additional learning needs;

- Requires a tutor with expert knowledge who is able to facilitate realistic case discussion through simulation;

- Relies on the effectiveness of the team for in generating the knowledge necessary to solve the case;

- May require foundation theory work to structure approach to case work;

- Requires motivating, well-developed, stimulating case studies;

- Develops *'useable'* knowledge (Elliot, 1991a:24);

- Has the potential to develop professional, competent practitioners; and

- Develops reflective, lifelong learners.

6.3 Lessons Learned

6.3.1 The key aspects of learning that have emerged from my experience of PBL are summarised below. These recommendations are included as a guide for other colleagues who wish to explore PBL within a similar context. Discussion of these issues can be found within the main body of the text. If the model in Figure 11 is implemented, then it is recommended that a change of tutors be introduced to correspond with the change in the teaching and learning approach. This would encourage both tutors and students to adjust to the different 'approaches'.

6.3.1.1 **Induction**

- Allow sufficient time for the tutorial group to bond and do not assume that an existing working group will adapt easily to a PBL context.

- Use a PBL approach to illustrate activities on how the team can support their own learning. Encourage the examination of seating arrangements and the development of interpersonal skills as contributory factors.

- Encourage the team to develop group norms and negotiate from the outset expected patterns of behaviour, within the group and as part of the PBL process, that the group should adhere to (Midgley and Le Rougetel, 1994).

- It is important that each student's autonomy within the group is recognised by colleagues as well as the facilitator, in developing a team spirit and mutual respect for one another (Margetson, 1997).

6.3.1.2 **Phase 1**

- Simulation is an excellent technique for the tutor to use to facilitate students' exploration of the psycho-social context of a client and to develop enquiry skills.

- Use real cases where possible to generate grounded, useable knowledge that is relevant to the future profession (Dolmans et al., 1997).

- The facilitator has a social and moral responsibility to ensure that the individual needs of each learner are supported within the spirit of PBL and social justice (Griffiths, 1998).

- All learners can benefit from inclusion in a PBL process. However, some learners require more support than others to ensure that they remain '*engaged*' (Fullan, 1991:174) and are not '*marginalised*' by the PBL process (Taylor and Burgess, 1997:105).

- Students are unable to direct the group discussion and chair phase 1 at the same time. These roles need to be separated as implied by the literature (Boud and Feletti, 1997).

- Case discussions (phase 1) would benefit from being held in a workplace context to encourage successful transfer of knowledge. This is because knowledge is claimed to be remembered best in the context within which it was learned (Norman, 1988).

6.3.1.3 **Phase 2**

- PBL is an ideal learning approach as a means of bridging the gap between progressing from a novice level of expertise to elaborate, expert knowledge (2.9.6).

- Both deep and surface learning are essential aspects of PBL and professional knowledge (5.4).

- Progressively more difficult cases should be chosen to provide greater challenges for the group in order to fuel and maintain group discussions and self-directed learning.

- Cases should be continuously generated to reflect current workplace knowledge and practice (Dolmans et al. 1997).

- Students should research different topic areas of each case in order to develop deeper understanding of key principles of knowledge requirements.

- Distributing the cases prior to the commencement of the lesson would allow self-directed study to take place. This would ensure that students who are expecting to be absent or those students who require more time to reflect on issues have the opportunity to conduct some self-directed study.

6.3.1.4 **Phase 3**

- Practical development of skills should reflect and link back to aspects of the case study in discussion. This will enforce and develop the learning taking place in other phases of the PBL cycle.

6.3.1.5 **Phase 4**

- Teacher-directed lectures should be incorporated into the PBL process only when required in order to clarify content or product knowledge to the group.

6.3.1.6 **Phase 5**

- Introduce non-threatening assessment, and a group mark reflecting teamwork and cohesiveness for members to share.

- Students should always be encouraged to revisit the case study and to explore all possible client options. In addition, students should be encouraged by the facilitator to make articulated, independent decisions. The decision taken should take into account the client's psycho-social context.

6.3.1.7 **Phase 6**

- Students should be encouraged to perceive themselves as solution providers rather than problem solvers. This is much more reflective of the workplace environment and professional practice during client consultation (Figure 10).

- Professional competency requires the practitioner to develop an understanding of the client in a holistic manner (Figure 11). This includes developing skills to identify unarticulated as well as articulated indicators of clients' needs (Figure 10)

- Students should be encouraged to develop their body of knowledge through the introduction of progress assessments.

6.4 Future Developments

This research journey was not commenced in order to reach universally recognised truths. Rather, the focus for this work was the improvement of practice in the workplace and a reflection on the personal development of the researcher. As expected, no summative conclusions can be claimed that can contribute to the body of 'truth' knowledge. However, the evidence suggests the existence of indicators, which can be valued in so far as they contribute to the understanding of the learners' experience of PBL. It is suggested that these indicators could form the basis for further study. These factors were derived from the coding of data analysis (3.8) based upon the themes of research (Table 2 and Table 7). These coded continuums are portrayed as reflections of valued attributes nurtured through a PBL approach. Furthermore, there is a gap in the existing literature on PBL. This relates to the deeper understanding of students' motivation within each individual phase of PBL. Evidence in this research indicated that this was variable.

Finally, it can be seen from this research, that the values underpinning the ethos of PBL are compatible with those of many educators who do not value the current surge towards CBET policies. It is my opinion that PBL holds much potential in addressing the imbalance caused by a focus on CBET and outcome statements in developing professional competence. While Lum (1999) claims that the increase in CBET programmes is an example of how educational theory has failed practice, I would claim that PBL is a practice that can win over many educational theorists.

7 Coherence and Integration Report 3:

The Doctoral Journey

7.1 Introduction

7.1.1 Over the past four years, the Doctoral journey has become an integral part of my life. This account has helped me to structure my personal thoughts and experiences of this research journey. It has been a useful summative exercise in rounding up what has been a '*demanding, painful and pleasurable experience*' (Griffiths, 1995:104). This reflective exercise has encouraged me to become a spectator and momentarily '*distance*' myself from this experience (Romanyshyn, 1989:65). Romanyshyn (1989) warns that non-intervention in situations that require change can only be justified by believing that humanity can distance itself from the world. Distancing can result in a lack of personal and public investment on the part of humanity in a changing world (Plant, 1998b). In contrast, this grounded research has shown how the personal application of my time, effort and resources has changed my work practice.

7.2 The journey

7.2.1 The motivation for the journey was formed by the desire to improve my practice. Soon after enrolment, my colleagues and I were immersed in a wide range of subjects that initially seemed to have little coherence. These were:-

- Research in a dynamic context;
- Ways of seeing;
- Management of change; and
- Coherence and Integration.

7.2.2 However, over the duration of the course, coherent themes emerged, stimulated by some key debates. These debates contributed to a wider mode of thinking and were influential in developing my research. Furthermore, they

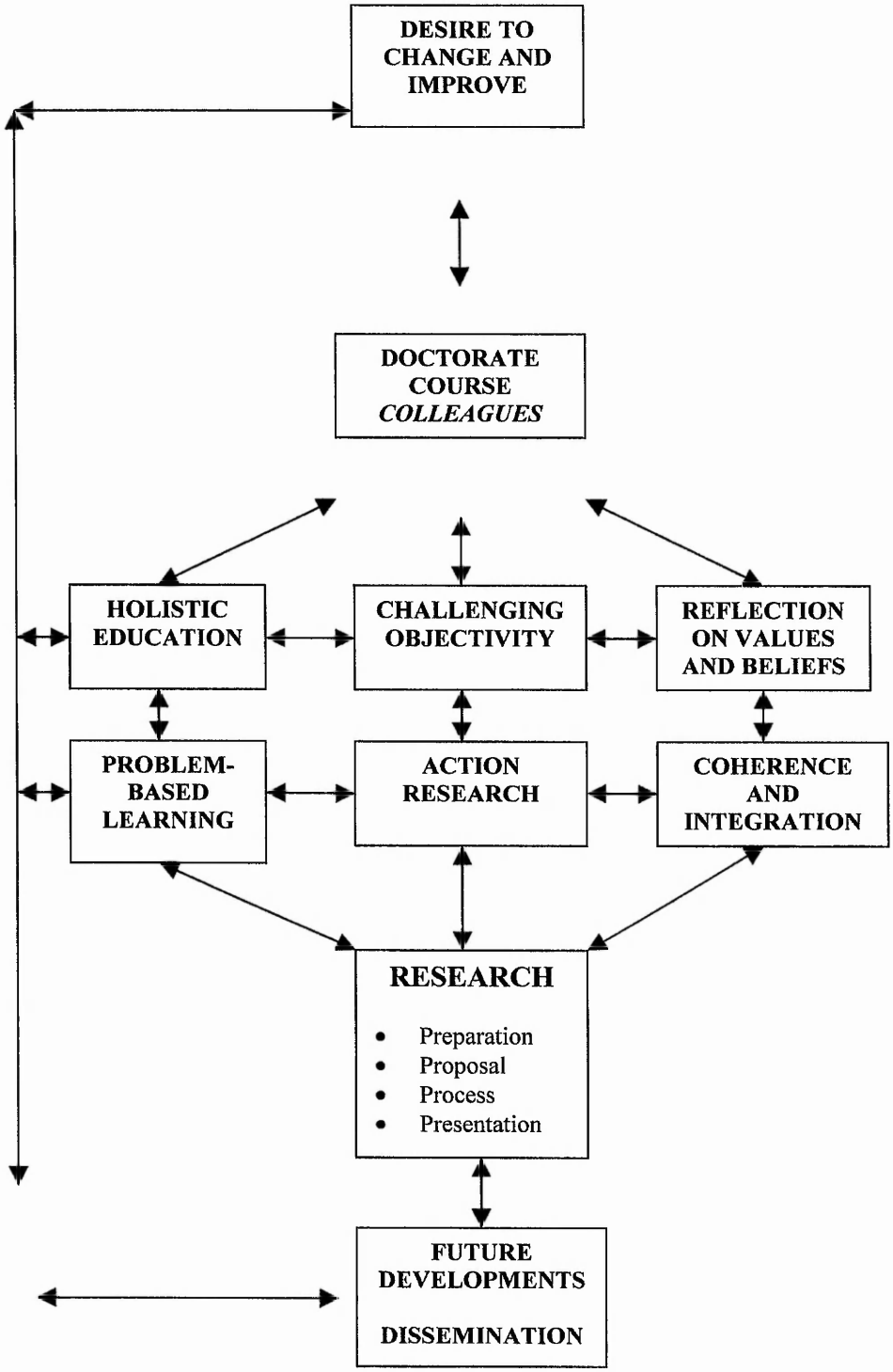
were indispensable in facilitating the articulation of my educational values and beliefs. These themes were:-

- The nature of knowledge, and an exploration of it's epistemological and ontological assumptions (Table 4);
- An exploration of research methodologies and methods (3.2);
- Characteristics of modernity and the '*puddle of postmodernity*' (Mackie, 1997,:50); and
- The role of the reflective practitioner in relation to knowledge (Table 9).

7.2.3 The course proved to be challenging, both personally and professionally. The collaborative nature of the course was a main component driving the whole of the research process. Educationalists and colleagues connected with the course formed a group of critical friends with whom I could share thoughts, feelings and experiences. Lomax and Whitehead (1998: 159) in like manner, describe their energies in collaborative working as '*coming from the resolving of tensions and differences*'. It was through formal and informal discussions and debates that the impetus for change became clearer and more explicitly articulated.

7.2.4 The results of course activities have fed into, and manifested themselves in, this research journey. My Doctoral journey is illustrated in Figure 23. Other action researchers have benefited from using this illustrative technique (Bowen, 1998; Orma and Stevens, 1995). Illustration has been a useful tool for surface analysis and linking of ideas within the action research process. I would strongly recommend its incorporation in action research. By scribing the key aspects of the course, I have come to appreciate its complexity, which was not apparent to me at the onset from course material. Figure 23 shows my representation of the matrix of ideas and influences that the course exposed me to.

Figure 23: An illustrative representation of my research journey



7.2.5 Figure 23 identifies three personal changes summarising my development on the course:

- My recognition of myself as a holistic educator;
- My greater understanding of the illusion of objectivity; and
- My development as a reflective practitioner.

7.2.6 Within these changes are reflected many of the educational themes that were identified earlier (7.2.2). Furthermore, Griffiths (1998) provides a set of three principles of social justice. These principles have emerged throughout the research as the values underpinning each of the personal changes (7.2.5). They are described as:-

(a) "There is no one right answer....;
(b) Each individual is valuable and recognised as an important part of the community as a whole....; and
(c) ...Social justice is concerned both with individual empowerment and structural injustices."

Griffiths (1998:12)

7.3 Holistic educator

7.3.1 One reason for enrolling on the Doctorate course was a growing awareness that my work practice did not reflect my educational values. My experiences of teaching and work indicated that the achievement of a National Vocational Qualification (NVQ), which technically qualified a candidate as a competent hairdresser, did not develop the skills and attributes that I, or my work colleagues, associated with a professional salon hairdresser. According to Davies and Ferguson (1998), professionalism is the way competence is performed. Thus, it is possible that a competent practitioner can be unprofessional. Davies and Ferguson, therefore, take a holistic view of competence, which they perceive as encompassing the job as a whole.

7.3.2 The emerging gulf between my '*espoused theory*' of competence and my '*theory in use*', resulting in the development of isolated competencies in the training centre, is explored in Coherence and Integration Report 2. The programmes offered were dictated by the functionalist requirements of NVQ evidence-based criteria. This created a distance between the vocational qualification and the world of work for both the students and myself. Included in this distancing was my naïve approach to developing a work-based curriculum guided by the NVQ outcome statements which, with an absence of personal reflection, had rendered me a prisoner of my own teaching programme (Argyris & Schon, 1978). Previous Coherence and Integration Reports 1 and 2 have explored the way my approaches to learning have highlighted this gulf. Escaping from the prison shackles involved becoming more aware of myself as a reflective practitioner. I began to realise that the proximity of the course to the social reality of the students' workplace was a contributory factor to the development of the 'competent' professional. This inferred that a grounding (Glaser and Strauss, 1967) in '*useable knowledge*' (Elliot, 1991a: 24) was needed. These reflections prompted me to contemplate a change in my practice in which these holistic beliefs of education were encapsulated.

7.3.3 According to Martin (1997:15) a holistic perspective of education is one where learners are assisted:

"*... in the process of integrating into a coherent and meaningful 'whole'...the relevance and value of individual events, theories and facts* (which) *are revealed only in their relationship to a wider context*".

7.3.4 Kilmartin (2000:17) has written that:

"If students are to make an effective contribution as citizens and employees they need to know.....how to live a balanced life".

Like Montessori (1989) and Martin (1997), Kilmartin (2000:17) calls for holistic education to address this need for balance by:

"Taking time to renew ourselves socially, mentally and physically, through exercise, recreation and relaxation".

7.3.5 As an educator, I valued a balanced approach to life and encouraged students to perceive themselves as part of a greater world, rather than distancing themselves from it. Hoogvelt (1997) supports this view and highlights the way that the world is becoming more interdependent and interconnected. Bawden's (1997) description of holistic competence achieved by PBL, ascribes to the integration of the parts (competencies) with the whole (competence). Bawden (1997:327) describes *'holistic competency'* as a:

"...dynamic praxis- an evolving set of interrelationships with the whole (praxis) being different from the sum of all its interdependent parts (theory, practice and experience)".

7.3.6 Many of these values are important to me and were recognised in my early draft of educational beliefs (Appendix 2). The research process has enabled me to recognise the values underpinning these beliefs more clearly. Furthermore, as a professional and change agent, the research process has empowered me to take action (Guba and Lincoln, 1989).

7.3.7 The influence of Maria Montessori (Chattin-McNichols, 1992) warrants special mention, as many of her ideas have been integrated in my research. The manner in which I discovered her work also confirmed to me how the unplanned contribution of luck or chance can provide the source of inspiration which subsequently impacts upon the course of a research project. Maria Montessori, a pioneering educator, provided the source for one of these inspirations. She proposed a radical change in learning approaches that challenged my own work practice.

7.3.8 An early entry in my research journal (18/10/96) records my initiation to the Montessori method. It refers to a television documentary describing the way the Montessori approach to teaching and learning had been applied at a high school in Missouri, United States of America. A large percentage of these students were deemed to be disaffected young persons. The results were very positive. Poor attendance had been ameliorated and the examination results greatly improved. However, it was the change in attitude of the young people that grabbed my attention. The television programme focussed on the concentration, self-motivation and genuine interest of the students in the work they were doing. Change seemed to have taken place. I began to reflect upon my own work practice and considered the motivation of these students towards their work in comparison with that of my own students, which was not generally favourable. An example that illustrates this was the students' lack of interest and motivation during theory lessons that was in stark contrast to their behaviour during practical classes. This was confirmed by some student course evaluations that noted their boredom with theory lessons. Furthermore, as I believed my teaching role was significant in their development (Appendix 2: 2.1, 2.2) I began to reflect on how I may have been contributing to their lack of motivation.

7.3.9 The Montessori Method acknowledges the development of essential attributes such as societal skills, independence and technical skills. It focuses on the education of the whole person as connected to their world, through a holistic or systems approach (Checkland, 1981) to education that I really only paid lip service to. Martin (1997, 13) describes the purpose of holistic education:

"...to develop all levels of human being- physical, emotional and mental- and to integrate them in the context of the spiritual whole that is all life".

7.3.10 The more I read about the Montessori method, the more I reflected on how the approach could influence and change my own teaching. In particular, three simple aspects of the method influenced me. These were:-

- The need for the creation of silence (Montessori, 1994);

- The necessity to leave a child to concentrate on a task and discover of himself/ herself what it holds without interruption (Chattin-McNichols, 1992); and

- The connection of the child to social reality by developing an awareness of his/ her environment and place in the universe (Montessori, 1989).

7.3.11 These three aspects of Montessori have certainly influenced me in the classroom. For example, I found myself more aware of perceiving students in a holistic way and trying to become more sensitised to their social perspectives rather than being primarily concerned with achieving the NVQ learning objectives for the lesson. Furthermore, when questioning students about their learning, I am now less inclined to be so concerned with silence as a response. I realise that silence gives a student the opportunity to absorb thoughts and prepare their own arguments. Prior to this research, I felt a silent response was a negative reflection of my own ability as a teacher because I was not imparting my knowledge to the students effectively.

7.3.12 Initially, I made enquiries about the possibility of conducting research within my own training centre using a Montessori approach. However, three obstacles soon began to emerge. The first was the 'Montessori-type' resources required. The emphasis given to Montessori resources is seen to be a key factor differentiating traditional, teacher-directed learning from the Montessori method which is more student-led and discovery-based (Chattin-McNichols, 1992). Montessori (1989) was concerned with developing knowledge through awakening interest. Although resources were available for primary age groups, there were none that seemed to relate to my students' age group and subject specialisation. This implied that I would have to develop resources myself. In developing these, I had to ask myself: Did I have the time? Did I know what a Montessori-designed resource would look like? Or more simply, what were the criteria for a Montessori-type resource?

7.3.13 The second obstacle was that the main focus of Montessori was in primary education. After contacting the headquarters of Montessori in Holland, I was provided with a contact name in America where the method was applied to young adults. Montessori (1989) proposed that when dealing with young adults the best option was to live in a commune where their essential attributes could be developed. However, in my own work-based context (1.3) this was neither possible nor practical to adopt. Furthermore the proposition conflicted with my idea of 'connection' to the social reality of the individual rather than a utopic society (Appendix 2: 1.1).

7.3.14 The third obstacle was the fact that I was not a Montessori-trained teacher and, despite efforts, could access very little information on what were the specific attributes and skills of a Montessori-trained teacher other than it involved a two year training course. Even a visit to one of the main Montessori training schools in Kensington, London did not allay these concerns.

7.3.15 One of my beliefs (Appendix 2: 1.3) emphasised the importance of communication mediums as a contributory factor to social development. With the Montessori method, there is an emphasis on developing the attributes of independence and individualism (Chattin-McNichols, 1992). I was concerned that this might lead to an unwillingness to work within a team, which I perceive is necessary. Teamwork is important, particularly in a people-based vocation such as hairdressing, and within a large, busy salon environment.

7.3.16 Ironically, I was not alone in my quest to incorporate the Montessori philosophy within a learning environment (Martin, 1997). However, at this time these three obstacles outweighed the factors in favour of continuing with the research idea. I decided to review other learning approaches that reflected a discovery and experiential stance for enlightenment.

7.3.17 Whilst browsing through libraries and reading articles and journals for inspiration, I unearthed a learning approach that became the basis for this current research. The book was called *The Challenge of Problem-based Learning* and was edited by Boud and Feletti, 1997. After an initial skim

read, I realised that this was a significant find. Further reading confirmed that here was a method of learning that matched many of the outcomes I wanted to encourage in my own students and which also contributed to the development of professional competence (2.6). Briefly, in a PBL curriculum, the vocational aspect of the course is designed in such a way as to develop the following outcomes: communication, team building skills, problem solving and lifelong learning skills (Table 2). PBL encourages open-minded, reflective, critical and active learning (Margetson, 1997). Like the Montessori method, PBL offers the means to facilitate a holistic (or systems) view of education that is grounded in social reality and aims to develop motivated, independent lifelong learners. PBL does not assert, like Locke, that the mind of the learner is a *tabular rasa* (Stevenson, 1998:147). Rather it is assumed that the learner brings his/ her existing knowledge and experience together in a mutually shared learning experience (Margetson, 1997). PBL, and its implications for learning, have been described and discussed in the literature overview (2.3).

7.3.18 PBL recognises my own educational views and values in a variety of ways:

- the importance of active learning being an integral part of workplace learning (Appendix 2: 1.2);
- the need to develop life-long learning skills (Appendix 2: 1.6); and
- the equality of opportunity in which education is facilitated, rather than directed, by the leaders (Appendix 2: 3.1).

PBL also reflects my own beliefs of the importance of communication in relation to working with others in improving one's own learning (Appendix 2: 1.3). PBL was chosen as an intervention change to my own teaching, as it emphasised the context of work and experiential learning. Two of my educational beliefs (Appendix 2:1.3, 2.2) infer the importance of grounding knowledge in the workplace that is reflected in a PBL approach. Furthermore, in PBL the social reality of the learner is acknowledged (2.4.5).

7.4 Understanding objectivity

7.4.1 As a learner, I have had mixed experiences of both vocational and academic institutions from which many of my own beliefs have emerged. My background encompasses careers in hairdressing, management and education. My educational experiences, prior to the Doctorate course, favoured an objective approach to problem solving and change where there was a proven outcome. The experience of teacher training began to challenge my reliance on these positivist beliefs. The positivist contribution to the nature of this research has also been explored as a result of debates during the *Research in a Dynamic Context* module of the Doctorate course. The work of Romanyshyn (1989) and his concept of distancing has already been described as influential on my understanding of how I view myself as interrelated with my environment (7.1.1). I have come to perceive my role as teacher as providing the opportunity to participate in real-world change. Freire (1998: 35) supports this perspective of teacher as researcher and suggests that the roles are inextricably intertwined:

"There is no such thing as teaching without research, and research without teaching".

In recognising this close relationship, my research idea evolved from a number of personal and professional reflections concerning my own approach to teaching.

7.4.2 The use of action research has been a personal development for me, challenging previously held beliefs on the nature of objectivity and subjectivity. In action research the focus is on understanding for which, sometimes, there are no solutions or truths only possible explanations. This reflects the first principle of social justice (7.2.6). Action researchers use qualitative methods in order to promote a deeper understanding of the issues present. I recognise that I have been socialised to rely on 'objectivity' as a means of finding the 'truth'. This reliance continued despite searching for meaning within action research. Having used objective facts to justify new

knowledge in previous research, I found that throughout the current project, I had to restrain myself from relying too much on facts.

7.4.3 Building on the work of Romanyshyn (1989) I particularly found objectivity an interesting debate during the taught element of the course. The work of Professor Morweena Griffiths was an inspiration with regard to this personal development. Her ideas met with mixed response within the Doctorate group. The postmodern perspective was introduced to challenge whether there was indeed such a concept as objectivity. I had never doubted the existence of objectivity or truth. The postmodern perspective was also personally challenging to many of my 'taken for granted' educational beliefs and values (Thomas, 1995). Postmodernism does not support the notion of one truth (Edwards, 1994). Now every time I refer to a 'fact', I find myself reflecting on what I mean by this 'fact' and what these facts represent. Fullan (1991:37), describes objective reality as:

"...only the reflection of the producers of change and thus simply a glorified version of their subjective conceptions".

This mirrors Griffith's (1998) and my own understanding of the nature of objectivity within educational research. There were six occasions during the research when I recognised that objectivity was challenging.

7.4.4 My initial research proposal involved exposing two groups of students to separate teaching methods, one group acting as a 'control' (Appendix 1). One group was to be taught using a PBL approach and the research results validated by comparing the assessment results with the separate groups of students. These test results would expose the truth as to whether PBL was an effective approach in my workplace. This scenario aimed to utilise a research method clearly belonging to the scientific approach. During the research, it became apparent to me that no comparison would help me to understand the experience of each individual student as I was searching for meaning. This caused a conflict in the principles of social justice within my practice and I subsequently changed the research proposal (Appendix 15).

7.4.5 Student reflections were identified at the onset of the project as a main source of data collection. Initially, I gave the students an 'open' style form with some indicators of the type of reflection that they should consider (Appendix 3: E18). However, at the end of cycle 1, I sensed their feedback to be rather vague (Appendix 16). It did not reflect many of the experiences that occurred during the cycle. I subsequently changed the student reflection forms from an open to a semi-structured format which I used during cycles 2 and 3 (Appendix 3: E32; E37; E56). This conflicted with the ideal of free, creative thought and was more in line with an objective, 'tick box' approach to learning that to a large extent I was aiming to avoid. Secondly, it was contrary to the values of closed-loop PBL in that it was prescriptive as opposed to encouraging the students' own personal skills (2.5.1/ 2.5.4). Also, the change did not seem to capture the full richness of the PBL experience. For cycle 4, I once again adapted the questions in the student reflection forms (Appendix 3: E74). In addition, I included an additional 'tick-box' form which was explicit in its reference to the self-assessment of the Key Skills (1.3.4).

7.4.6 Despite my changes I realised, like Derrida (1982), that language is limited in its ability to accurately reflect the world. The use of student reflections helped me to shape and create an understanding of the students' reality and experiences. In the quest to become more objective and prescriptive however, some meaning was ultimately lost. Knowing how best to capture the process of PBL through the experiences of my students, and also my own experiences, has been a constant source of challenge for me throughout the research.

7.4.7 My reliance on objectivity resurfaced again in my role as facilitator. During the phase 1 discussions over all the cycles, I was concerned about students raising the key issues of the case within the limited time available (Appendix 16). In cycle 1, the key issues were left 'open' and my role was to use my expertise to guide the discussion. For cycles 2 and 3, I employed the use of a facilitator's guide. Rather than leave the case issues open, I used pre-recorded notes of the key issues of the case for myself and endeavoured to ensure that these topics were identified for investigation by the group. I was aware that by doing this I was again becoming prescriptive. However, I justified the

action in terms of time saved, making the best use of the demands of my dual role and trying not to disadvantage any student. My personal diary records a reflective conversation with my tutor:

"*Peter thought it was funny that I felt I would benefit from my tick-box learning objectives, but I do feel I am working within the boundaries of the C&G (City and Guilds) to which the students are subject. Therefore, if they are to be tested in those areas, they need to be familiar with the topics of questioning and the terminology*".

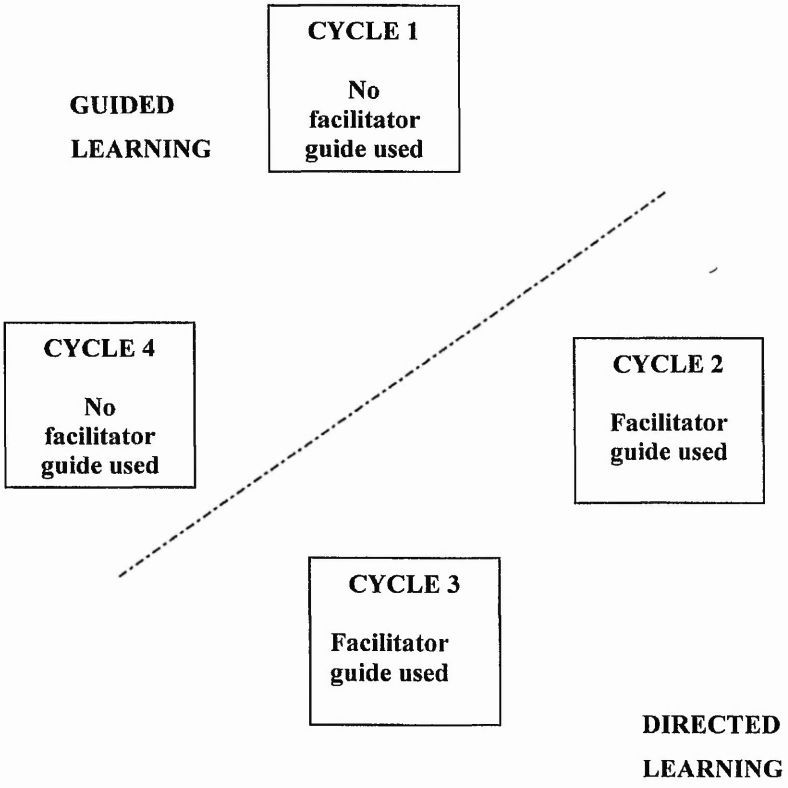
(Appendix 3: E38)

Thus, despite becoming more distant, I was trying to ensure that all of the students had the same opportunities to explore the topics as their colleagues in order to prepare for mandatory tests.

7.4.8 My justification of the facilitator's guide reflected a leaning towards more structure than I had originally intended. This impacted upon my role as a facilitator. Figure 24 illustrates how the use of the facilitator's guide manifested itself in the research.

7.4.9 Evidence suggested that when using the guide, I tended to become more directive and prescriptive (Appendix 16). This reduced the students' need to become self-directed learners (Barrows, 1986). Reznick et al. (1998) have recognised the limitations of using a task-based checklist for scoring clinical performance. Their suggestions confirm my experience in this research that checklists transform issues into dichotomous variables. Barrows and Williams (1987) suggest that scenarios, which enable checklists to be made, may artificially limit the range of competence that can be measured. As I became aware of this development, I reviewed my use of the guide before cycle 4 and decided to resume the use of an open format to nurture guided rather than directed learning.

Figure 24: Reflection–on-action of my role as facilitator during the cycles



7.4.10 Whilst conducting content analysis of data collected, I found that allocating and labelling themes to capture meaning was restrictive. Furthermore, the labels were narrow as they did not recognise the inter-relatedness of the research themes (Table 2). I concluded that the use of labelling is a sometimes necessary, but unwelcome task. This experience reminded me of the use of outcome statements. Outcome statements, as found in NVQs, aim to represent real world experience. However, being subject to the same restrictions in capturing meaning as labelling is, they too lose their meaning. This was the focus of concern of Coherence and Integration Report 2. It was suggested as an explanation for the reason why students working towards NVQs emerge with a set of competencies rather than holistic competence. Language is only able to point to competence and not fully capture it. The restriction imposed by language is an educational axiom (Steirer and Maybin,

1994) and recognised by students themselves as a barrier to knowledge-based development and learning (Table 10).

7.4.11 One result of this research journey has been an increased awareness of when to use and how best to define terms. This awareness involved identifying the values underpinning terms (Codd, 1988). Berman Brown (1994) conducted a useful deconstruction of educational dualisms which highlighted the values underlying the titles we attribute to our jobs and how these titles reflect our approaches to education. I have always had difficulty in deciding on a suitable title for myself and my students. This has been exacerbated by workplace terminology. For instance, apprentices, students and trainees are all terms I would use interchangeably for the 'learners' in my organisation. Furthermore, teachers, assessors and tutors are all terms I would use for the facilitators of learning. During the course of writing-up the research, I found myself using these terms interchangeably. However, I recognise that one of the disadvantages of feeling comfortable with imprecise labelling is that other readers who are trying to understand your work have greater difficulty in interpreting it. Thus, deconstruction has been useful to help me develop and present a more accurate account of the research.

7.4.12 When acting as facilitator, I reflected that I was sometimes unsure when to intervene in the PBL process (Appendix 16). It has become increasingly clear on reflection that one of the main causes for this uncertainty was my perception of the role of the facilitator. Whilst I was aware of my emergence as a holistic educator, an interview with Dr. Burdett (1999, Appendix 3: E2) explored his role as a facilitator:

"I am not the overall expert but I am a facilitator. I sit outside the group and listen. They (the students) *can ask me for help and I may or not be able to give that, but from the notes that the design team have given me I can get them to discuss the objectives that they have to cover for that week".*

7.4.13 This explanation of the role of the facilitator influenced my understanding of how I should approach a PBL session. Dr.Burdett described the tutor sitting outside the group and using a facilitator's guide. My understanding of my role was as an integral part of the group without the use of a guide but acting as an expert tutor. The work of Friere (1998) Romanyshyn (1989) and Schön (1983) inspired me to reflect upon the distancing that Dr. Burdett implied. Freire (1998:43) like Schön (1983) distinguished between a dynamic and dialetical movement between the '*doing*' and *'reflecting-on-doing'* of practitioner research. He claims that knowledge produced by spontaneous practice lacks the methodological rigour that characterises the epistemological curiosity of a reflecting subject. Unlike Schön (1983) he maintains that '*reflecting on doing*' is epistemologically distant from practice as an object of analysis. This amounts to distancing oneself from the object (Romanyshyn, 1989). However, Friere (1998) suggests that the distancing is acceptable and is compensated for by an even greater proximity to the object of analysis in terms of lived experience. In this way, Friere (1998) acknowledges that reflecting on doing has to be objective but recognises that this form of objectivity does not deny the reflector a holistic view of the reflection. The compensation referred to by Friere (1998) infers that Romanyshyn's (1989) investment in time, effort and resources are still maintained.

7.4.14 At times, I was uncomfortable sitting '*on the outside*' (Dr. Burdett, 1999, Appendix 3: E2) and felt that some critical incidents during the research cycles required my intervention (Appendix 16). These have been explored during the research discussion. As facilitator, I had an overall understanding of the classroom environment. I was aware that I was reflecting 'in situ' (Figure 9). Following on from my acceptance that reflection and action do not occur simultaneously, it is my understanding that all reflection involves a degree of distancing and thus objectivity. This version of objectivity acknowledges the need to distance oneself in order to reflect, but does not acknowledge the notion of truth. Furthermore, like Friere (1998) this reflection maintains the investment in the object and a holistic overview of the reflection.

7.4.15 During the research, I reflected that one of the students was experiencing personal distress (Cushmann, 1990) which was increasing his disengagement from the group and the PBL activities (5.1.7). Being able to distance myself from the holistic environment was necessary, in order to reflect on the range of options available to me for taking further action. His suspended student autonomy in the student-teacher relationship morally required that I take reflective action. In this scenario, I acknowledge that my chosen course of action was not necessarily the correct one but was, in my own opinion, the most beneficial for the student. Therefore, the principles of social justice outlined earlier (7.2.6), where each individual in the research is valued and there is no one right answer, were maintained.

7.5 Reflective practitioner: theory and practice

7.5.1 As a direct result of reflection during the research, I can readily acknowledge my broader outlook on the nature of knowledge. I have a clearer understanding of the arguments relating to the epistemological and ontological postulates of the research paradigms (Table 4). At the beginning of the course, my objective was to become a good researcher. I had visions of accumulating a vast array of methods and techniques that would allow me to research any topic effectively. I now realise that these visions reflected positivist values. Conversely, and as a result of my experience as an action researcher, I can appreciate the values inherent in the interpretive paradigm as an acceptable alternative. This paradigm recognises the existence of multiple realities rather than one correct answer.

7.5.2 My view on the nature of knowledge has been influenced by postmodernist values. However, rather than fully immerse myself in its waters, I feel that I have only dabbled in its '*puddle*' (Mackie 1997: 50). Edwards (1994:429) identified four features of post modernity in relation to the experiential learning domain within which PBL rests. Postmodernity recognises that:-

- Different sources of knowledge are given greater quality of status;

- There is an attack on high culture which attempts to break down barriers;
- Meaning is constructed rather than being conveyed ; and
- There is no single point in a judgement for deciding what is right or wrong.

The notion of multiple realities and the lack of an ultimate truth or outcome was implemented in this research. Students were encouraged to perceive themselves as solution providers rather than problem solvers (2.11.9). This also reflected a holistic view of the client in his/ her environment.

7.5.3 As a learner, I recognise my increased understanding of the roles of process and content in relation to learning and change. Prior to the Doctorate course, I passively accepted explanations that were based on rational, technical models of thinking and change (Whitaker, 1995). I now accept that sustainable change does not happen immediately but is the result of a slow incremental process. The *Management of Change* lectures (Fisher, 1998) helped me to grow in my understanding of the change process. Process change, based on participants' reflections is more likely to be sustained than change which is limited to superficial content such as changing an institutional logo. Long-term change occurs when people, as change agents, take action to transform a situation. In this way students within the research process were encouraged to reflect upon their own participation in order to foster sustained change. Whilst process is of key importance, I also recognise that content change can act as a powerful tool when used as the impetus or stimulus for instigating lasting change. The client cases were used in the PBL cycles as examples of this content stimulation.

7.5.4 Without reflecting on my own teaching, I may still have been trying to develop students' skills by imparting content knowledge without recognising or acknowledging its limitations. In this regard my attitude towards learning has become more balanced. I now acknowledge the importance of both content and process knowledge. I find myself less frustrated with students who do not remember facts (1.4.2) and have more respect for their autonomy

as life-long learners or '*unfinished beings*' (Freire, 1998, 49). This change has been the result of continuous reflection and growing self-awareness throughout the research.

7.5.5 Lums's (1999) analogy was useful in exploring my understanding of the differences between deep and surface learning, concepts originally identified by Marton and Säljö (1976). At the beginning of the Doctoral course, I associated surface learning solely with memorising content knowledge. As surface learning seemed superficial and short term, it became a learning strategy I wished to avoid (Vu et al.,1998). However, during the research I developed an understanding of the need for both deep and surface learning and the beneficial roles that both can play in facilitating learners' access to knowledge (2.10.18). As Allen (1990: 19) aptly describes:

"Education is what is left with children when what they have 'learnt' has been forgotten".

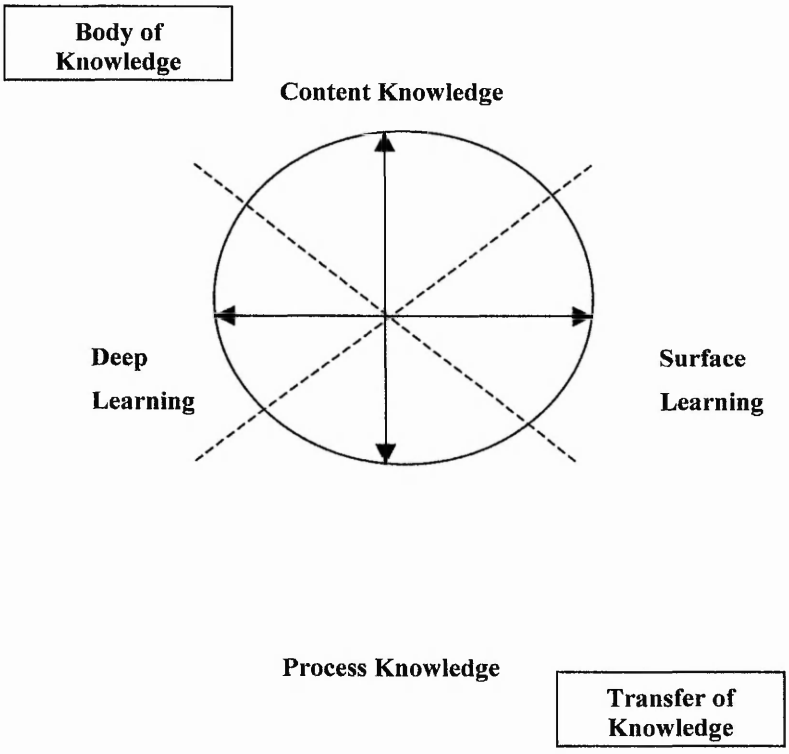
7.5.6 Following this reflection and previous work (Coherence and Integration Reports, 1 & 2), I have become clearer in my understanding of when and how to use learning strategies in order to nurture professional competence as part of the PBL process (Figure 11).

7.5.7 The links between content and process knowledge, and deep and surface learning, offered another explanation for the distance between work and vocational knowledge. Evidence showed that transfer did not occur during cycle 2 simply as a result of deep learning, or content knowledge. It could be inferred from evidence that surface learning and process knowledge are also required to allow transfer of knowledge to occur. The literature overview, and other evidence suggests, that in addition to these factors, context is contributory to transfer. As much of the knowledge developed in the students' training experience was not grounded in the social reality of their work it, therefore, did not relate to their experience of the workplace. Scott (1996:147) supports my own view for the need for a grounded perspective to knowledge:

"Knowing, therefore, always has to be located within particular ways of knowing, and is therefore always context-bound".

7.5.8 Prior to the Doctorate, in a teacher-directed environment, I understood that knowledge was interpreted by students as content knowledge (information) which was only required for recall. This gave rise to situations as described in 1.4.2. I realised that my teaching relied on the development of a wide range of content or habitual knowledge rather than focussing on intelligent skill knowledge and the process of learning (Pearson, 1984). The awareness of the importance of the process and accumulation of content learning and its association with '*useable knowledge*' (Elliot, 1991a: 24) was a key personal development that has evolved simultaneously alongside my growing awareness of the nature of knowledge.

Figure 25: Reflection on the relationship between learning and knowledge



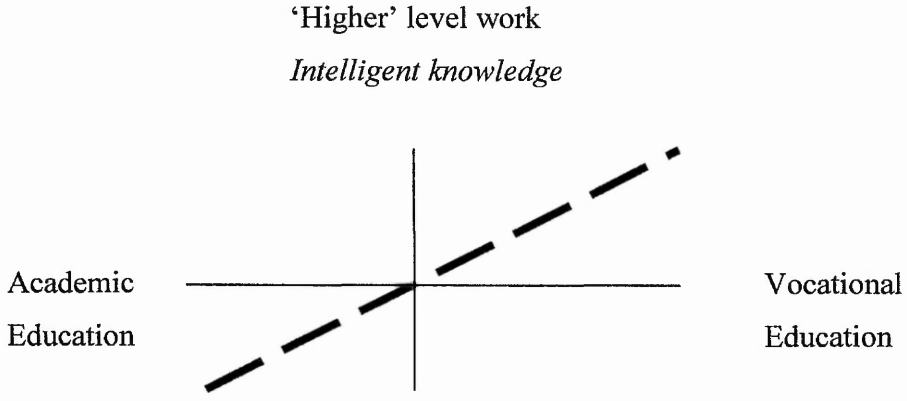
7.5.9 According to Hyland (1994; 1997), current CBET policy largely focuses on the accumulation of habitual knowledge. Foot and Megginson (1996) claim that this CBET policy will consign Britain to a low-skill competitive position within Europe. This is in contrast to the stated aims of this CBET policy which were to increase Britain's high-skill competitiveness (Cantor et al. (1995). However, Foot and Megginson (1996) suggest that the current policy is de-skilling Britain, creating a low-skilled, as opposed to a high-skilled workforce. Plant's (1998a; 1998b) lecture on the divided world encouraged me to reconsider the divisions emerging from the implementation of the divisive NVQ policy, both laterally and vertically. Plant (1998b: 1) was concerned with how humanity is failing to address the '*widening gulf between the rich and the poor*'. Likewise, I was concerned at the widening gap between the traditional academic/ vocational divide and also at the recent growing distinction between so-called higher and lower work levels within classes (Figure 26). This new dualism does not respect the principles of social justice, mutual respect and equality. It is being used to justify a false and unethical division which cannot be morally sustained.

7.5.10 Bridges (1996) acknowledges the rise in CBET throughout all vocational and occupational areas. He notes that some professionals have found it acceptable to apply competence-based schemes for those employed in '*lower level*' occupations (Bridges 1996:31). The values which form the basis of social justice within our society (7.2.6) cannot justify two forms of competence: (behaviourist) for the workers or '*lower levels*' (Bridges, 1996:31) and (cognitive) for the managers and professions. The creation of a hierarchical and separatist system does not respect the equality of each individual in our society. While I accept that all individuals are not equal in terms of (dis)ability, I believe that one set of educational values should form the basis for all.

7.5.11 This research has been both innovative and constructive in seeking to identify a single set of values for all. Bridges (1996) argues the case for a cognitively-laden concept of personal and professional competence for all levels of CBET rather than paying lip service to the concept. Following the principles of

social justice (7.2.6) all individuals should have a voice, not just those with 'louder voices' who are better at articulating their needs. PBL can support this principle. I originally stated that, for me, education and training are one and the same (Appendix 2: 1.4). I value both education and training as processes of development. I do not perceive them as separate dualisms since they are intertwined. When reflecting on my understanding of knowledge (Figure 9), I feel it is too simplistic to suggest that training occurs in the behaviourist domain and education occurs in the cognitive domain. Training requires reflection. The application of intelligent knowledge is always required in developing a vocational professional. Thus, from my perspective, all vocational and professional developments are educational processes, underpinned by the same holistic values. Consequently these processes are equally deserving of adequate training facilities and resources.

Figure 26: Matrix of my perception of the current academic-vocational divide and the new dualisms of levels of work.



7.5.12 Unlike some educational policy makers (Gubb, 1999:18) it has been my experience that educational researchers can provide useful insights into the teaching role. This potential is increased when the distance between the role of the teacher and researcher, or practice and theory, is minimised. Thus, I

believe the trend towards teachers becoming researchers is a positive development (Lewis and Saunders, 1995:9) and prevents the establishment of an *'elite of researchers in a department'*. Griffiths (1998), Davies (1997), Morrison (1995) and Bradley (1995) chart the changing relationships between education, training and work. This change is described aptly by Bradley (1995:80):

"The society in which the universities exist is changing. Universities are therefore changing, probably more willy than nilly, but willy-nilly in any case".

7.5.13 Morrison (1995) proposed the need to change to an adaptive learning system based on open systems principles (Checkland, 1991). Morrison (1995: 188) describes this learning system as:

"...learner-centred, change-focussed, value-based and technologically mediated".

The 'systems' principle, which is based upon a holistic view of the world where all systems feed into and are dependent on the whole, reflects Hoogvelts's (1997) view of the emerging world. One of the reasons for the changing relationships between education, training and work has been the increasing perception of these systems as separate from each other. Elliot (1991a: 24) has recognised the need to develop '*useable knowledge*' to reverse this trend. Davies (1997: 4) too, recognises the need for '*vocational relevance*' and proposes this trend can be reversed through the convergence of professional and personal learning. The merging of theory and educational practice in a collaborative environment of mutual respect benefits all participants. Furthermore, as reflective practice can be described as '*...individuals working to improve organisations through improving themselves*', the teacher-researcher movement will ultimately benefit students (Osterman and Kottkamp,1993:1).

7.5.14 The shift in the focus of power and resources away from the traditional suppliers of training and education has personally been a liberating experience. It has broken down the boundaries traditionally accessible only to hierarchical academics (Morrison, 1995). This widening of recognised knowledge generation has brought has brought 'education' back in touch with the real world (Robson, 1993). In the real world, anxieties exist regarding intellectual property, knowledge and power, and democratic relations. Lomax and Whitehead (1998: 445) believe that in order for teachers and teacher educators to work together effectively these '*dilemmas of educating for empowerment*' need to be conquered. My research has been a means of empowering students to become more independent and lifelong learners. Findings suggest that this application of PBL can contribute to empowerment of students and help allay their legitimate anxieties. It has provided the personal means of merging the realms of theory and practice in my own practice.

After reflecting on my educational beliefs throughout this research journey, I have come to realise how many of my decisions in my workplace are based upon these values. There are very few changes that I would make to these educational beliefs. I have decided to replace my final educational belief (Appendix 2: 4.4) with a belief in the principles of social justice (7.2.6). These are important to me as they reflect the development in my values that have emerged during the course.

7.6 Conclusion

7.6.1 This reflection on my research journey has pulled together many of the personal developments in my own thinking that have occurred. Undeniably, the focus of the research has been instrumental in raising many of the issues I experienced. The research has improved my knowledge of my professional practice. I have learnt how PBL can be incorporated into my workplace in ways that can benefit students. I anticipate that students themselves will benefit from my experience.

7.6.2 By far my greatest personal development is my acceptance that there exists no one truth, only multiple realities, and that knowledge is current and emerging rather than static and factual. No longer do I consider myself the fount of all knowledge in the classroom. This has manifested itself in a shift in the relationship between students and myself in the workplace. I have become more open-minded and questioning about issues that once I freely accepted.

7.6.3 Originally, I stated that I encouraged my colleagues to take a holistic rather than narrow approach to the development of the individual (Appendix 2: 3.2). I recognise that this has been idealistic and that I cannot impose my own beliefs on another colleague and expect them to be internalised. However, I feel that a review of the curriculum, which incorporated aspects of PBL, would facilitate a more holistic approach to professional development. Furthermore, I hoped that this would encourage more of my colleagues to develop as comprehensive teachers (Tubbs, 2000) and extend their own (and their students') knowledge through an awakening interest in their teaching (Chattin-McNichols, 1992: 58).

7.6.4 Nevertheless, just as my students learn within the workplace, I must acknowledge the influence that the Doctorate journey has had on my professional development as both teacher and researcher. My increased self-awareness and professional development cannot be understood outside of the context of collaborative learning with colleagues. Despite the inevitable challenges that this course presented, I feel fortunate to have had the opportunity to take a bite of the tree of knowledge.

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APPENDICES

APPENDIX 1

ORIGINAL RESEARCH PROPOSAL

1.4.98

To: Professor Morwenna Griffiths

From: Teresa Mullin, Doctorate in Education Year 2

Date: 1st April 1998

RESEARCH PROPOSAL

1 Research Question

Can Problem-Based Learning offer a more effective approach to the development of essential learning and understanding in competence-based qualifications ?

National Vocational Qualifications (NVQs) and competence-based qualifications have been developed for the workplace by educationalists working with industrial representatives (Bees,1990, p.22). NVQs form the basis of publicly funded schemes such as Modern Apprenticeships (MA) and National Traineeships (NT). Designed as a flexible model, the NVQ was seen to facilitate a trend towards a more flexible approach to learning (Bees, 1990, p.24). However, the competence-based ideology has been criticised for neglecting the development of essential understanding as well as the competence aspect of the qualification (Beaumont, 1996, p.16, Cantor et al, 1995, p.37). The focus on outcomes in achieving competence-based qualifications has resulted in undermining both the teacher and learner in the rush to achieve targets (Beaumont, 1996, p.40, Helsby, 1996, p.17).

Problem-based learning offers a means of developing learning for capability rather than learning for the sake of acquiring knowledge (Boud and Feletti, 1997, p15). It is my hypothesis that a problem-based approach to learning which encourages an active student centered approach to development of essential understanding, facilitated by a supportive tutor, would develop a more competent, motivated learner for the workplace than is currently developed from standard approaches. With reference to my own practice, I wish to answer the following questions during the course of my research:-

Can a problem-based approach to learning develop a more competent learner for the workplace than the standard methods currently used in the training centre where I operate?

Would this approach provide a natural development and integration of 'Key Skills', which are now required to be assessed, within the vocational curriculum ?

When implementing a problem-based approach at what stage of development is it most beneficially introduced into the curriculum?

2 Theoretical Context

Learning has been described as a basic human need and one which occurs in most people throughout their lives (Jarvis, 1995, p.43). This lifelong learning is one of the foundation stones of a problem-based learning approach which has been employed in recent years with particular regard to the training of doctors, engineers and lawyers (Boud and Feletti, 1997, p.17). It has been described as a means of developing

professionals who will be able to respond to inevitable changes that will occur within and outside their future profession (Boud and Feletti, 1997, p.18). As an approach to learning, it exhibits elements of both discovery learning and experiential learning (Jarvis, 1995, p.64). Adapting to, and participating in change and self-directed learning are according to Engel, 'component competencies' each requiring the development of skills such as communication, critical reasoning, self-evaluation, a logical and analytical approach to problems and reasoned decision making (Boud and Feletti, 1997, p.18). These skills identified by Engel mirror the Key Skills now required to be assessed for government funded training: information technology, application of number, problem solving, communication, improving own learning and working with others. They also imply a sense of reflective action to be employed in order for the change to come about (Schön, cited in Jarvis, 1995, p.73)

The learning that occurs as part of an MA or NT is based on a combination of competence based qualifications, i.e. NVQs and Key Skills. Despite criticism of the NVQ model (Hyland and Weller, 1996) it is likely to remain as the vocational and educational training (VET) model for some time due to it's popularity with employers and the huge investment already absorbed in it's development. One reason identified by Beaumont as affecting the quality in many NVQ programmes is the pressure on the training providers (TP) to attain targets set by the local TEC's (Beaumont, 1996, p.40, Helsby, 1996, p.17). This results in cutting corners in the delivery of theory towards focusing on developing competence thereby taking advantage of the flexible structure of the NVQ model. I suggest that it is this 'distortion of delivery' which is affecting the quality and competency of learners (Beaumont, 1996 p.42).

In a problem-based approach to learning, there is a holistic approach taken to the teaching of theory as there is no attempt made to unitise the curriculum. The knowledge which is valued in this approach is that which can be used in context rather than that which justifies the structure of particular disciplines (Boud and Feletti, 1997, p.38). This supports a Gestaltian approach to learning (Jarvis, 1995, p.63). As the development of competent professionals is the aim of vocational learning, the problem-based learning approach is seen to be appropriate as it remains firmly rooted in the socio-cultural environment. If this approach to learning develops many of the key skill requirements naturally, then perhaps the need to deliver key skills alongside a vocational qualification may be negated. However, the approach, if effective, should not be misconstrued as supporting a reduction in teaching time or resources or be used as a control tool of the 'elite' (Friere, cited in Jarvis, 1995, p.84).

The majority of trainees in my organisation are following a three year MA programme in Hairdressing, are adolescent and female. British society and British law categorize a person as a minor until the age of eighteen. Both Montessori and Piaget recognise stages of cognitive development and personal growth (Chattin-McNichols, 1992, p.150). These stages are suggested as a means to fit the learner to materials being used and the approach to teaching being taken. Are these trainees to be perceived as adults or school age children ? Would a mixed gender group respond differently to a single gender group. This research acknowledges that a contextual problem-based approach, may be more suited to a school leaver who has spent some time in the work place rather than a new school leaver with little experience of work. Thus, gender, age and previous work experience are all factors which can contribute to the effectiveness of a new approach to learning and therefore need to be taken into account.

3 Methodological Approaches

An action research approach will be taken to this small scale, practice-based research incorporating a variety of both qualitative and quantitative techniques but predominantly the former. A multiple method approach will be used to reduce inappropriate uncertainty (Robson, 1993, p.290). The justification for the choice of approach is discussed as follows:-

a) The aim of the research is to improve my own practice in the classroom and if the research implies a more effective approach to delivery of NVQs then I will disseminate my findings to my colleagues within the training centre for them to adopt the approach. McNiff (1996, p.17) advocates putting 'I' at the centre of the research. However, this view of action research will be extended to incorporate the participatory, democratic approach of Carr and Kemmis who advocate collaboratively working with others and allowing them to influence the research (Carr and Kemmis, 1993, cited in Scott et al, 1996, p.110).

b) The research will explore the effectiveness of applying a problem based approach to learning within a vocational training centre. The approach is not new and has been used in other settings, so the focus is on developing new products as opposed to discovering new information. Cohen and Manion (1994, p.194) state that action research is appropriate as a choice of research method when 'a new approach is to grafted onto an existing system', which is in fact what will be occurring.

c) The findings of the research may not be of relevance to others for a number of reasons. Firstly, the sample of students employed may not be representative of the total population of similar students as it is a convenience sample. Secondly, the research will be conducted in a unique context and specific educational setting. However, the purpose of action research is not to make general discoveries and thus the approach remains valid (Cohen and Manion, 1994, p 192: Charles, 1996, p.229).

d) An important aspect of the research will be the ongoing reflection of participants on the processes taking place. Cohen and Manion (1994) focus on the empirical data generated by action research techniques and do not discuss the reflective aspect. Elliot (1991, cited in Scott and Usher, 1996, p.108) suggests that action research and reflective practice are equivalent. Schön too, although he never uses the term 'action research' links research and action in recognising that reflection is implicit in action (Schön 1983, cited in Scott and Usher 1996, p.115). The reflectiveness of the research should help in addressing the questions raised by the research question. To compare the existing effect on different groups of a method of delivery, I will assess the students and by using quantitative methods compare the results. To discover and understand how this process has affected the learner both in study and in the workplace I will ask each student to keep a diary, I will interview members of staff that they work with, and observe colleagues and students in training sessions. This reflective approach will provide me with a better understanding of what competency is perceived to be in the workplace.

e) Action research incorporates a wide range of techniques which will support my findings not restricting the research to any specific methodology whereby important information is lost in the quest for reliability and validity.

f) As a 'standard' approach to learning is open to definition I will ask one of my colleagues, an experienced but relative newly qualified further education teacher, to

deliver the standard unit. This is for two reasons. Firstly, if I deliver both units there is the danger that I may confuse my approaches and then no clear definitions can be identified. Secondly, a newly qualified teacher may be more likely to put into effect a current standard teaching approach rather than myself who would be immersing in a problem-based approach. The participation of my colleague should give the research better validity as it will be less open to my own bias.

g) The delivery would be to similar groups of learners from both the first and third years at different assessment sites. The learners are all members of the same training centre that I operate.

Finally, Charles summarizes the use of action research by stating that it has, 'great potential for bringing about improvements in teaching and learning....it can resolve an immediate problem and can produce tangible and useful process.' (Charles, 1996, p.231)

4 Data Collection

Prior to delivering a new approach that I am unfamiliar with, I will endeavor to observe the problem-based learning approach implemented at a training centre that already uses the approach and communicate with practitioners. After having obtained a clearer idea of how the method works I will ask my critical friends to act as 'guinea pigs' so that I may practice the method in order to receive feedback. I will brief them first on what I am expected to do.

The data generated will be as follows:

- pre-research profiling on students to contextualise the research;
- taped group interviews with assessors at two sites prior to the delivery of the problem-based approach to establish the notion of 'competency' in the workplace;
- taped interviews with 10 work-based assessors at the two sites to identify individual ongoing progression of trainees;
- student diaries (for groups of approx. 6 trainees per group);
- assessed test results of all groups with both methods of assessment;
- attendance records of trainees over the period of the research;
- observation of teaching records and personal diary of myself and other colleague;
- video recordings of training sessions to support observation notes and journals.

At the training centre where I work, I am going to deliver a unit of either key skill or vocational qualification to a group of first year students and to a group of third year students with a problem-based learning approach. A colleague will deliver the same units using a standard approach to similar groups in a different assessment centre. The size of the groups will depend on the intake and usually ranges from three to eight.

I will request that all students keep a diary of their experiences during the period of the research and these diaries will be used to track their progress and reflections during each of the methods. These diaries may provide insight into the development of key skills during the process. The diary inserts will be semi-structured for students

so that information provided can be categorized. Students will be observed to see how they adapt to both methods of learning during lessons.

At the end of each unit all students will be given the existing assessment material provided by the examination board for that unit. The results between groups will be compared and can be validated with comparable tests from previous years' tests. The results of the assessment should provide information on the competency of the students exposed to each learning method. I also hope to include a new method of assessment in a case study format and use it to assess both groups. This should highlight the application of the essential understanding learned and the presence, or not, of active learning.

The data gathered will be complimented by records of attendance throughout the period of the research which can be compared with the attendance rates of previous year students. This may indicate an increased motivation to learn in one or other method.

To gather data on the effect of the learning methods in the workplace, I will interview the ten work-based key assessors of these students. These interviews will be recorded, but not transcribed, and will be semi-structured lasting no more than half an hour each.

5 Ethical Issues

Robson provides a list of ethical principles for action researchers which are seen as relevant to this research (Robson, 1996, p.33). From this list the following issues are to be taken into account:-

- Students will range in age from 16 to 19 years. At the lower end of the range, permission may be required to be sought from parents/ guardians in addition to getting agreement from the employer and all students taking part in the research
- As the problem-based learning method is based largely on self-directed learning, I will have to ensure that any student experiencing difficulty in these techniques is assisted. All students will be provided with a demonstration of how to use the resources that will be available prior to each unit being delivered.
- Confidentiality of test results and diaries will have to be ensured.
- All students must have the choice to opt out at any time during the research.
- A pre-research contract will have to be signed for the permission to own and utilise the information in the participant's diaries at the end of the study.

6 Gatekeepers and other hurdles

Prior to implementing the research, if I am not allowed access to observing the problem-based learning approach in action, albeit in a different context with a different curriculum or cannot access it due to logistical reasons/ constraints, then I will have to rely on the information that I can obtain via text, e.mail and the internet, and hopefully discussion with other users. However, I would state in my write-up that the application of the problem-based learning was only my interpretation of the approach.

As classes at the training centre are constituted of employed 'MAs', the centre has no control over their leaving employment (and thus their training) The apprentices, as the focus in this research, are gatekeepers as, if they don't turn up, or if they do not attend training then the research project is affected. Classes are small and variable in size depending on the year's intake. If fluctuations occur, I will note them and take them into account when writing up. If they are very disruptive fluctuations such as several trainees dropping out, then I shall endeavor to repeat the approach in the following term with a different group of learners. All student trainees, as well as their tutors/assessors, will be briefed on the research in advance and will have the choice to opt out, if they wish.

The research assumes no previous exposure to this approach. However, prior to the commencement of the research, I will question all students about the learning techniques that they have been exposed to at school and take their responses into account.

There are two issues concerning resources. The first is the need to develop sufficient resources to be able to implement the approach successfully. I envisage obtaining suggestions from observing the approach in action. The second is that the training rooms at the two sites being considered are different: one is owned by a large superstore and is used only as a base, the other is a permanent base and contains far more resources. As the problem-based learning approach is reliant on access to resources, it is more practical to deliver this approach at the site where the main resources are held. The implications of implementing the approach outside the main centre would infer an increase in resource requirements.

One final hurdle is the fact that, as I am perceived to be a member of the management group, the Key Assessors may only tell me what they think I want to hear when interviewing them. I will try to ensure that when interviewing them that no conflict of interest is seen to be present by having a clear interview guide and by stating this fact prior to the interview. If this proves to be a problem, I will ask a colleague to conduct the interviews using the same guide and tape them for me to hear with the interviewees' permission.

7 Methods of analysis

The data generated will be analysed on an ongoing basis to ensure that any issues arising out of the approaches implemented are addressed. This flexible approach is characteristic of action research. During analysis themes will be identified from the various methods adopted and ultimately triangulated to check for validity and reliability (Robson, 1993, p.290, Cohen and Manion, 1994, p.233). Interviews will be post-coded and subjected to content analysis before scoring. Scoring will enable general categories of the notion of 'competence' to be identified which will be cross-checked with individual trainees' experiences recorded in diaries and reflected in their tests results and attendance records. Diaries will be regularly analysed to ensure that they are complete and authenticated, and to address concerns. In order to produce an "account of the accounts", general themes from all diaries will be identified to enable an overall picture of the experiences of trainees and teachers exposed to both approaches to be presented (Cohen and Manion, 1994, p.207). The diaries will remain semi-structured to encourage trainees to reflect on 'key skill' areas as well as their vocational competency. Due to the small samples involved in this research, test results and other quantitative data will be presented in tabular form to allow comparisons to be made and the data generated to remain in context and support the other naturalistic data. Poor test results, although indicative of incompetence, may not reflect the skills of the individual in the workplace. So, rather than distort data, this approach will be taken in order that it makes sense (Ely et al, 1991, p.143).

8 Dissemination and writing up

Dissemination will take a variety of forms. Although action research cannot be replicated, and is focused in the workplace of the practitioner, issues raised may be of relevance to others in similar contexts and/or situations.

Presentation to both work-based staff and trainees. If the feedback is positive, I will implement a staff development programme to train staff in problem based learning approach and further develop PBL resources.

Journals that will be contacted to publish a paper on the research are:-

Research in Post Compulsory Education;

Journal of Vocational, Education and Training;

Educational Action Research.

I would hope to present the results of my research in a paper at the Journal of Vocational Education Conference Summer 1999.

I would contact the Hairdressing Training Board at Doncaster with a view to presenting the paper to Member Schools, or at their annual conference.

I would also contact the City and Guilds, and the Training and Enterprise Councils (TEC) with whom I work to discuss my findings. Funding may be available for further work from these sources.

NB: The terms 'apprentice', 'student' and 'trainee' are used interchangeably with reference to the same individuals throughout this research proposal.

9 Time Scale

1998

February	Draft Research Proposal.
March	Continue Literature Search/ internet search.
April	Contact a Medical School whhich uses problem-based learning with
view	to a visit.
	Research Proposal.
May	-
June	Ensure Recruitment of Apprentices.
July	Pre- research work-based interviews with assessors.
August	Prepare Resources and Lessons for Observations.
September	Observations of classes / Delivery.
October	" "
November	End interviews if possible.
December	Analysis of observation.
	Collection of absenteeism data and previous year's comparison.

1999

January	Analysis continued. / Conduct interviews and begin to write.
February	Evaluations.
March	Evaluations and write-up.
April	Literature Review continued.
May	Cease review and write-up.
June	Write / Reflect/ Re-read.
July	10th - Bind/ Submit.

10 BIBLIOGRAPHY

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APPENDIX 2

EDUCATIONAL BELIEFS

AT THE BEGINNING OF THE DOCTORATE COURSE

OCOBER 1996

EDUCATIONAL BELIEFS (AUTUMN TERM 1996)

My educational beliefs as developed during the first term of the Doctorate in Education course were as follows:-

1 My View of Education

1.1 I believe that education is the medium through which a person learns socially accepted skills of existing in a community, beginning in the home.

1.2 I believe that education plays a large role in the building of society, in that it helps raise a person's awareness of their own individual talents and skills and enables them to express themselves.

1.3 I believe that education helps people to continue to develop by allowing them access to other people's thoughts and learning experiences through a communication medium.

1.4 I believe that education and training are one and the same.

1.5 I believe that education is about a development process, not just about a qualification collection process.

1.6 I believe that learning is a life long process.

2 My Role in Education

2.1 I believe that my role in education is to facilitate a quality learning experience for each student and those connected with their welfare.

2.2 I believe that one of my roles is to provide the means and environment whereby students are enabled to realise their potential through the development and expression of their talents and skills.

3 Me

3.1 I believe that I facilitate, not only a student's learning but, contribute to the development of the whole person and thus, indirectly, society as a whole.

3.2 I also believe that I encourage my colleagues to take a holistic rather than a narrow approach to the development of each individual.

4 My Students

4.1 I believe that everyone has a role to play in society and that these roles often change.

4.2 I believe that all roles are of equal importance and should not be based on an economical 'supply/demand', hierarchical or other cultural assessment despite the fact that some carry a higher profile than others do.

4.3 I believe that everyone has the potential to develop their talents and skills to succeed in a particular role, within the limits imposed upon them by society. Everyone should have the right to access the means to challenge these societal limitations.

4.4 I believe that those who express a desire to learn in a traditional format (i.e. school) should have access to the educational process provided by society. At higher levels (college, university) a person should be able to justify why they wish to proceed in this manner, which should be as a result of reflection, not peer or parental pressure. If justified, an individual should be able to access the means to follow that route, which should be duly recognised by society.

4.5 I believe in the equality of opportunity for all.

APPENDIX 3

RESEARCH EVIDENCE (E)

Research Archive (E)

References (in Chronological Order)

1. Taped Interview- recording- MH- 2nd year Manchester Medical School Student- MMU
2. Taped Interview -recording- Dr Keith Burdett- 1st/ 2nd Course Director MMU
3. Presentation of research to Doc. Ed. colleagues and lecturers
4. Personal reflection on analysis of feedback from presentation
5. Minutes of Meeting with Colleagues
6. Definition of competence from training colleagues
7. Student profile of research group
8. Outline of summer training timetable (including research cycles)
9. Case Manual
10. Course Booklet
11. Practical Manual
12. Personal Reflection on ethics meeting with trainees
13. Signed Ethics Statements
14. Video recordings of the cases Rose, Felix,, Gazza!
15. Personal reflections on Induction to PBL

Cycle 1

16. TM Rose lesson plan 15.6.99
17. TM Class notes from Rose (15.6.99- original + write up)
18. Blank copy of personal journal from case workbook
19. Students feedback on Rose lesson 15.6.99
20. Students notes developed as part of the lesson 15.6.99
21. TM field notes on case review session
22. Students completed case notes as presented to colleagues at review 16.6.99
23. Completed Rose case report for A
24. Completed Rose case report for B
25. Completed Rose case report for C
26. Completed Rose case report for D
27. Completed Rose case report for E
28. E-mail to Peter Ovens Tutor, 18.6.99
29. Summary of learning objectives, resources/ communication/seating analysis covered by students in Rose
30. TM reflections from Cycle Rose: Initial Analysis in terms of themes
31. Personal Reflection: Does PBL make a difference?
32. Personal Reflection: Need to change diary structure to semi-structure
33. Personal Reflection: Distribution of knowledge and issue of what is truth?

Cycle 2

34. TM Felix lesson plan, resources 30.6.99 and TM notes on lesson objectives needed to be covered during Felix case discussion
35. TM Field notes from Felix class 30.6.99 and TM transcript of class video recording
36. Notes of students developed during the Felix session
37. Completed student personal reflections and feedback on Felix lesson 30.6.99
38. Critical friend notes/ validation discussion on watching video/ notes of discussion
39. Personal Reflection: Comments following critical friend discussion
40. TM Felix review field notes/ discussion notes with B
41. Case report submitted by D
42. Case report submitted by A
43. Case report submitted by B
44. TM Initial analysis of Learning Objectives/ Resources/ communication/seating during the Felix case
45. Personal Reflection: Does PBL facilitate learning?
46. Facilitator notes for opening discussion of reflection and student notes for reflection
47. Video- transcript of critical incidences
48. Critical friends records of critical incidences occurring during student reflection of Cycle 1/ 2 (discussion with TM)

Cycle 3

49. TM lesson plan and resources 13.7.99 Shirley
50. TM Class notes opening discussion about improving discussion/ reflection, evidence distributed
51. TM Rose/ Felix Review field notes referring to the discussion
52. TM notes on lesson objectives needed to be covered during Shirley case discussion
53. TM field notes of Shirley session
54. Students notes developed as part of the lesson 13.7.99
55. Seating arrangements during Shirley and Shirley review
56. Completed student personal reflections and feedback on Shirley lesson
57. TM Class notes- Review of Shirley case 15.7.99 (transcribed from video)
58. T2 (cover tutor) class notes- from Shirley review 15.7.99
59. Notes used and distributed for presentation of Shirley case
60. Completed Shirley case report for D
61. Completed Shirley case report for C
62. Completed Shirley case report for B
63. Cycle 3: Video records of critical incidents of student reflection/ discussion
64. Critical friend records of cycle 3 reflection
65. TM Initial analysis of topics covered in cases submitted/ resources/ seating
66. Personal Reflection re: informal interview with C following her feedback
67. Personal Reflection: should the case be distributed beforehand?

Cycle 4

68. TM Gazza case: a return to no objectives
69. TM field notes from Gazza 28.7.99
70. Cycle 4 seating arrangements
71. Personal Reflection 28.7.99 Students bored with PBL!
72. Student notes developed as part of the Gazza case study
73. TM transcript of critical incidences video 28.7.99
74. Blank feedback forms (Student reflection and Key Skills self assessment)
75. Student Reflections on phase 2 and 3 on Gazza lesson 28.7.99
76. Student Key Skills self assessment forms and analysis (Phase 2 and 3)
77. Completed Gazza case report for A
78. Completed Gazza case report for B
79. Completed Gazza case report for C
80. Completed Gazza case report for D
81. TM Initial case study analysis phase 6- and resource use during phase 3
82. Critical friend feedback on cycle 4 evidence
83. Personal Reflection: Marking comments and feedback
84. Personal Reflection: What about researching cases individually. Does it defeat the object?
85. Personal Reflection: Critical friend discussion on outline of writing up colouring assessments-

Cycle 5

86. Lesson Plan 18/8/99
87. Colouring Case assessment, questions and marking sheet
(City and Guilds Hairdressing Unit 206 Exam confidential/ available on request from TM)
88. Assessment results for both groups
89. Transcript of open book' case' written assessment video recording (+ original notes)
90. Case study assessment test papers
91. Student feedback on testing methods and analysis (validation by students for relevance and method of assessment)
92. Cycle 1-4 case report analysis
93. Critical friend feedback on Cycle 5 (confirmation of case report codes for content analysis and interpretation of case reports)

APPENDIX 4

STUDENT PROFILE

TABLE 13: STUDENT PROFILE

This information provides a brief profile of the coded student as a learner. It is included to assist the reader in contextualising the research cycles.

Student/ Age	***Profile***
A(16)	Self-assured female student. Naturally creative and orally competent. Making excellent progress in the work place. Did not achieve any examination grades at school as she did not take exams due to personal difficulties.
B (16)	Very unconfident male student making reasonable progress for his ability. Receiving additional support at a local learning centre. Dyslexia suspected following report from school. No funding available to test. Test not done at school. Has problems distinguishing between right and left, very forgetful and lacks concentration frequently.
C (30)	Mature female student. Very motivated. A late comer to the group. Growing in confidence all the time. No learning difficulties identified. Making excellent progress in the salon. Good in administration due to previous working skills developed.
D (16)	Very quiet, unconfident female student. Needs reassurance continuously. Making steady progress in the salon. Spelling often poor. Needs much support and encouragement to keep to deadlines
E (16)	Very self-assured female student experiencing learning difficulties which require additional support in spelling and structuring work. Confident outlook and orally competent. However, applying theoretical concepts to practical work needs development. Making sporadic progress in the salon.

APPENDIX 5

CYCLE 1

DATA ANALYSIS

Figure 12 : Seating Arrangements and Flow of Discussion during Cycle 1, Phase 1

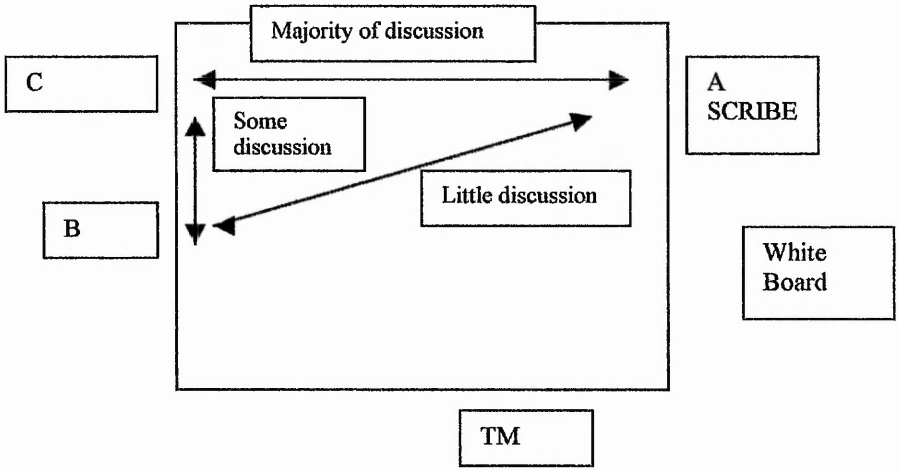

Figure 13 : Seating Arrangements throughout Cycle 1, Phase 5 (Sharing of information)

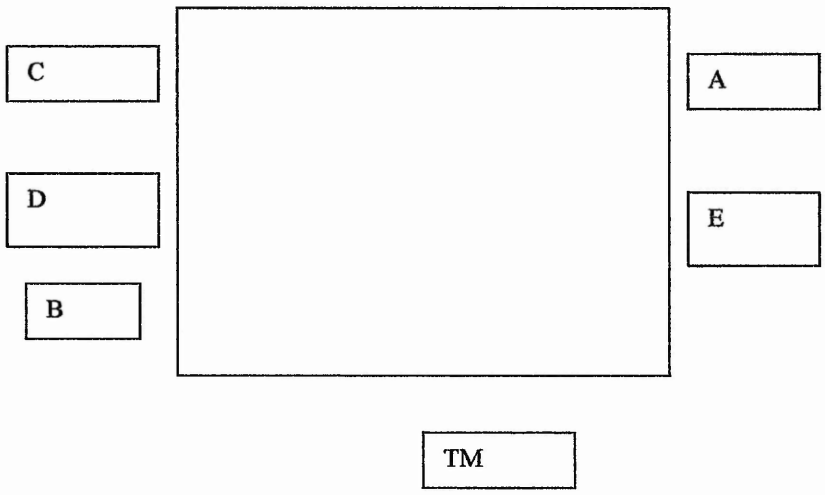

Table 14 : Cycle 1, Phase 2 Resource Use

Resource / Student	Text Own-Other	TV/ Video	Clynol Educator	Computer/ CD-ROM	Other/ External
C	*				* (Health Shop)
B	*			*	
A	* (requested info.)	*		*	
E	Absent				
D	Absent				

Table 15 : Case issues discussed by tutorial group (phase 1), researched (phase 2) and analysed by individual students in solving the Rose case (phase 6).

Case Issues (group) / Student + chosen research topic	Health and Safety	Hair growth	Aftercare /Lifestyle	Products/ Application	Colour Tones
C Aftercare/ Lifestyle/ Hair Growth	* (not hair tests)	*	*	*	
B Health and Safety			*		
A Colour Tones/ Products	*	*	*	* (not application)	*
E (not present)		* (not thinning)	*		*
D	*	*	*	* (not application)	

Table 16: Cycle 1- Analysis of Critical Incidences in relation to Table 4 (for Evidence [E] see Appendix 3: Research Archive)

Aspect of PBL to be researched	+/-	*CYCLE 1 DATA ANALYSIS OF CRITICAL INCIDENCES*
1. Motivation	+	*"Can I write it in my diary?"*- Phase Induction (E19)
	+	*"Overall this lesson was enjoyable"* -Phase 1and 2 (E19A)
	+	*Starting to get into it more*" -Phase 1 and 2 (E19B)
	+	*"I like the idea of getting our own information together, although it took a bit of thinking about to get into it*" -Phase 1and 2 (E19C)
	-	It was evident at review that only C had prepared sufficient work to share with others. A and B needed more time to prepare their feedback- Phase 5 (E21)
	-	Cases in late- need to negotiate better with the students for the next submission date- Phase 6 (E23-27)
2. Team Working/ Group Communication	+	*"We were then given a case study....and discussed what to do"*- Phase 1 (E19A)
	+	"We figured out what questions needed to be asked to come to a conclusion of what Rose would be having done"- Phase 1 (E22)
	+	*"Getting involved in the group doing Health and Safety*" –Phase 1 and 2 (E19B)
	+	*"My part in this was to find out what sort of supplements she could take..."* Phase 2 (E19C)
	-	A, very little verbal communication with B, mainly focussed on discussion with C. B communicated mainly with C too. Was this a seating arrangement issue?- Phase 1 (E17)
	-	A expressed concern about depending on others for information - Phase 5 (E17)
	+	All began well in discussion, B (with learning difficulties) contributing well. Group identified main issues with little prompting- Phase 1 (E17)
	+/-	Interesting to see how the group will adapt to B's slowness in some aspects of this work. Should he be excused from scribing? I can't see a way around this as to excuse him from having to write up his own questions would be to emphasise his disability more- Phase 1 (E17)
3. Knowledge based development	+	Overall, it was observed by the facilitator, that students were developing their knowledge in the topic area that they were delegated to research. Furthermore this was supported by oral discussion and questioning with the students- Phase 1 and 2 (E21/22)
	+/ -	There was a range in the quality of cases submitted. Some of the trainees had not submitted a full case addressing all of the issues that the group had identified as being important- Phase 6 (E29)
	-	C had made a mistake in her notes for distribution. This mistake was then duplicated by some trainees into their own work. Having had previous seminars on this aspect of the course, this mistake should have been recognised. Did they not check through the notes of others? Did I need to check all notes for 'truth' before they are distributed or should this be developed as part of the trainee skill- Phase 5 and 6 (E25/33).
4. Application of knowledge to context	+	*"I went to the health food shop and the pharmacy and picked up some info."*- Phase 2 (E19C)
	+/-	Students asked to meet Rose when video wouldn't work properly- Phase 1 (E17)
	+	C suggesting menopause as a cause of Rose's problem- Phase 1 (E17)
5. Consultation skills (1:1)	+	*"Today the session has been about getting to know the needs/ services/ products of Rose"*- Phase 1 and 2 (E19C)
	+	The students needed very little prompting from me to identify the main issues - Phase 1 (E17)
6. Improve own Learning	+	*"We all went off to do our own section. I've used the text books and booklets to find out information and watched a video on the Clynol range"* - Phase 2 (E19A)
	+	"There are a few things we need to consider and ask the client before going ahead with the colour" - Phase 1 (E23)
7. IT Skills	+	*"We started off on the computers looking at the hairdresser discs. These were good and had useful information on"*- Phase 2 (E19A)
	+	*"I am getting better at my I.T. Skills*" Phase 2 (E19B)
	+/-	Took them through Microsoft Word and gave handout. A competent , C less confident but capable Induction (E17)

8. Other issues arising	-	Should I have got them to do a review at the end of the review session?- Phase 5
	-	C feedback about the PBL method being time consuming - Phase 1 and 2 (E17)
	+/-	When it came to the discussion, B was copying a lot of notes from C. I had to assist B as I realised that he was not going to have any work prepared to share- Phase 1 (E17)
	-	I found myself prompting about the 'widow' social situation - Phase 1 (E17)
	+/-	During sharing we overlapped with the groups next class so I invited the teacher to join us and observe/ listen. The teacher fedback that she was really impressed by their approach and knowledge - Phase 5 (E21).
	-	The non-PBL group were making similar resource requests when working in a portfolio-building session. Does PBL make a difference in this respect? (E31)
	-	Reflections did not pick out the full range of processes that the students are working through. Need to change reflection to a semi-structured approach- Phase 2 (E32)
	-	I forgot questions, I found myself organising and grouping the issues they had raised - Phase 1 (E17)

N.B.

Italics represent student comments: non-italics represent field notes, personal reflections or critical friend feedback.

Table 17: Case Analysis Summary for Cycle 1

Aspect of PBL to be researched	+/-	*CYCLE 1 DATA ANALYSIS SUMMARY*
1. Motivation	+	1. Students B and C recognised the change in emphasis towards the student-orientated, active approach of PBL during phases 1 and 2.
	+	2. Students were motivated and enjoyed phases 1 and 2.
	-	3. Students A and B had not prepared feedback material to the group for phase 5.
	-	4. Deadlines for submission of case reports suggested by TM during phase 1 were not met.
2. Team Working and Group Communication	+	5. Students were aware of their contribution to the team aim during phases 1 and 2.
	-	6. Student A expressed her concern about having to depend on weaker group members for information.
	+	7. Group members recognised and delegated tasks during phase 2 in accordance with their perception of individual students' abilities.
	+	8. All students were observed contributing to phase 1 discussion.
	+/-	9. It was observed that the most orally competent and confident group member acted as chairperson during phase 1, in addition to the scribe.
3. Knowledge based development	+	10. Students were able to direct their own learning during phase 2 and requested support from TM when they needed it.
	-	11. False knowledge was circulated during phase 5.
	-	12. Students had not addressed all the group issues that had been identified during phase 1, in their case reports (phase 6).
	+/-	13. During phases 1 and 2, TM was aware of directing and guiding students in identifying certain issues.
	+/-	14. TM felt the need for a facilitator guide for phase 1. The facilitator would use the guide to help prompt and guide the students better during discussion and ensure that all the important aspects of the case were identified.
4. Application of knowledge to context	+	15. Student C brought own life experience and knowledge to the group discussion in interpreting case issues during phase 1.
	+	16. Students asked if the case study client was real and requested to meet the client during phase 1.
5. Consultation skills (1:1)	+	17. Consultation issues were identified with ease by the group during phase 1.
	+	18. Student A recognised the need for consultation prior to taking action or making a decision during phase 6.
6. Improve own Learning	+/-	19. Students used a range of resources during phase 3. These were ones that they were familiar with and confident in using.
	+	20. Student C asked if she could go to the pharmacy to find out more information during phase 2.
	+	21. Student B used student C as a resource for copying/ taking notes.
7. Information Technology (IT) Skills	+	22. It was observed that the hairdressing CD-ROM was a popular resource with students A and B for finding out information.
	-	23. Student C expressed her lack of confidence using IT during phase 1.
8. Other issues arising	-	24. C fedback during phase 5 that the PBL process was time consuming.
	-	25. Student feedback after phase 3 did not capture how the students experienced the aspects of PBL being monitored which had been observed by TM during phases 1 and 2.

Table 18: PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and participants in cycle 1.

Aspect of PBL being monitored in cycle 1	Differ (+/-)	Agree (+)	Disagree (-)
Motivation	TM reflected on the need to negotiate realistic deadlines in line with collaborative principles and a student-led programme.	Students enjoyed phases 1 and 2. Students recognised change towards a student-orientated approach. Students motivated by real world relevance of client case.	Case reports were submitted late. Students had not prepared information for feedback to group.
Team working and group communication	PBL favoured orally competent and confident group members.	Students aware of their contribution to the team effort and delegated tasks appropriately. All students contributed to discussion in phase 1.	Students expressed concerns about having to depend on 'weaker' group members for information.
Knowledge based development	TM aware of directing and guiding students towards certain case issues. Case reports reflected various depths of understanding. TM felt the need to have a facilitators guide.	Students able to direct their own learning and request support when required.	Students did not address all the case issues identified during phase 1 in their case reports. False knowledge circulated.
Application of knowledge to context		Students brought real world experience to phase 1.	
Consultation enquiry skill	Students used their knowledge of the workplace to relate to the case client.	Consultation issues were identified easily by students.	
Improve own learning	Students used resources, but only resources that they were familiar with or confident in using.	Students perceived one another, the tutor and other colleagues available in the real world as resources.	
IT skills	Students A and B found the CD-ROM programme a popular resource.		A lack in confidence prevented Student C from using computers.
Other issues arising	TM student reflection format did not sufficiently capture the research themes of PBL.		Student C expressed that PBL was time consuming.

APPENDIX 6

CYCLE 2

DATA ANALYSIS

Figure 14: Seating Arrangements during Cycle 2, Phase 4

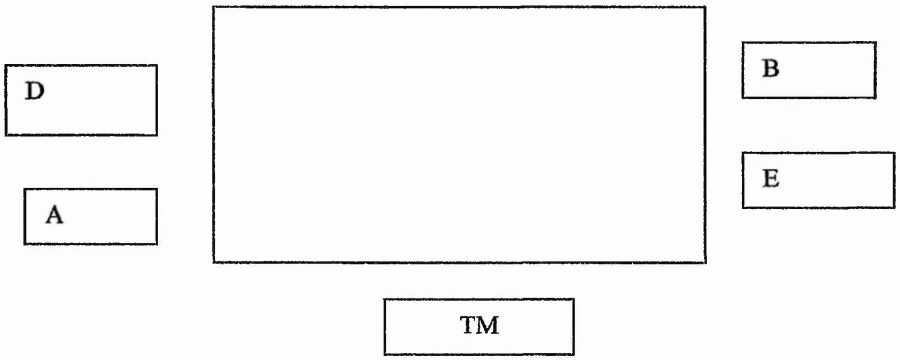

Figure 15: Seating Arrangements and Flow of Discussion during Cycle 2, Phase 1

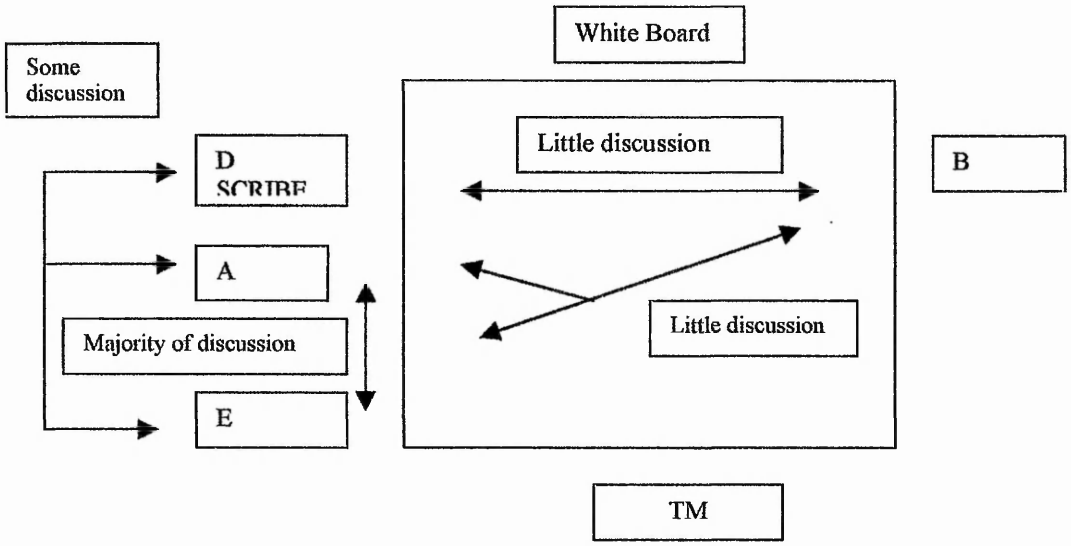

Figure 16: Seating positions throughout Cycle 2, Phase 5 (Sharing information)

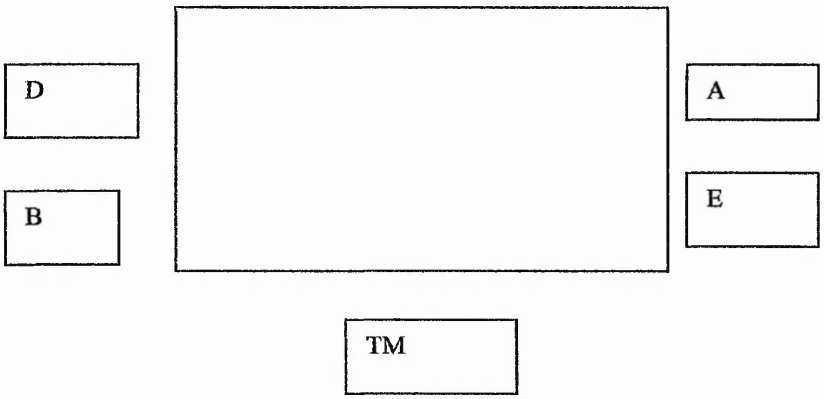

Figure 17 : Seating Arrangements and Flow of Discussion during Cycle 2, Phase 7

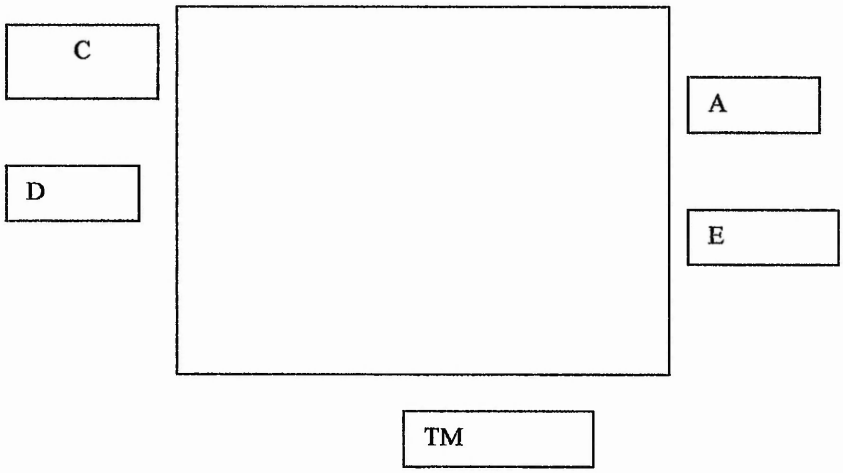

Table 19: Resource Use during Cycle 2, Phase 2

Resource / Student	Text Own-Other	TV/ Video	Clynol Educator	Computer/ CD-ROM	Other/ External
C Absent					
B	* (requested info.)				* Chemist/ £
A	* (requested info.)	* (requested info.) none suitable		*	
E	*			*	
D	* (requested info.)				

Table 20: Cycle 2 case issues discussed by tutorial group (phase 1), researched (phase 2) and analysed by individual students in solving the Felix case (phase 6).

Case Issues (group) / Student + chosen research topic	Health and Safety	Social Issues	Grecian 2000	Aftercare /Lifestyle	Products/ Application	Colour Choice
C ***Absent-Hols***						
B **Grecian 2000** *Report not submitted until Cycle 4*						
A **Aftercare/ Social issues**	* (not skin test)	*	*	*	* (not application)	*
E **Products and application**						
D **Health and Safety- Choice of colour**	*	*	*	*	* (not application)	*

Table 21: Cycle 2- Critical Incidents Analysis in relation to Table 4 PBL Issues (for Evidence [E] see Appendix 3: Research Archive)

Aspect of PBL to be researched	+/ -	*CYCLE 2 DATA ANALYSIS OF CRITICAL INCIDENTS*
1. Motivation	+	*"I enjoyed using the books and the computer and to find out about grey hair and finding out new things about colours and how different colours are applied and what they contain"* Phase 2 (E37E)
	+	*"It was interesting to find out information to see if you can really go grey overnight"* Phase 2 (E37D)
	+	*"Most of the lesson was interesting as it was finding out new information. It was stuff that we hadn't covered before that is why it was more interesting"* Phases 1 and 2 (E37A)
	-	B seemed to respond more when the relations in the group changed (i.e. C or myself intervened) he was more willing and comfortable to speak up- Phase 4 (E35)
	+/-	B asked for help and said he was lost. After I prompted him to look in the texts, he still claimed there was nothing in there for him. However, he claimed that from the beginning without looking in them- Phase 2 (E35)
	+/-	*"I worked with the group most of the lesson, then I went on my own to find out about the metallic colours"* –Phases 1 and 2 (E37B)
	+/-	Are they motivated enough to research a new topic or change topics?- Phase 1 (E35)
	-	All case reports were submitted late – Phase 6
2. Team Working/ Communication (group)	+	*"We worked all together at the start brainstorming, then we worked on our own"* Phases 1 and 2 (E37E)
	+	*"I worked on my own for a bit after we discussed things"* Phase 1 and 2 (E37D)
	+	*"We worked out the key points of the case study on Felix and then we all decided which point we would look at"* Phase 1 and 2 (E37A)
	+/ -	Critical friend commented that girls integrated, not B. B trying. Not able to give any view-point in PBL. Scribe (D) not integrated initially but participated later - Phases 1 and 2 (E37)
	+	E said by talking to the group you could make sure that all the case information was covered- Phase 7 (E46)
	-	PBL lends itself to someone taking over- E or facilitator. Phase 1 and 2 (E35)
	-	B's body language defensive even when not writing- Phase 1 (E35)
	-	Identifying too many 'issues' during brainstorming- Phase 1 (E35)
	-	Facilitator pushes group- implications taking over too much – Phase 1 (E38)
	+/-	Facilitator should acknowledge B, head shake/ facilitator must find ways to let each respond- Phase 1 (E38)
	+/ -	Do they swop researching issues for case? Or do they always do the same for every case? Equal division of work ?- Phase 1 (E38)
	+/ -	A decided to share tasks by working around in a circle and began with B- Phase 1 (E35)
	+/-	Discussed seating arrangements during presentations and the fact that there wasn't an assessment on teamwork, only on communication as a strategy to get everyone involved during phase 2 and make sure they contribute- Phase 7 (E46)
	-	D said it was difficult acting as scribe and joining in the case discussion as they kept changing their minds about what was being wrote down as an issue and that kept her occupied- Phase 7 (E46)
	+/-	When I asked students to reflect on the pattern of communication in the group, they all laughed, E was genuinely surprised to see it was heavily one sided. A and E acknowledged that this was not reflective of good team work. There was general agreement that team work was not going very well - Phase 7 (E46).
	+	C suggested that if someone hasn't got anything to say, then they can't input to phase 2. I agreed but suggested more time needed to be allowed to give the opportunity to speak -Phase 7 (E46)
	+/-	C said she didn't like speaking during phase 5 as she was shy. Both TM, A and E expressed surprise. Phase 7 (E46)
	-	C said that B was being left out. E suggested to get B more involved and give him more chance to speak.. I asked was it enough to ask someone if they had anything to say. C replied No, because they'll just say no. –Phase 7 (E46)
	+	I asked the others in the group did they mind feeding back during phase 5. They said no- Phase 7 (E46)
	+	A suggested changing the seating may improve communication skills in the group. E suggested that B should sit between her and A. I asked

		them about the balance of the group. They suggested some more balanced seating plans with suggestions for poor spellers- Phase 7 (E46)
3. Knowledge based development	+ – +/-	E and D said they didn't know what was required for case reports- Phase 5 (E40) Phase 5- E did not submit a case study report. Other reports submitted (A and D) comprehensive and covered main learning objectives and case issues as identified by the group (E44) When I asked the students how write ups could be improved, E replied that everyone needs to be sure of what they are doing- Phase 7 (E46)
4. Application of knowledge to context	+ +/ - +/ - + +	In phase 1 A referred to an example of a salon client who has a colour to address a similar problem to Felix (E35) D said she read about stress and hair recently but couldn't remember where-Phase 1 (E35) Facilitator links their questioning to past knowledge on colour- Phase 1 (E38) Resources were used by students from previous weeks for phase 5 (E40) D described the research tasks as doing a job- Phase 7- (E46)
5. Consultation Skills (1:1)	+ +/ - +	E initially reluctant to see what stress and redundancies had to do with greying or hair colour during phase 1 (E35) A explained to E "*We need to do the questions first…because we did that last time*" during phase 1 (E35) I fedback to the group that everyone was using a different approach in writing up the cases- Phase 7 (E46)
6. Improve own Learning	+ +/ - + + +	"*Went to the chemist to see if they had the price of colour*" during phase 2 (E37B) Skills issue-they use the resources they enjoy – may need to push other resources during phase 2 (E35) D asked for help during phase 3 and just wanted support and clearing up in her own mind questions about the colour choice. A also asked for help in finding information (E35) Everyone photocopied during phase 2 (E40) D suggested not to do the same research tasks twice Phase 7 (E46)
7. IT Skills	-	Only A and E used the computer CDROM as a resource during phase 2 (E44)
8. Other issues arising	+/ - - – - - - - - + +/- +	Did I answer the question? Do I speak too quiet…too fast….? This week I was much better- Phases 1 and 2 (E35) Did B have his hearing aid in?- Phase 1 and 2 (E35) Interviewed B about his contribution to the case discussion and asked why he had not contributed even on the topic that I knew he had researched the previous case. He said he knew about two issues (stress and health and safety) but not the others. He promptly then asked both A and E how to spell something- Phase 5 (E40) Initially, students were looking at me for confirmation that they were either right or wrong. I do not respond- Phase 1 (E35) Instead of leading too much, just give topic/ issue headings for more independence- Phase 1 (E38) I sought student agreement in deciding stress was a key factor of the case being aware of collaboration- Phase 1 (E35) Unusually there was a change in seating arrangements after the break which isolated B further- Phase 5 (E40) Interesting situation with A on Saturday after Felix. Gent requesting subtle highlights. She didn't make the social transfer issue between Felix and the client) Neither did the non PBL(H) student (E45) Should I have intervened earlier with B or changed the seating arrangements?- Phase 1 (E39) Students remembered that they were being assessed on teamwork and communication skills-Phase 7 (E46) I made a suggestion to students that they could develop an issues grid during phase 1 to ensure they had covered all the aspects of the case during their own write ups (E46). It was noted by the critical friend that this strategy was though to be a good idea but not taken up in practice- Phase 1 in Cycle 2 (E56) Students found phase 7 a useful exercise (E46)

Italics are student comments from their feedback. Non-italics are facilitator field notes or critical friend comments.

Table 22: Cycle 2 -Data Analysis Summary

Aspect of PBL to be researched	+/-	*DATA ANALYSIS SUMMARY*
1. Motivation	+	1. Student E, D and A were motivated by finding out new information in phases 1, 2 and 4.
	-	2. All case reports were submitted after the deadline in phase 6.
	-	3. Student B was experienced serious motivational difficulties during Phases 1 and 2. However, this was not reflected in his student reflection (phase 2) as this was positive.
2. Team Working and Group Communication	+	4. During phase 2, students acknowledged that both group discussion and individual tasks were components of the PBL process.
	-	5. Student D said it was difficult to act as a scribe and direct discussion at the same time
	-	6. The critical friend suggested that unconfident students found it difficult to contribute to a PBL discussion during phase 1.
	+/-	7. Students acknowledged in phase 7 that their teamwork skills had been poor in phase 1 of cycles 1 and 2. During phase 7, students identified strategies for improving their teamwork skills.
	-	8. TM was concerned with the large number of case issues that were emerging during phase 1
	+/-	9. C said she did not like presenting information to the group during phase 5. Other students when questioned did not mind.
	-	10. The critical friend noted that TM was unaware that she was directing the group too much whereas TM thought facilitation skills had improved with the use of the guide and planned prompts.
	-	11. TM unsure as to when the facilitator should intervene and to what extent, during PBL phases 1, 2 and 5.
	+	12. Students were aware that they were being monitored on their communication and team work skills during the PBL process.
3. Knowledge based development	+/-	13. Students E and D requested information on the correct way to present their case reports. TM suggested using the case issues as an outline. Students A and D submitted comprehensive reports. E did not submit a report.
4. Application of knowledge to context	+	14. Students used their previous knowledge to identify and understand case issues in phase 1.
	+	15. D perceived her role in the group as a 'job'.
	-	16. Neither student A or H made a 'transfer' of knowledge regarding consultation issues when faced with a salon client who spoke of a work context resembling that of the Felix case.
5. Consultation skills (1:1)	-	17. E unable to see the relevance of exploring the social context of the client during phase 2 in order to identify any underlying case issues during phase 1.
	+	18. Student A recognised the importance of asking consultation questions as part of the PBL process but could not explain to E why they were necessary.
6. Improve own Learning	+/-	19. The photocopier was used extensively during phase 2.
	-	20. TM was aware of the need to promote resources other than those frequently used by the students during phase 2.
	+	21. Students requested support from TM for finding information during phase 2.
7. Information Technology (IT) Skills	-	22. The computer was only used by A and E during phase 2.
8. Other issues arising	-	23. TM reflected whether student B's difficulties during Cycle 2, phases 1 and 2 were physiological as they did not reflect his ability to contribute which was demonstrated during phase 1 in Cycle 1.
	+	24. TMs suggestion to create a grid as a checklist for issues developed during phase 1 for use in phases 5 and 6 was not followed up.

Table 23 : PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and with participants in cycle 2.

Aspect of PBL being monitored in cycle 2	Differ (+/-)	Agree (+)	Disagree (-)
Motivation	Student B's ability to contribute, observed in cycle 1, was not demonstration in cycle 2.	Students A, D and E motivated by finding out 'new' information.	Student B experienced motivational difficulties. All case reports submitted late. Student E did not submit a case report.
Team working and group communication	Students acknowledged poor teamwork skills. Student C did not like presenting during phase 5. TM directing group too much during phase 2. TM unsure as to when to intervene in PBL phases.	Students aware that they were being monitored on research themes. Students acknowledged teamwork and individual tasks as part of PBL.	Student D found it difficult to act as scribe and chairperson. Critical friend suggested that unconfident students would find it difficult to contribute to PBL. TM concerned with large number of case issues.
Knowledge based development	Students E and D requested teacher direction on the right way to present case reports.	Students used their previous knowledge to solve case.	
Application of knowledge to context		Student D perceived her team role as a job.	Student did not make transfer of knowledge in the workplace with real client expressing similar case characteristics.
Consultation enquiry skill	Student A explained the reason consultation questions were needed in behavioural terms.	Student A recognised the importance of asking consultation questions.	Student E could not see the relevance of exploring the client's social context in solving the case.
Improve own learning	Photocopier used extensively.	Students requested support from TM.	TM perceived need to promote use of unfamiliar resources.
IT skills	Computer only used by students A and E.		

APPENDIX 7

CYCLE 3

DATA ANALYSIS

Figure 18 : Seating Arrangements and Flow of Discussion during Cycle 3, Phases1 and 2

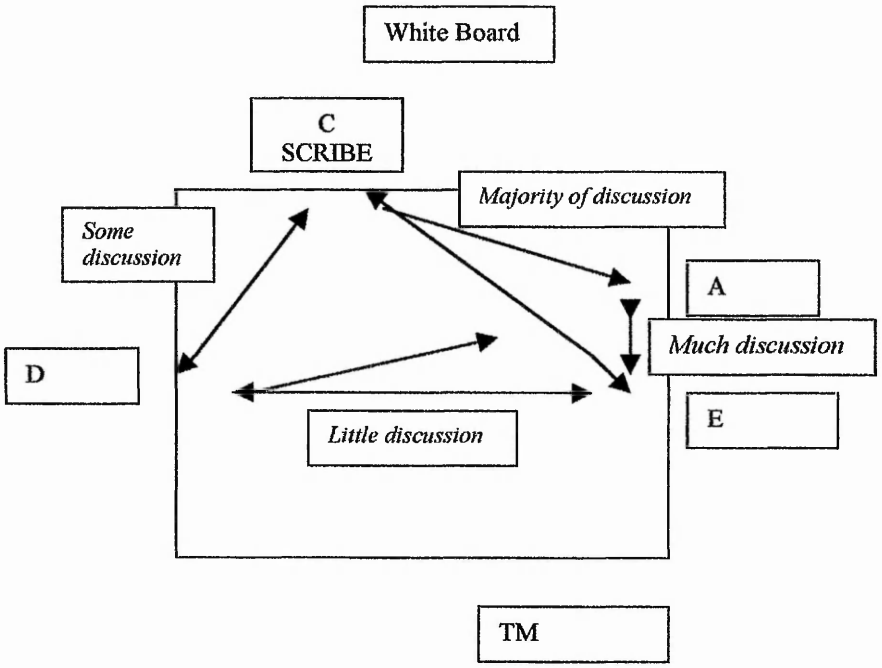

Figure 19:Seating positions and throughout Cycle 3, Phase 5

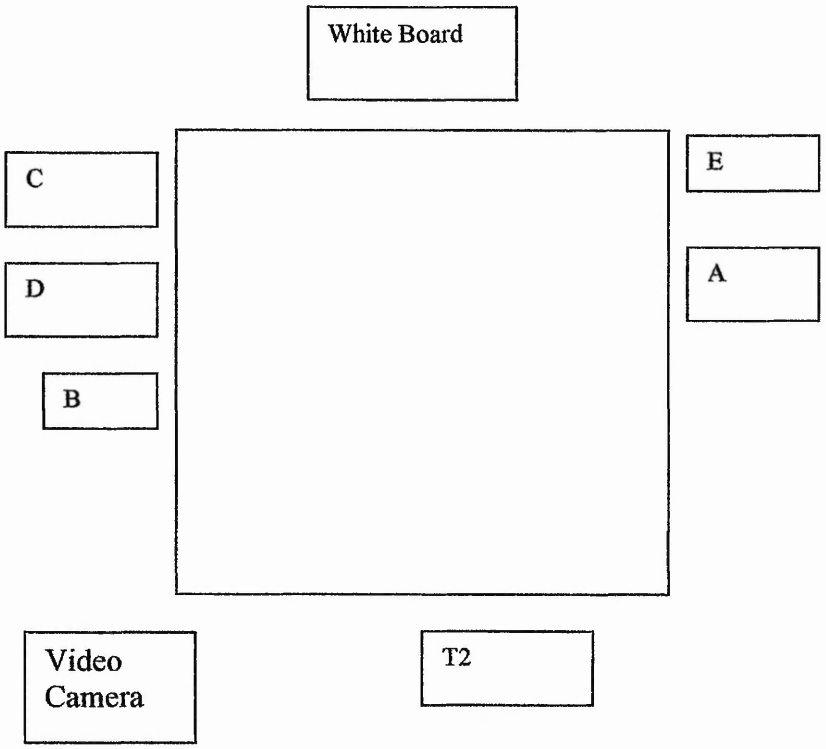

Figure 20 : Seating Arrangements during Cycle 3, Phase 7

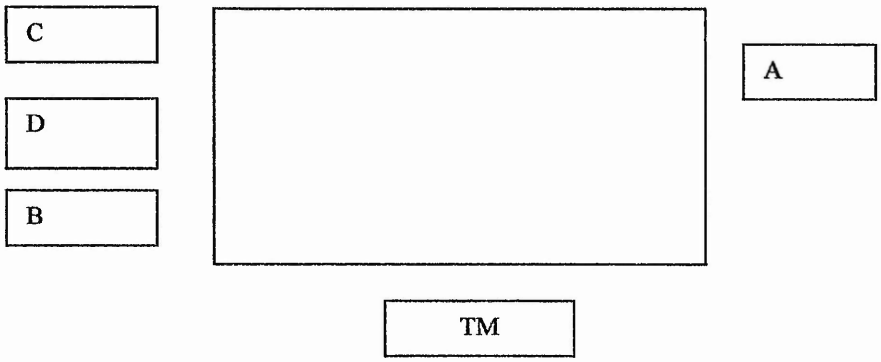

Table 24 : Resource Use during Cycle 3, Phase 2

Resource / Student	Text Own-Other	TV/ Video	Clynol Educator	Computer/ CD-ROM	Other/ External
C	*		*	* suggested	
B Absent (Hols)					
A	*	*			TM offered leaflets on request
E	*			* suggested	
D	* suggested			* suggested	

Table 25 : Cycle 3 case issues discussed by tutorial group (phase 1), researched (phase 2) and analysed by individual students in solving the Shirley case (phase 6).

Case Issues (group) / Student + chosen research topic	Health and Safety 1	Restyle/ Lifestyle 2	Techniq-ues 3	Aftercare / Lifestyle 4	Products 5	Shades and Tones 6
C 1, 2, 3 (easi-meche), 5 (permanent colour)	*	*	*	*	*	* not cool/warm
B Absent-Hols **Submitted late case report**	* only skin test	*	* named but no method		* named no mix	*
A 2, 3(spatula), 5 (Majiblonds/ meche)**Report not submitted**						
E 2, 4, 3(cap/judge), 5(highlift colours) **Report not submitted**						
D 6, 5(Bleach), 3(peigne meche)	*	*	* (only cap)	*	*	*

Table 26: Cycle 3- Critical Incident Analysis in relation to Table 4 PBL Issues (for Evidence [E] see Appendix 3: Research Archive)

Aspect of PBL to be researched	+/ -	*CYCLE 3 DATA ANALYSIS OF CRITICAL INCIDENTS*
1. Motivation	+	*"There was nothing I didn't like about today"* Phases 1 and 2 (E56A)
	+	*"The quiz about colours was interesting (on the computer). There wasn't anything I didn't like"* Phase 1 and 2 (E56C)
	+	*"The quiz that I did on the computer was interesting to do"*- Phase 2 (E56D)
	+	*"I really enjoyed doing the STQ questions testing what we have done and you can see what you have done and can understand what they mean"*- Phase 2 (E56E)
	+/-	TM reflection 'Should the case be given to the students beforehand to allow motivated students to continue with self-directed study?' (E67)
	-	Phase 6- A and E did not submit case studies (E65)
	-	TM fedback to the group that during phase 5 they all looked bored to tears and looked as though they were just going through the motions of feedback – Phase 7 (E63)
2. Team Working/ Communication (group)	+	Distributed the case to the students who read through it. A and E wanted to start the discussion but D said that she was still reading through it – Phase 1 (E53)
	+	A asked "Who's penning it today?". C suggested herself. (E53)
	+	C (Scribe) began by bringing up the issues- Phase 1 (E53)
	+/-	Critical friend noted that C found it hard to scribe and chair. This led to E acting as chairperson at times during phase 7 (E64)
	+	A picked up on the PBL process and began to raise question for the client during phase 2- (E53) D a lot of talking during phase 1- (E53)
	+/-	TM wrote 'Don't interrupt' on top of field notes to remind her to let the conversation flow- Phase 1 (E53)
	-	TM observed that the majority of the discussion during phase 1 was between A, C and E, the dominant members- (E55)
	-	Seating arrangements were not changed as had been discussed during Cycles 1 and 2 (phase 7) when B returned to the group (E55)
	+	*"I worked with everyone at the beginning when we were discussing the case study and then I went off on my own to find out the information"*- Phase 1 and 2 (E56A)
	+	During Phases 1 and 2, student C worked with "D, E and A for the first part, discussing Shirley's case. Then on my own to find out about permanent colours, toners and crazy colours" (E56C)
	+	*"A, E and C and I worked together and then I worked on my own"* Phases 1 and 2 (E56D)
	+/-	*"I worked on my own today on the computer"* Phase 2 (E56E)
	-	A sorting out her papers and seemed to not be listening to the others feedback. Seemed to disturb both B and D Phase 5 (E57)
	+	During phase 5, C began by introducing Shirley and her topic, health and safety. She referred to previous work of A that she had used for her research and explained where her other notes came from. (E57)
	-	After C, D and E had fedback, A had still not organised her papers ready to present so she asked someone else to speak while she was '*finishing off*'- Phase 5 (E57)
	+/-	Following the Cycle 1 and 2 reflections (phase 7) E asked B if he had anything he would like to add to the feedback. He responded that he did not (E57)
	-	Students relied heavily on notes to feedback to the group. The research issues were not revisited to 'solve ' the case. Phase 5 (E57)
	-	TM fedback to students during phase 7 that the review was not just a reading exercise. TM also reflected that students may have thought that was what was expected (E63)
	+/-	TM noted during phase 5 that there was a need to monitor skills development and the team contribution from the student perspective (E57)
	+/-	It was notable that A was more comfortable sitting on the opposite side of the table rather than next to A despite the uneven balance of the seating Phase 7 (E63)
	-	This was still a group that was not functioning as a team Phase 7 (E63)

	-	I asked students to reflect on previous Cycle 1and 2 reflections and recap on what had been suggested to improve team work. Aspects were recalled - Phase 7 (E63)
	-	TM expressed disappointment to group that none of the suggestions had been implemented during her absence- Phase 7 (E63)
	*	There was silence as the group thought why they hadn't implemented what they had said they would – Phase 7 (E63)
	+	When I showed the video, B commented on the '*good looking lad on the telly*' referring to himself of course!- Phase 7 (E63)
	+	The students laughed together at the video clip (Phase 5) of A organising her notes when others were feeding back.
	+/-	A commented that she hadn't had time to do her photocopying the previous day. TM responded it was her team responsibility to have the work prepared in the first five minutes of the lesson. A was surprised at her behaviour on video- Phase 7 (E63)
	+	TM reflected that the group laughing together was like a group bonding session as they were all being held to account for the 'non-success' of phase 5- Phase 7 (E63)
	+/-	Critical friend commented that individual research topics seemed to be divisive and suggested incorporated a % of the assessment as a team effort (E64)
	+	Critical friend commented that TM intervened to tighten up discussion at the end of the discussion in response to their dithering and to provide guidance in time constraint- Phase 5 (E64)
	+/-	Group discussion cohesive but feedback individualistic Phase 1 and 5 (E64)
	+	*"I enjoyed watching us on the video, looking at how everyone acts, you don't realise until you watch yourself what you are doing. I think it has been useful to see yourself"*- Phase 3 referring to Phase 7 Cycle 3 (E75A)
3. Knowledge based development	+	Students A, C and D prepared comprehensive class notes during phase 2 (E50)
	-	Students weren't summarising the work, they photocopied it all-implications for cost, access, time- Phases 1 and 5 (E64)
	+/-	The information being distributed by students is now very bulky consisting of new information and reutilised previous notes –Phase 5 (E59)
	+	*"Learning more about the majiblonde/ meche products. Finding out what it's about, how it is mixed, how it is applied. I already knew about the spatula but I read up more about it"* – Phases 1 and 2 (E56A)
	+	*"Today was partly going into more detail about easi-meche and getting a bit more idea about colours (which I'm struggling with). The terminology is getting a bit easier too (once explained)"* -Phases 1 and 2 (E56C)
	+	*"Today I learnt about all the different types of bleaches and how to apply them"*. Phase 1 (E56D)
	+/-	Questioned C about comment that she was struggling with theory. She replied that it was the numbers and that she couldn't get her head around it. It was just a case of getting used to it. She said that other aspects of colour were ok (E66)
	-	Compare B's absence with Ds and Cs in previous cycles. Critical friend suggested the use of interventions and a recap for absent students. As T2 had not done this for B. (E64)
	-	Critical friend commented that there seemed to be an information overload. Are the cases too broad, more indicative at the beginning and less specific as they progress?– Phase 1 (E64)
4. Application of knowledge to context	+	They asked me (TM) to be Shirley! Good idea as I had no client video- looking for context-Phase 1 (E53)
	+	Critical friend commented that during TM simulation of Shirley, she swopped twice back into her facilitator role to provide expert advice. This worked well. Expert knowledge was required to allow the client consultation flow smoothly. In her role as a client, TM asked the students for their expert opinion twice- Phase 1 (E64)
	+	Is she allowed it coloured for work? –Phase 1 (E53)
	+	E and A said that the method of colouring was dependent on the client restyle- Phase 1 (E53)
	+	Sports? Which ones? Phase 1 (E53)
	+/-	1. During phase 6 B and D produced case reports which represented knowledge as discrete issues. During phase 6 B, C and D produced case report with clear links to the workplace. C's case report presented the knowledge in an integrated format (E92).
5. Consultation Skills (1:1)	+	E brought up face shape during phase 2 and whether you would tell a client that they haven't got the face for a style? (E53)
	+	Is the boyfriend an issue? C asked is Shirley stable?- Phase 1 (E53)
	+	Did Shirley really mind what we do?- Phase 1 (E53)

6. Improve own Learning	+	*"I used some text books and leaflets. Videos were no good for what I wanted"*- Phases 1 and 2 (E56A)
	+/ -	"*I also used text books*" Phase 1 (E56D)
	+	*" I didn't understand a few words but I looked them up and found out what they meant*" Phase 2 (E56C)
	+	"*Learning about the pen-meche. I didn't really understand it but after I read the book and watched how they did it (on video) I understood it was very good and gave a good effect at the end*" Phase 2 (E56E)
	+	*"The video was interesting, I learnt that I need to become neater and take my time"*- Phases 1 and 2 (E56A)
7. IT Skills	+	E used the computer to prepare her notes on cap highlighting during phase 2 (E50)
	+	*"I used the computer and text*" Phase 2 (E56C)
	+	*"I used the computer today. It was very useful. It has got a lot of information on it*" Phase 2 (E56D)
	+	*"I wrote somethings on the computer and then printed it out. It made it a bit more neater*" Phase 2 (E56E)
8. Other issues arising	+/ -	Critical friend commented that time was a major factor especially near the end of a session when TM tended to become more directive (E64)

Italics are student comments from their feedback. Non-italics are facilitator field notes or critical friend comments.

Table 27: Data Analysis Summary for Cycle 3

Aspect of PBL to be researched	+/-	*DATA ANALYSIS SUMMARY*
1. Motivation	+	1. Students C, D and E found the quiz on the computer interesting during phase 2.
	+/-	2. TM reflected that motivated students may benefit from distributing the cases at the beginning of the course (Cycle 1).
	-	3. B, C and D case reports were submitted late in phase 6. A and D did not submit reports.
	-	4. TM observed that phase 5 was perceived by students as being a functional session rather than a reiterative discussion of the case issues. This resulted in boredom.
2. Team Working and Group Communication	+	5. Students C and D became more assertive and vocal during phases 1 and 2.
	-	6. Student C experienced difficulty in scribing and chairing phase 1 simultaneously.
	-	7. Dominant group members A, C and E led phase 1 discussion.
	+/-	8. TM was aware of over directing and guiding students. Time constraints were perceived to be a factor contributing to increased direction of students during phases 1 and 2.
	+/-	9. During phases 1 and 2, A, C and D acknowledged group process and individual tasks. E only acknowledged her own work.
	-	10. TM observed that PBL is encouraging individualistic rather than group work values.
	-	11. Absent student B found it difficult to involve himself in phase 5 without a case recap.
	-	12. Critical friend commented that the students' perception of phase 5 as a reading exercise was divisive rather than cohesive.
	+	13. During phase 5, Student C acknowledged her use of student A's work from previous cycles.
	-	14. During phases 1 and 5, the group did not implement any previously discussed or agreed changes (Cycles 1and 2, Phase 7) to improve their team work and communication skills.
	-	15. TM observed during phase 5 that the group was not functioning as a team.
	+/-	16. During phase 7, team bonding occurred when all students were laughing at a video of themselves (in phase 5) illustrating their unsuccessful attempts to operate as a team.
3. Knowledge based development	-	17. Students relied heavily on generating and distributing vast amounts of paperwork and photocopies during phase 5.
	-	18. There was little evidence of summarising knowledge. TM reflected that she was contributing to this as she had indicated to students that they should cover all client options during phases 1 and 2.
	+	19. During phase 2, students A and C were aware of researching topics at a deeper level than they had in previous cycles.
	-	20. TM reflected that cases were too broad resulting in an information overload.
	+	21. During phase 1, expert knowledge was useful to facilitate students' progression with client consultation.
	-	22. C recognised technical terminology as a barrier to learning during cycles 1-3.
4. Application of knowledge to context	+	23. During phase 6, B, C and D produced case reports with clear links to the workplace..
	+/-	24. C's case report presented the knowledge in an integrated format whereas B and D produced case reports which represented knowledge as discrete issues
5. Consultation skills (1:1)	+	25. Students recognised the importance of questioning Shirley on her social and emotional situation in order to understand her requirements during phase 1.
	+/-	26. Student consultation was more interactive using facilitator simulation during phase 1.
6. Improve own Learning	+/-	27. A wider range of resources were being used by students during phase 2.
7. IT skills	+	28. Students C, D and E found the Hairdressing CD-ROM useful for information. Student E acknowledged the usefulness of the computer to process and present work.
8. Other issues arising	-	29. Reliance on vast amounts of paperwork has resource implications in terms of cost and time.

Table 28 : PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and with the participants in cycle 3.

Aspect of PBL being monitored in cycle 3	Differ (+/-)	Agree (+)	Disagree (-)
Motivation	TM reflected that it may be beneficial to distribute cases before phase 1.	Students C, D and E found the CD-ROM quiz interesting.	Students B, C and D case reports submitted late. Students A and E did not submit reports. Students perceived phase 5 as a function, rather than a team process.
Team working and group communication	TM aware that she was over-directing, instead of guiding students. Team bonding occurred when all students were reflecting on their lack of team performance.	Students became more assertive and vocal during phases1 and 2. Students A, C and D acknowledged group processes and individual tasks. Student C acknowledged her use of another student's work from a pervious cycle. TM suggestion to group not followed up.	Student C experienced difficulty in scribing and chairing phase 1. Dominant group members A, C and E led phase 1 discussion. Student E only acknowledged individual tasks. TM reflected that PBL encouraged individualistic rather than group values. Students did not implement any discussed changes to improve teamwork from cycle 2 phase 7 reflection Phase 5 was divisive rather than cohesive
Knowledge based development	Students did little summarising of knowledge for phase 5. TM aware that she was influencing information overload by indicating to students they should explore all case options.	During phase 1 the expert tutor was useful in facilitating student's consultation and knowledge progress. Students A and C were aware that they were researching topics at a deeper level than previously.	C recognised technical terminology as a barrier to learning in PBL. TM reflected that cases may be too broad resulting in information overload.
Application of knowledge to context	Students presented their case reports as either integrated or discrete knowledge.	Case reports showed clear links to workplace.	
Consultation enquiry skill	Student consultation was more interactive using facilitator simulation.	Students recognised the importance of understanding the client's social context.	
Improve own learning	A wider range of resources was being used by students during phase 2.	Students C, D and E found CD-ROM useful.	PBL generated vast amounts of paperwork.

APPENDIX 8

CYCLE 4

DATA ANALYSIS

Figure 21 : Seating Arrangements initially during Cycle 4, Phase 1

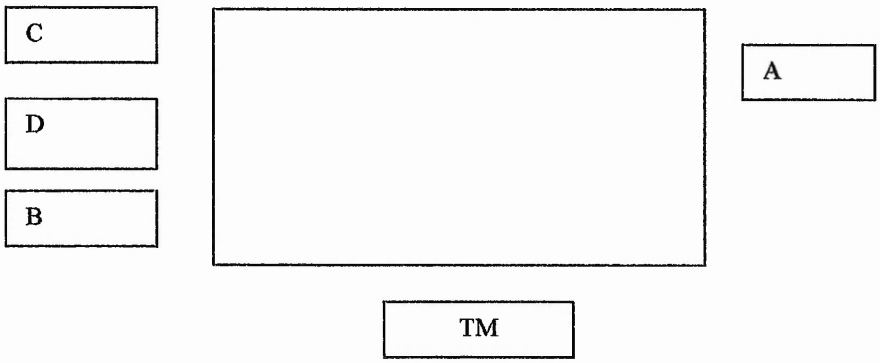

Figure 22 : Changes to Table and Seating Positions by TM and Flow of Discussion during Cycle 2, Phase 1

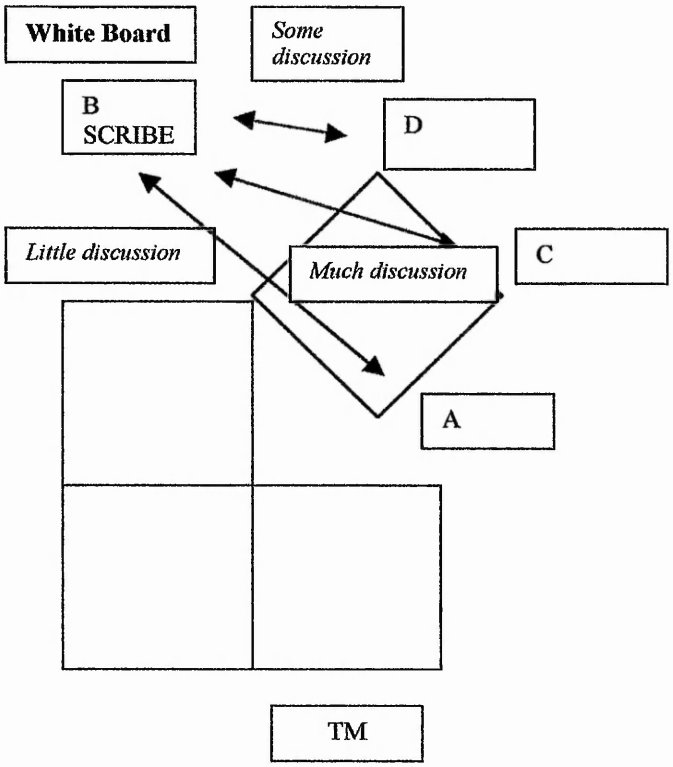

Table 29 : Resource Use during Cycle 4, Phase 2

Resource / Student	Text Own-Other	TV/ Video	Clynol Educator	Computer/ CD-ROM	Other/ External
C	* Previous notes	*		*	
B	* (requested info.)	*		*	
A	* own and others notes	* (requested info.) none suitable		*	
E Absent					
D	* own and others notes	*		*	

Table 30 : Cycle 4 case issues discussed by tutorial group (phase 1), researched (phase 2) and analysed by individual students in solving the Gazza case (phase 6).

Case Issues (group) / Student + chosen research topic	Health and Safety 1	Social Issues/ Lifestyle 2	Technique 3	Return colour 4	Maintenance/ Aftercare 5	Product 6
C	*	*	*	*	*	*
B	*	*	*		*	*
A	*	*	*	*	*	*
E **Absent –Hols.**						
D	*	*	*	*	*	*

TABLE 31

KEY SKILLS SELF-ASSESSMENT ANALYSIS

STUDENT RECORDS OF THEIR OPINION OF PERFORMANCE DURING CYCLE 4- GAZZA	☺ Very Good	😐 Average	☹ Needs Improving
1. TEAM WORKING		A B C D	
2. ORAL COMMUNICATION	C	A D	B
3. WRITTEN COMMUNICATION	A C	B D	
4. INFORMATION TECHNOLOGY SKILLS	D	B C	A
5. PROBLEM SOLVING		A C	B D
6. IMPROVING YOUR OWN LEARNING	C	A B D	

Table 32: Cycle 4- Critical Incident Analysis in relation to Table 4 PBL Issues (for Evidence [E] see Appendix 3: Research Archive)

Aspect of PBL to be researched	+/ -	*CYCLE 4 DATA ANALYSIS OF CRITICAL INCIDENTS*
1. Motivation	-	TM sensed a feeling of repetition and boredom within the group when they anticipated researching their topics during phase 3. TM suggested that each individual should work on their own cases during phase 3. Students were asked to have prepared the case analysis by the end of phase 2. (E69)
	-	Individual working was particularly appealing for A during phase 1 and 2 (E69)
	+	*"Bleaching interested me today"* Phases 1 and 2 (E75B)
	+	*"I'm very interested in colours/ base shades the more I get to know. I didn't dislike anything really"* Phase 1 and 2 (E75C)
	+	*"I learnt about how bleach works which is something new"*- Phase 2 (E75A)
	+/-	Students seemed unchallenged by the Gazza discussion so TM adapted PBL process (E71)
2. Team Working/ Communication (group)	+/-	TM instigated a change in seating positions by changing the layout of the tables and chairs (E69 and E70)
	+/-	TM suggested using a paired round robin discussion (A and C) and (B and A) and then each individual to work on their own topic during phase 1 and 2 (E69)
	+	A suggested to the group that they could watch a relevant video that she had seen during phase 2 of Cycle 3 (E69)
		B (scribe) noted main issues on white board during phase 1 (E69).
	+	During phase 2, D said she worked with *"C, B and A to organise what we were doing and then I worked on my own for a bit to get information on what we had decided to do"* (E75D)
	+	*"The first half of the session we worked together but after we worked on our own"* Phases 1 and 2 (E75B)
	+	*"I worked with A for a short time this morning, discussing factors to consider about the boys who want to look like Gazza"*- Phases 1 and 2 (E75A)
	+	*"I worked with everyone today, also we did split into twos to discuss something and then we all came back together to discuss it. I worked on my own when I wrote my case study up"*- Phases 2 and 3 (E75A)
	+	Students self assessed their team working skills as average during phases 2 and 3 (E76)
	+/-	TM reflection about whether changing to non-reiterative PBL negates the benefits of the PBL process –Phase 3 (E84)
3. Knowledge based development	+	Notes had previously been distributed about most subjects during phase 5 of Cycles 1, 2 and 3 (E69)
	+/-	After phase 2, TM arranged the case issues on the white board so that the students could refer to it during phase 3. This followed the previous weeks review of a tick box and was mainly for Bs benefit (E69)
	+/-	*"Today we were going over a lot of things we had already done but we learn a bit more about bleaching and highlift colours"* (E75D)
	+	*"Learning about colours...it's starting to give me a clearer picture of colouring"* Phase 2 (E75D)
	+	*"Today I learnt about all the tones and how to lift normal hair"*-Phases 1 and 2 (E75B)
	+	*"I also used information previously collected"* -Phase 2 (E75C)
	+	*"More about colours/ bleaching, I learnt more about depths and tones and how to apply on different lengths"*- Phase 1 and 2 (E75C)
	+	*"I knew about bleach before but I found out about it in more detail"*-Phase 2 (E75A)
4. Application of knowledge to context	+	Students C and D produced comprehensive case reports during phase 6 clearly linking their knowledge with the workplace. The information was presented in an integrated format (E92)
	-	Students A and B produced case reports during phase 6 which presented the information they had acquired as separate issues (discrete). There was evidence of the use of work related knowledge (E92)
5. Consultation Skills (1:1)	+	Students approached their case reports as a consultation process in a personal way – Phase 6 (E77-E80)

6. Improve own Learning	+/-	TM asked students to reflect on their experience of PBL and their Key Skill development during phases 1 and 2, Cycle 4 (E69)
	+	B acting as scribe during phase 2 (E69)
	+/-	TM found the section of video that was requested and played it for the group during phase 2 (E69)
	+	*"Computer, textbook and video, they were all very useful. They had a lot on bleaching"* –Phase 2 (E75D)
	+	*"Today, I used the computer, my textbook, the TV and video"* -Phase 2 (E75B)
	+/-	Student B identified that he needed to improve his oral communication skills (E76)
	+	*"Videos, very useful information"*- Phase 2 (E75C)
7. Information Technology (IT) Skills	-	The computers were turned on already prior to the beginning of the lesson during phases 1 and 2 (E69)
	+	*"Discs- information about applying good"* Phase 2 (E75C)
	+	*"I used the computer and video. These were both very good because they had good information on bleaching, also the texts books were useful too"*- Phase 2 (E75A)
	-	Student A identified herself as needing to improve her IT skills during phase 2 (E76)
	+	Student D identified her IT skills as very good during phase 2 (E76)
8. Other issues arising	+/ -	TM returned to using no facilitator guide during phase 1 (E68)
	+/-	TM declined to comment on whether reports were good or bad, just mention topic areas missed or obvious mistakes where improvement could be made- Phase 6 (E83)
	+/-	TM reflection on whether case reports be given to students beforehand rather than one at a time. Would help in absences (E84)

Italics are student comments from their feedback. Non-italics are facilitator field notes or critical friend comments.

Table 33: Data Analysis Summary for Cycle 4

Aspect of PBL to be researched	+/-	*DATA ANALYSIS SUMMARY*
1. Motivation	+	1. Students liked finding out about new information during phase 2.
	-	2. Student A was motivated by being allowed to research the case on her own after phase 1.
	+/-	3. Non-reiterative PBL was more motivating for students during cycle 4.
2. Team Working and Group Communication	+	4. Students acknowledged group work during phase 1.
	+/-	5. TM instigated changes to seating plans and discussion formats to promote group work in phase 1.
	+/-	6. TM reflected whether non-reiterative PBL decreased teamwork and group communication skills during cycle 4.
	+/-	7. TM reflected what contribution the use of the facilitator guide had made to her role.
3. Knowledge-based development	+/-	8. Following a previous suggestion, TM wrote the ten main issues that had emerged from phase 1 on the white board. This was mainly for the benefit of student B.
	+	9. Students A and D recognised they were researching topics in more depth than in previous cycles.
	+/-	10. C acknowledged the use of knowledge from previous cycles during phase 1.
	+/-	11. Students perceived knowledge to be largely discrete or integrated.
	+/-	12. Providing students with all cases prior to cycle 1 would facilitate the students' involvement in the case cycles following or prior to an absence.
	+/-	13. TM reflected on a suitable format for giving students feedback on their case reports in phase 6.
4. Application of knowledge to context	+	14. All student case reports made links to workplace knowledge in varying degrees.
5. Consultation skills (1:1)	+	15. Students took a personal approach to case report writing during phase 6.
	+	16. Students provided options for the clients along with their professional opinion in phase 6.
6. Improve own Learning	+/-	17. Student B acted as scribe during cycle 4, phase 1. He assessed his writing skills as average and stated that his oral communication skills needed improving.
	+	18. Students used a wide range of resources including TM and prior knowledge during phase 2.
	+	19. TM reflected that the classroom required a considerable time to set up in order to facilitate PBL during phases 1 and 2.
	+/-	20. Students B, C and Ds' self-assessment of key skills matched those observed. Student A's key skills did not match those observed.
7. Information Technology (IT) Skills	+	21. TM ensured that all computers were switched on prior to phase 1 and 2 classes commencing.
	-	22. Students did not use computers to prepare their case reports for phase 6.

Table 34: PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and participants in cycle 4.

Aspect of PBL being monitored in cycle 4	Differ (+/-)	Agree (+)	Disagree (-)
Motivation	Non-reiterative PBL was more motivating for students when a body of knowledge had been constructed.	Students liked finding out about new information.	Student A was more motivated by being allowed to research the full case on her own rather than collaboratively.
Team working and group communication	TM instigated changes to seating plans as previously discussed by the group. TM reflected whether non-reiterative PBL decreased teamwork and communication aspects of PBL. TM reflected on the benefit of the user guide to her role, as one had not been used during cycle 4.	Students valued group work during phase 1.	
Knowledge based development	TM reflected that providing students with all case studies would facilitate their self-directed study in cases of absence. TM supported Student B in scribe role. TM reflected on grading of phase 6 reports.	Students aware of building a deeper body of knowledge. Students had built up a considerable amount of knowledge from previous research and circulated information.	Students recording knowledge during phase 6 as largely discrete or integrated.
Application of knowledge to context		All case reports made varying degrees of links to the workplace.	
Consultation enquiry skill		Students A, C and D provided solutions for the client case along with their opinion. Students took a personal approach to writing the case study.	
Improve own learning	TM reflected that a considerable amount of time was needed to create a PBL class environment. TM encouraged computer use by ensuring they were turned on prior to classes.	Some student's self-assessment did not match facilitators observed records of performance. All students used a wide range of resources in phase 2.	Student did not use IT skills to produce their phase 6 reports.

APPENDIX 9

CYCLE 5

DATA ANALYSIS

TABLE 35: ASSESSMENT RESULTS

City and Guilds (C&G) Mandatory Hairdressing Level 2 Examination Unit 206 (8 Questions- I hour test, 18/8/99 – 1st attempt)

PBL Case Study Assessment (I hour, 18/8/99)

Trainee name/ Group	*C&G Questions marked correct*	*C&G Questions that could be completed by oral examination*	*C&G Incorrect answers*	*Case study assessment (%)*
B / B	0	2	6	30%
C/ B	4	2	2	60%
D/ B	2	4	2	54%
E/ B	4	2	2	76%
A/ B	4	3	1	90%
F/ A	5	2	1	80%
I /A	3	2	3	46%
H /A	5	3	0	82%
G /A	4	0	4	72%
J (absent)	1	2	5	N/A

Average case study assessment marks:

BETA Group (B) 64% or (- Student B result) 70%
ALPHA Group (A) 70 % (Student J absent)

Table 36: Student Reflection on Assessment Methods

Following the assessments, students were asked to reflect on the following questions. The six questions were read out to them and students were asked to record their responses. The results are analysed in the following tables.

Questions:

(Referring to the case study assessment)

1. Is the case study representative of the type of situation that would occur in the salon?
2. Did you feel that you knew the answers?
3. Did you feel that the case study was relevant to you?
4. Which resources did you use in order to answer the case study (say how much)? (class notes/texts/educator)
5. How did you feel that this case study tested your colouring knowledge?

(Referring to both assessment methods)

6. Which type of test would you prefer to do and why (one or other or both)?

1

Trainee name	Is the case study representative of the type of situation that would occur in the salon ? Yes= 100%
B	Yes
C	Yes
D	Yes
E	Yes
A	Yes
F	Yes
I	Yes
H	Yes
G	Yes

2

Trainee name	Did you feel that you knew the answers? Yes= 56% No= 22% Some= 22%
B	Some of them
C	If I had time to finish it I think I could have managed
D	Yes, but couldn't finish in time
E	No
A	Yes
F	Yes
I	No! middle
H	Yes
G	Yes

3

Trainee name	Did you feel that the case study was relevant to you? Yes= 66% No= 34%
B	Yes
C	Yes, no questions weren't relevant
D	Yes
E	No
A	Yes
F	Yes
I	No
H	Yes
G	No

4

Trainee name	Which resources did you use in order to answer the case study (say how much)? (class notes/texts/educator) Memory = 66% Colour chart= 100% Texts= 55%
B	Colour chart, text books, the text book helped me a lot
C	Memory(a little) colour chart(a lot) and educator(a little). Colour Chart was most useful
D	Viton S ICC quite a bit, hairdressing book a little, memory a lot
E	Notes lot, text book, little, colour chart little
A	Memory a lot, colour chart little, memory from class notes most useful
F	Text book a lot, ICC little, memory a lot, text book and memory most useful
I	Book a lot for one question and Viton S colour chart directory was very helpful used it a lot
H	Memory and colour chart, a little class notes v little
G	Memory, Icc chart, Direct colour chart, the charts were most useful. Mostly my memory

5

Trainee name	How did you feel that this case study tested your colouring knowledge? No difference = 1 (11%) More difficult = 1 (11%) Easier = 7 (77%)
B	It was the same as the 1st paper (test)
C	Easier to have info. in front of you, but not long enough for all the answers
D	Tested me, quite easy, it seemed easier, maybe because we had been doing it before
E	Easier because your have a case study you knew what you have to find out
A	It tests your knowledge better because it is putting you in a situation that will occur in the salon and tests what questions you need to ask unlike the written test questions
F	It was easier because we had the safety net of using text books and resources
I	I thought the test was easier because I was dealing with a customer and I could use text books.
H	This test was easier because we were able to relate to the problems rather than just a question on colouring
G	I thought it was more difficult because you had to think about the possible solutions and the consequences

6

Trainee name	Which type of test would you prefer to do and why (one or other or both)? Both= 4 (44%) Case Study= 4 (44%) City and Guilds= 1 (44%)
B	Both of them
C	I think both are good to test memory and knowledge to use information available
D	Case Study method
E	2nd KM Test (Case Study)
A	Do both because the City and Guilds asks you questions that you need to know but don't come up everyday like the case study questions
F	Open-book case study method
I	This case study(KM) do both
H	Natalia Test. Case Study
G	I prefer City and Guilds because

Table 37: Case Analysis Summary for Cycle 5 (in relation to Table 4 PBL Issues)

Aspect of PBL to be researched	+/-	*ASSESSMENT DATA ANALYSIS SUMMARY*
Knowledge-based development	+	Students who scored highly on the City and Guilds test paper also scored well on the case study assessment.
	+/-	Average case study assessment marks between PBL group and non-PBL group were similar.
	-	PBL students who scored the highest marks were students who largely had perceived knowledge as discrete rather than integrated during the presentation of their case reports in Cycles 1-4.
	+/-	66% (6) students said they used their memory as a resource in the case assessment.
	+/-	77% (7) students felt the case study assessment was easier than the City and Guilds Written test paper in terms of testing their knowledge
	+/-	44% (4 students including A, B and C) responded that they would like to be tested in both formats and
	+	C thought that 'both tests were good to test memory and knowledge to use information available'.
	+	44% of students responded that they preferred to be tested just by the case study. Only 1 student (11%) preferred the City and Guilds Written test format.
Application of knowledge to context	+	All the students involved in the assessment agreed that the case study used in the assessment was representative of the type of situation that would occur in the salon.
	+	66%(6) of the students felt that the case study was relevant to them.
	+	All of the students used the salon colour chart in their case study assessment.
Improve own Learning	+/-	55%(5) students claimed to have known the answers to the case study assessment. However, time was mentioned by 22% as a constraint on completing the assessment.
	+	55%(5) students used texts during the case study assessment
	+	Students used a range of resources during the case study assessment

Table 38: PBL research themes highlighting where the data differs, agrees and disagrees with the literature overview and participants in cycle 5.

Aspect of PBL being monitored in cycle 5	Differ (+/-)	Agree (+)	Disagree (-)
Knowledge based development	Average case study assessment marks between PBL and non-PBL groups were similar. 66% of students used their memory as a resource during the case assessment. 77% of students felt that the case study assessment was easier than the mandatory test paper. 44% of students responded that they would like to be tested in both assessment formats.	Students who scored highly on the mandatory test paper also scored highly in the case study assessment. Student C recognised the development of both content and process knowledge. 44% of students responded that they would like to be tested in a case study format in preference to the mandatory written test.	PBL students who scored the highest marks were students who largely perceived knowledge as discrete during cycles 1-4 case reports.
Application of knowledge to context		All students used the salon colour chart in their case study assessment (salon standard practice). All students agreed that the case study was representative of a salon situation. 66% of students felt the case study was relevant to them.	
Improve own learning	22% of students felt they would have completed the test but were constrained by time.	Students made use of a wide range of resources during the case study assessment. 55% of students claimed to have known the answers to the questions.	

APPENDIX 10

CYCLE 1 -4

CASE STUDY ANALYSIS

TABLE 39 :Analysis of students' approach to presenting case reports during all cycles 1-4 and case assessment results

Student/ Case Report	CYCLE 1 Rose E23-27	CYCLE 2 Felix E41-43	CYCLE 3 Shirley E59-61	CYCLE 4 Gazza E73-76	Natalia Assessment E84
A	• Use of 'we' • Discrete • Recognition of transfer • Solution provider • Team dependent • Evidence of IT use	• Use of 'we' and 'I' • Discrete • Recognition of transfer • Problem solver • Team dependency • No evidence of IT use	Not submitted	• Use of 'I' and 'we' • Discrete • Recognition of transfer • Solution provider • Independent • No use of IT	90%
B	• No recognition of 'I' or 'we' • Discrete • Little recognition of transfer • Solution provider • Team dependent • No use of IT	• Use of 'I' and 'we' • Discrete • Little recognition of transfer • Problem solver • Team dependent • No use of IT	• Use of 'we' • Discrete • Recognition of transfer • Problem solver • Team dependent • No use of IT	• Use of 'we' • Discrete • Recognition of transfer • Problem solver • Team dependent • No use of IT	30%
C	• Use of 'I' and 'we' • Integrated • Recognition of transfer • Solution provider • Independent • No use of IT	Holiday	• Use of 'I' • Integrated • Recognition of transfer • Solution provider • Independent • No use of IT	• Use of 'I' and 'we' • Integrated • Recognition of transfer • Solution provider • Independent • No use of IT	60%
D	• Use of 'I' and 'we' • Discrete • Recognition of transfer • Solution provider • Team dependent • No use of IT	• Use of 'I' and 'we' • Discrete • Recognition of transfer • Solution provider • Team dependent • No use of IT	• Use of 'I' and 'we' • Discrete • Recognition of transfer • Problem solver • Team dependent • No use of IT	• Use of 'we' and 'I' • Integrated • Recognition of transfer • Solution provider • Independent • No use of IT	54%
E	• Use of 'I' • Discrete • Little recognition of transfer • No options/ little solving of issues • Independent • No use of IT	Not submitted	Not submitted	Holiday	76%

APPENDIX 11

LITERATURE OVERVIEW DEVELOPMENT

Table 40: LITERATURE OVERVIEW ISSUES

Aspect of PBL to be researched	*LITERATURE OVERVIEW ISSUES SUMMARY*
1. Motivation	1. Students were motivated by a student orientated PBL approach during phase 1. 2. Students were aware of the change in values away from dependency on the teacher to themselves. 3. Students were motivated by finding out new knowledge. 4. There was a need for negotiation for submission of case reports for phase 6. 5. Some students were de-motivated by not being given clear guidelines by the teacher on how to present their work. 6. The submission of case reports were not compulsory. The case reports were not graded for used as assessed work that contributed to the students final mark. Some students did not submit reports. 7. Personality types and learning styles affected the working of the group and group motivation. **Types of PBL used** 8. Reiterative PBL (variety 6) was implemented in Cycle 1 and 3 (Barrows, 1986) 9. Cycle 2 was implemented using a modified case-based method (variety 4) 10. Cycle 4 was implemented using a problem-based method of PBL as it was more motivating for students who wanted to work more on their own (variety 5). 11. Time was a factor which restricted student effort. 12. Students found computer quizzes motivating to check their understanding during self directed learning, in place of confirmation from the teacher. 13. Motivated students may benefit from distributing the cases at the beginning of the course 14. Phase 5 was perceived by students as being a functional feedback session rather than a reiterative discussion of the case issues. 15. Students used a range of resources during the case study assessment
2. Team-Working and Group Communication	16. Students were aware of their contribution to the team aim during phase 1 and 2. 17. Students expressed concerns about having to depend on weaker group members for information. 18. Group members recognised and delegated tasks in accordance with their perception of individual students' abilities. 19. Phase 1 discussions ranged from full to partial participation of the group. This was dependent on the group members present, the seating positions, confidence, phase of the discussion, previous attendance of the student and individual oral competence. 20. During phase 2, students acknowledged that both group discussion and individual tasks were components of the PBL process. 21. Students found it difficult to act as a scribe and direct discussion at the same time 22. Students acknowledged that their teamwork skills were often poor. 23. Students identified strategies for improving their teamwork skills which were not subsequently implemented. 24. TM was concerned with the large number of case issues that were emerging during phases 2. 25. C said she did not like presenting information to the group during phase 5. Other students when questioned did not mind. 26. TM unsure as to when the facilitator should intervene and to what extent, during PBL phases 1, 2 and 5. 27. Students were aware that they were being monitored on their communication and team work skills during the PBL process 28. Students became more assertive as the cycles progressed. 29. TM was often unaware aware of over directing and guiding students. Time constraints were perceived to be a factor contributing to increased direction of students during phase 1 and 2. 30. TM observed that PBL is encouraging individualistic rather than group work values, phase 5 became divisive rather than cohesive. 31. TM observed during phase 5 that the group was not functioning as a team. 32. During phase 7, team-bonding occurred when all students were laughing at a video of themselves (in phase 5) illustrating their unsuccessful attempts to operate as a team.

	33. Students acknowledged group work during phase 1. 34. TM instigated changes to seating plans and discussion formats to promote group work in phase 1. 35. TM reflected whether non-reiterative PBL decreased teamwork and group communication skills during cycle 4. 36. TM reflected what contribution the use of the facilitator guide had made to her role. 37. Providing students with all cases prior to cycle 1 would facilitate the students' involvement in the case cycles following or prior to an absence
3. Knowledge-based development	38. Students were able to direct their own learning during phases 2 with support from TM. 39. False knowledge was circulated during phase 5 of Cycle 1. 40. Students had not addressed all the group issues that had been identified during phase 1, in their case reports (phase 6). 41. During phase 1 and 2 TM was aware of directing and guiding students in identifying certain issues. 42. TM felt the need for a facilitator guide for phase. The facilitator would use the guide to help prompt and guide the students better during discussion and ensure that all the important aspects of the case were identified 43. Students E and D requested information on the correct way to present their case reports. TM suggested using the case issues as an outline. 44. Students relied heavily on generating and distributing vast amounts of paperwork and photocopies during phase 5. There was little evidence of summarising knowledge. 45. TM reflected that she was contributing to this as she had indicated to students that they should cover all client options during phase 1 and 2. 46. TM reflected that cases were too broad resulting in an information overload. 47. Expert knowledge was useful to facilitate students' progression with client consultation. 48. C recognised technical terminology as a barrier to learning during cycles 1-3. 49. TM intervened and recorded the main case issued for Cycle 4 on the white board for benefit of student B. 50. Students recognised they were researching topics in more depth as they progressed through the cycles. 51. Students were aware that they were building a body of knowledge by using notes from previous cycles to contribute to understanding in solving cases. 52. Students who scored highly on the City and Guilds test paper also scored well on the case study assessment. 53. Average case study assessment marks between PBL group and non-PBL group were similar. 54. Students who scored high on content perceived knowledge to be discrete 55. Students perceived knowledge to be largely discrete or integrated 56. Some students recognised that the assessment were testing content and process knowledge.
4. Application of knowledge to context	57. Students brought their own life experience and knowledge to the group discussions 58. Students were eager to find out more about the real clients. 59. Students used their previous knowledge to identify and understand case issues in phases 1. 60. D perceived her role in the group as a 'job'. 61. Transfer of knowledge was not guaranteed solely by clients with similar social issues. 62. Neither student A or H made a 'transfer' of knowledge regarding consultation issues when faced with a salon client who spoke of a work context resembling that of the Felix case 63. Students either perceived their knowledge to be integrated or discrete with regard to case issues. 64. All student case reports made links to workplace knowledge in varying degrees. 65. All the students involved in the assessment agreed that the case study used in the assessment was representative of the type of situation that would occur in the salon. 66. 66%(6) of the students felt that the case study was relevant to them. 67. All of the students used the salon colour chart in their case study assessment. This is what occurs in the salon.
5. Consultation skills (1:1)	68. Consultation issues were identified with ease by the group during phases 2. 69. Students generally recognised the need for questioning clients prior to taking action or making a decision during phases 6. This included finding about their social environment and emotional state. 70. Students either perceived themselves as solution providers or problem solvers. Some students provided solutions and then gave the client their own professional opinion. 71. E unable to see the relevance of exploring the social context of the client during phase 1 in order

	to identify any underlying case issues. 72. Initially consultation skills were a learned behaviour. By cycle 3 students were asking more deeper, probing questions. 73. Student consultation was more interactive using facilitator simulation rather than a video. 74. Students took a personal approach to case report writing during phase 6.
6. Improve own Learning	75. Some students did not value completing the written case report which would have provided them with feedback from the teacher. 76. Students initially used resources they were confident and familiar in using. During the cycles and with support from the teacher, they were able to progress by using other unfamiliar resources. 77. Students used each other as resources. 78. The teacher (facilitator) acted as an essential resource. 79. Students perceived other resources as existing in the real world. 80. The photocopier was used extensively as a resource for generating information for the student reviews in phases 5. 81. Students requested support from TM for finding information during phases 2. 82. Students' self assessment and evaluations often did not reflect their experiences observed by the teacher 83. Time was noted as a factor in restricting learning. 84. TM reflected that the classroom required a considerable time to set up in order to facilitate PBL during phases 1 and 2. 85. TM reflected on a suitable format and use of language for giving students constructive feedback on their case reports in phases 6. 86. In phases 5 and 6 students used previous knowledge already developed by themselves and their colleagues to build a framework of knowledge and solve the case.
7. IT skills	87. The hairdressing CD-ROM was a popular resource with students in self-directed learning environment for information and checking progress. 88. Confidence using IT during increased during the cycles 1-4. 89. Computer was seen to be useful for processing and presenting information during phase 2. However, due to time and lack of access this resource was not used for processing case reports in phase 6. 90. Students were encouraged to use the computers by TM who ensured they were switched on prior to phases 1 and 2 classes commencing in cycle 3 and 4.
8. Other issues arising	91. The PBL process was time consuming. 92. There was a need to review and change the student evaluations to capture the PBL experience. 93. Student difficulties can be physically based 94. The group demonstrated that they could act independently from the teacher by not following up TMs suggestion to create a checklist grid for case issues. 95. PBL has resource implications in terms of cost and time.

Table 41: LITERATURE STRUCTURE

Aspect of PBL to be researched	*LITERATURE STRUCTURE*
1. Motivation	1. Motivation- (underpinned by reflection). 2. Learning styles and how they affect motivation. 3. PBL as part of discovery learning 4. PBL motivators and de-motivators
2. Team Working and Group Communication	5. Characteristics of the group and how it affects team work and communication. 6. How the method of PBL used affects the teamwork and communication. 7. The role of the facilitator in contributing to good team work and communication skills.
3. Knowledge based development	8. Types of knowledge (discrete or integrated) 9. Development of knowledge in PBL. 10. Role of expert v. non-expert facilitator. 11. Use of different assessment formats to test knowledge.
4. Application of knowledge to context	12. Students perception of developing knowledge in relation to application. 13. Transfer of knowledge and recognition of context.
5. Consultation skills (1:1)	14. Consultation skills develop from learned behaviour to professional judgement. 15. The importance of prior knowledge in identifying case issues. 16. Students' perception of themselves as solution providers or problem solvers.
6. Improve own Learning/ IT skills	17. Role of facilitator in supporting students' learning. 18. Resource implications of PBL in terms of cost and time. 19. Multiple role of computer: resource, motivator and as a tool for processing information. 20. Confidence improved with use, facilitated by teacher
8. My own role as facilitator/ Reflective journey	21. Need to review and change research tools in order to capture PBL process and student experience of PBL. 22. The limitations of words in describing, capturing and accessing meaning.

APPENDIX 12

DATA RELATED TO THEMES

Table 42: Summary of data emerging throughout Cycles 1-4 relating to Motivation

Cycle	Differ (+/-)	Agree (+)	Disagree (-)
1	• TM reflected on the need to negotiate the deadlines in line with collaborative principles and student-led programme	• Students enjoyed phases 1 and 2 • Students recognised change towards student orientated approach. • Students motivated by real world relevance of client case.	• Case reports were submitted late • Students had not prepared information for feedback to group.
2	• Student B's ability to contribute not reflective of demonstration in cycle 1	• Students A, D and E motivated by finding out 'new' information	• Student B experienced motivational difficulties • All case reports submitted late • Student E did not submit a case report
3	• TM reflected that it may be beneficial to distribute cases before phase 1	• Students C, D and E found the CD-ROM quiz interesting	• Students B, C and D case reports submitted late • Students A and E did not submit reports • Phase 5 was perceived by students as a function rather than a team process
4	• Non-reiterative PBL was more motivating for students when a body of knowledge had been constructed	• Students liked finding out about new information	• Student A was more motivated by being allowed to research the full case on her own rather than collaboratively

Table 43: Summary of data themes emerging throughout Cycles 1-4 relating to teamwork/ communication

Cycle	Differ (+/-)	Agree (+)	Disagree (-)
1	• PBL favoured orally competent and confident group members.	• Students aware of their contribution to the team effort and delegated tasks appropriately. • All students contributed to discussion in phase 1.	• Students expressed concerns about having to depend on weaker members for information.
2	• Students acknowledged poor teamwork skills • Student C did not like presenting during phase 5 • TM directing group too much during phase 2 • TM unsure as to when to intervene in PBL phases	• TM suggestion to group not followed up • Students aware that they were being monitored on research themes • Students acknowledged teamwork and individual tasks as part of PBL	• Student D finding it difficult to act as scribe and chairperson • Critical friend suggested that unconfident students would find it difficult to contribute to PBL • TM concerned with large number of case issues
3	• TM aware that she was over- directing instead of guiding students • Team bonding occurred when all students were reflecting on their lack of team performance	• Students became more assertive and vocal during phase 1 and 2 • Students A, C and D acknowledged group processes and individual tasks • Student C acknowledge her use of another students work from a pervious cycle	• Student C experienced difficulty in scribing and chairing phase 1 • Dominant group members A,C and E led phase 1 discussion • Student E only acknowledged individual tasks • TM reflected that PBL encouraged individualistic rather than group values • Students did not implement any discussed changes to improve teamwork from cycle 2 phase 7 reflection • Phase 5 was divisive rather than cohesive
4	• TM instigated changes to seating plans as previously discussed by the group • TM reflected whether non-reiterative PBL decreased teamwork and communication aspects of PBL • TM reflected of the benefit of the user guide to her role as one had not been used during cycle 4	• Students valued group work during phase 1	•

Table 44: Summary of data themes emerging throughout Cycles 1-5 relating to knowledge-based development

Cycle	Differ (+/-)	Agree (+)	Disagree (-)
1	• TM aware of directing and guiding students towards certain case issues. • Case reports reflected various depths of understanding • TM felt the need to have a facilitator's guide. • TM reflection on whether all circulating information should be checked for 'truth'	• Students able to direct their own learning and request support when required.	• Students did not address all the case issues in their reports as had been identified during phase 1. • False knowledge circulated.
2	• Student E and D requesting teacher direction on the right way to present case reports	• Students used their previous knowledge to solve case	
3	• Students did little summarising of knowledge for phase 5 • TM aware that she was influencing information overload by indicating to students they should explore all case options	• During phase 1 the expert tutor was useful in facilitating student's consultation and knowledge progress • Students A and C were aware that they were researching topics at a deeper level than previously	• C recognised technical terminology as a barrier to learning in PBL • TM reflected that cases may be too broad resulting in information overload
4	• TM reflected that providing students with all case studies would facilitate their self-directed study in cases of absence • TM supported Student B in scribe role • TM reflected on grading of phase 6 reports	• Students aware of building a deeper body of knowledge • Students had built up and had access to a considerable amount of knowledge from previous research and circulated information	• Students recording knowledge during phase 6 as largely discrete or integrated
5	• Average case study assessment marks between PBL and non-PBL groups were similar • 66% of students used their memory as a resource during the case assessment • 77% of students felt that the case study assessment was easier than the mandatory test paper • 44% of students responded that they would like to be tested in both assessment formats	• Students who scored highly on the mandatory test paper also scored highly in the case study assessment • Student C recognised the development of both content and process knowledge • 44% of students responded that they would like to be tested in a case study format in preference to the mandatory written test	• PBL students who scored the highest marks were students who largely perceived knowledge as discrete during cycles 1-4 case reports.

Table 45: Summary of data themes emerging throughout Cycles 1-5 relating to Application of knowledge to context

Cycle	Differ (+/-)	Agree (+)	Disagree (-)
1		• Students brought real world experience to phase 1.	
2		• Student D perceived her team role as a job	• Studentsdid not make transfer of knowledge in the workplace with real client expressing similar case characteristics
3	• Students presented their case reports as either integrated or discrete knowledge	• Case reports showed clear links to workplace	
4		• All case reports made varying degrees of links to the workplace	
5		• All students used the salon colour chart in their case study assessment (salon standard practice) • All students agreed that the case study was representative of a salon situation • 66% of students felt the case study was relevant to them	

Table 46: Summary of data themes emerging throughout Cycles 1-5 relating to client consultation skills

Cycle	Differ (+/-)	Agree (+)	Disagree (-)
1	• Students used their knowledge of the workplace to relate to client	• Consultation issues were identified easily by students.	
2	• Student A explained the reason consultation questions were needed in behavioural terms	• Student A recognised the importance of asking consultation questions	• Student E could not see the relevance of exploring the clients social context in solving the case
3	• Student consultation more interactive using facilitator simulation	• Students recognised the importance of understanding the client's social context	
4		• Students A, C and D provided solutions for the client case along with their opinion • Students took a personal approach to writing the case study	

Table 47: Summary of data themes emerging throughout Cycles 1-4 relating to 'Improve own learning' and incorporating Information Technology (IT)

Cycle	Differ (+/-)	Agree (+)	Disagree (-)
1	• Students used resources but only resources that they were familiar with or confident in using. • Students A and B found the CD-ROM programme a popular resource	• Students perceived resources to be the tutor, other colleagues and available in the real world.	• A lack in confidence prevented Student C from using computers • Student C expressed that PBL was time consuming.
2	• Photocopier used extensively • Computer only used by students A and E	• Students requested support from TM	• TM perceived need to promote use of 'new' resources
3	• A wider range of resources being used by students during phase 2	• Students C, D and E found CD-ROM useful.	• PBL generated vast amounts of paperwork
4	• TM reflected that a considerable amount of time was needed to create a PBL class environment • TM encouraged computer use by ensuring they were turned on prior to classes	• Some students self assessments did not match facilitators observed records of performance • All students used a wide range of resources in phase 2	• Student did not use IT skills to produce their phase 6 reports
5	• 22% of students felt they would have completed the test but were constrained by time	• Students made used of a wide range of resources during the case study assessment • 55% of students claimed to have known the answers to the questions	

APPENDIX 13

GLOSSARY

TABLE 48 : GLOSSARY

ABBREVIATION/ CODE	EXPLANATION
A, B, C, D, E, F, G, H, I , J	Students in research group
T1, T2, T3	Tutors involved and contributing to the research data
TM	Author of research project, facilitator, teacher
CF	Critical friend/ colleague
PBL	Problem-based learning
NVQ	National Vocational Qualification
MA	Modern Apprentice
CBET	Competence-Based Education and Training
TEC	Training and Enterprise Councils (forerunners of the Learning Skills Council introduced in April 2001 to replace the TECs -LSC)
QCA	Quality and Curriculum Authority
HTB	Hairdressing Training Board (forerunner of HABIA)
HABIA	Hairdressing and Beauty Industry Authority
C&G	City and Guilds
EKU	Essential Knowledge and Understanding
GMC	General Medical Council
TSC	Training Standards Council (forerunners of ALI)
ALI	Adult Learning Inspectorate (introduced in April 2001 to replace the TSC)
Rose, Felix, Shirley, Gazza (Patrick & Liam) and Natalia	Named case studies within research cycles 1-5

APPENDIX 14

DISCUSSION ISSUES

Table 49: DISCUSSION ISSUES FOR CYCLES 1-5

Aspect of PBL to be researched	*DISCUSSION DATA ANALYSIS SUMMARY*
1. Motivation	**Cycle 1** Students B and C recognised the change in emphasis towards the student orientated, active approach of PBL during phases 2 and 3. Students were motivated and enjoyed phases 2 and 3. Students A and B had not prepared feedback material to the group for phase 5. Deadlines for submission of case reports suggested by TM during phase 2 were not met **Cycle 2** Student E, D and A were motivated by finding out new information in phases 1, 2, and 3. All case reports were submitted after the deadline in phase 6. Student B was experienced serious motivational difficulties during phases 2 and 3. However, this was not reflected in his student reflection (phase 3) as this was positive **Cycle 3** Students C, D and E found the quiz on the computer interesting during phase 3. TM reflected that motivated students may benefit from distributing the cases at the beginning of the course (Cycle 1). B, C and D case reports were submitted late in phase 6. A and D did not submit reports. TM observed that phase 5 was perceived by students as being a functional feedback session rather than a reiterative discussion of the case issues. This resulted in boredom. **Cycle 4** Students liked finding out about new information during phase 3. Student A was motivated by being allowed to research the case on her own after phase 2. Non-reiterative PBL was more motivating for students during cycle 4 **Cycle 5** Students used a range of resources during the case study assessment
2. Team Working and Group Communication	**Cycle 1** Students were aware of their contribution to the team aim during phase 2 and 3. Student A expressed her concern about having to depend on weaker group members for information. Group members recognised and delegated tasks during phase 3 in accordance with their perception of individual students' abilities. All students were observed contributing to phase 2 discussion. It was observed that the most orally competent and confident group member acted as chairperson during phase 2 in addition to the scribe. **Cycle 2** During phase 3, students acknowledged that both group discussion and individual tasks were components of the PBL process. Student D said it was difficult to act as a scribe and direct discussion at the same time The critical friend suggested that unconfident students found it difficult to contribute to a PBL discussion during phase 2. Students acknowledged in phase 7 that their teamwork skills had been poor in phase 2 of cycles 1 and 2. During phase 7, students identified strategies for improving their teamwork skills. TM was concerned with the large number of case issues that were emerging during phase 1. C said she did not like presenting information to the group during phase 5. Other students when questioned did not mind. The critical friend noted that TM was unaware that she was directing the group too much whereas, TM thought facilitation skills had improved with the use of the guide and planned prompts. TM unsure as to when the facilitator should intervene and to what extent, during PBL phases 2, 3 and 5. Students were aware that they were being monitored on their communication and team work skills during the PBL process **Cycle 3** Students C and D became more assertive and vocal during phase 2 and 3.

	Student C experienced difficulty in scribing and chairing phase 2 simultaneously. Dominant group members A, C and E led phase 2 discussion. TM was aware of over directing and guiding students. Time constraints were perceived to be a factor contributing to increased direction of students during phase 2 and 3. During phase 2 and 3, A, C and D acknowledged group process and individual tasks. E only acknowledged her own work. TM observed that PBL is encouraging individualistic rather than group work values. Absent student B found it difficult to involve himself in phase 5 without a case recap. Critical friend commented that the students' perception of phase 5 as a reading exercise was divisive rather than cohesive. During phase 5, Student C acknowledged her use of student A's work from previous cycles. During phase 2 and 5, the group did not implement any previously discussed or agreed changes (Cycle 1and 2, Phase 7) to improve their team work and communication skills. TM observed during phase 5 that the group was not functioning as a team. During phase 7, team bonding occurred when all students were laughing at a video of themselves (in phase 5) illustrating their unsuccessful attempts to operate as a team. **Cycle 4** Students acknowledged group work during phase 2. TM instigated changes to seating plans and discussion formats to promote group work in phase 2. TM reflected whether non-reiterative PBL decreased teamwork and group communication skills during cycle 4. TM reflected what contribution the use of the facilitator guide had made to her role. Providing students with all cases prior to cycle 1 would facilitate the students' involvement in the case cycles following or prior to an absence
3. Knowledge-based development	**Cycle 1** Students were able to direct their own learning during phase 3 and requested support from TM when they needed it. False knowledge was circulated during phase 5. Students had not addressed all the group issues that had been identified during phase 2, in their case reports (phase 6). During phases 2 and 3 TM was aware of directing and guiding students in identifying certain issues. TM felt the need for a facilitator guide for phase 1. The facilitator would use the guide to help prompt and guide the students better during discussion and ensure that all the important aspects of the case were identified **Cycle 2** Students E and D requested information on the correct way to present their case reports. TM suggested using the case issues as an outline. Students A and D submitted comprehensive reports. E did not submit a report **Cycle 3** Students relied heavily on generating and distributing vast amounts of paperwork and photocopies during phase 5. There was little evidence of summarising knowledge. TM reflected that she may be contributing to this as she had indicated to students that they should cover all client options during phases 2 and 3. During phase 3, students A and C were aware of researching topics at a deeper level than they had in previous cycles. TM reflected that cases may be too broad resulting in an information overload in Cycle 4. During phase 2, expert knowledge was useful to facilitate students' progression with client consultation. C recognised technical terminology as a barrier to learning during cycles 1-3. **Cycle 4** Following a previous suggestion, TM wrote the ten main issues that had emerged from phase 2 on the white board. This was mainly for the benefit of student B. Students A and D recognised they were researching topics in more depth than in previous cycles. C acknowledged the use of knowledge from previous cycles during phase 2. Students perceived knowledge to be largely discrete or integrated **Cycle 5** Students who scored highly on the City and Guilds test paper also scored well on the case study assessment.

	Average case study assessment marks between PBL group and non-PBL group were similar. PBL students who scored the highest marks were students who largely had perceived knowledge as discrete rather than integrated during the presentation of their case reports in Cycles 1-4. 66% (6) students said they used their memory as a resource in the case assessment. 77% (7) students felt the case study assessment was easier than the City and Guilds Written test paper in terms of testing their knowledge 44% (4 students including A, B and C) responded that they would like to be tested in both formats and 44% responded that they preferred to be tested just by the case study. Only 1 student (11%) preferred the City and Guilds Written test. C thought that 'both tests were good to test memory and knowledge to use information available'.
4. Application of knowledge to context	**Cycle 1** Student C brought own life experience and knowledge to the group discussion in interpreting case issues during phase 2. Students asked if the case study client was real and requested to meet the client during phase 2 **Cycle 2** Students used their previous knowledge to identify and understand case issues in phase 2. D perceived her role in the group as a 'job'. Neither student A or H made a 'transfer' of knowledge regarding consultation issues when faced with a salon client who spoke of a work context resembling that of the Felix case **Cycle 3** During phase 6, B, C and D produced case reports with clear links to the workplace. C's case report presented the knowledge in an integrated format whereas B and D produced case reports which represented knowledge as discrete issues. **Cycle 4** All student case reports made links to workplace knowledge in varying degrees. **Cycle 5** All the students involved in the assessment agreed that the case study used in the assessment was representative of the type of situation that would occur in the salon. 66%(6) of the students felt that the case study was relevant to them.
5. Consultation skills (1:1)	**Cycle 1** Consultation issues were identified with ease by the group during phase 2. Student A recognised the need for consultation prior to taking action or making a decision during phase 6. **Cycle 2** E unable to see the relevance of exploring the social context of the client during phase 2 in order to identify any underlying case issues during phase 2. Student A recognised the importance of asking consultation questions as part of the PBL process but could not explain to E why they were necessary **Cycle 3** Students recognised the importance of questioning Shirley on her social and emotional situation in order to understand her requirements during phase 2. Student consultation was more interactive using facilitator simulation during phase 2. **Cycle 4** Students took a personal approach to case report writing during phase 6. Students provided options for the clients along with their professional opinion in phase 6. **Cycle 5** All of the students used the salon colour chart in their case study assessment.
6. Improve own Learning	**Cycle 1** Students used a range of resources during phase 3. These were ones that they were familiar with and confident in using. Student C asked if she could go to the pharmacy to find out more information during phase 3. Student B used student C as a resource for copying up notes **Cycle 2** The photocopier was used extensively during phase 3. TM was aware of the need to promote resources other than those frequently used by the students during phase 3. Students requested support from TM for finding information during phase 3 **Cycle 3**

	A wider range of resources was being used by students during phase 3. **Cycle 4** Student B acted as scribe during cycle 4, phase 2. He assessed his writing skills as average and stated that his oral communication skills needed improving. TM reflected on a suitable format for giving students feedback on their case reports in phase 6. Students used a wide range of resources including TM and prior knowledge during phase 3. TM reflected that the classroom required a considerable time to set up in order to facilitate PBL during phases 2 and 3. Students B, C and Ds' self-assessment of key skills matched those observed. Student A's key skills did not match those observed **Cycle 5** 55%(5) students claimed to have known the answers to the case study assessment. However, time was mentioned by 22% as a constraint on completing the assessment. 55%(5) students used texts during the case study assessment
7. IT skills	**Cycle 1** It was observed that the hairdressing CDRom was a popular resource with students A and B for finding out information. Student C expressed her lack of confidence using IT during phase **Cycle 2** The computer was only used by A and E during phase 3 **Cycle 3** Students C, D and E found the Hairdressing CDRom useful for information. Student E acknowledged the usefulness of the computer to process and present work. **Cycle 4** TM ensured that all computers were switched on prior to phases 2 and 3 classes commencing. Students did not use computers to prepare their case reports for phase 6
8. Other issues arising	**Cycle 1** C fedback during phase 5 that the PBL process was time consuming. Student feedback after phase 3 did not capture how the students experienced the aspects of PBL being monitored (Table 4) which had been observed by TM during phases 2 and 3 **Cycle 2** TM reflected whether student B's difficulties during Cycle 2, phases 2 and 3 were physiological as they did not reflect his ability to contribute which was demonstrated during phase 2 in Cycle 1. TM's suggestion to create a grid as a checklist for issues developed during phase 2 for use in phases 5 and 6 was not followed up **Cycle 3** Reliance on vast amounts of paperwork has resource implications in terms of cost and time.

APPENDIX 15

REVISED RESEARCH PROPOSAL OF APPENDIX 1

To: Professor Morwenna Griffiths

From: Teresa Mullin, Doctorate in Education Year 2

Date: 1st April 1998

REVISED RESEARCH PROPOSAL

1 Research Question

How can I improve the teaching of 'theory' in vocational qualifications using a Problem-Based approach to Learning?

Problem-based learning offers a means of developing learning for capability rather than learning for the sake of acquiring knowledge (Boud and Feletti, 1997, p15). It is my hypothesis that a problem-based approach to learning which encourages an active student-centered approach to development of essential understanding, facilitated by a supportive tutor, would develop a more competent, motivated learner for the workplace than is currently developed from standard approaches. With reference to my own practice, I wish to answer the following questions during the course of my research:

Can a problem-based approach to learning develop a more competent learner for the workplace than the standard methods currently used in the training centre where I operate?

Would this approach provide a natural development and integration of 'Key Skills', which are now required to be assessed, within the vocational curriculum ?

When implementing a problem-based approach at what stage of development is it most beneficially introduced into the curriculum?

2 Theoretical Context

In a problem-based approach to learning, there is a holistic approach taken to the teaching of theory as there is no attempt made to unitise the curriculum. The knowledge which is valued in this approach is that which can be used in context rather than that which justifies the structure of particular disciplines (Boud and Feletti, 1997, p.38). This supports a Gestaltian approach to learning (Jarvis, 1995, p.63). As the development of competent professionals is the aim of vocational learning, the problem-based learning approach is seen to be appropriate as it remains firmly rooted in the socio-cultural environment. If this approach to learning develops many of the key skill requirements naturally then, perhaps, the need to deliver key skills alongside a vocational qualification may be negated. However, the approach, if effective, should not be misconstrued as supporting a reduction in teaching time or resources, or be used as a control tool of the 'elite' (Friere, cited in Jarvis, 1995, p.84).

The majority of trainees in my organisation are following a three year MA programme in Hairdressing, are adolescent and female. British society and British law categorize that a person is a minor until the age of eighteen. Both Montessori and Piaget provide stages of cognitive development and personal growth (Chattin-McNichols, 1992, p.150). These stages are suggested as a means of fitting the learner to the materials being used and the approach to teaching being taken. Are these

trainees to be perceived as adults or school-age children ? Would a mixed gender group respond differently to a single gender group. This research acknowledges that a contextual problem-based approach may be more suited to a school leaver who has acquired some time in the workplace rather than a new school leaver with little experience of work. Thus, gender, age and previous work experience are all factors that contribute to the effectiveness of a new approach to learning and therefore need to be taken into account.

3 Methodological Approaches

An action research approach will be taken to this small scale, practice-based research incorporating a variety of both qualitative and quantitative techniques but predominantly the former. A multiple method approach will be used to reduce inappropriate uncertainty (Robson, 1993, p.290). The justification for the choice of approach is discussed as follows:-

a) The aim of the research is to improve my own practice in the classroom and if the research implies a more effective approach to delivery of NVQs then I will disseminate my findings to my colleagues within the training centre for them to adopt the approach. McNiff (1996, p.17) advocates putting 'I' at the centre of the research. However, this view of action research will be extended to incorporate the participatory, democratic approach of Carr and Kemmis who advocate collaboratively working with others and allowing them to influence the research (Carr and Kemmis, 1993, cited in Scott et al, 1996, p.110) .

b) The research will explore the effectiveness of applying a problem-based approach to learning within a vocational training centre. The approach is not new and has been used in other settings, so the focus is on developing new products as opposed to discovering new information. Cohen and Manion (1994, p.194) state that action research is appropriate as a choice of research method when 'a new approach is to grafted onto a existing system', which is in fact what will be occurring.

c) The findings of the research may not be of relevance to others for a number of reasons. Firstly, the sample of students employed may not be representative of the total population of similar students as it is a convenience sample. Secondly, the research will be conducted in a unique context and specific educational setting. However, the purpose of action research is not to make general discoveries and thus the approach remains valid (Cohen and Manion, 1994, p 192: Charles, 1996, p.229).

d) An important aspect of the research will be the ongoing reflection of participants on the processes taking place. Cohen and Manion (1994) focus on the empirical data generated by action research techniques and do not discuss the reflective aspect. Elliot (1991, cited in Scott and Usher, 1996, p.108) suggests that action research and reflective practice are equivalent. Schön too, although he never uses the term 'action research' links research and action in recognising that reflection is implicit in action (Schön 1983, cited in Scott and Usher 1996, p.115). The reflectiveness of the research should help in addressing the questions raised by the research question. To compare the existing effect on different groups of a method of delivery, I will assess the students, and by using quantitative methods compare the results. To discover and understand how this process has affected the learner both in study and in the workplace I will ask each student to keep a diary, I will interview members of staff that they work with and observe colleagues and students in training

sessions. This reflective approach will provide me with a better understanding of what competency is perceived to be in the workplace.

e) Action research incorporates a wide range of techniques which will support my findings by not restricting the research to any specific methodology whereby important information is lost in the quest for reliability and validity.

f) I will deliver both approaches to a vocational unit. I am aware of the danger that I may confuse my approaches and then no clear definitions can be identified. However, both the PBL approach and the adapted standard approach are new to the training centre. I have decided on this as I feel it would not be ethical to give the group that I have been teaching for a year now a different tutor with whom they would have to develop a working relationship. This would put them at a disadvantage and in addition it would also be obvious that the focus of the research would be the particular group that I was working with, and this may cause internal group friction and de-motivation of the non-PBL group.

g) The delivery would be to two groups of learners from the first year at the Derby training site. The learners are all members of the same training centre that I operate and have been working in separate groups as well as together on various topics and in the workplace during the past year. They are a mixed-ability group of learners and their profiles will be provided.

Finally, Charles summarizes the use of action research by stating that it has, 'great potential for bringing about improvements in teaching and learning....it can resolve an immediate problem and can produce a tangible and useful process.' (Charles, 1996, p.231)

4 Data Collection

Prior to delivering a PBL approach that I am unfamiliar with, I have visited and interviewed Dr.Keith Burdett at Manchester Medical School, to discuss the PBL approach as implemented by the Medical School which is considered to be effective.

The data generated will be as follows:

- **pre-research profiling on students to contextualise the research;**
- **group meeting with teacher/ practitioners who will be involved in the research at the Derby site prior to the delivery of the problem-based approach. This is to discuss the appropriateness of the case studies devised and to facilitate the linking of ideas from the cases within their respective practical classes;**
- **feedback from salon assessors to establish their notion of 'competency' in the workplace;**
- **taped interviews with work-based assessors at Derby to identify individual ongoing progression of trainees;**
- **student diaries (for groups of approx. 6 trainees per group) completed weekly and handed in after each training session;**
- **assessed test results of all groups with both the City & Guilds and case study method of assessment;**

- **attendance records of trainees over the period of the research;**
- **observation of teaching records and personal diaries of myself and other colleagues;**
- **video-recordings of four training sessions for each group to support observation notes and journals.**

At the training centre where I work, I am going to deliver the colouring unit of NVQ Hairdressing Level 2 to two separate groups of first year students (Alpha and Beta) using a problem-based learning approach and a revised standard approach. The size of the groups will depend on their attendance but is usually five in each group.

I will request that all students keep a diary/ journal of their experiences during the period of the research and these diaries will be used to track their training progress and reflections during each of the methods. These diaries may provide insight into the development of key skills during the process. The diary inserts will be semi-structured for students so that information provided can be categorized. Students will be observed to see how they adapt to both methods of learning during lessons.

At the end of each unit all students will be given the existing assessment material provided by the City & Guilds examination board for that unit. The results between groups will be compared and can be validated with comparable tests from previous years' tests. The results of the assessment should provide information on the competency of the students exposed to each learning method. In addition, I hope to also include a new method of assessment in a case study format and use it to assess both groups. This should highlight the application of the essential understanding learned and the presence, or not, of active learning.

The data gathered will be complimented by records of attendance throughout the period of the research, which can be compared with the attendance rates of previous year students. This may indicate an increased motivation to learning in one method or another.

To gather data on the effect of the learning methods in the workplace, I will interview some key work-based assessors of these students. These interviews will be recorded, but not transcribed, and will be semi-structured lasting no more than half-an-hour each.

5 Ethical Issues

Robson provides a list of ethical principles for action researchers which are seen as relevant to this research (Robson, 1996, p.33). From this list the following issues are to be taken into account:-

- Students will range in age from 16 to 19 years. At the lower end of the range, permission may be required to be sought from parents/ guardians in addition to getting agreement from the employer and all students to be taking part in the research;
- As the problem-based learning method is based largely on self-directed learning, I will have to ensure that any student experiencing difficulty in these techniques is assisted. All students will be provided with a demonstration of how to use the resources that will be available prior to each unit delivered;

- Confidentiality of test results and diaries will have to be ensured;
- All students must have the choice to opt out at any time during the research;
- A pre-research contract will have to be signed for permission to own and utilise the information in each participant's diaries at the end of the study.

6 Gatekeepers and other hurdles

Prior to implementing the research, if I am not allowed access to observing the problem-based learning approach in action, albeit in a different context with a different curriculum or cannot access it due to logistical reasons/ constraints, then I will have to rely on the information that I can obtain via text, e.mail and the internet, and hopefully discussion with other users. However, I would state in my write-up that the application of the problem-based learning was only my interpretation of the approach.

As classes at the training centre are constituted of employed 'MAs', the centre has no control over their leaving employment (and thus their training) The apprentices, as the focus in this research, are gatekeepers as, if they don't turn up, or if they do not attend training then the research project is affected. Classes are small and variable in size depending on the year's intake. If fluctuations occur, I will note them and take them into account when writing up. If they are very disruptive fluctuations such as several trainees dropping out, then I shall endeavor to repeat the approach in the following term with a different group of learners. All student trainees, as well as their tutors/assessors, will be briefed on the research in advance and will have the choice to opt out, if they wish.

The research assumes no previous exposure to this approach. However, prior to the commencement of the research, I will question all students about the learning techniques that they have been exposed to at school and take their responses into account.

There are two issues concerning resources. The first is the need to develop sufficient resources to be able to implement the approach successfully. I envisage obtaining suggestions from observing the approach in action. The second is that the training rooms at the two sites being considered are different: one is owned by a large superstore and is used only as a base, the other is a permanent base and contains far more resources. As the problem-based learning approach is reliant on access to resources, it is more practical to deliver this approach at the site where the main resources are held. The implications of implementing the approach outside the main centre would infer an increase in resource requirements.

One final hurdle is the fact that, as I am perceived to be a member of the management group, the Key Assessors may only tell me what they think I want to hear when interviewing them. I will try to ensure that when interviewing them that no conflict of interest is seen to be present by having a clear interview guide and by stating this fact prior to the interview. If this proves to be a problem, I will ask a colleague to conduct the interviews using the same guide and tape them for me to hear with the interviewees' permission.

7 Methods of analysis

The data generated will be analysed on an ongoing basis to ensure that any issues arising out of the approaches implemented are addressed. This flexible approach is characteristic of action research. During analysis, themes will be identified from the various methods adopted and ultimately triangulated to check for validity and reliability (Robson, 1993, p.290, Cohen and Manion, 1994, p.233). Interviews will be post-coded and subjected to content analysis before scoring. Scoring will enable general categories of the notion of 'competence' to be identified which will be cross-checked with individual trainees' experiences as recorded in their diaries and reflected in their tests results and attendance records. Diaries will be regularly analysed to ensure that they are complete and authenticated ,and to address concerns. In order to produce an "account of the accounts" general themes from all diaries will be identified to enable an overall picture of the experiences of trainees and teachers exposed to both approaches to be presented (Cohen and Manion, 1994, p.207). The diaries will remain semi-structured to encourage trainees to reflect on 'key skill' areas as well as their vocational competency. Due to the small samples involved in this research, tests results and other quantitative data will be presented in tabular form to allow comparisons to be made and the data generated to remain in context and support other naturalistic data. Poor test results, although indicative of incompetence may not reflect the skills of the individual in the workplace. So rather than distort data a contextualised approach will be taken in order that data makes sense (Ely et al, 1991, p.143).

8 Dissemination and writing up

Dissemination will take a variety of forms. Although action research cannot be replicated and is focused in the workplace of the practitioner, issues raised may be of relevance to others in similar contexts and/or situations.

Presentation to work-based staff and trainees. If the feedback is positive, I will implement a staff development programme to train staff in a problem-based learning approach and further develop resources.

Journals that will be contacted to publish a paper on the research are :

Research in Post Compulsory Education;

Journal of Vocational, Education and Training;

Educational Action Research.

I would hope to present the results of my research in a paper at the Journal of Vocational Education Conference, Summer 1999.

I would contact the Hairdressing Training Board at Doncaster with a view to presenting the paper to Member Schools or at their annual conference.

I would also contact the City and Guilds and Training and Enterprise Councils (TECs) with whom I work to discuss my findings. Funding may be available for further work from these sources.

NB: The terms 'apprentice', 'student' and 'trainee' are used interchangeably with reference to the same individuals throughout this research proposal.

9 Proposed Time Scale

1999

May	Prepare Resources and Lessons for Observations
	Pre- research work-based interviews with assessors
June	Meeting with tutor prior to commencement of Cycle 1
	Observations of classes / Delivery
	Analysis of observation/ Cycle 1
	Collection of absenteeism data and previous year's comparison.
July	Meeting with tutor (1 hour)
	Observations of classes / Delivery
	Analysis of observation/ Cycle 2 & 3
	Submit initial writing to tutor
August	Meeting with tutor (1 hour)
	Observations of classes / Delivery
	Analysis of observation/ Cycle 4
	Write / Reflect/ Re-read.
	Assessments
	Evaluations
	Literature Review continued
	Submit writing to tutor
September	Begin write-up of research and C&I report 3
	Submit writing to tutor
October	Write-up continued
	Finalise draft with tutor
	Send for binding
November	Submit bound research

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APPENDIX 16

SUMMARY OF EMERGING THEMES

Table 50 : Summary of emerging themes (Cycles 1-4) for my role as a facilitator

Cycle	Differ (+/-)	Agree (+)	Disagree (-)
1	• TM student reflection format did not sufficiently capture the research themes of PBL. • TM reflected on the need to negotiate the deadlines in line with collaborative principles and student-led programme • TM aware of directing and guiding students towards certain case issues. • Case reports reflected various depths of understanding • TM felt the need to have a facilitators guide. • TM reflection on whether all circulating information should be checked for 'truth'		
2	• TM directing group too much during phase 2 • TM unsure as to when to intervene in PBL phases	• TM suggestion to group not followed up	• TM concerned with large number of case issues • TM perceived need to promote use of 'new' resources
3	• TM reflected that it may be beneficial to distribute cases before phase 1 • TM aware that she was over-directing instead of guiding student		• TM reflected that PBL encouraged individualistic rather than group values
4	• TM reflected that providing students with all case studies would facilitate their self-directed study in cases of absence • TM supported Student B in scribe role • TM reflected on grading of phase 6 reports • TM reflected that a considerable amount of time was needed to create a PBL class environment • TM encouraged computer use by ensuring they were turned on prior to classes	•	