

**An Evaluation of
Outreach Dental Education
Volume One**

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Table of Contents

Volume One

Publications arising from the thesis	ii
List of Figures	iv
List of Tables	vi
Acknowledgements.....	vii
Abstract	viii
Chapter 1 Introduction	1
Chapter 2 Literature Review.....	4
2.1 Terminology and Taxonomy.....	5
2.2 UK primary care dental services at the start of the 21 st century	8
2.3 Dental Education.....	17
2.4 Placement Learning.....	20
2.5 Research into the Effects of Dental Outreach Training.....	61
2.6 Concluding remarks	88
2.7 Rationale and Aims.....	88
Chapter 3 Methodology	90
3.1 Introduction.....	90
3.2 The Positivist Approach.....	92
3.3 The Relativist Approach	95
3.4 Mixing the Methods.....	97
3.5 Strategic decisions for this research.....	99
3.6 Implications for the design of the research	100
3.7 Concluding remarks	100
Chapter 4 Perspectives of placement staff on outreach training.....	102
4.1 Background and Objective.....	103
4.2 Method	104
4.3 Results.....	109
4.4 Discussion	123
4.5 Summary	130
Chapter 5 Student perspectives on their outreach experiences.....	132
5.1 Introduction.....	133
5.2 Method	134
5.3 Results.....	138
5.4 Discussion	160
5.5 Summary	168
Chapter 6 A randomised controlled trial of outreach training	170
6.1 Abstract	170
6.2 Introduction.....	172
6.3 Method	174
6.4 Results.....	207
6.5 Discussion	198
6.6 Summary	192
Chapter 7 Summary, Conclusions and Recommendations	210
7.1 Summary	210
7.2 Conclusions and Recommendations	216

Volume Two

References	220
Appendices.....	255

Publications arising from the thesis

The peer-reviewed and non-peer-reviewed publications arising from this research are listed below. These papers and abstracts are reproduced in Appendix A (page 283).

Peer-reviewed Publications

Smith, M., Lennon, M.A., Brook, A.H. and Robinson, P.G. Perspectives of staff on student outreach placements. *European Journal of Dental Education* 2006; 10(1): 44-51.

Smith, M., Lennon, M.A., Brook, A.H., Ritucci, L. and Robinson, P.G. Student perspectives on their recent dental outreach placement experiences. *European Journal of Dental Education* 2006; 10(2): 80-86.

Smith, M., Lennon, M.A., Brook, A.H. and Robinson, P.G. A Randomized Controlled Trial of Outreach Placement's Effect on Dental Students' Clinical Confidence. *Journal of Dental Education* 2006; 70(5): 566-570.

Smith, M., Lennon, M.A., Brook, A.H., Blinkhorn, F.A., Blinkhorn, A.S. and Robinson, P.G. A randomised controlled trial of the effect of outreach placement on treatment planning by dental students. *British Dental Journal* 2006; 201(Education supplement): 27-31.

Non-peer-reviewed Publications

Smith, M. An educational package for trainers in dental outreach placements. A miniproject update in the LTSN-01 newsletter 2004; June: 8-9.

Smith, M. and Crossley, M. Public service values. Letter. *British Dental Journal* 2004; 196(8): 441.

Smith, M., Brook, A. and Robinson, P.G. (2004c) Abstract. Dental Students' Activities on Outreach Training. Abstract 127 for British Society for Dental Research scientific meeting, Birmingham, April 6-8, 2004. (www.dentalresearch.org).

Smith, M., Brook, A. and Robinson, P.G. Supervisors' perceptions of interdisciplinary outreach training in the dental curriculum. *Journal for Dental Research* 2004; 83(Special Issue B): 129(2015).

Smith, M., Lennon, M.A., Brook, A.H. and Robinson, P.G. (2005c) Abstract. Outreach Placement Increases Students' Clinical Activity. Abstract 198 for British Society for Dental Research scientific meeting, Dundee, April 5-7, 2005. (www.dentalresearch.org).

Smith, M., Lennon, M.A., Brook, A.H. and Robinson, P.G. Outreach Placements Increase Students' Confidence to Plan Treatment. *Journal of Dental Research* 2005; 84(Special Issue A): 181(3235).

Smith, M., Lennon, M.A., Brook, A.H., Blinkhorn, F.A., Blinkhorn, A.S. and Robinson, P.G. Outreach placements increase undergraduates' treatment planning ability. *Journal of Dental Research* 2005; 84(Special Issue A): 181(3234).

Smith, M., Ritucci, L., Brook, A. and Robinson, P.G. Dental students' experience of interdisciplinary outreach training. *Journal for Dental Research* 2004; 83(Special Issue B): 129(2016).

Smith, M., Tomlinson, M., Brook, A. and Robinson, P.G. (2003a) Training the Dental Team Together – Initial Findings from Pilot. Presentation at South Yorkshire Workforce Development Confederation conference, Sheffield, 6 November 2003.

Smith, M., Tomlinson, M., Brook, A. and Robinson, P.G. (2003b) Training the Dental Team Together in Outreach Placements. Presentation at South Yorkshire Workforce Development Confederation conference, Sheffield, 6 November 2003.

List of Figures

Figures are numbered sequentially within each chapter and appendix with the number preceded by the chapter number or appendix letter.

Figure 2.01	A spectrum of outreach placement types	8
Figure 2.02	Graphical representation of the Inverse Care Law.....	9
Figure 2.03	Topic map for the Placement Learning section.....	21
Figure 2.04	Broad parallels between four models of learner development.....	27
Figure 2.05	Learning through work in a community of practice.....	36
Figure 2.06	Structure of an ideal human activity system (Engeström, 1987)	38
Figure 2.07	An Institution-based Model of Teaching (Proctor, 1984).....	43
Figure 2.08	The Biddle and Ellena (1964) model of teaching	44
Figure 2.09	A Classroom-based Model of Teaching (Cruickshank, 1985).....	44
Figure 2.10	A general model of teaching (Pratt, 1992).....	45
Figure 2.11	An engineering conception of teaching (Pratt, 1992)	45
Figure 2.12	An apprenticeship conception of teaching (Pratt, 1992).....	46
Figure 2.13	A developmental conception of teaching (Pratt, 1992).....	47
Figure 2.14	A Model of Bedside Teaching Practice	48
Figure 2.15	A Two Cycle Model for Clinical Teaching.....	49
Figure 2.16	The Auburn <i>et al.</i> (1993) transition model of placements	55
Figure 2.17	An activity diagram for supervision on outreach placement	59
Figure 2.18	An activity diagram for learning on outreach placement	59
Figure 2.19	Topic map for the student perspective section.....	80
Figure 4.01	Matrix of themes and strands identified in the analysis of staff perceptions	110
Figure 5.01	Patient numbers treated by students on placement by course and setting	159
Figure 5.02	Undergraduates' clinical activity on six-week placement compared with their activity in the dental hospital	159
Figure 6.01	The three stage process of treatment planning.....	173
Figure 6.02	Self-assessed global transition judgement of confidence.....	175
Figure 6.03	Outline history of the simulated patient	180
Figure 6.04	The Arizona Clinical Interview Rating Scale	182
Figure 6.05	Assessment criteria for the history and treatment plan	184
Figure 6.06	Self-assessed global transition judgement of confidence.....	186
Figure 6.07	Self-assessed global judgement of confidence.....	187
Figure 6.08	Then-test for confidence	187

Figure 6.09	Trial Profile	192
Figure 6.10	Measures related to the construct of treatment planning and hypotheses	198

Figures in Appendix C, Statistical Findings

Figure C.1	Number of clinical half-day sessions worked per week on placement or in the dental hospital	332
Figure C.2	Number of patients encountered by students during the intervention period	333
Figure C.3	Number of treatments per student during the intervention period by setting	334
Figure C.4	Annual number of treatments per student in the Dental Hospital during the year of the intervention by setting	335

Figures in Appendix D, Chronologies

Figure D.1	Chronology of the research and development programme	337
Figure D.2	Chronology of the initial placements and qualitative study	338
Figure D.3	Chronology of the trial of outreach training	339

List of Tables

Tables are numbered sequentially within each chapter and appendix with the number preceded by the chapter number or appendix letter.

Table 2.1	Count of search results by quality, subject area and location	63
Table 2.2	Summary of published and peer-reviewed resources grouped by quality level	64
Table 2.3	Summary of additional resources grouped by quality level	70
Table 5.1	Preliminary topic guide for student interviews	136
Table 5.2	Themes identified in the analysis of students' perception	139
Table 6.1	Summary of Variables.....	177
Table 6.2	Baseline measures in outreach and hospital-based groups	193
Table 6.3	Follow up measures from the OSCA case study	194
Table 6.4	Follow up results relating to confidence in clinical working	195
Table 6.5	Patients treated by the outreach and hospital-based groups.....	197
Table 6.6	CONSORT checklist for reporting an RCT	203
Table 6.7	CASP checklist for RCTs.....	204

Tables in Appendix C, Statistical Findings

Table C.1	Allocation of 25 students by setting and location.....	329
Table C.2	Number of adults and children treated by students in each setting and location.....	330
Table C.3	Comparison of UK dental schools by key indicators	331

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Abstract

An Evaluation of Outreach Dental Education

Introduction: Dental schools are developing new curricula, with primary care outreach training placements complementing hospital-based training.

Objective: To evaluate undergraduate dental outreach training.

Design: A mixed-method study phased to match a developing programme of outreach training. The first phase used qualitative methods to identify key educational outcomes for use as principal variables in the second phase, a randomised controlled trial.

Intervention: Block placements of 5-6 weeks in existing primary care clinics for undergraduate students to work supervised by local dentists while providing care to patients. The intervention took place within a traditional dental curriculum.

Methods: Qualitative methods included semi-structured interviews, content analysis and respondent validation. Parallel studies gathered placement staff and student perceptions and interpretations of their recent outreach training experiences. The randomised controlled trial (n=49) used a hospital-based control, had two primary variables: confidence in providing everyday care and competence in treatment planning. Confidence was self-assessed. Competence was assessed using a standard simulated patient and viva.

Results: Key benefits of the programme identified qualitatively by stakeholders included: the workplace setting; increased clinical experience; nursing support; and a broader view of dentistry. Effective communication was identified as a critical success factor. Both stakeholder groups found unanticipated benefits. In the trial the groups were similar at baseline. The outreach group perceived their confidence to be increased more than the control group ($P=0.05$). Treatment planning scores were also greater for the outreach group for capturing a social history ($P=0.01$) and the appropriateness of treatment planning ($P=0.01$).

Conclusions: Dental outreach training in primary care settings is positively regarded by students and placement staff. A five-week block placement within a traditional curriculum is more effective than dental hospital training alone in improving students' confidence in clinical situations and their competence in treatment planning.

Chapter 1

Introduction

There can have been few, if any times, in any nations' history when the attention of its political leaders has been focussed as recently as in the UK, albeit for a short period, on assuring an adequate supply of dentists prepared to practice their profession for the benefit of whole communities. The Prime Minister pledged a resolution to the problem of access and the subsequent Government's response had several facets. One facet involved expanding the intake of dental schools and encouraging pre-existing developments in those schools' curricula designed to produce newly qualified dentists more inclined to provide to dental care for the population as a whole.

In recent years the national bodies responsible for dental education have encouraged dental schools to place dental students in clinics away from the traditional secondary care regimen of the dental hospital to work as part of a primary care team treating typical patients. These placements, *outreach training*, are the subject of this thesis.

A phased development of outreach training in one UK dental school provided an opportunity to research the programme's educational benefits. The first phase of the development consisted of an exploratory set of placements with volunteer students and then progressed through a half-cohort implementation to test the programme before full operation in the third phase.

There are two main lines of enquiry in this research;

- To identify the key effects of outreach training on participants, and
- To compare outreach with traditional dental hospital based training.

The studies identify *inter alia* some critical success factors for outreach training.

This thesis focuses on students' learning experiences and their outcomes rather than other important facets of the feasibility of outreach such as the organisation, management, patient service or resourcing of the programme.

Following this introduction, the second chapter of the thesis reviews previous existing literature in the fields of dental education, outreach training and associated education theory. Encompassing some material from other countries and from medicine ensured the review was comprehensive.

The third chapter explores educational research methodology and outlines strategic decisions in the research.

The next two chapters describe the outreach staff (chapter four) and the student (chapter five) perspectives on outreach training. These findings informed the selection of outcome variables for a randomised controlled trial of outreach education (chapter 6) that showed that outreach increased students' confidence and clinical skills.

The findings from the qualitative and quantitative components are brought together in the seventh chapter. Here the conclusions and recommendations relating to policy are presented separately from those relating to research.

Then following the references, the appendices include the publications and presentations arising from the research, the documents used in the studies, confirmatory details of statistical analyses, chronologies and a glossary of terms.

Included in the publications are the four published papers arising from this study (Smith *et al.* 2006a-d, see Appendix A, page 283).

This introduction opened by highlighting the prominence in politics of access to dental services in recent years. Government attention, for those few weeks focussed on this issue, has long since been claimed by other matters. There are however still those in the NHS, higher education and general dental practice working to increase and improve the supply of dentists prepared to practice their profession for the benefit of whole communities. This research may inform that endeavour.

Chapter 2

Literature Review

This review of the literature associated with outreach dental education is structured in five main sections. The first three establish the context and the last two review the literature. The sections are:

- 2.1 A definition of terms,
- 2.2 A description of primary care dental services at the start of the twenty-first century including the distinction between primary and secondary care, the workforce shortages, the expansion of the dental team and new contracts and duties,
- 2.3 An outline of dental education historically, internationally and in the local context of this research,
- 2.4 A review of placement learning with particular attention to social theories of learning, and finally,
- 2.5 Research into dental outreach training is reviewed in detail. This section incorporates the search strategy then presents the findings systematically from the perspectives of higher education institutions, placement hosts, students and patients.

The literature relating to outreach dental education is complemented by relevant material from other healthcare professions and occasionally other vocational work areas. Studies of work-based learning across diverse professions have observed

that such programmes share many common features though professions use varied vocabularies to describe them (Lave and Wenger, 1991; Taylor *et al.*, 1995; Brennan and Little, 1996).

There is considerable overlap between dental curricula and those of other healthcare professions but they differ in significant respects (Spielman *et al.*, 2005). Firstly, it is only in dentistry *that irreversible procedures are routinely undertaken on members of the general public by students* even in the first half of their training (Mullins *et al.*, 2003; Ross, 2004). Secondly, only dentistry traditionally maintains its own clinical training establishments rather than using existing healthcare services to provide learning environments (Blinkhorn, 2006; Wilson, 2006).

To reduce the potential for confusion arising from the alternative vocabularies used in this field the next section defines the principal terms used in this research.

2.1 Terminology and Taxonomy

The literature of outreach placement in dental education is complicated by terminology. The term ‘outreach’ is used to describe different activities and alternative terms are used to describe the type of activity which is the subject of this research. The working definition of outreach training used in this review is:

clinical training in a primary dental care setting away from the dental school and dental hospital.

This definition emphasises the primary care setting when compared to a recent and consciously broad definition of outreach teaching:

teaching which although, co-ordinated by a traditional provider of dental education, such as a dental school, takes place at a site, distant to the traditional centre (Eaton *et al.*, 2006).

The working of outreach training definition does not encompass the following situations where the term ‘outreach’ has been applied.

- A simulated general dental practice adjacent to a dental school (Tennant and McGeachie, 1999; QAA, 2000b; RCS, 2001; BDA and LTSN01, 2002)

- A school's multi-chair open-plan teaching clinic at a nearby hospital (Bartlett and Woodford, 2003)
- The provision of dental hospital or consultant services to distant communities (Parker, 1988; Bandara, 1997; O'Brien *et al.*, 2001; Lalumandier *et al.*, 2004; Moran *et al.*, 2005)
- The development of educational opportunities for distant communities (Watt and Patterson, 2000; UoS, 2004)
- The development of best clinical practice in primary care (Soumerai and Avorn, 1990; Seager *et al.*, 2006)
- Students' observation of families in their homes (Stewart *et al.*, 2007), and
- Students observing patients in primary care settings without providing their clinical treatment (Pau and Croucher, 2001).

While dental education includes provision for dental nurses, hygienists, therapists, graduate level dental surgeons, vocational trainees, specialists and practitioners, this review concentrates predominantly on undergraduate dental education.

Outreach as clinical training in dental settings away from the learners' usual educational venue is an activity referred to by various terms. These include:

- extramural education or rotation – learning opportunities provided outside the dental school and its dental hospital (Soble, 1971; Gardiner and Lotzkar, 1975; Miller and Heil, 1976; Holloway and Dixon, 1977; Stiefel, 1979; Grantham and Block, 1983; Born and DiAngelis, 1986; Hamilton *et al.*, 1997; Butters and Vaught, 1999; Ayers *et al.*, 2001; Kinirons, 2003; Andersen *et al.*, 2005),
- community-based education – training provided in healthcare services that are often not primarily established as training establishments (Bailit, 1999a; Cinotti *et al.*, 1999; Blinkhorn, 2002; Boyle *et al.*, 2002; Elkind, 2002; DeCastro *et al.*, 2003; Mofidi *et al.*, 2003; Strauss *et al.*, 2003; Woronuk *et al.*, 2004),
- service-learning – learning opportunities presented through learners providing a healthcare service (Jacobson *et al.*, 2000; Inglehart *et al.*, 2003; Gadbury-Amyot *et al.*, 2006)
- extended clinical environment – any clinical environment approved for UK dental education outwith the dental hospital including other dental teaching hospitals, simulated general practices and primary care services including community clinics and general practices (GDC, 2002; Queen's Belfast, 2004)
- outplacement – block and often residential, work-experience placements distant from the dental school (Booth *et al.*, 2003; Murray *et al.*, 2003)
- vocational clinical activity – weekly clinical working visits to (French) dental offices (Benbelaïd *et al.*, 2006) or, more generally,

- a practicum – a programme of supervised work experience which complements an academic programme of study (Schön, 1987; Barr, 2000).

Normally, the single term ‘outreach training’ has been used in this review.

The term ‘placement’ is used for the locations for outreach training. This section summarises classifications of those placements. An alternative term used by the American Dental Association (ADA) is satellite clinic (Ayers *et al.*, 2003; ADA, 1999, 2000; Woronuk *et al.*, 2004). The ADA makes a useful distinction between types of placement depending on the degree of the dental schools’ control of the establishment.

- Type 1 placements are independent of the dental school and placement opportunities are by mutual agreement.
- Type 2 placements, such as simulated dental practices and community clinics established for training purposes, are typically financed, managed and staffed by the dental school.

The Association for the Study of Medical Education (ASME) offers an alternative classification based on the focus of the learning being:

- the community
- a support agency
- general practice, or
- the dispersed delivery of specialist services (McCrorie *et al.*, 1993).

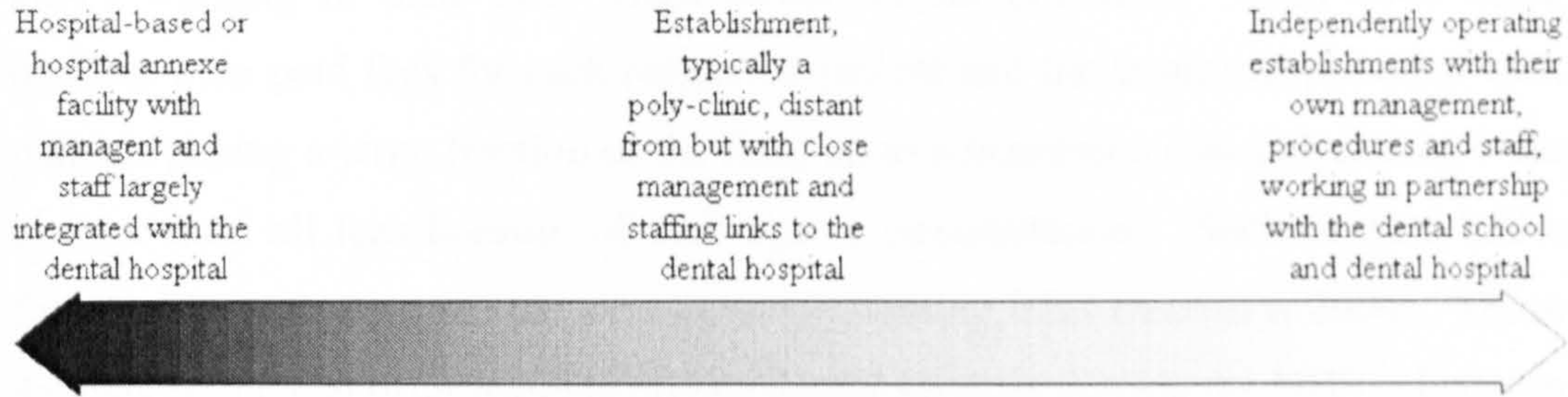
Finally, the American Association of Dental Schools, (AADS, 1980) identified four types of outreach training programme distinguished by their setting. The settings fit the US national context and were:

- dental specialist services
- community assignments
- institution-based programs (such as residential accommodation)
- private practice.

Using the ADA distinction, many UK outreach training programmes are type 2 while the vehicle for this research (the Sheffield programme) is type 1. In terms of the ASME classifications that programme does not have a single focus but spans two categories – community and practice – and were based in community settings. On a spectrum of placement types (Fig. 2.01) ranging from simulated general practices or annexe clinics on the left, through school organised distant polyclinics to independent, ADA type 1 clinics, Sheffield’s placements lie at the far right.

Further to the right might lie a form of dental education is not *hospital-centric* but entirely community based (Kay, 2006).

Figure 2.01 A spectrum of outreach placement types



After Robinson, 2006

UK Dental services were undergoing systematic change during this study. Depending on the timing, documents within this thesis may refer to Community Dental Services (CDS) and Dental Access Centres (DACs provide care including emergency care for people experiencing difficulty in accessing NHS dental care) or the later umbrella term Salaried Primary Dental Care Service (SPDCS). Despite the change in terminology these refer to essentially the same, though developing, services delivered by the same teams in the same locations.

2.2 UK primary care dental services at the start of the twenty-first century

This section considers the context of primary care dental services at the start of the twenty-first century with emphasis on the differences between primary and secondary care; then workforce issues and current changes are outlined.

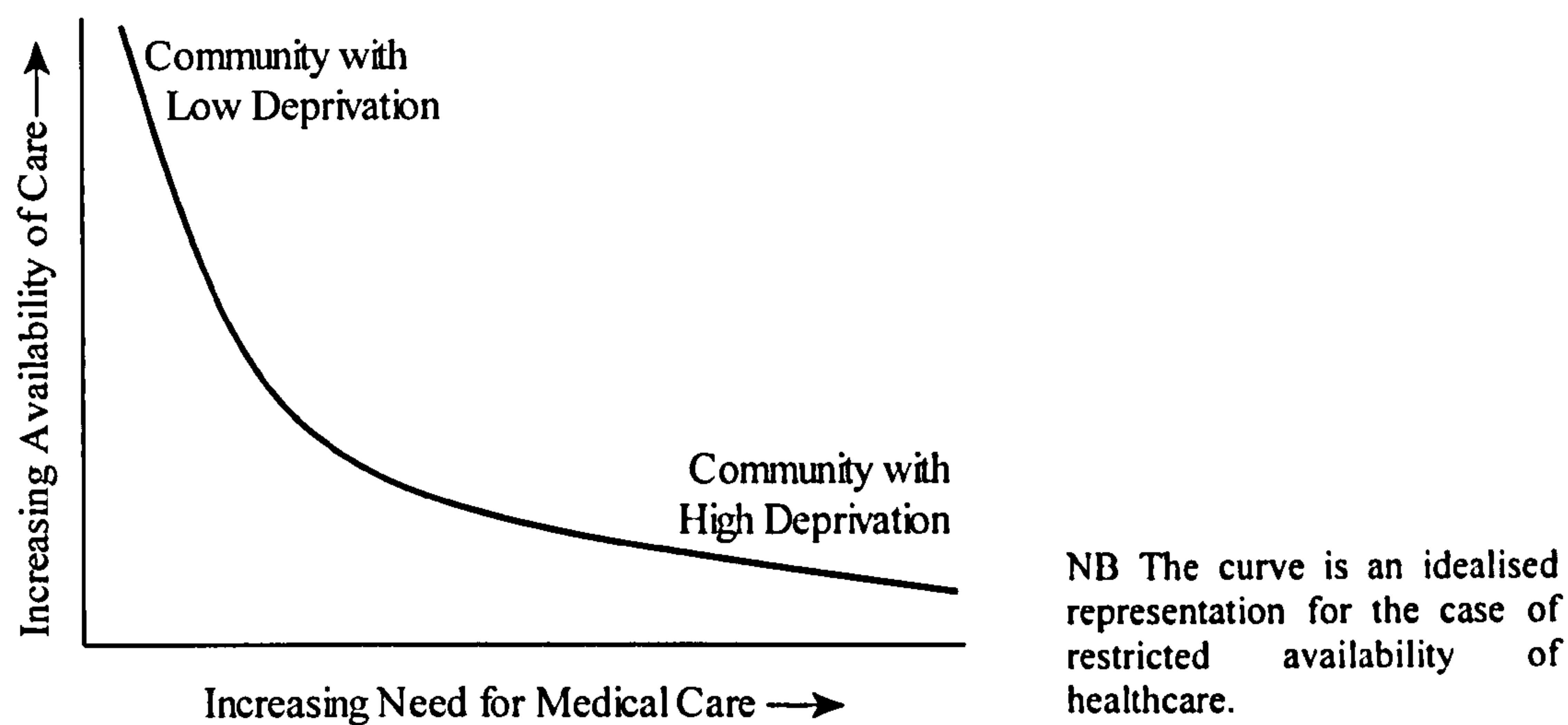
2.2.1 The context of UK primary care dental services

The context for this research, the UK primary dental care services, is described in the following six sections: the General Dental Service, the Community Dental Service, increasing consumerism, National Health Service modernisation, Dental Access Centres and dental workforce issues. The section is then summarised.

2.2.1.1 The General Dental Service

Primary care services are the ‘first port of call’ for the public in accessing dental care. The General Dental Service (GDS) delivers most of NHS dentistry through GPs working in their own ‘High Street’ dental practices. Until 2006 these dentists were paid fees for each registered patient and the treatment provided with patients paying a large fraction of the fees, up to a maximum cost unless they were exempt from all fees because of their age or circumstances. Such dentists had a financial incentive to provide treatments (*Reforming NHS Dentistry*, 2004). These dentists could also offer patients private dental services outside the NHS scheme in which case this treatment was funded by the patient or their health insurance scheme.

Figure 2.02 Graphical representation of the Inverse Care Law



Until recently, GDS principals chose where to establish their practices. Practices tended to be located in more affluent areas leaving areas of greater healthcare need the least well served (Lennon, 1976; Jones, 2001). This is an example of the long established ‘inverse care law’ (Fig. 2.02) that applies to healthcare services in general wherein, if the provision of services is restricted as currently in the UK (2.2.1.6, page 12)

the availability of good medical care tends to vary inversely with the need for it in the population served (Hart, 1971).

To address this inequality, the GDS has often been supplemented by safety-net services in areas of deprivation such as Community Dental Service (CDS) provided by NHS salaried dentists including *highly qualified people offering specialist clinical services* (Blinkhorn *et al.*, 2001).

2.2.1.2 The Community Dental Service

The CDS service has six objectives as defined in NHS circular *HC(89)2* and updated in *HSG(97)4*. These objectives complement those of the GDS. They are:

- *The provision of dental health promotion programmes*
- *The provision of facilities for a full range of treatment to patients for whom there is evidence that they would not otherwise seek treatment from the general dental services. eg. patients with special needs*
- *The provision of facilities for a full range of treatment to patients who have experienced difficulty in obtaining treatment in the GDS*
- *The provision of treatment which may not be generally available in the general dental service, such as anaesthetics and orthodontics*
- *Oral screening for children in state funded schools... and of other client groups with particular special needs*
- *The provision of epidemiological field work.*

2.2.1.3 Increasing consumerism

In the early 1990s the Conservative government responded to a consumerist zeitgeist and introduced a democratisation of public services which is still having effects at the time of this research. John Major's *programme for a decade* promised better quality for consumers through the publication of service standards, the right of redress, performance monitoring and increased pressures resulting from competition and privatisation throughout the public sector including the NHS (*Citizen's Charter*, 1991; *Patient's Charter*, 1991, 1995). There was an apparent shift in power from the provider to the customer, though some have portrayed the changes as *rhetoric as much as action* (Klein, 1995). The subsequent Labour Government adapted the principle, adding a local emphasis. Patients' guarantees under the Charter remained well known in the NHS but were not widely appreciated among patients (Farrel, 1999).

2.2.1.4 National Health Service modernisation

Increasing consumerism led to the NHS again refocusing its attention on service delivery (*Shifting the Balance of Power*, 2001; *The NHS Improvement Plan*, 2004c) in what has been characterised as *the most ambitious service development and modernisation agenda seen since the inception of the NHS* (Unsworth, 2004). This development included the Primary Care Trusts (PCTs) being charged with responsibility to...

ensure access and choice to a range of high quality health services and ensure the Government's commitments to health, reducing health inequalities and health services are delivered for local people (Commissioning a Patient-Led NHS, 2005d).

In one of the structural reforms designed to allow the PCTs to meet their responsibilities they became commissioners of services rather than providers (*Reforming NHS Dentistry*, 2004). Where they were also providers of services the arm managing provision, such as the CDS, was separated from the commissioning arm. Further, the CDS was reformed as a Salaried Personal Dental Care Service (SPDCS) to be another provider alongside the GDS and Personal Dental Service (PDS, a form of commissioned GDS encouraging preventive care and without fee-per-item piecework). The SPCDS could then contract with PCTs to provide services to complement other contractors.

Returning to the GDS, changes to the reimbursement regimen for GPs in 1992, together with the cumulative effects of the workforce shortfall (DH, 2004a) and the market forces of supply and demand, combined to reduce access to oral care for many communities. There was an increase in the profession's longstanding dissatisfaction with financial reimbursement for NHS work (Silvester *et al.*, 2000). NHS patient registration numbers fell and patient dissatisfaction with access to NHS dental services grew (BDA, 1999; Hancock *et al.*, 1999). Private dentistry provided outside the NHS grew several-fold (*Reforming NHS Dentistry*, 2004). Negotiations on the funding of primary dental care were conducted in this unsatisfactory environment.

An alternative funding model was trialled from 1998. This was for the Personal Dental Services (PDS), as the primary care services were to be called when

reformed. This model encouraged preventive care and removed the financial incentive to treat by paying dentists a more generous fixed amount to provide care. Despite the Chief Dental Officer reporting the model to be a success and popular (DH, 2004b) it was revised on full implementation in 2006 to restore targets for undertaking dental procedures with financial incentives to meet those targets (DH, 2005c).

2.2.1.5 Dental Access Centres

Political pressure mounted as problems of access to care gained national publicity (Telegraph, 5 May 2005; 22 May 2005) leading to the Prime Minister Blair at the 1999 Labour Party Conference pledging to ensure access for all (Colwyn, 1999). Soon thereafter Dental Access Centres (DACs) were opened in areas of unmet need with salaried dentists serving those not registered with the GDS (*Reforming NHS Dentistry*, 2004). Though intended to provide a full range of dental services, DACs finding unmeetable demand had to prioritise patients requiring urgent care (Herefordshire NHS, 2006; Melton, Rutland and Harborough NHS PCT, 2006).

2.2.1.6 Dental workforce

The Dental Workforce review (DH, 2004a) noted a shortage in the dental workforce of nine per cent that was set to double between 2003 and 2011. A companion document, *NHS Dentistry: Delivering change* (DH, 2004b), presented strategies to meet this shortfall including the delegation of more duties to dental hygienists and therapists and new contracts for GPs. Further, it noted that the Department of Health (DH) had put in place measures for a 25% increase in the student intake of dental schools from 2005 and a three-fold increase in training places for dental therapists. While part of this expansion was planned to be met by the opening of two additional dental schools, existing schools were invited to increase their intakes (DH, 2005b). In addition, separate work was refocusing dental education as described below (2.3, page 17).

In 2004, *NHS Dentistry: Options for Change* noted that the *experience of grappling with the current systems often leaves patients feeling disempowered and dentists disengaged*. The document outlined a modernised service better tailored to populations' and patients' needs. It envisaged the use of expanded dental teams

whose members had benefited from improved training including increased use of outreach training *to develop dental professionals who are best suited to working in practice*. Among the changes required were a number of structural and educational reforms.

One of the changes, an extension of dental hygienists' and therapists' duties, continued an earlier development of a team to deliver dental care (GDC, 2004b, 2005h). In 1999, the General Dental Council (GDC) decided to develop the role of therapists and they were later allowed to work in all sectors of dentistry undertaking a wider range of procedures. However, many GDCPs remained unaware of their potential (Gallagher and Wright, 2003; Ross *et al.*, 2007). Attempts to supplement dentists' work with dental auxiliaries had limited success in the past due to the profession's concerns, sometimes voiced as a safeguard for patients. This resistance was again expressed (BDA, 2003) but was not found persuasive by the Office of Fair Trading (OFT, 2003b).

The third element in the DH's strategy for addressing the workforce shortfall was to expand and refocus dental education and this is considered later in section 2.3 (page 17). In brief, *NHS Dentistry: Options for Change* (2002) considering training and development of the dental team, recommended increased use of primary care settings for training. In Scotland the same change was considered beneficial in expanding access to training (Rennie, 2002). Further, though the NHS has a commitment to entrant training for its own services, *Options for Change* queried the interest Primary Care Trusts (PCTs) would have in developing outreach training when the GDCPs they used to provide services are not considered part of the NHS.

Together, these factors may provide opportunities for the development of primary care outreach training programmes. The expansion of services might include facilities for student use as part of the services' commitment to workforce training. The expansion is likely to be in underserved areas of high need and deprivation which provide opportunities for students to experience both clinical working and dental public health projects in operation.

Those differences between the primary and secondary sectors relevant to dental education are detailed next.

2.2.1.7 Summary

In summary, at the time of writing, national primary dental care services are in upheaval resulting from the introduction of new services, the new contractual arrangements and the expansion of the dental team. These changes aim to reduce the problems many communities have in accessing oral healthcare which has become a political issue. Increased use primary care settings has been suggested as a means of better preparing most students for their working futures as the current settings used, dental hospitals, provide a different case mix and different work practices. The commitment of PCTs to developing these new training opportunities needs to be secured.

2.2.2 Differences between Primary and Secondary care environments

Primary care delivered in the community, patients' *first port of call*, differs in many respects from secondary care which is normally delivered in hospitals and mainly serves patients referred to them by the primary care services for procedures beyond GPs' competence.

General practices are mainly small establishments with a small number of surgeries each with a single chair and a simple flat organisational structure. The staff, typically 2 or 3 dentists and 5 other staff (OFT, 2003a), comprise a single team often familiar with patient's families who tend to live locally and have visited the practice for many years. Operatives are normally assisted by a dental nurse and appointment times may well be under thirty minutes.

In contrast, a dental teaching hospital within secondary care is a large impersonal hierarchical institution occupying a large building with a mixture of individual surgeries and large, open-plan multi-chair surgeries. Where a student is the operative the treatment is liable to take longer partly because they are not as proficient as an experienced dentist but also because of delays waiting for the

supervising dentist, the need to collect instruments or materials from distribution control points and lack of close nursing support (GDC, 2006a).

Patients attending hospitals may be moved between departments as they progress through stages of their treatment. The departmental divisions reflect the specialisms within dentistry (GDC, 2006a). Hierarchical administrative structures and associated division of the body of knowledge may impede students' learning as it restricts the opportunities for integrated teaching (Andrews *et al.*, 1996). However, some believe these environments result in a higher quality of dental work than is achievable in NHS general practice (Murray, 2002). The suitability of hospitals as *learning laboratories* has probably deteriorated recently because of increasing specialism and non-educational pressures on staff time (Parry and Greenfield, 2001).

Of the primary care provided by the GDS about half is assessment without dental intervention, a third is routine work such as simple restorations and a twentieth is intricate work such as crowns or bridges with the remainder being assorted other work (Rodgers, 2002; DPB, 2006). The secondary care provided by the Dental Hospital Service (DHS) is *usually more complex as [patients] have generally been referred by a general dental practitioner or doctor [because of] complex medical conditions, congenital abnormalities, complex facial injuries or oral facial disease* (NHS, 2006).

Patients attending a dental hospital following referral by a general practitioner are also an atypical subset of patients in that they are self-selected compliant patients who have agreed to referral and, if returning for subsequent appointments, have accepted the institutional nature of dental hospitals outlined above.

The two sectors have been linked to fundamentally different approaches to the provision of care. In medical schools and hospitals the traditional biomedical approach predominates with its assumption of specific etiological causes underlying diseases and treatment being required for these diseases (Larivaara *et al.*, 2000). Increasingly in primary care a more complex and contingent model of oral (ill)health is considered appropriate (Smith, 2002; Toy and Richards, 2004). This biopsychosocial model considers the patients' illness or health rather than the

disease and recognises the interacting effects of biological, psychological and social factors impinging on an individual's health (Engel, 1980; Deep, 1999; Dworkin, 2001). Although rarely explicit this perspective is compatible with local dentists being better attuned to the circumstances and outlook of their patients than hospital-based staff.

These differences in approach between the sectors are reflected in the relationships between patients and clinicians. The hospital consultant is the expert who identifies the solution to the patient's referred problem and after their intervention the patient is returned to their dentist with an explanatory letter. The GDS dentist, having a continuing care relationship probably with the whole family and familiar with local cultures, is likely to take a more holistic approach taking into account a wider range of factors in the manner of John Sassall (Berger, 1967).

As a learning environment these sectors have corresponding differences. In a hospital specialist clinic, learning is likely to be narrowly focussed on the patient's clinical status as an example of a previously theoretically studied part of the specialism's curriculum. Students may be asked to note the occurrence of various symptoms but they are less likely to take, for example, a social history (Boston and Marks, 1993; Harris *et al.*, 2003). A student on placement in a primary care setting is granted membership of a working team where learning is across a broad front, integrating the whole curriculum (Elkind *et al.*, 2005c). Such students operate amidst a wide range of learning experiences: consciously and unconsciously absorbing information relating to the cultures, attitudes, behaviours, language registers, terminology, patient management and decision making processes appropriate to the different situations encountered (Lave and Wenger, 1991). This type of learning environment is explored further later in this chapter (2.4, page 20).

Alongside these rapid and large-scale changes in the UK's dental health service, the setting for outreach training, there are changes in dental education. These are explored in the next section.

2.3 Dental Education

UK dental education is also changing at the start of the twenty-first century. The traditional paradigm was developed almost a century ago and is heavily influenced by the biomedical model of health and *technical skills in clinical practice* (Ismail, 2003).

Pressure from Government (The *NHS Plan*, 2000a) for all health professions to become more patient-centred with a shift of emphasis toward needs-driven primary care services prompted universities to announce closer cooperation with the NHS in the delivery of professional training (CVCP, 2000). These pressures resulted in service and educational revision being set out in *NHS Dentistry: Options for Change* (2002) which queried the suitability of the training *provided mainly in secondary and tertiary care* settings as a preparation for careers predominantly located in the primary care sector. Further, it recommended *increased use of primary care outreach schemes throughout training* to increase dental professionals' suitability for practice, especially in meeting the oral health needs of the population. Outreach training experiences, it was believed, would ensure students' readiness for practice focussed on the needs of the population but a hub and spoke model with smaller groups of students in various placements would have resource implications.

This shift towards learning experiences in primary care was reflected in the GDC's revised guidance on dental curricula which stated that

An extended clinical environment and outreach teaching can potentially broaden the base of available clinical material and enhance the educational experience... In pursuit of this students may...operate in the following situations (amongst others):

- *GP units established by the dental school;*
- *Approved CDS clinics;*
- *PDS; ...*
- *All systems for the delivery of primary dental care approved by the schools for these purposes (GDC, 2002).*

That guidance describes the aim of the undergraduate curriculum being to

...produce a caring, knowledgeable competent and skilful dentist, who understands the principles of health promotion and disease prevention, as well as the organisation and provision of healthcare in the community.

Dental educationalists supported the use of outreach training to develop such attitudes, knowledge, skills and understanding (Gibbons, 2001; Mossey, 2003) despite this external pressure for change being counter to the autonomy of both universities and their disciplines (Young and Guile, 1998).

A few years later, reports from the thirteen GDC Visitations to UK dental schools indicated that almost all the schools had plans to introduce or expand outreach training provision (GDC, 2004c-i, 2005a-g). The single exception preferred to prioritise satellite general dental practice centres for ease of quality management. In the summary report produced on completion of this audit, these outreach training programmes were described providing *a greater perspective to the student experience* though programmes were mostly *in their infancy* (GDC, 2006b). The GDC called for outreach training programmes to be *evaluated thoroughly* so that the Council can *monitor the effectiveness of outreach teaching* (GDC, 2006a).

That summary report identified quality criteria for outreach training programmes.

...all outreach schemes should have clearly defined learning outcomes and be co-ordinated by the school. Outreach schemes need to have:

- *a clear relationship between the university... and the... primary care authorities engaged in teaching and supervising students...;*
- *appropriate educational, clinical and social facilities, as well as suitable transport arrangements...;*
- *a robust financial plan, based on sound costings;*
- *clear teaching objectives, led by university teachers;*
- *opportunities for all staff involved in outreach teaching to become fully integrated into the educational development, philosophy and practice of the dental school;*
- *an appropriate case mix, complementing the clinical experience in the dental hospital;*
- *clear assessment procedures; and*
- *well-developed quality assurance procedures.* (GDC, 2006a)

Other parts of the report drew attention to two interrelated areas of perceived weakness. Firstly, inadequate dental team teaching for undergraduates to develop as effective team leaders and, secondly, the continued lack of close support nursing

for students in dental hospitals referred to in the previous such report (GDC, 1996). Further, interprofessional training may improve students' communication with nurses (Freeman *et al.*, 2007). Outreach training programmes placing students in existing primary care teams with individual nursing support can provide realistic opportunities to develop their team leadership skills through supported working.

The shift in approach from a mainly biomedical model of health care towards a biopsychosocial model has been mentioned previously in the relation to differences between primary and secondary care. The behavioural sciences are a *major priority* in dental education and an increased emphasis on the behavioural sciences in dental school curricula over the last decade has been reported though this is not fully integrated with students' clinical practice and work on dental public health (GDC, 2002, 2006a).

There are similar concerns in US dental education communities despite differences between national contexts. A similar preference for smaller service-based rather than large educational institutions is made in a review of locations for dental training (Huynh-Vo *et al.*, 2002). In the US, dental schools employ outreach training to *achieve 'private' levels of patient centredness* and the required numbers and variety of patients (Bailit, 1999b). Leading opinion considering dentistry's and dental education's need for new solutions questions the effect outreach training will have on the qualities it will develop in trainees (Donoff, 2006). Taking a wider perspective, DePaola and Slavkin (2004) call for a new vision to provide a continuum for dental education throughout training and practice to keep pace with communities' needs and patients' expectations. They cite a reform initiative advocated by Hendricson and Cohen (2001) which included increasing students' exposure to patients, extending the use of outreach training and simulated practice environments and ensuring dental schools' work met communities' needs rather than viewing patients largely as an educational resource.

This increasing emphasis on communities' and patients' needs can be viewed as part of a broader movement. The Alma Ata Declaration included the principle of individual and community participation in planning for and ensuring access to *socially acceptable* primary health care (WHO, 1978) as a step towards *Health for All*. The Citizens' Charter, Patient's Charters and increasing consumerism

mentioned earlier (2.2.1.3, page 10) are symptomatic of the same movement though the Patient's Charter was rescinded in 2000 as part of the *NHS Plan*.

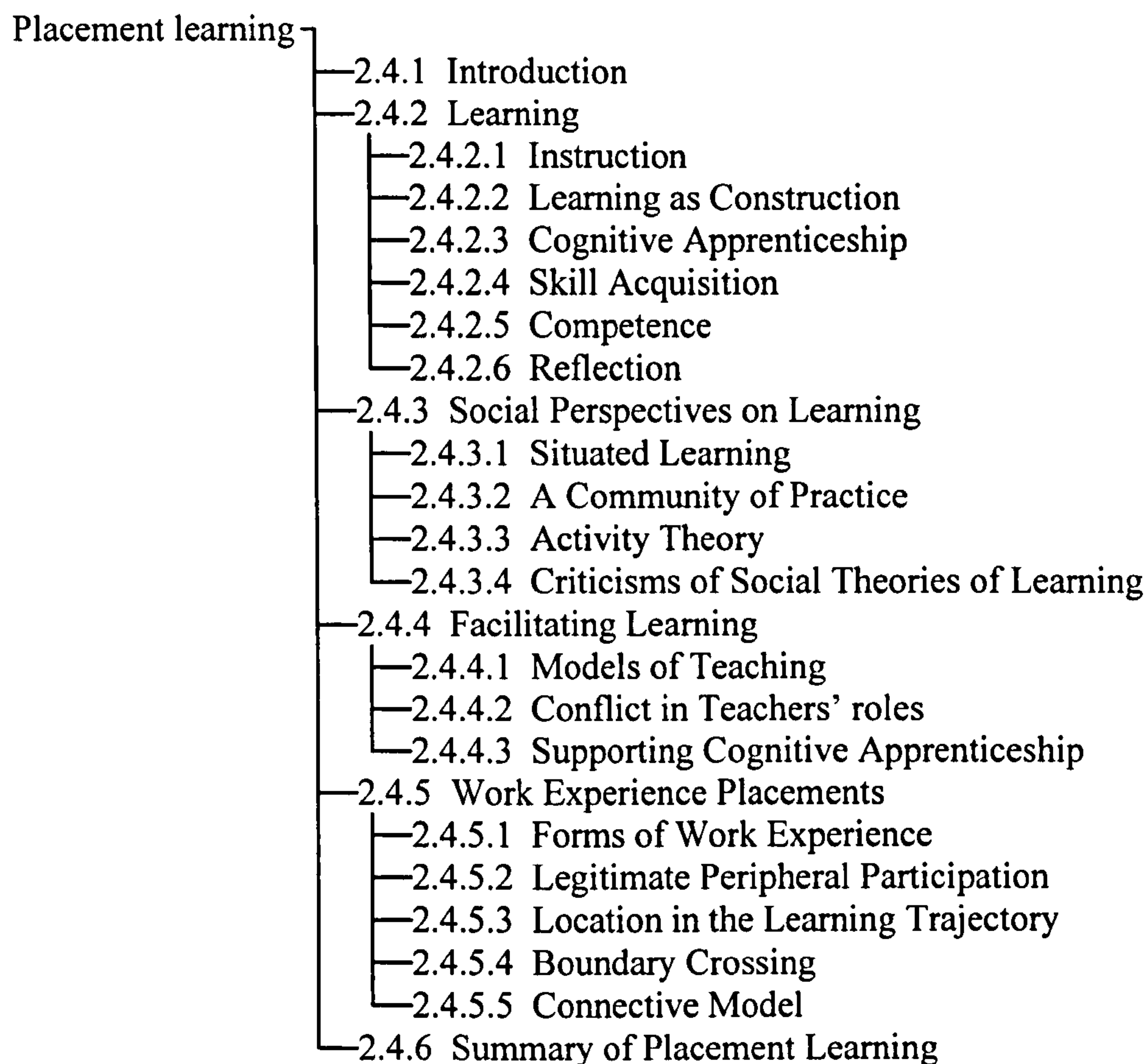
Two changes in UK dental education run counter to earlier developments. These are the shifts in emphasis from secondary care as a suitable training location and from clinical specialities towards a more integrated, holistic patient-centred care. The education of dentists had become increasingly regulated as it changed from an apprenticeship situated in primary care to become an academic discipline under the control of universities (RCSE, 2003; Gelbier, 2005). Initial postgraduate dental training remains an apprenticeship model (COPDEND, 2006). Curricula under the control of university academics, it has been claimed, tend to become increasingly abstracted from the contextual details which give knowledge its meaning as academic specialities become self-isolating to establish an *intellectual territory*, and also they tend to overemphasise *the 'demands of the discipline' in specifying the types of learning* to be undertaken at the expense of the needs of the society being served (Goodlad, 1995).

In summary, dental education is responding to similar external pressures to the national primary care services: problems of access to care and the need for increasingly patient-centred services. Dental education has made some progress in teaching the behavioural sciences but this needs more integration and students lack close nursing support to develop teamworking skills. Outreach training is viewed as a potential solution to prepare students for working in primary care but schemes are mostly at the planning stage.

The use of workplaces for developing students' skills leads to the next topic for review: learning in the workplace.

2.4 Placement Learning

This section reviews the literature of placement learning in four stages. An introduction is followed by an outline of some pertinent topics from general theories of learning and social perspectives on learning. Means of facilitating learning follow before work experience placements are reviewed. Finally the section is summarised briefly. These topics are mapped in Fig. 2.03 below.

Figure 2.03 Topic map for the Placement Learning section

2.4.1 Introduction

Organised learning activities are not restricted to educational establishments but include learning in the workplace (Brennan and Little, 1996). These activities can take many forms. Seagraves and colleagues (1996) conceptualise three forms of work-related learning: learning *for* work as in general or vocational education wherever located; learning *at* work referring to informal, in-house workplace training; and, learning *through* work where learning and working are integrated as in outreach placement learning. Weaknesses of this approach include the overlap between categories and their breadth (Harris, 2006). For example, learning *through* work includes reinforcing application of both learning *at* work and learning *for* work. The distinctions between academic, professional, location specific and participative or restrictive learning environments (Fuller and Unwin, 2004) are not made in the Seagraves conceptualisation.

Perhaps of greater use in structuring of this discussion is the categorisation of work based learning incorporated into higher education programmes: visits, short project, sandwich placement, alternating periods of placement and education, employment-based learning programme, immediately post-qualifying (as in dental vocational training or foundation programme) and continuing professional development (Brennan and Little, 1996). The sandwich and alternating programmes correspond to the forms of dental outreach training. Though employment-based programmes, such as apprenticeships may also provide pertinent insights.

The following sections consider learning as more than an additive process of accumulating more facts, understanding and skills. Qualitative changes take place during the process of learning both in the nature both of the knowledge gained and of what is being learned. There are corresponding changes in expectations of those supervising learning. Learning is then considered on a wider canvas than the individual as a social experience with a particular set of relationships between a number of actors and communities. Those relationships may shape and promote the learning.

The role of one of those actors, the placement supervisor, is then considered including models of teaching, strategies for supporting learning and conflicts inherent in the role. Finally, the role of a placement is discussed as a learning experience in relation to other parts of the programme.

Work placements are often the first fully engaged encounter a student has with the type of community in which they intend to become immersed. A study of transitions from university to social work illustrated the opportunities and pitfalls.

For the neophyte, the first days, weeks and months of life in a professional community can set the stage for a successful and gratifying career – or lead to stagnation, disillusionment and attrition. For the community, the arrival of a newcomer can mean fresh perspectives, new expertise, and revitalising energy – or disruptions, resistance, and unwelcome work for veteran staff.
(Paré and Le Maistre, 2006)

2.4.2 Learning

Learning is an internal process of learners that yields new knowledge, skill or understanding. Initially in this section, learning is considered from instructivist and constructivist perspectives before cognitive apprenticeships, skill acquisition, competence and reflection are considered.

2.4.2.1 Instruction

The traditional model of education assumes that the material to be learned is clearly defined and held by ‘teachers’ who present the content to the learners. There is a strong focus on this content which is filtered from reality into a format judged suitable to ease learning. Learning often takes place in large groups independent of learners’ individual characteristics. The learners’ responsibility is to learn the content with standardised tests used to monitor success. This instructivist or transmissive model persists in much of western training and schooling (Wring, 1991; Tyack and Cuban, 1995) and is held to have been *the predominant mode of education* in dentistry (Brown *et al.*, 2003).

One transmissive model is *Component Display Theory* (Merrill, 1983) which classifies learning in two dimensions: content (ranked as facts, concepts, procedures and principles) and learner performance (ranked as remembering, using and generalising). The theory specifies activities, including rule stating, giving examples, learner recall and practice application which, if applied with appropriate content and performances in prescriptive combinations for different types of learners, ensures the most effective learning outcomes (Clark, 1999).

A second instructivist model is *Theory One* with its four distinctive features of clear information, thoughtful practice, informative feedback and strong intrinsic and extrinsic motivation (Perkins, 1992). The learning here has well defined objectives and criteria for identifying successful learning.

While such instructivist models may be appropriate for learning well defined skills and knowledge, their suitability for developing higher order professional skills will be questioned later in the section on skill acquisition (2.4.2.4, page 26).

A stark contrast to the transmissive model is learner-centred education (Coles, 1994). In its purest form, learner-centred education's goal is self-determining peer-groups of learners' discovery without the impediment of existing authorities' constraints. In practice there may be negotiation between learners and their teachers to agree learning objectives.

These two define a spectrum in which one of the parties, learner or instructor respectively, is largely passive in determining the learning (Rogoff *et al.*, 1996). Between these extremes lie other models including those with workplace learning in which both parties bear distinctive responsibility for learning: the experts for the framework and learners for managing their own learning. Wring (1991) portrays this approach as being not only concerned with knowledge but also with learners' attitudes, commitments and their understanding of themselves.

Teaching in the workplace is distinct from transmissive teaching which is academic, i.e. abstracted from reality. Workplace tuition is typically provided individually or in small groups with the learners carrying much of the responsibility for learning (Stronach and Morris, 1994). Such learning may be not instructivist but constructivist in nature and this is the subject of the next section.

2.4.2.2 Learning as Construction

Constructivist approaches to learning are based on cognitive theory and hold that learners create new knowledge through internal interactions between knowledge, memories and emotions already held and through newly presented information. These approaches may now prevail in western education (Petraglia, 1998) and particularly among clinical teachers (Spencer, 2003). However, the knowledge produced is acknowledged to be temporary, developmental and socioculturally mediated (Brown *et al.*, 1989).

Constructivist learning is inevitably learner-centred but is not necessarily found solely at that extreme of the educational spectrum. Constructivist learning programmes may be heavily trainer determined.

One constructivist model of cognition using the language of schema theory describes the *transfer of knowledge from the basic sciences to the clinic* being

achieved by *tuning and restructuring knowledge* (Rumelhart and Norman, 1978). New schemata (representations of knowledge) are formed when existing schemata no longer solve the problems encountered in practice. The *structuring* often involves considerable cognitive effort and occurs relatively rarely. It might occur in outreach placements when students struggle to understand an unfamiliar case or situation. Once a structure is created further experiences are *accreted* into the new structure adding knowledge. A third form of learning, *tuning*, finely adjusts new knowledge, optimising schema.

A beneficial effect on US dental students' learning has been observed and associated with fieldwork. This finding resonates with the constructivist approach to learning. Fieldwork has a *strong sensory component* and it...

provides students with an insight into specific realities of both his [sic] worlds and the world of his patients. It translates the objective theoretical concepts into living, breathing happenings that often have a significantly meaningful impact on the student. It sometimes becomes a sensory "gut" experience which stirs the student to look more closely at similarities and differences in a given issue. It makes learning "real" because the student has lived and felt the experience directly (Soble, 1971).

While instructivist approaches suit preclinical skill learning, constructivist approaches appear better suited to clinical contexts (Chambers, 1987)

2.4.2.3 Cognitive apprenticeship

This section on cognitive apprenticeship briefly considers traditional and cognitive apprenticeships. Apprenticeships involve learning in real-world situations the skills required to work there. They are situated learning (2.4.3.1, page 23).

Apprenticeships where learners agree to work for minimal remuneration in return for being taught a trade were recently held to be *synonymous in many people's minds with high standards of workplace training* (Fuller and Unwin, 1998). Traditional apprenticeships employed a model of learning consisting of observation, assimilation and emulation. The material to be learned was fixed and often no teaching was required to make the skills to be learned explicit. If the skills were demonstrated by the learner then learning was implicit (Pratt, 1992; Guile and Young, 1998).

The traditional instructivist approach (2.4.2.1) holds that knowledge is an entity presented for the learner to absorb intact and then apply as required. This approach may be appropriate in developing basic clinical skills but inappropriate for integrating skills and knowledge from different fields and in resolving conflicting demands such as treatment planning and patient management. For developing these more complex skills cognitive apprenticeship may be more appropriate.

The theory of cognitive apprenticeship (Brown *et al.*, 1989) holds that skilled workers too easily fail to appreciate the implicit processes they deploy when instructing learners. Accordingly cognitive apprenticeships...

bring these tacit processes into the open, where students can observe, enact, and practice them with help from the teacher (Collins et al., 1987).

Herein, lays a potential difficulty for clinical education. Supervisors may encounter difficulty in making explicit their tacit skills, knowledge and understanding. Appreciation of these deconstructed components of their professional behaviours is necessary for effective teaching. The means of supporting cognitive apprenticeships are described below (2.4.4.3, page 50).

The constructivist approach to learning has been criticised for its inattention to culture, power and educational discourse (O'Loughlin, 1992). A sociocultural approach may provide a more robust model of learning (2.4.3, page 33).

2.4.2.4 Skill Acquisition

Theories of learning can be distilled into a three phase model (Shuell, 1990) which resonates with constructivist learning. Initially, isolated learned facts are linked in pre-ordained relationships with groups of similar elements being identified. Next, connections made between previously distinct relationships create new schemata and provide increased conceptual power. Finally, these schemata are strengthened and better integrated with domain specific strategies being developed. It was unclear whether these phases are sequential, concentric or they co-exist throughout learning. These phases of learning have parallels in the next model's stages.

A predominant model of learning consists of a five stage sequence of skill acquisition along a continuum from novice to expert (Dreyfus and Dreyfus, 1998)

Figure 2.04 Relationships between four models of learner development

Dreyfus and Dreyfus skill acquisition model (1998)	May and Kruger's developing competence (1988)	Shuell Three-Phase model of learning (1990)	Perry's modes of intellectual development (1970)
<p><u>Novice stage:</u> Knowledge is largely context-free with rules followed in specific circumstances without understanding their full implication</p> <p><u>Advanced beginner:</u> Rules become situated through practice, more numerous and less clear-cut. Their application is a conscious process</p> <p>Change: Increasing complexity / contextuality</p> <p><u>Competent performer:</u> Acquires and develops new rules until they are so numerous and ill-defined that selection of appropriate ones is increasingly problematic</p> <p>Change: Increasing fear of failure</p> <p><u>Proficient performer:</u> Reinforcement through practice identifies appropriate routines for more familiar situations – sees what needs to be done, then decides how</p> <p>Change: Stress diminishes</p> <p><u>Expert:</u> Wider repertoire of familiar situations in which responses are automatic – Does what normally works and it normally works but with unfamiliar cases resort to following rules</p>	<p><u>Unconscious incompetence:</u> Learner unaware of the full range of knowledge and skills required for competent performance</p> <p>Change: Abandonment of certainty</p> <p><u>Conscious incompetence:</u> Learner aware that they lack the necessary knowledge and skill to perform competently</p> <p><u>Conscious competence:</u> Learner aware of own capability but needing to decide which rules to apply</p> <p>Change: Decreasing awareness of which 'rules' are being applied</p> <p><u>Unconscious competence:</u> Highly capable practitioner with decision making largely intuitive and unconsciously based on contextual rules</p>	<p><u>Phase 1:</u> Initially isolated factual knowledge is gradually grouped</p> <p><u>Phase 2:</u> Schema linking items of factual knowledge are formed so increasing conceptual power</p> <p><u>Phase 3:</u> Schema strengthened and linked to one another. Learner becomes increasingly autonomous and decision making less conscious</p>	<p><u>Mode 1: Dualism</u> Learner conceptualises information as true or false</p> <p>Transition 1: to Uncertainty and ambiguity</p> <p><u>Mode 2: Multiplicity</u> accepting uncertainty</p> <p>Transition 2: to an acceptance of opinion alone as being insufficient argument</p> <p><u>Mode 3: Contextual Realism</u> with explicit and tacit knowledge determining professional action</p> <p>Transition 3: Joining values and action</p> <p><u>Mode 4: Contextually appropriate decision making</u> combining rules and value judgements</p>

Horizontal proximity denotes broad equivalence between stages in the models but does not imply they are identical.

termed a cognitive learning trajectory. The five stages in this model form a linear progression from the application of rules in prescribed situations through to intuitively knowing what is required in almost any situation and how it might be achieved (Fig. 2.04). Their model, developed in the field of artificial intelligence and skill acquisition through practice, may over emphasise repetition as a means of learning and underestimate the effect of prior experience (Lahn, 1998).

These classifications of phases of learning may help teachers and coaches focus their and learners' attention on the learning process to aid both development and metacognitive understanding (Rumelhart and Norman, 1978). The remaining models of skills and cognitive development highlight the nature of the transitions between these phases of learning.

Novice learners lack awareness of what constitutes competence but move from this *unconscious incompetence* to *conscious incompetence* as they realise what is required. They then achieve *conscious competence* as they develop the necessary ability. Finally they may attain *unconscious competence* as their actions become routine (May and Kruger, 1988).

This model highlights two problems identified previously. Firstly, the expert's unconscious competence may restrict exposition of their mastery. Secondly, action-inhibiting fear of failure may be experienced when moving from the competent performer to become more proficient. In order to progress the learner must let go of certainty and begin to act when they really do not know how they should act (Bolton, 2001). This can be uncomfortable in an environment where the learner feels insecure. Placement learning can provide a protected environment if close supportive supervision gives students the freedom to progress by risking failure. In UK dental education, vocational training (or its successor, foundation training) with a secured income, assured professional support and guidance can provide this opportunity.

A fourth model describes students' intellectual development from a simplistic, categorical understanding of knowledge to a complex, contextual and shifting view of their working world and of themselves (Perry, 1970). Like the Dreyfus' model it identifies a series of conceptual transitions to be made between stages of

intellectual development with a mid-point stage of potential alienation as initial certainty is abandoned to progress (Nelson, 1989).

There are other broad similarities between the stages identified in the various models of development described above. Fig. 2.04 maps these stages to highlight some similarities. While there is some equivalence between stages in the different models their representation at the same level does not imply they are identical.

2.4.2.5 Competence

Competence features in several guises in the models described above. It is necessary however to distinguish between academic competence involving cognitive understanding and operational competency leading to practical effectiveness (Barnet, 1994, 1999). Competency is a stringent requirement; the behaviour expected of independent practitioners on first qualification

...incorporates understanding, skills, and values in an integrated response to the full range of circumstances encountered in general professional practice. This level of performance requires some degree of speed and accuracy consistent with patient well-being but not performance at the highest level possible. It also requires an awareness of what constitutes acceptable performance under the circumstances and desire for self-improvement (Chambers and Gerrow, 1994).

Achieving competence through experiential learning is believed to require a supportive environment and appropriate learner attitudes. Specifically it requires: learner's commitment to *exploring and learning*; supervisors' to value the learner's own experience; and, *scope for independence in learning* within a clear structure (Stanton and Grant, 1999).

An additional dimension of acceptable performance incorporates non-technical factors. Healthcare workers to progress beyond *rule following* need to become engaged at the affective level and dental curricula demand *an awareness of moral and ethical responsibilities involved in the provision of care to individual patients and to populations [and] integrity, honesty and trustworthiness* (Benner et al., 1999; GDC, 2002).

Competence, then, is more than the ability to demonstrate a skill. It includes demonstrable mastery across diverse situations, efficient and effective execution and awareness both of any ethical implications and of the limitations of one's skill.

2.4.2.6 Reflection

Reflection is a response in which a learner *recaptures their experiences* and explores them to lead to new understandings (Boud *et al.*, 1985). Because of its role as a means of contesting and furthering knowledge, reflection is widely considered to be a distinguishing characteristic of modern professional practice (Cant and Sharma, 1998). A range of activities is encompassed by the umbrella term *reflection* (Moon, 1999). This section considers reflective practices and their application in healthcare.

It has long been recognised that people reflect on their performance as a means of development (Dewey, 1933). In healthcare, John Sassel's reflections were held as a model of good practice especially for the isolated practitioner (Berger, 1967). He knew that, in relation to any individual patient *no previous explanation will exactly fit* so he uses professional knowledge, self-exploration and reflective processes to create *new knowledge* by challenging orthodoxies and opening up new avenues of enquiry. The resulting self awareness may be *emancipatory and empowering... thereby enhancing professional as well as personal autonomy and practice* (Moon, 1999). Despite wide acceptance such *navel gazing* may not be universally accepted (Brigley, 2003).

Schön (1983) distinctively highlighted the role of reflection in the development of professional expertise beyond that of the competent practitioner (Rømer, 2003). His and Berger's perspective are grounded in practice whereas Boud, Barnett and Dewey's analyses are concerned with learning processes including reflection on learners' *beliefs and assumptions* (Fisher, 2003).

2.4.2.6.1 Levels of reflective practice

Griffiths and Tann (1992) refined Schön's categories of reflective practice based on observation of and discussion with teachers. Teachers evaluated their practice against immediate outcomes but did not mention comparison with existing models.

However, on interrogation they revealed underpinning ‘personal’ theories they had adapted from standard educational models. A five level hierarchy of reflection was proposed:

Reflection-in-action

- 1 Reaction i.e. immediate corrective changes to planned actions
- 2 Repair i.e. corrective adjustments to ways of working

Reflection-on-action

- 3 Reviewing i.e. Act-observe-analyse and evaluate-plan-act
- 4 Researching
- 5 Rethorising

The first three of these may be applicable to outreach training.

In developing reflection in learners and the self-awareness of those acting as models for trainee professionals there may be a need to make explicit those normally unconscious or unspoken higher levels of reflection. As Bourdieu put it the practitioner *does more than s/he knows* (1977).

Schön (1983) also drew a distinction between the notions of technical rationality and the more complex knowledge of appropriate practice which included interpersonal and moral dimensions. This echoes an earlier requirement for an ethical dimension in dental education (2.4.2.5, page 29). There may be opportunities on outreach training for students’ learning in both these areas if they encounter ethical stances and moral dilemmas in their delivery of primary care.

2.4.2.6.2 Reflective practice in healthcare

Reflection is referred to explicitly several times in documents prescribing undergraduate dental education (GDC, 2002; QAA, 2002; Bergqvist *et al.*, 2006). These relate reflective practice to lifelong learning; maintaining professional competence; the profession’s collective initiatives in self-regulation, maintenance of standards, and the advancement of knowledge and expertise; identifying personal strengths and weaknesses; evaluating all treatment outcomes; fulfilling one’s responsibilities both as adult learners and as teachers; peer review and quality assurance. Together these form a large part of a dentist’s work.

The ability to develop through reflective practice is said to be as important as knowledge and skill for healthcare professionals (Burns and Bulman, 2000; Maudsley and Strivens, 2000) and a prerequisite for accepting responsibility.

Expert medics report that while most of their cases are routine, several percent challenge their expertise and require high level reflection (cited by Bereiter and Scardamalia, 1993). Reflection can aid selection from multiple diagnoses, unexpected contingencies during treatment and adapting to changing social and professional environments (Brigley, 2003). Practitioners cite developing a reflective approach as a managerial skill and as a tool for metacognitive development, that is gaining a better understanding of their own learning processes (Flavel, 1979; Wimpenny, 2004).

In relation to experiential learning in medicine both the experience and the reflection on that experience are required and the two must be integrated by the learner for effective learning (Stanton and Grant, 1999 citing Gibbs, 1988). However, students in higher education may need *learned routines* involving others to *guide their reflection* in preparation for learning during work placement (Blackwell *et al.*, 2001).

One of the many frameworks developed from observation and action research to guide the reflection process is one which suggests practitioners reflect on actions, ideas and feelings (Bolton, 2001).

Practitioners in UK medical general practice were less confident of including the last of those items. When formulating rules for encouraging reflection-on-action they included: not expecting immediate solutions but to anticipate recasting understanding in a more helpful way; selecting challenging though not too problematic cases; and, in contrast to Bolton's and Boud's approach, deliberately not setting out to explore feelings though affective aspects may emerge as an important factor (Samuel *et al.*, 2004). Where guidance was given to exclude feelings and focus on values, beliefs and assumptions students' reflective practice improved (Fisher, 2003).

Keeping a diary commenting on experiences is a tool for encouraging reflection. Action research in UK undergraduate dental education found this approach time consuming but encouraging of *personal learning, empowerment and sharing knowledge* (Robinson and Davies, 2004). The study's method, though, applied quantitative techniques to qualitative data.

A dental school inspection found discussions with staff encouraged students *to reflect on their values and attitudes*. These interactions were...

less formal, but extremely valuable... especially ... when students are being supervised on clinics in small groups (GDC, 2006a).

On a Canadian dental outreach training programme the sentiments of reflective accounts have been used as an indicator of success (MacEntee *et al.*, 2005) and US students' reflection on critical incidents *holds promise as an educational strategy to facilitate personal and professional development* (Mofidi *et al.*, 2003).

Pressure on time, the inherent difficulty and initial negativity of considering problems are possible reasons for not engaging in reflection (Pee *et al.*, 2000).

For UK students, reflection narrows the *theory–practice gap* though it not always a positive experience (Bulpitt and Martin, 2005). Despite an apparent national reluctance to reflect on feelings it was considered valuable if carefully managed.

2.4.2.6.3 Summary of Reflection

This section has seen learning described as more than the recall of presented information or the accomplishment of skills. Learning professional behaviours requires learners to construct their own understandings consisting of complex interrelated schema linked to applicable situations. Mastery requires schema to be interlinked whilst accepting conflicting pressures and the eventual development of routine responses for a wide range of situations. To reach this stage of expertise requires passage through a number of preparatory phases with transitions requiring changes in the learner and the nature of the learning. Learners may find some of these transitions unsettling. Factors promoting learning are practice, encouragement, feedback, guidance, reflection and opportunities to develop practice without fear of condemnation.

2.4.3 Social Perspectives on Learning

In the above learning was considered as a psychological phenomenon of an individual's progress towards mastery. However, learning is also achieved through interactions with others. In such a situation a sociological perspective may be informative and that is the basis of this section.

Dental education involves students engaging in learning experiences through relationships and dialogue with team members, patients and others. Professional behaviours and attitudes are learned alongside the knowledge and skills developed through working in new situations (Billett, 2004; COPDEND, 2006). Learning and progression into professional working are explored in this section as sociocultural phenomena. This social perspective on learning in higher education is considered neglected compared to the individual and the macro societal sociological levels (Trowler, 2005).

2.4.3.1 Situated Learning

Situated learning is a general theory of knowledge acquisition stressing the key role of social interaction. The learning is a function of the activity and cultural context.

Social interaction has a fundamental role in children's cognitive development where *higher functions originate as actual relationships between individuals*, first between learner and teacher or parent then internal to the learner. This applies to *voluntary attention, to logical memory, and the formation of concepts* (Vygotsky, 1978).

For older learners situated learning may take place in a workplace where transmissive learning activities play only a minor part. It is the learner's participation in work while being supported in their learning by the social networks of the workplace that characterises this type of learning.

Illich (1971, 1976) asserted the value of learning in authentic contexts over schooling in separate institutions. In Vygotskian terms the learning needed to be first experienced as a function of workplace interactions before being appreciated and internalised to develop appropriate work practices. Engeström (1991) also suggests learning in or from authentic contexts avoids *encapsulation* and increases the transfer of learning to new working contexts.

An influential model of situated learning was propounded by the originators of the term, Lave and Wenger (1991), based on diverse ethnographic research into vocational learning where the primary focus of attention is on production or service delivery rather than learning. They stress the importance of the socio-cultural

transformation of the learner. Learning situated in activity allows the gradual inculcation of attitudes and appreciation of subtly differing contexts through oft repeated observation. Maximising the learners' involvement in observing general practice was *an important factor in making... an effective learning experience* (McCrorie *et al.*, 1993).

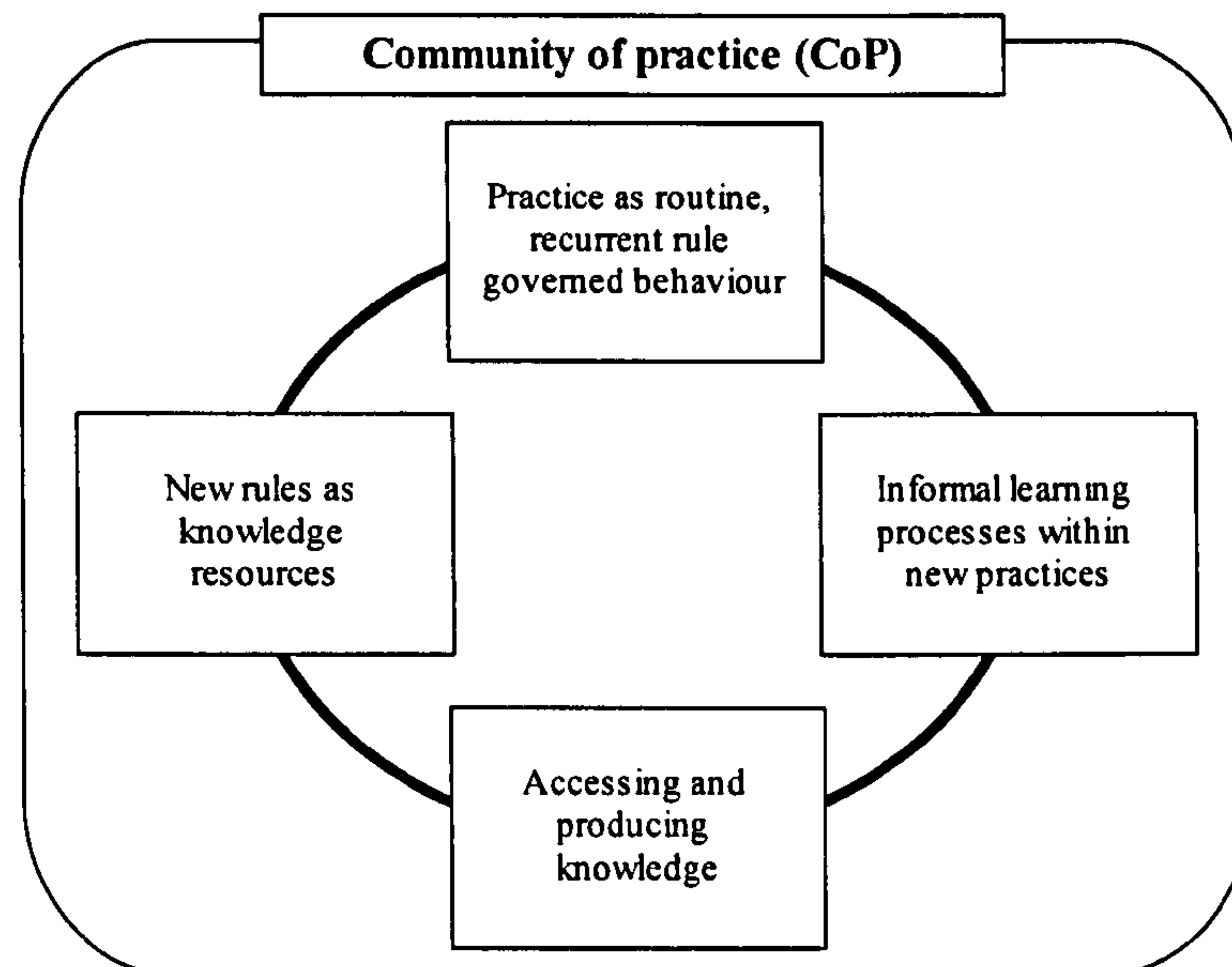
Later, Lave (1993) identified four advantages of her situated learning analysis over standard cognitive models. First, learning and practice are seen as inseparable. Second, situated learning encompasses the learning of new knowledge. Third, situated learning accepts individual differences and consequent variability in actions. Fourth, situated learning recognises that learning can be constrained by situations as well as individual factors. Schön (1987) makes a related point contrasting the metaphorical high ground of abstract solutions based on researched theory with the swampy lowland of confusing messy problems practitioners deal with wherein lie most problems of the greatest human concern.

One set of insights from the situated learning perspective relates to appropriate ways of learning. Mastery and pedagogy are common to many in a workplace rather than being the prerogative of a 'teacher' (Lave and Wenger, 1991). This leads to the notion of a *community of practice*.

2.4.3.2 A Community of Practice

The creation of *new knowledge* via individual reflection was mentioned earlier (2.4.2.6, page 30). On a wider scale the experiences and reflections of a broad professional group, a *community of practice*, can also create new knowledge (Lave and Wenger, 1991, Fig. 2.05).

Professional communities create and change the meanings they give to situations in a process termed praxis (Hoffman-Kipp *et al.*, 2003). They create and revise their professional knowledge as *an integral part of generative practice in the lived-in world* (Lave and Wenger, 1991). Ownership of this knowledge is decentred with many members of the community contributing to its development. In this conception learning is defined *in terms of participation* as the transformation of learners for whom knowledge is a social construct largely specific to the situation where it was learned.

Figure 2.05 Learning through work in a community of practice (Saunders, 2006)

However, collective learning in a community of practice necessarily consists of multiple individual advancements. This perspective sees teaching as accepting newcomers into the community and facilitating appropriate social interactions and participation for their enculturation.

Learners are typically aided by peers a little ahead in the trajectory who are well placed to assist those following. Their assistance is considered particularly effective as they retain a vivid awareness of the difficulties they recently encountered in mastering the difficulties their near peers now face (Lave and Wenger, *ibid.*; Fuller and Unwin, 2003a).

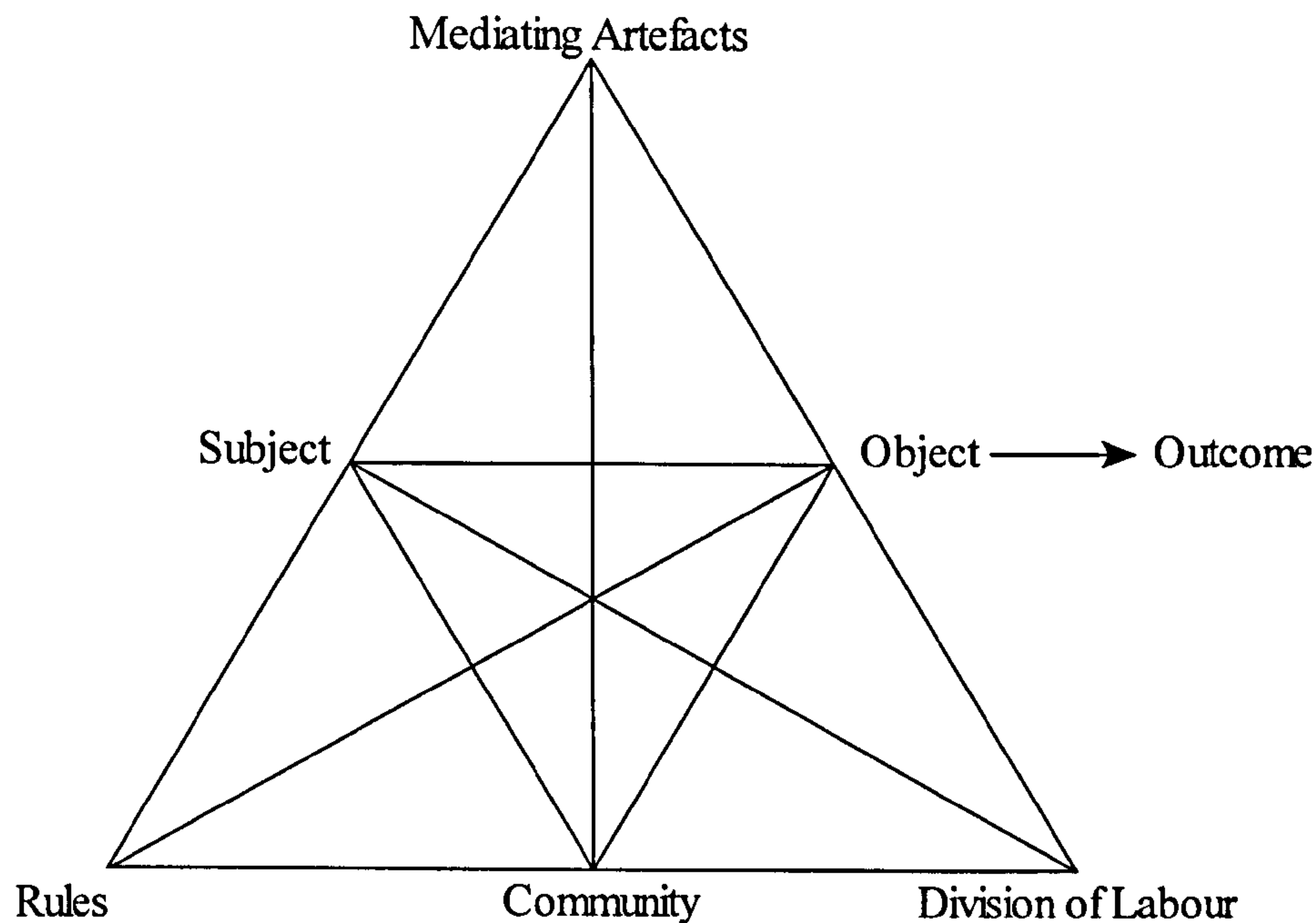
Through interactions, reflections are shared to aid learners' formation of abstractions as tacit knowledge is made explicit. Learners' progress is continually monitored both through their actions and their expressed perceptions (Herrington and Oliver, 1995). Socialisation into the profession and an appreciation of its developing standards provide the community with a standard trajectory for learners. This standard trajectory guides the identification of appropriate work for individual learners. This combination of learners and experts collaborating is an alternative to the extremes of transmissive and learner-centred education (Rogoff *et al.*, 1996),

Achieving an understanding of the interrelationship of the many factors involved in an activity such as situated learning or a community of practice may be aided by an application of activity theory.

2.4.3.3 Activity Theory

Activity theory provides tools to aid analysis of a wide range of factors involved in contextualised processes. Activity theory, or more fully *cultural historical activity theory*, is based on the Vygotskian concept that individuals do not interact simply with their environment in a Pavlovian animal stimulus-response sense (Pavlov, 1927) but human experience is mediated by the cultural context. Russian activity theory (Leont'ev, 1981) holds that while individual *actions* may not achieve an objective, taken together as an *activity* they may do so. Engeström (1987) developed activity the underlying influence of the community so the activity is understood in a social context. The community here is those involved who share the common purpose. The resulting Scandinavian model of activity theory is holistic since it takes into account wide-ranging factors that bear on learning activity, such as the *mediating artefacts*, instruments or tools people use, the community, the goals of the individual, the culture's rules and the division of labour.

The relationships between these factors in activity theory are represented diagrammatically in a triangular model (Fig. 2.06). The uppermost triangle represents activity at the individual level incorporating the subject, their objective and the mediating artefacts they may employ. This is underpinned by the wider context grouped in three factors along the diagram's base. Placed centrally are any communities affecting the subject-object activity. To the left, the implicit and explicit rules governing the behaviour of individuals within those communities. These rules mediate interactions between the subject and the communities. On the right is the division of labour mediating how the community organises individuals' efforts to achieve the objective. The lines linking these factors represent their interrelationships. Finally, the activity's outcomes are shown to the right arising from the object of the activity.

Figure 2.06 Structure of an ideal human activity system (Engeström, 1987)

The theory itself does not predict the outcomes of an activity. Instead it provides a framework for observation and analysis (Engeström, 1991; Engeström *et al.*, 1996). In use it proved convenient, relatively easy to apply to varied empirical data and valid (Nardi, 1996; Brown, Hyland and Piper, 2005).

One feature not represented in the activity diagram is any form of feedback from the outcomes affecting the factors in the model, for example, students' successes bolstering teachers' confidence and enhancing their teaching performance. Further, the emotional and motivational factors may be under emphasised (Fanghanel, 2004).

Despite these limitations the model can usefully represent the factors identified in the literature with their interrelationships and will be used in this manner in this section's summary. A further recommendation for this type of analysis in outreach training situations comes from the aforementioned increasing emphasis on biopsychosocial models of healthcare (2.2.2, page 15) on account of activity theory's approach being inclusive of a broad range of connected factors.

2.4.3.4 Criticisms of Social Theories of Learning

As there are many standpoints for analysing learning each can be criticised from the others. Social theories are no exception.

Socio-cultural models may undervalue the distinctive part played by individuals (Guile and Young, 1998). They also fail to distinguish between official knowledge and the self-constructed knowledge used in the workplace (Orr, 1990). Both these criticisms apply to the lack of reference in social models to learners' previous learning or experiences.

From an educational perspective Anderson *et al.* (1996) reviewed four central claims of situated learning:

1. *Action is grounded in the concrete situation in which it occurs*
 2. *Knowledge does not transfer between tasks*
 3. *Training by abstraction is of little use*
 4. *Instruction must occur in complex social environments*
- (Reder and Klatzky, 1994).

Anderson found these claims both overstated and to reject commonplace empirical evidence of individual learning through schooling. This criticism has been countered for only considering the imputed claims rather than the underlying perspectives (Greeno, 1997). Further, Anderson and colleagues (1997) claimed that the differences between the two perspectives are exaggerated by their distinctive vocabularies and, in practice, they share much common ground. However, stressing the two perspectives' similarities rather defeats the objective of creating a new perspective with the potential for yielding new insights (Cobb and Bowers, 1999). Anderson also claims that situated learning has not provided demonstrably better educational tools than those based on existing cognitive theories.

It may be that individual, cognitive and social, situated perspectives add to the understanding of learning. Official knowledge, or the way one is supposed to work, might be construed as the procedures taught in the dental schools with other everyday procedures situated in the society of practitioners. Further, the cultures encountered in a student's upbringing may affect their interactions with the communities they serve and their co-workers.

A second area of criticism is the assumption that communities consist of benign competent workers and *old-timers*. Societies can be *sectarian, dictatorial, controlling, divisive, exploitative* and *cliquish* (Hay, 1993). Newcomers have to decide where to locate themselves in such communities. This potential difficulty is exacerbated by the newcomer's initial lack of power to create their own interpretation until they demonstrate expertise. Until then the newcomer's creativity is suppressed as the arrangement is essentially oppressive and instructivist. His solution is for communities of practice to grant the learner the *space* to develop their practice to the point where they seek input from one or more *old-timers*. The learner remains in control and constructs their own understanding. For a dental student undertaking clinical procedures this approach may offer insurmountable difficulties for ensuring the quality of patient care unless the student is already competent in the procedure. In which case it is conceivable that a student supervised by multiple dentists may discuss with one or more of the dentists the inconsistencies they perceive in attempting to form their own approach.

Lave and Wenger's learning trajectory is linear from newcomer to expert and old-timer with broad-based experiences. Empirical studies of apprentices indicate that learning typically is not linear and is sometimes so focussed on one area that learners become narrowly-expert where their apprenticeship is restrictive rather than expansive (Fuller and Unwin, 2003a; 2004). Expansive learning shares features with reflective practice in that the learner *questions the validity of tasks and problems posed and begins to... analyze critically their work practice and begin to transform it* (Engeström, 1994).

The same study noted apprentices' academic studies gave them, knowledge not possessed by *expert* co-workers and sometimes taught the *old-timers*. This reciprocal learning does not match a linear progression of learning.

Lave and Wenger risk undervaluing the role of the teacher (Fuller and Unwin, 2004) because they stress the negative aspects of didactic teaching and assert that knowledge is so contextual that it is neither general nor abstract.

A broader criticism of Lave and Wenger's conclusions arises from their studies of diverse situations. While this might allow triangulation between several contexts, observations from *natural apprenticeship* situations (e.g. extended family-provided

midwife training in the Yucatan) may not be applicable to formal training in the UK (Fuller and Unwin, 1998).

Another criticism of social models of learning identifies a potential weakness in the knowledge created by a community of practice. Once newcomers become members of a community through enculturation (Kottak, 2004) they are changed to view the world from the old-timers' perspective. An inevitable corollary is that other perspectives are lost (Hay, 1993).

The thrust of many of these criticisms is that the community of practice perspective is limited because it underestimates the roles of teaching and constructivist learning. Further, the self-developmental achievement of a community of practice is limited by its own world view. Despite these criticisms there may be understandings from social perspectives on learning illuminate placement learning. Broad-based models, such as activity diagrams may have value in analysing placement activity.

2.4.4 Facilitating Learning

All models of learning recognise the value of knowledgeable practitioners in developing newcomers. This section reviews models of teaching before describing potential conflicts in the teaching role and outlining methods to support cognitive apprenticeships and learners' reflection.

2.4.4.1 Models of Teaching

Teaching is concerned with the facilitation of learning by someone other than the learner while learning is a process internal to the learner. Higher education staff have a range of attitudes to theories of teaching: some enthusiastic, others resistant or finding theories inappropriate (Trowler and Cooper, 2002). Applying theories to common learning tasks reduced teaching and increased learning (McAlpine, 2004). The extent to which these classroom approaches inform facilitating situated learning is uncertain.

Models are simplified representations of a complex situation which facilitate understanding (Gage and Berliner, 1992). There are innumerable models of

teaching derived from different approaches. A few of these are selected for presentation on grounds of apparent relevance to outreach teaching. Then a phenomenological approach identifies distinctive constructions of teaching found in different contexts.

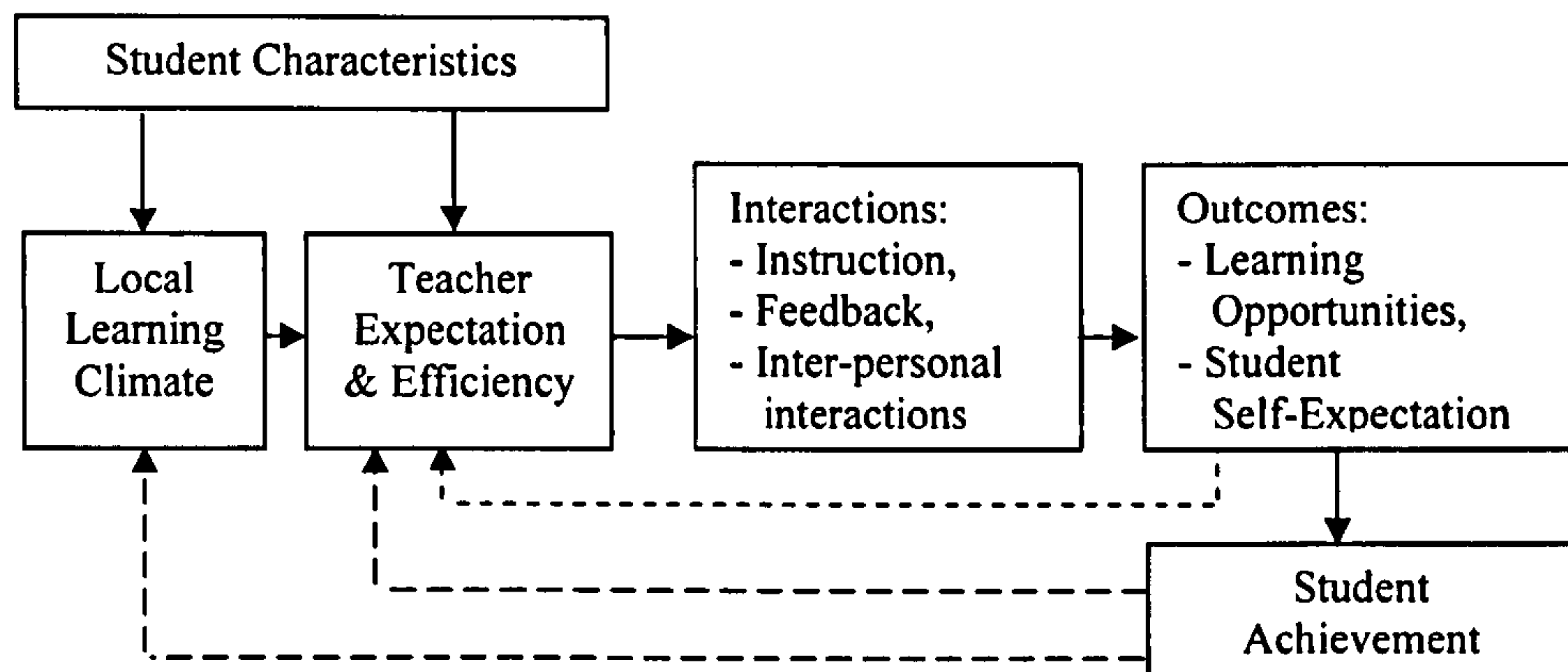
Instructivist approaches to teaching (Carroll, 1963) consider teaching's success to be a function of the time spent, learner variables such as perseverance, intelligence, aptitude, comprehension and engagement and teachers' instructional capability and opportunity. They ignore outside factors such as the family, community and society. This approach influenced Bloom's model (1971) which encourages individualised learning and holds that achievement is almost inevitable provided sufficient time and quality instruction is available. According to this model teachers should divide the content to be learned into manageable units, set specific learning objectives, devise formative and summative assessments and plan tuition, practice and reinstruction for learners to achieve mastery.

Another model defines *quality instruction* by identifying what teachers should do:

- *Select a learning objective...*
- *Consider the characteristics of the students...*
- *Consider learning processes and motivation...*
- *Select and execute a suitable teaching method...*
- *Evaluate the learning achieved* (Gage and Berliner, 1992).

If learning is inadequate then the process is modified in the light of the experience. In order to make optimal decisions the teachers should use principles from educational psychology. While such principles feature in teacher training programmes they are perhaps less likely to feature in the training of primary care clinicians.

Proctor (1984) extends instructivism in a model that incorporates the local climate, teacher expectation and personal interactions all shaping students' self-expectations to determine learning outcomes (Fig. 2.07). High expectations of learners increase their achievement (Rosenthal and Jacobson, 1968). The model also suggests that seeing students improve provides positive feedback to enhance the learning climate and clinical supervisors' expectations and behaviours.

Figure 2.07 An Institution-based Model of Teaching (Proctor, 1984)

Another model (Biddle and Ellena, 1964) extends beyond the classroom to incorporate teachers' formative experiences on not only the students but teaching elsewhere (Fig 2.08). Such a model accounts for differences between settings but allows for educational practice to transfer between settings. Further it links the outputs of teaching to the conception of education in a context as might be observed in a new educational setting such as a developing outreach training programme.

A development of that model incorporates presage (or predictive) characteristics and context as factors affecting the complex iterative teacher – pupil interactions (Cruickshank, 1985; Fig. 2.09).

All the above models were developed from consideration of classroom teaching. A wider perspective is now taken comparing a number of contrasting educational environments.

Figure 2.08 The Biddle and Ellena (1964) model of teaching

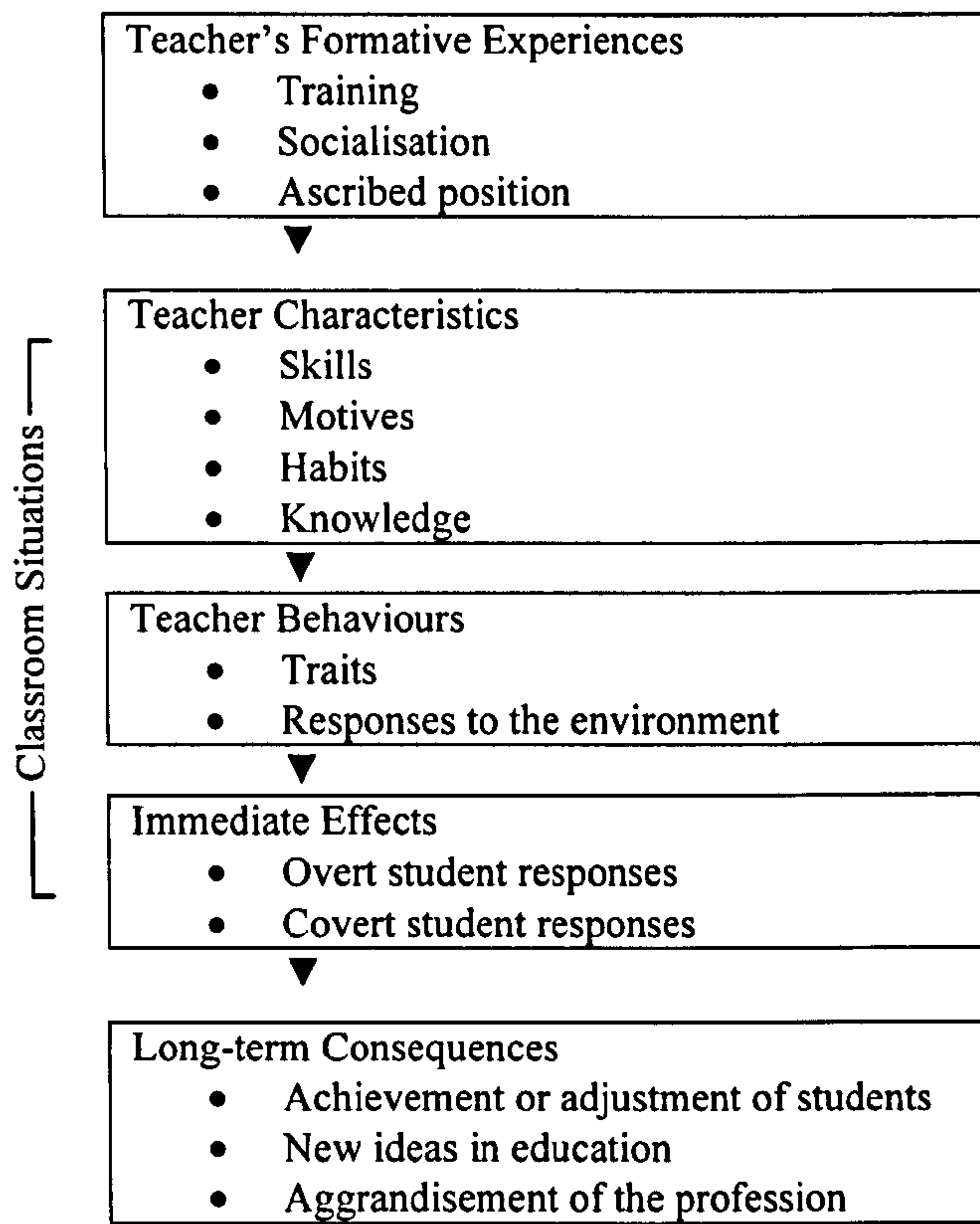
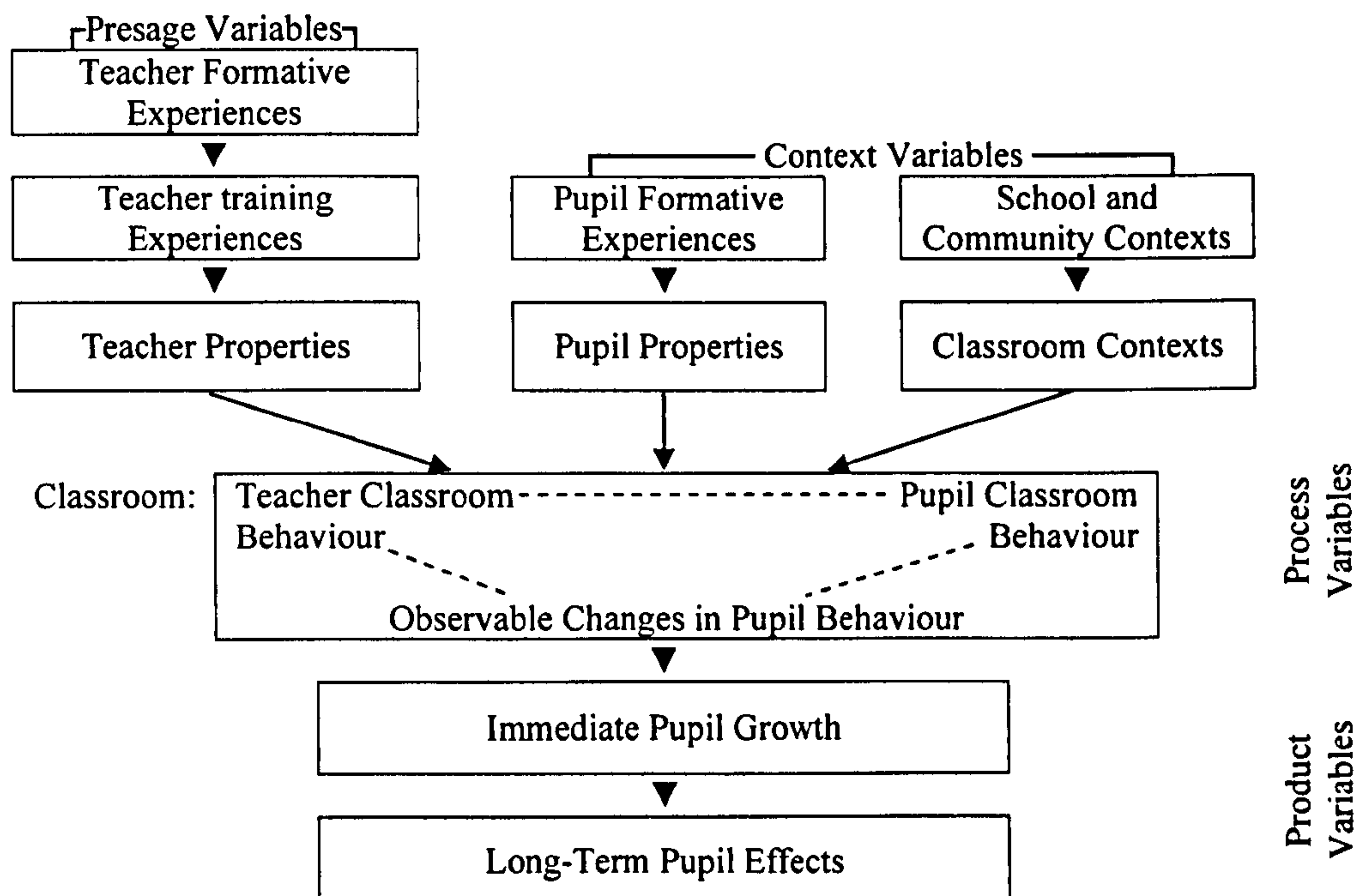


Figure 2.09 A Classroom-based Model of Teaching (Cruickshank, 1985)



2.4.4.1.1 Different Teaching Environments

New concepts of teaching have been derived from phenomenographic research in several societies (Pratt, 1992, 1998) and may provide frameworks for assessing teaching in dental education. While these models are not mutually exclusive, generally one predominates in each situation.

Pratt's general model (Fig. 2.10) places three main elements – teacher, learners and the content – in their context. Three variations of this model are relevant to outreach training: the engineering, developmental and apprenticeship models.

Figure 2.10 A general model of teaching (Pratt, 1992)

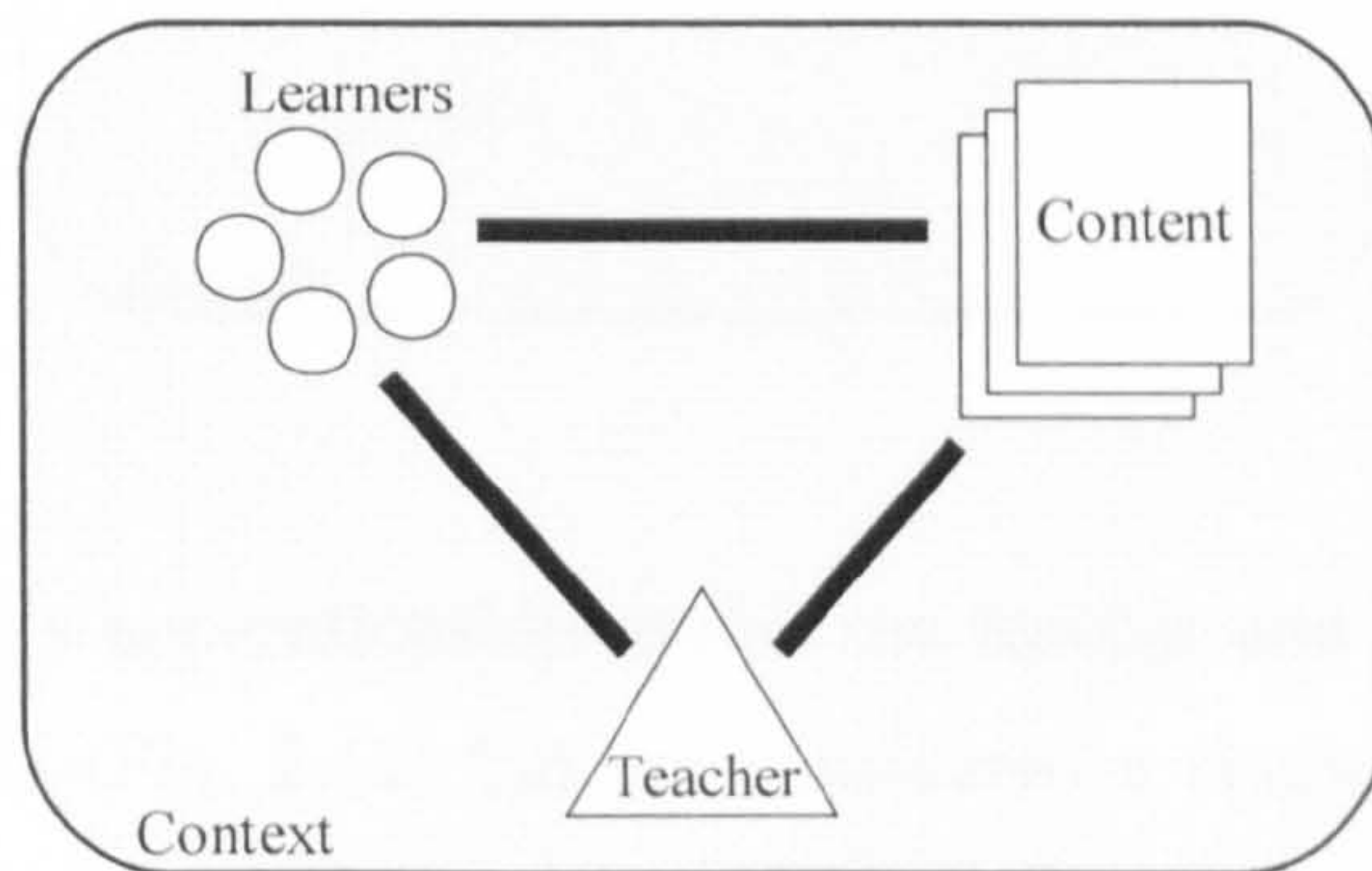
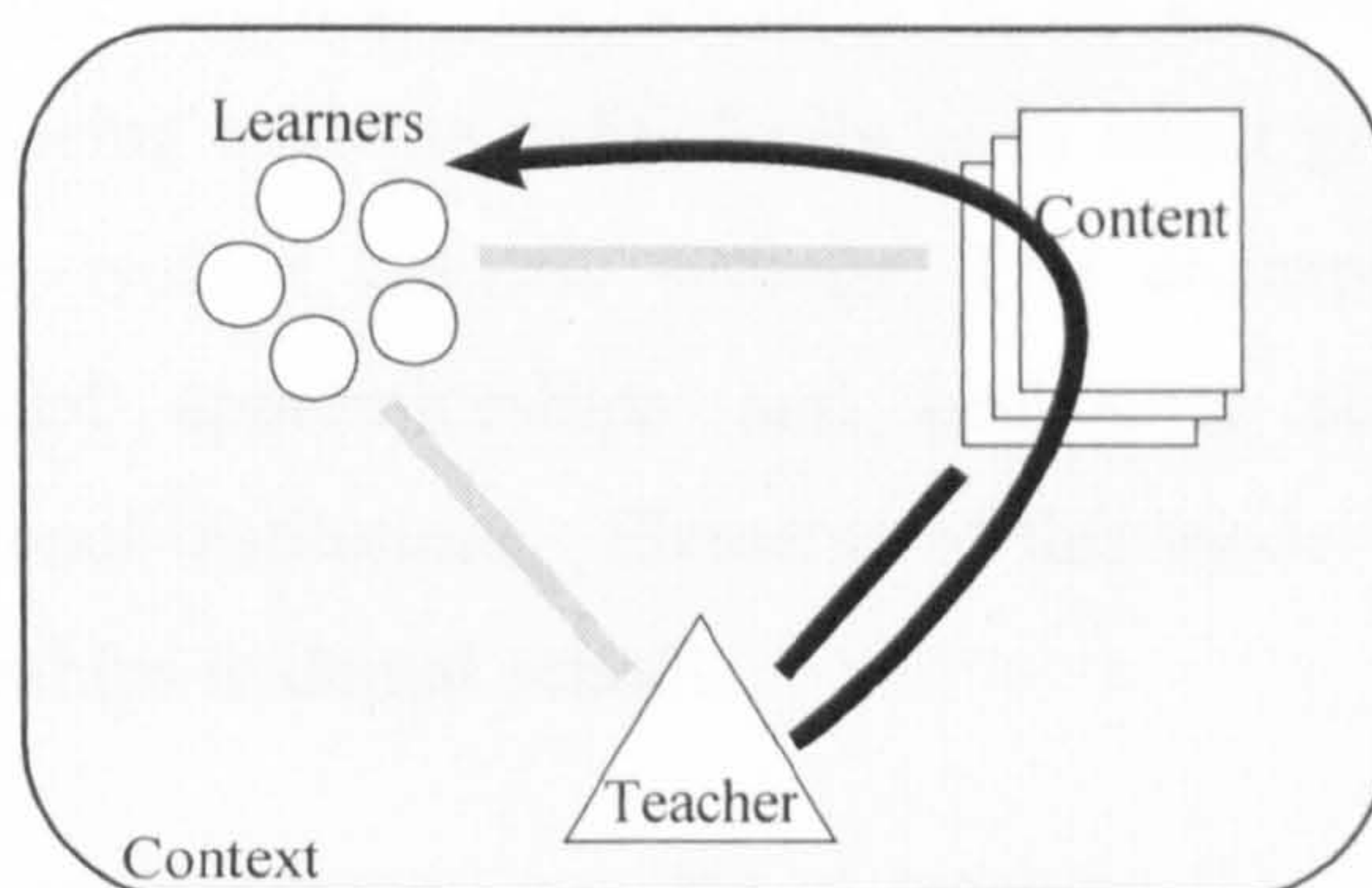


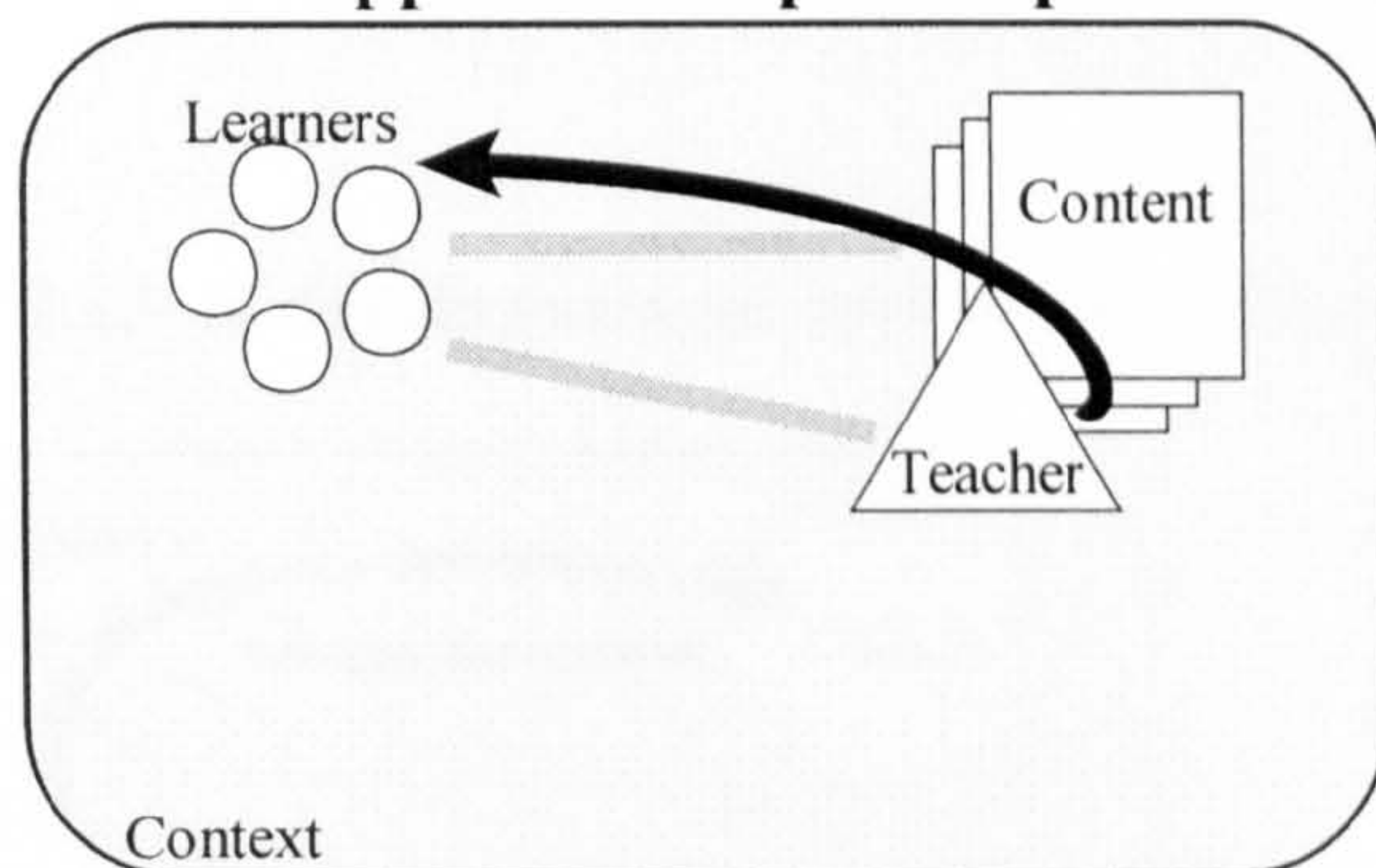
Figure 2.11 An engineering conception of teaching (Pratt, 1992)



The 'engineering' conception (Fig. 2.11) concentrates on the delivery of content with the key relationship being that between the teacher and the content. Emphasis is placed on lecturers' expertise, *coverage* of the content and efficient delivery of the material. The material to be learned is definable and independent of the teacher

and the learners. Transmission typically involves classrooms, lectures, and printed factual material. Learners are assessed through tests of recall or application. Individual differences between learners are considered unimportant other than their effort in applying themselves. This model is characteristic of state education and corresponds to transmissive models of learning in dental education.

Figure 2.12 An apprenticeship conception of teaching (Pratt, 1992)

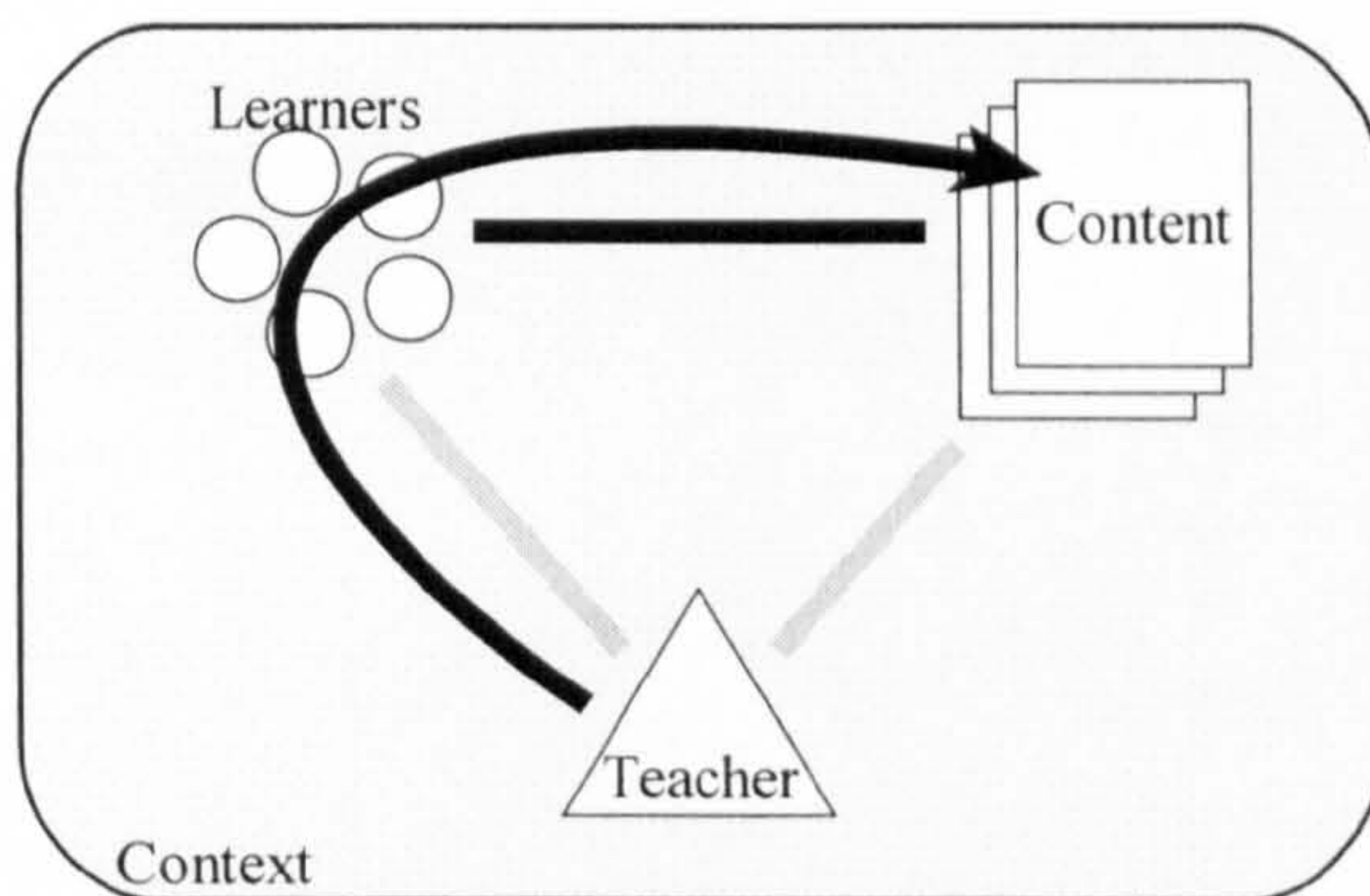


In Pratt's apprenticeship model the teacher and the content remain the dominant elements (Fig. 2.12) but are considered a single entity. The master is an expert practitioner whose knowledge, awareness, attitudes, values and practice are the expertise to be learned. This 'content' might be characterised as highly contextual *craft knowledge*. As stated earlier, practitioners often struggle to make their knowledge explicit. Transmission of the knowledge is typically by encouraging and advising students individually or in small groups while they work on typical tasks in real or realistic settings. This conceptualisation was developed from vocational apprenticeships and healthcare service learning outside formal educational institutions. Elements of this model may be visible in some learning relationships in dental schools.

Pratt's developmental concept of teaching (Fig. 2.13) is found in western higher education. The roles of both the learners and the teacher are emphasised, as are the learners' interactions with the content. However, the content is of secondary importance, merely providing a vehicle for learning which often differs between learners. Learners are individuals each at their own stage of development along distinct learning paths developed from different backgrounds toward differing

potentials with some autonomy over their own development. The teacher's role is to match appropriate learning experiences to learners' individual needs, to develop not only their knowledge and understanding but also their learning. The knowledge itself may be questioned and learners may be unsettled in progressing through the phases of learning as described earlier (2.4.2.4, page 27). The teachers' goal is to develop autonomous learners able to deal with *unpredictable and complex situations*. The processes of researching and questioning are central while the content and context are peripheral.

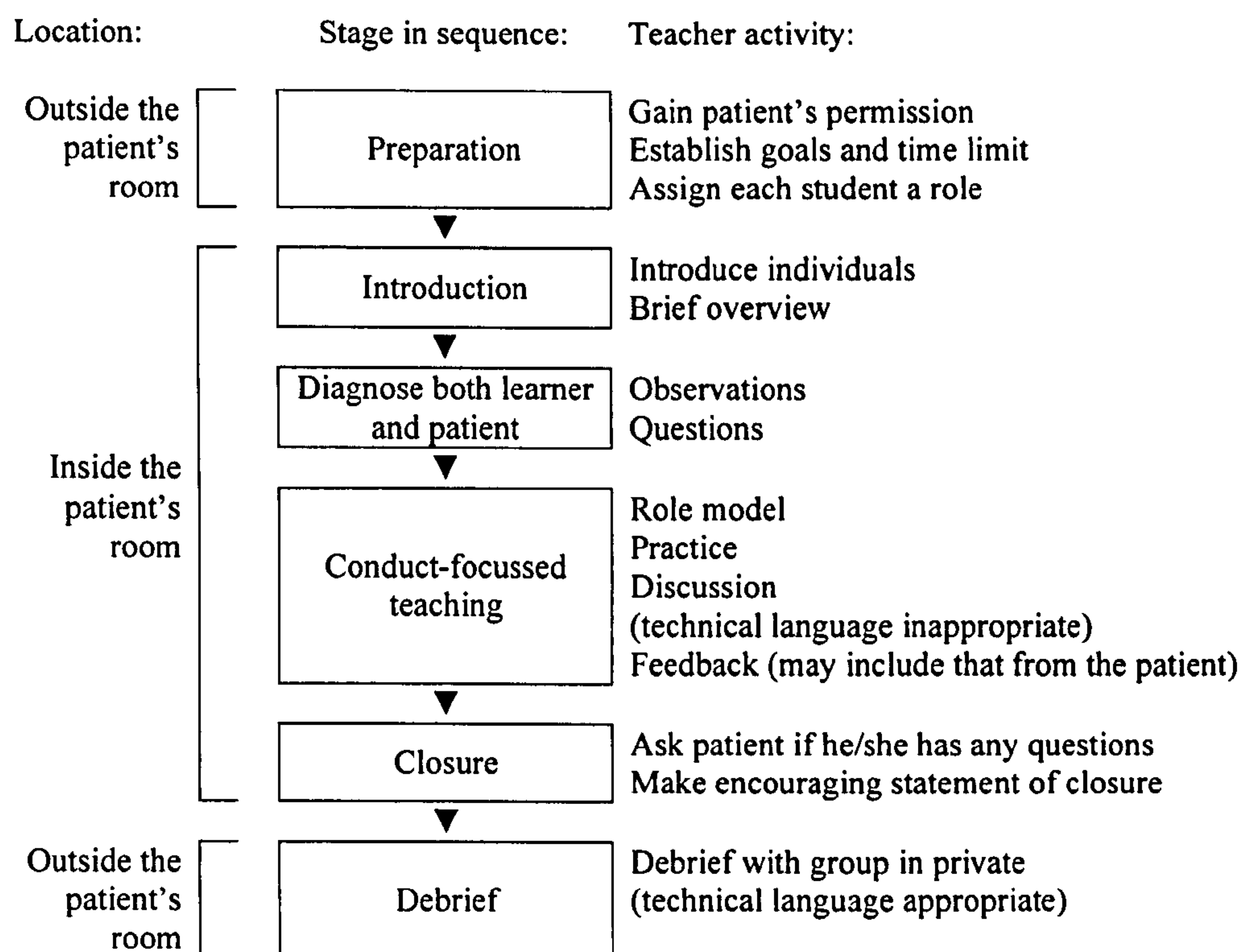
Figure 2.13 A developmental conception of teaching (Pratt, 1992)



This model is consonant with Fox's *growing theory* of higher education teaching which is centred on the *intellectual and emotional development of the learner* (1983). An outreach training programme with aims of increasing professionalism or providing an understanding of, say, applied principles of dental public health, might be less concerned with the specific content of students' learning experiences and aligned with such developmental models of teaching.

2.4.4.1.2 Chairside or Bedside Teaching

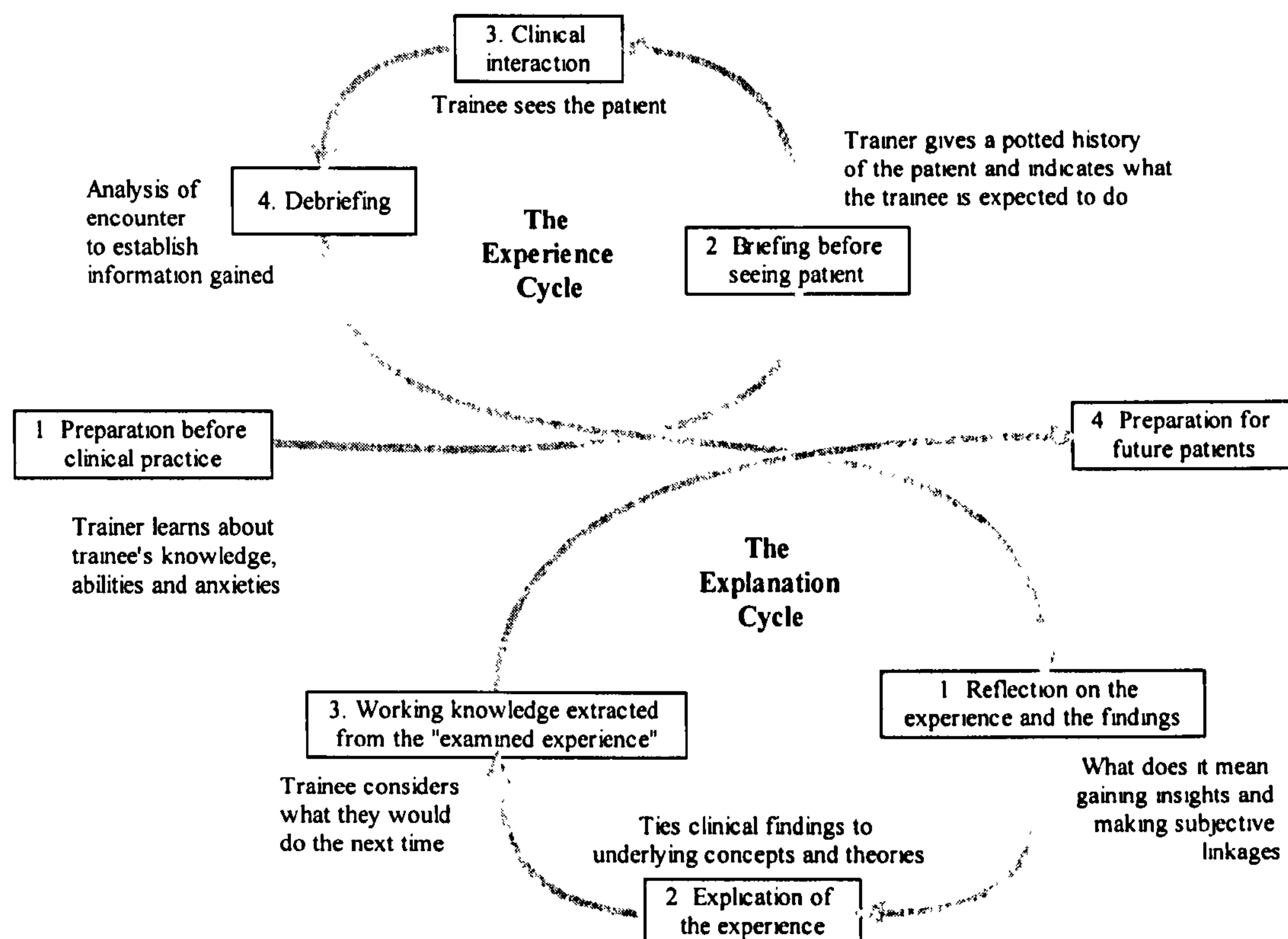
Finally, two models from bedside teaching in medicine (chairside in dentistry) both developed from reviews of the literature and input from medical educators. The first model is a concrete guide to practice for practitioners (Fig. 2.14). It includes two phases of teacher feedback: one in the presence of the patient and a more technical one in their absence.

Figure 2.14 A Model of Bedside Teaching Practice

After Janicik and Fletcher, 2003: 129.

The second model reinforces the first by highlighting the practice of providing students with links to material beyond their immediate experiences thus raising the level of abstraction beyond the learner's concrete experiences (Cox, 1993, Fig. 2.15). This model is akin to standard experiential learning cycle models (Kolb, 1984; Stanton and Grant, 1999; Spencer, 2003). It includes preparation for and discussion of experiences of individual patients. However, in Cox's model supervisors encourage students to identify similarities or contrasts with other cases, theories or expectations and so develop generalised solutions in an *explanation cycle* which builds on the concrete experiences of the first cycle.

Figure 2.15 A Two Cycle Model for Clinical Teaching



Annotated from Cox, 1993.

In summary, teaching can range from transmissive to learner-centred approaches. The relationships between the key elements of content, teacher, and learner differ markedly between models. Students involved in outreach training may experience several approaches. Where teaching involves patients their needs and rights should be considered. There are detailed models of teaching to guide instruction. Factors common to the models in determining the outcomes of teaching include organisation of the learning, matching learning processes to learners' characteristics and managing learners' comprehension, motivation and engagement. Local cultures and teacher expectations also have an effect. Success, demonstrated by observable student progress, may bolster both teachers' and learners' future performance. It may influence future teaching and even conceptions of education.

2.4.4.2 Conflict within Clinical Teachers' Roles

Clinical supervisors have other roles which may conflict with facilitating students' learning. Three sources of potential conflict are now outlined: patients' needs, assessment of students and their institutions' culture.

The tensions created for supervisors in balancing the treatment needs of patients and learning needs of students are widely recognised (Hartley *et al.*, 2003; Spencer, 2003; GDC, 2004a; SDS, 2004). Professional guidance is available for dental supervisors (BDA, 2005). While treating patients in primary care settings may reduce this tension (RCS, 2001) for some medics involving patients is a *burden* which made *them hesitant to engage in bedside teaching* (Janicik and Fletcher, 2003).

Respected US higher education teachers noted role conflict between their culture of *equality and respect for students* and the requirement to summatively assess them (Andrews *et al.*, 1996).

UK university tutors identified a number of dissonances between applying educational theories and local power relationships, funding arrangements, competing priorities and conflicting ideologies with deleterious effects for praxis (Fanghanel, 2004). Such incongruity between departmental and educational norms may result in antagonism and anxiety (Trowler and Cooper, 2002).

Outreach supervisors may encounter conflicting sets of needs besides addressing their own need for fulfilling work: their services', the patients' and the learners' needs.

2.4.4.3 Supporting Cognitive Apprenticeship

The basic stages for supporting cognitive apprenticeship (Brown *et al.*, 1989) start with the expert considering the processes involved in a professional skill to make explicit the tacit knowledge involved. Next, authentic tasks are designed to lead the learner into those processes and practice effective strategies. Then the teacher models the strategies and allows the learner to attempt them independently before coaching them as required. This model may be applied in a controlled linear manner for basic skills.

Teaching methods deemed to support cognitive development include: modelling, coaching, fading (that is the gradual removal of assistance), articulation, reflection and exploration of ideas (Brown *et al.*, 1989). Educationalists claim these methods, especially the last three, distinguish cognitive apprenticeship from traditional craft apprenticeships (Collins *et al.*, 1987). Further, this learning can occur away from the workplace with groups of learners and be task- rather than work-focussed.

The need to match the pedagogy to learners' current learning phase (see 2.4.2.4, page 26) requires a critical skill of a coach. The difficulty of each task must be finely judged as challengingly beyond their current competence but still achievable with assistance. This is the *zone of proximal development* (Vygotsky, 1978). He used this concept to identify pedagogic structures to assist learners to widen their zone of mastery.

Teachers' impressions of this zone, termed the *zone of potential construction*, are based on their interactions with the learner and their pedagogic knowledge (Steffe and D'Ambrosio, 1995). Assistance provided in the early stages of developing a skill is termed *scaffolding*, which is gradually removed by *fading*.

Teaching in a vocational context has distinctive features. Schön (1987) identified three models of coaching with corresponding practicums (forms of outreach training placements) matched to the three phases of learning described earlier (Fig. 2.04, see page 27).

1. *Follow me*: with expert demonstration and imitation for learning rules and applying them
2. *Joint experimentation*: where the learner may set the objectives, attempt new procedures or suggest the expert tries them, then the master leads an evaluation of the approaches' relative merits. Learners practice reasoning in problematic situations from the rules to devise appropriate responses
3. *Hall of mirrors*: where the master leads the learner in a masterclass, critically discussing responses to particular (increasingly demanding) scenarios so helping the learner to understand the profession's tacit frameworks as models for practice.

These forms of coaching aim to encourage reflective practice (2.4.2.6, page 30).

2.4.5 Work Experience Placements

The common themes of theories of learning from experience may be summarised as a set of propositions:

- *experience is the foundation of, and the stimulus for, learning and reflection plays a key role in drawing meaning from experience*
- *learners actively construct their experience uniquely based on their individual past experiences*
- *learning is a holistic process rather than being limited by distinctions of discipline or the affective/cognitive/psychomotor*
- *learning is socially and culturally constructed within local norms and values*
- *learning is influenced by the socio-emotional context in which it occurs and this affects confidence and perceived competence* (Boud, Cohen and Walker, 1993).

Key aspects which emerge from the analysis are those concerning situated learning, valuing learners' autonomy, providing feedback, encouraging reflection and metacognition, and support for learning. These factors are cornerstones of the design and implementation of work experience placements discussed in this section. They appear to be compatible with the generic aims of UK higher education vocational placements:

- *to provide practical application of learned theory;*
- *to gain an appreciation of a working organisation; to promote personal development;*
- *to permit the learning of practical skills, and*
- *to clarify career pathways* (Smithers, 1976 citing University of Bradford).

However, care needs to be taken in applying general statements on work experience to dental education. Dentistry programmes, along with those for medicine, teaching and social work, incorporate a practical component *precisely so that graduates will be able to continue their learning in the work situation* (Candy and Crebert, 1991).

2.4.5.1 Forms of Work Experience

A number of alternative narratives of connecting education, learning and work have been identified (Saunders, 2006). At the societal level are functionalist narratives, stressing preparation for employment, and Marxist narratives integrating education, learning and work. These narratives can be identified in the literature of dental outreach programmes more frequently than those the individual level. The latter includes the social practice narrative emphasising situated learning over schooling and the boundary crossing narrative considering learning through transfers between activity systems. There may be value in further research into outreach training from the individual perspectives.

At the more mundane organisational level, work experience for undergraduates may be a structured part of their programme external to other studies or completely unrelated to the curriculum (Little *et al.*, 2001). This experience may take the form of sandwich course placements, professional placements, work experience, work linked project, workplace visit, work shadowing or simulated case study (Harvey *et al.*, 1998) however, the last four are unlikely to involve learning through work. Three forms of learning through work experience are: introducing students to the realities of work; applying learned skills to the working situation; and experiencing work as a basis for reflection (Guile and Griffiths, 2001). All those forms appear applicable to outreach training.

Learning while working risks being informal, opportunistic and unsupervised unless planned and organised within a structured programme with induction and mentoring (Candy and Crebert, 1991). Strategies for learning used by university students in work situations are typically those carried over from academic settings, for example individual competitive approaches, and these may be inappropriate in a contextualised collaborative team setting. A significant advantage of work placements may be to develop students' ability to learn in ways typical of working professionals.

The distinction between restrictive and expansive work-based learning was outlined earlier (2.4.3.4, page 40). Features of participation in an expansive work-based training programme are:

- *Participation... in multiple communities of practice inside and outside the workplace;*
- *the primary community of practice has a shared 'participative memory' gained, for example, through having a long tradition of providing [training];*
- *breadth of experience is fostered by planned rotation [around tasks];*
- *[learners'] gradual transition to rounded and full participation.*
(Fuller and Unwin, 2003a, after Engeström, 1994)

These features are more broadly applicable than to the apprenticeship from which they emerged (Brennan and Little, 2006). In relation to outreach training the outside communities of practice might be technical support services and other healthcare services and besides clinical working there are tasks such as sterilisation, cross-infection control, stock control, practice management, audit and reception which may provide opportunities for planned rotations.

A phenomenological study of placement learning also drew attention to the importance to learning of learners' involvement and participation in work activities and the acceptance of the newcomers in the communities of practice (Rismark and Sitter, 2003). This aspect of work experience placements is discussed next.

2.4.5.2 Legitimate Peripheral Participation

Lave and Wenger (1991) identified an essential common feature of workplace learning which they termed *legitimate peripheral participation*.

Learners in apprenticeship-like situations are granted a privileged position within the productive workplace in a *community of practice*. This position is not that of a full practitioner with all the rights and responsibilities that implies but one of *legitimate peripherality* as it is sufficiently close to the core activities for participation in genuine work to an extent appropriate to the learner's expertise. The learner can access *sources of understanding through growing involvement* but still have time to reflect on their experiences with peers or masters. It is not so much that situated learners acquire alternative structures or models to understand the world, but that by participation in frameworks that have a social structure they gain a comprehensive understanding rather than simply being presented with and receiving a collection of isolated bodies of knowledge and skills.

2.4.5.3 Location in the Learning Trajectory

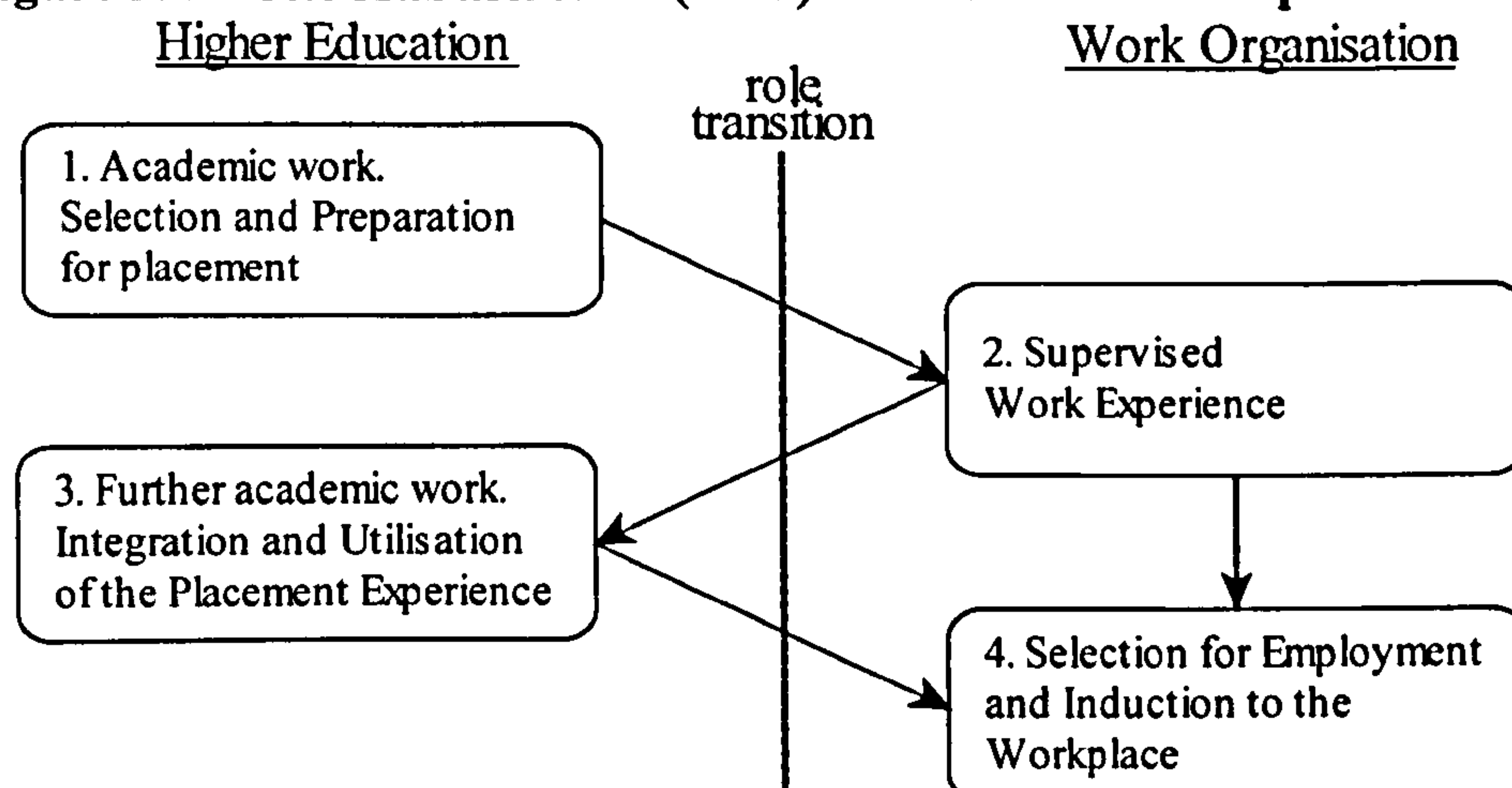
A tenet of outreach training is that it provides valuable additional experience once the basics have been learned in the dental school ‘laboratory’ (Bailit, 1999a). Students may no longer require close supervision as provided at the school (Jacobson *et al.*, 1999a). Linking this to the Dreyfus model might have the first two stages of skill acquisition being undertaken in the dental school while the later stages might be developed in outreach placement settings.

The location in a learning trajectory of learning experience intended to establish good professional practice has been discussed (Barr, 2000). There was no agreement from the limited literature whether these experiences should be post-qualification when a firm autostereotype or professional self-image is formed (Carpenter, 1995) or much earlier to prepare students before potentially obstructive stereotypes had formed. Work in medical settings suggests early intervention has a beneficial effect (Carpenter, 1995). Similar consideration could be given to some non-clinical aspects of outreach training.

2.4.5.4 Boundary Crossing

The role of work placements can be conceived of as a bridge between academic and work environments (Saunders, 2006). However, the transition between settings may inhibit students recognising the two experiences as an integrated learning programme (Auburn *et al.*, 1993).

Figure 2.16 The Auburn *et al.* (1993) transition model of placements



Preparedness for employment is key in undergraduate dental programmes and transitions have a positive effect on this preparedness (GDC, 2002; Cranmer, 2006). These transitions and progression to employment in a generic programme are portrayed in Fig. 2.16. Placements can balance liberal and vocational curricula within a course (Auburn *et al.*, 1993). A vocational course, such as dentistry, probably has stages 1 and 3 serving the needs of stages 2 and 4 (University of Bath, 2004). In dentistry programmes, transitions between the academic dental school and dental hospital clinical settings usually precede any transitions to an outreach programme. Despite dental programmes' emphasis on the vocational, undergraduates perceived difficulties on transferring to general dentistry from the secondary care setting (Benbelaïd *et al.*, 2006).

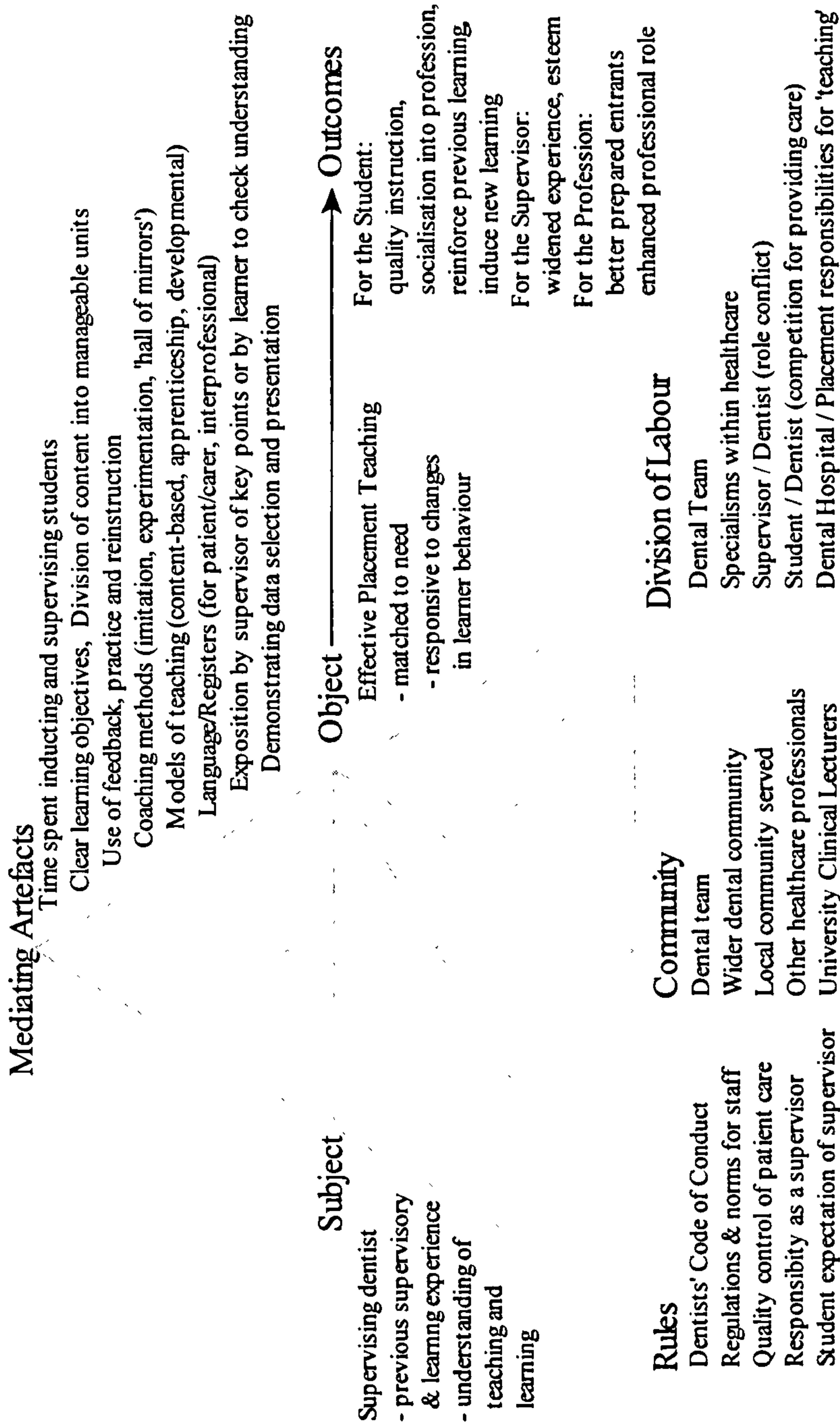
Healthcare students transferring to work settings suffered anxiety and an initial decline in performance exacerbated by their inexperience (Bain, 1996; Cope *et al.*, 2000). Kramer (1974) termed this a *reality shock*. However, such shocks may stimulate learning to operate effectively (Candy and Crebert, 1991).

Boundary crossing, as in being able to apply conceptual approaches in a new contrasting situation, is *a cognitive process that characterizes much expertise* (Engeström *et al.*, 1995). Students on work placement, lacking that expertise, strive to make sense of their experiences to achieve an *ontological security* in their new environment (Beach 1999; Saunders, 2006). For them the bridging between settings can be viewed variously as a rehearsal for entering employment, work experience, a series of learning opportunities, or a shared learning experience. Negotiation skills may help students bridge the divide (Beach and Vyas, 1998).

2.4.5.5 Connective Model

A new conception of work experience, termed a connective model (Guile and Griffiths, 2001, 2003) draws together many of the concepts described in this section. It defines an approach to teaching and learning in which students experience *interconnected activity systems* in the workplace as components in a range of *communities of practice*. In this learning environment: learners negotiate their learning opportunities; placement hosts design *situated learning* activities in learners' *zones of proximal development*; and, university programme staff build

Figure 2.17 An activity diagram for supervision on outreach placement



productive *partnerships* with placements and encourage integrative reflection. *Boundary crossing* uses learners' previous academic learning to help them...

understand why certain types of performance are required in different work contexts and how to work with others to produce new knowledge.

Within the connective model social theories of learning are applied to provide supervisory support within workplace teams and this is considered *a more effective means to understand and implement an educational partnership for work-place learning* (Spouse, 2001). However, it requires of the supervisor...

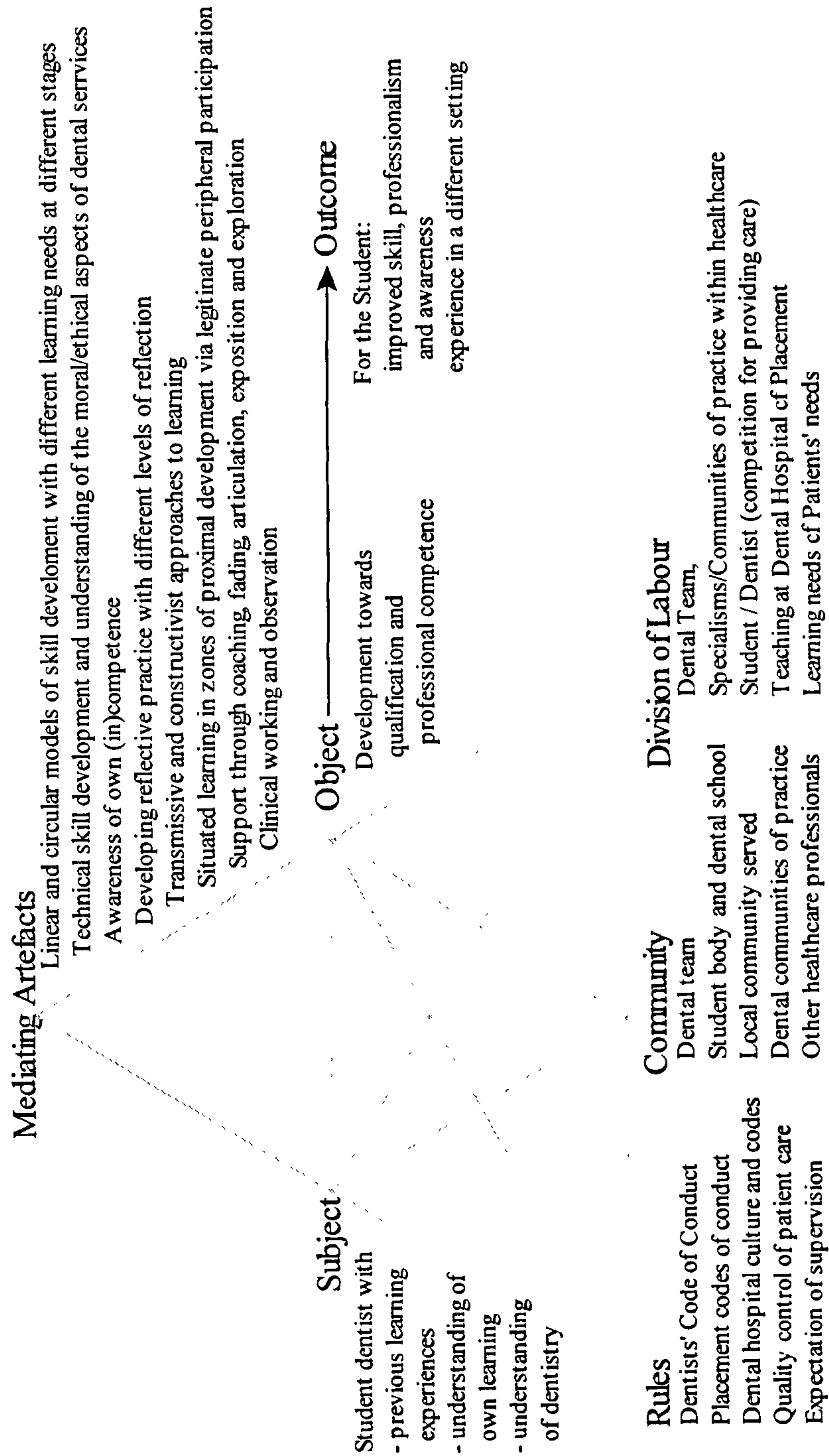
a breadth of vision and the use of the teacher's intuition...[and] a shared value in the outcomes that work based learning can achieve, plus a belief that the learner can achieve the outcomes (Charmers *et al.*, 2004).

Outreach training may be viewed as a form of connective work experience which offers the advanced beginner or competent performer opportunities to develop their practice and to participate in a wider range of professional activities.

The connective model combines factors from diverse literatures on teaching. These factors and other topics relevant to the activity of outreach supervisors striving to achieve effective teaching of students may be represented in an activity diagram (Fig. 2.17, page 57).

In the same manner many of the salient points relating to learning in outreach training may be represented as an activity model (Fig. 2.18, page 59). While the tools listed as mediating artefacts in the diagram may be used by the student to achieve their object it is likely that the choice of those tools will be influenced by the supervisor. The extent of a supervisor's awareness of individual students' competence and previous learning experiences may affect the suitability of the learning experiences they select for students and the starting points they use for coaching.

Figure 2.18 An activity diagram for learning on outreach placement



2.4.6 Summary of Placement Learning

In summary, placement learning as with other forms of learning can be viewed from the perspectives of teaching or learning and each of those from stances of psychology, pedagogy, phenomenology and sociology. Teaching's form is contextual with teachers' and learners' responsibilities varying accordingly. In apprenticeships the 'teacher' and content to be learned are largely inseparable. In developmental contexts the specific content is secondary to the student's learning and this is in stark contrast to the instruction so commonplace in much of academic dental curricula. The findings of research into higher education's teaching and learning may not be directly applicable to situated learning such as outreach training.

Learning can be viewed as internalising presented information, individually constructing one's own understanding or growing into a new role through interactions with others.

Skill development progresses through increasingly complex stages and the nature of the learning changes to become more integrated and less conscious at the highest level. The higher levels of development require not only factual knowledge and skills but an appreciation of ethical considerations. There are recognised tools for developing cognitive skills. Applying these to tasks in the learner's zone of proximal development aids their progress.

Professionals work within communities of practice and learning results from the social interactions within that community. Individual's reflection on experiences can contribute to new understandings for individuals and collectively advance a profession's knowledge. Such situated learning, some argue, holds deeper meaning than learning applied from exercises devoid of their contextual information. To facilitate their development learners may be granted access to learning opportunities through legitimate peripheral participation.

Outreach training may be viewed as a combination of applying learned skills in a working situation and use of these experiences as a basis for reflexive learning. It is a form of expansive learning through work. Dental students gain initial clinical

experience in a hospital setting and outreach training adds further work experience in primary care settings.

Having in the section above considered teaching and learning in generic placement learning situations, the next section reports the narrower field of dental outreach training.

2.5 Research into the Effects of Dental Outreach Training

This section describes the search and review of published research into the effects of dental outreach training. The findings are divided into the perspectives of the higher education institutions, the placement hosts, the students and, finally, the patients.

2.5.1 Search Method

The databases used in the search were:

1. EMBASE – 1980 to 2006 week 18,
2. Medline - 1966 to April 2006,
3. CINAHL –1982 to May 2006, and
4. ERIC - 1966 to April 2006.

These databases were searched on 5 May 2006 using the following sets of criteria for resources in the English language and without limiting the search to particular fields:

1. dental OR dentistry
AND
2. outreach OR outplacement OR rotation OR community-based OR
extramural OR placement (see section 2.1).
AND
3. education OR training (omitted when searching ERIC).

This search yielded 451 sources. Manually filtering by title and abstract identified 71 relevant resources. The criteria for inclusion at this stage were those used to delineate dental outreach training at the start of this chapter (2.1, page 5). A review of references of these sources and other sources encountered during this research increased the number of relevant resources to 146.

These resources were classified firstly as either published and peer-reviewed or other sources such as conference abstracts, grey literature or personal correspondence, and secondly according to the quality level of the research, or grade of evidence, using a five-point scale (NHS, 2003). Most of these resources¹ were level 4 programme evaluations though there were several controlled trials and a randomised controlled trial of medical education (Table 2.1). Most of the resources were dental rather than medical partly because only the most pertinent medical studies were included. Most were of US origin though about a quarter are from the UK.

These resources are summarised in tables 2.3 and 2.3 to capture the large number of diverse sources, highlight the low research quality and the broad nature of many evaluations spanning multiple perspectives and topics. Summarising the sources in this way before detailing the findings from the stakeholders' perspectives also avoids breaking the flow of the narrative in the remainder of this chapter.

¹ It should be noted the resources include multiple evaluations or descriptions are of the same programmes though usually at different stages of development. For example the Community-Oriented Dental Education (CODE) programme of the New Jersey Dental School in the US is described by Desjardin (1990) and evaluated by Feldman (2004) and Cinotti *et al.* (1999) and DeCastro (2003, 2005). Also the UK's Manchester programme offering adult dental restorative experience in the community dental service is described by Elkind and Blinkhorn (2001) and evaluated in Elkind *et al.* (2003, 2005a,b,c, 2006a,b). This last programme is distinct from the long-standing precursor paediatric dentistry programme in the community dental service in Manchester (Holloway and Dixon, 1977).

Table 2.1 Count of search results by quality, subject area and location

Published Peer-Reviewed Sources							
Quality level of research and descriptor	Total of Sources	Dental	Medical	Other	UK	US	Other
1 Systematic review of trials	0						
2 Randomised controlled trials	1		1				1
3 Quasi-controlled trials	9	4	5		2	7	
4 Other research designs	69	53	11	5	14	49	6
5 Expert opinion	17	15	2			15	2
Total	96	72	19	5	16	71	9
Other Sources (grey literature, abstracts and personal correspondence)							
Quality level of research and descriptor	Total of Sources	Dental	Medical	Other	UK	US	Other
3 Quasi-controlled trials	2	2			1	1	
4 Other research designs	31	28	1	2	13	11	7
5 Expert opinion	17	14	3		9	6	2
Total	50	44	4	2	23	18	9

Notes:

The overall 'Count of sources' for each type and level of source is further categorised in the six columns to the right as: Dental, Medical or other subject areas and United Kingdom, United States of America or other locations. Several resources were neither dental nor medical but interdisciplinary. Resources that were neither UK nor US based were usually Canadian, Scandinavian or Australian.

Table 2.2 Summary of published and peer-reviewed resources grouped by quality level

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Quality level 2					
Wade <i>et al.</i> , 1998	AU	M	Randomised controlled trial (effects student self-assessed).	In enhanced GP attachments goals better achieved but clinical test score lower. Inter-professional experiences increased.	n=67. Intervention structured learning. Standard GP placement as control.
Quality level 3					
Bartlett & Woolford, 2003	UK	D	Controlled group study.	Nurse support increases student productivity.	n=3901 days working.
DeCastro <i>et al.</i> , 2005	US	D	Natural experiment.	Outreach increases pace, experience and restorative competence.	n=284 students (24 on placement, 4 years). Retrospective analysis.
Erney <i>et al.</i> , 1991	US	M	Controlled group study.	Longitudinal placement increased recruitment to host setting.	Unclear which aspect is effective.
Harris <i>et al.</i> , 2003	UK	D	Controlled comparative group study.	Placement-based learning of dental public health topics aided by structured study framework.	n=60 case studies.
Jones, 1993	US	M	Controlled group study.	Placement experiences have no effect on career choice.	n=88. Confounded control.
McCurdy <i>et al.</i> , 1999	US	M	Retrospective analysis of cohort's records.	Placement neither increases recruitment nor affects examination performance but care more integrated.	n=113 students whose preferences for allocation were generally followed.
McCurdy <i>et al.</i> , 2003	US	M	Retrospective analysis of clinical records.	Placement increases clinical activity to three times that of hospital-based students.	n=112 students (31 on 8 week placement).
Moosbrucker & Giddon, 1966	US	D	Case control study.	No improvement in self-reported attitude to special needs patients following placement.	n=150. Groups from different schools.
Rabinowitz, 1993	US	M	Controlled longitudinal study.	Placements increased recruitment & retention in underserved areas.	n=148 on placement.
Quality level 4					
ADA, 1999	US	D	National survey of schools and dental societies.	Categorises placements and stresses role of school/service partnership.	n=46 schools (83%) and n=58 dental societies (72%).
Andersen <i>et al.</i> , 2005	US	D	National cohort survey.	Under-represented minorities more positive attitudes.	n>3000. Baseline measures.
Ayers <i>et al.</i> , 2001	US / CA	D	Bi-national survey of schools.	Most schools offer extramural placements often in hospitals.	n=51, 80% response rate.
Ayers, 2003	US	D	Comparative survey of two schools.	Private practice placements preferred by students.	n=480, 77% response rate.
Bailit, 1999b	US	D	Survey of schools.	Placement experiences valued but weak evidence of outcomes.	Diversity complicates comparisons.

Table 2.2 Summary of reviewed resources ranked by quality level (continued)

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Beasley, 1993	US	M	Retrospective multiple-cohort study.	Placements increase recruitment to host settings.	n=971 graduates followed up from a single institution.
Benbelaïd <i>et al.</i> , 2006	F	D	Programme evaluation.	Outreach students perceived difficulties in pace, administration and clinical decision making	n=83 survey of graduates' perceptions, 90% response rate.
Bennard <i>et al.</i> , 2004	UK	M	Programme evaluation.	Outreach a positive experience but educational value uncertain.	n=879 patients (96%), n=167 students.
Blinkhorn, 2002	UK	D	Case study.	Placements exceeded expectations and enhanced patient management and clinical skill.	n=30 students.
Block & Walken, 1980	US	D	Survey of student self-rating of attitude.	Placements improve orientation towards special needs groups.	
Born & DiAngelis, 1986	US	D	Self-reported survey of schools.	Funding influenced placement development. Placements increasingly clinical rather than socio-cultural.	83% response rate.
Boston & Marks, 1993	US	D	Retrospective pre-post audits of clinical practice.	Placement improves social history taking.	n=20
Brown <i>et al.</i> , 2005	UK	M	Retrospective qualitative study of accounts.	Supervisor's mentoring role vital for placement success.	Purposive sampling.
Butters & Vaught, 1999	US	DCP	Pre-post self-assessed confidence single-cohort study.	Placement enhances DCP's self-perceptions of clinical confidence.	4 week placement.
Caine, 1975	US	D	Programme evaluation.	Placements reduced unrealistic expectations of dentistry.	n=5, psychiatric institution placements
Campos-Outcalt & Snef, 1989	US	M	Multivariate analysis of factors.	Placement duration significant factor in career choice matching host setting.	Family medicine speciality entrants.
Chávez & LaBarre, 2004	US	D	Programme evaluation.	Placement balances service and educational needs.	n=124 students.
Christner <i>et al.</i> , 2004	US	M	Survey by semi-structured questionnaire.	Placements considered beneficial but rely on good site-school liaison.	n=20 placement site administrators. Postgraduate training.
Comer <i>et al.</i> , 1987	US	D	Programme evaluation.	Placement increased appreciation of practice management.	Placements in private practices.
Cope <i>et al.</i> , 2000	UK	M	Qualitative surveys and focus groups.	Placement learning may benefit from cognitive apprenticeship-style mentoring	Compared groups from two curricula.
DeCastro <i>et al.</i> , 2003	US	D	Retrospective cohort study.	Positive attitudes to outreach but no increase in recruitment to salaried services.	Modest response rates.
Desjardins, 1996	US	D	Case study.	Programme considered educationally beneficial.	Interim evaluation.
DiBiaggio, 1973	US	D	Review of case studies.	Block attendance more meaningful. Patient variety vital.	Mostly opinion.

Table 2.2 Summary of reviewed resources ranked by quality level (continued)

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Doshi & Brown, 2005	UK	O	Expert opinion.	Patient-based teaching aids professional enculturation.	
Elkind <i>et al.</i> , 2005a	US	D	Survey of patients and clinical records.	Outreach in adult dental primary care practicable in salaried service.	
Elkind <i>et al.</i> , 2005b	UK	D	Survey of patients and clinical records.	Outreach in adult dental care is a viable and acceptable service.	
Elkind, 2002	UK	D	Review of self-reported case studies.	Increasing use of outreach placements.	Workshop based.
Frankl <i>et al.</i> , 1993	US	D	Programme evaluation by staff perception.	Outreach programme acceptable to supervisors and patients. Students seen to progress.	50 students, block placements in 30 private practices.
Freidrich <i>et al.</i> , 1967	US	D	Programme evaluation.	Dental hospital placements increased orientation to hospital service.	2 week block placements.
Gadbury-Amyoy <i>et al.</i> , 2006	US	D	Pre-post comparison of attitudinal scores.	Integrated placements enriched learning in ethics and improved their community orientation.	Reflective accounts also analysed.
Gardiner & Lotzkar, 1975	US	D	Survey of schools.	Placements usually for seniors, evaluated positively and aimed at increasing social consciousness.	n=53, 69% response rate, some self-selection bias.
Grantham & Block, 1983	US	D	Pre-post test study, single-cohort.	Placements may improve or worsen attitudes to special needs groups.	n=118 students, 91%.
Hamby & Miller, 1990	US	D	Programme evaluation.	Placements in private practice acceptable and beneficial.	Qualitative.
Hamilton <i>et al.</i> , 1997	US	M	Questionnaire survey of schools.	Medical rural placements support public service ethic.	Voluntary programme not financed
Harrell <i>et al.</i> , 1993	US	M	Multi-factor analysis of records and self-ratings.	Clinical experiences builds clinical confidence on placement	n=60 students. n>5900 patient encounters.
Holloway & Dixon, 1977	UK	D	Inter-institution case series.	Outreach does provide 'real world' experience but not panacea.	
Howe, 2000	UK	M	Survey then qualitative factor analysis.	Funding and workload key issues for placement supervisors.	n=45 tutor and 120 GDP questionnaires, 15 interviews.
Huynh-Vo, 2002	CA	D	Review of case studies.	Issues include funding, ownership and duration of placement.	Detailed.
Jacobson <i>et al.</i> , 1999b	US	D	Programme evaluation.	Placements valued for real world experience. Productivity increase within one week.	n=40 students.
Johnston <i>et al.</i> , 1970	US	D	Programme Evaluation.	Placements for fieldwork provide valued community orientation.	n=5. Students accompanied to aid acceptance.
Jones <i>et al.</i> , 1996	US	M	Postal survey of patients.	Patients supportive of placements and saw benefits to themselves.	84% response rate
Jong & Field, 1972	US	D	Case study.	Productivity 1/3 of dentist. Little supervision required.	n=14. Patients sympathetic.

Table 2.2 Summary of reviewed resources ranked by quality level (continued)

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Kinne & Stiefel, 1979	US	D	Longitudinal study of attitudes.	Placements improve students' attitudes and confidence towards special needs groups.	n=503. Effect persists for a year.
Kiyak & Brudvik, 1992	US	D	Survey of self-assessed attitudes.	Clinical experience with special needs group improved student confidence in working.	n=172 students on geriatric 2-week placements.
Lalumandier <i>et al.</i> , 2004	US	D	Content analysis of reflective reports.	Early outreach experience encourages service attitudes, professional behaviours and wider perspective.	n=26 students on school visits.
Lennon <i>et al.</i> , 2004	UK	D	360° programme evaluation.	GDS placements educationally viable.	n=6 students. n=45 patients. n=2 GDPs.
Lerner <i>et al.</i> , 1971	US	D	Programme evaluation.	Placements increased orientation to host setting	n=5 students. Rural setting.
Lucas and, Young, 1967	US	D	Programme evaluation.	Observational programme felt to increase orientation to host service.	n=5 students.
Lynøe <i>et al.</i> , 1998	SW	M	Survey by questionnaire.	Patients mostly positive attitudes to placements.	n = 582 patients, 76% response rate.
MacEntee <i>et al.</i> , 2005	CA	D	Qualitative analysis of text.	Placements promote reflective learning.	Placement lasts 6 hours.
Miller & Heil, 1976	US	D	Pre-post test single-cohort study.	Badly conceived placements increased negative attitudes to special needs groups.	Placements inadequately equipped.
Mofidi <i>et al.</i> , 2003	US	D	Content analysis of critical incident reports.	Reflection on placement experiences may improve personal and professional development.	n=160 students from two cohorts.
Pau & Croucher, 2001	UK	D	Programme evaluation.	Placements in GDS develop skills required in practice.	n=61 students, 100% response rate. GDPs 34, 77%.
Reeves, 2000	UK	O	Methodological case study.	Suggests methods for evaluating IPE.	Students had positive attitudes to placement learning.
Rismark & Sitter, 2003	NO	O	Participant-observation qualitative study.	Placement learning benefits from students integration and structured activities.	n=3. 3 month placements.
Rock & Foster, 1982	UK	D	Programme evaluation.	Student's own surgery and nurse increase placement productivity to 40% of dentist.	Students overestimate their productivity by 35%.
Rubin, 2004	US	D	Text analysis of reflective journals.	Non-clinical placements aid cultural competence.	n=61 junior students.
Sharp <i>et al.</i> , 2005	US	D	Mixed-methods analysis of qualitative record data.	Students' accounts an indicator of application of theoretical learning.	n=123 students' accounts of ethical dilemmas.
Skelton <i>et al.</i> , 2001	US	D	Survey of student perception.	Outreach provides relevant and authentic experiences.	n=90, 100% of two cohorts.
Stiefel, 1979	US	D	Case study.	Outreach improved orientation towards special needs groups.	Single cohort. Student self-rating.
Strauss <i>et al.</i> , 2003	US	D	Qualitative case study	Directed reflection may enhance placement learning.	Used critical incident analysis.

Table 2.2 Summary of reviewed resources ranked by quality level (continued)

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Taylor & Turner, 2002	UK	D	Programme evaluation.	GDS placement experiences considered valuable by students.	n=6.
Thind <i>et al.</i> , 2005	US	D	Multi-factor analysis of survey data.	Social consciousness and time on placement factors in placement acceptability.	National cohort survey, n>3000.
Vrahnos & Maddux, 1998	US	O	Programme evaluation by student survey.	Placements considered effective as introduction to practice.	Student portfolio kept.
Weaver <i>et al.</i> , 2004	US	D	Annual national cohort survey.	Placements enjoyable, beneficial but some quality issues.	n>3000
Weaver <i>et al.</i> , 2005	US	D	Annual national cohort survey.	Placements enjoyable, beneficial but some quality issues.	n>3000 ~74% response rate
Wilcox <i>et al.</i> , 1977	US	O	Case study.	Increased orientation towards underserved.	Hospital clinic setting.
Winkley <i>et al.</i> , 1991	US	DCP	Programme evaluation.	Staff became mentors. Students benefited.	Single cohort. Staff and student accounts.
Woronuk <i>et al.</i> , 2004	CA	D	Retrospective audit of clinical records.	Mostly basic clinical work on placement.	n=30 students, n=7170 patient cases.
Quality level 5					
ADEA, 2004	US	D	Descriptive self-reported case studies.	Voluntary temporary schemes raise schools profile.	Not evaluative.
Cinotti <i>et al.</i> , 1999	US	D	Expert opinion.	Programmes require sound funding and quality management.	
Dummett, 1974	US	D	Expert opinion.	Encourages holistic approach and service to a community	Questions quality of some placements.
Eaton <i>et al.</i> , 2006	Int.	D	Expert opinion	Identifies both claimed benefits across varied programmes and areas for further research	Findings considered highly contextual
Foreman, 1994	US	M	Expert opinion.	Increase emphasis on primary care.	Suggested curriculum development.
Guitierrez & Soto, 2002	US	M	Expert opinion.	Structured, early clinical experience is considered beneficial.	Anecdotal.
Heitke, 1984	US	D	Expert opinion.	Placements provide culturally diverse experiences.	6 week placements.
Henshaw <i>et al.</i> , 1999	US	D	Expert opinion.	Placements felt to provide a case mix matched to students' initial training needs.	
Jacobson <i>et al.</i> , 1999a	US	D	Expert opinion.	Placements only after student competent. Clinical efficiency measures required.	
Jolly, 1978	US	D	Expert opinion.	Placements in private practice are beneficial.	Need for adequate supervision stressed.
Khosla, 1972	US	D	Expert opinion.	Placements offer clinical experiences with patients from other cultural groups and of teamworking.	

Table 2.2 Summary of reviewed resources ranked by quality level (continued)

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Kirkham, 2001	US	D	Expert opinion.	Placement believed to increase confidence and promote holistic approach.	
Lerner <i>et al.</i> , 1971	US	D	Qualitative programme evaluation.	Observational placement increased cultural-awareness and patient-centeredness.	n=5 students.
Levine <i>et al.</i> , 1986	CA	D	Expert opinion.	Placement experiences increase community service orientation.	Revitalised programme.
Robinson & Bagramian, 1974	US	D	Case study.	Outreach may aid orientation toward community dentistry.	Varied visits including prisons.
Soble, 1971	US	D	Expert opinion.	Outreach has high impact but needs management.	Details prerequisites for success.
Vining, 1984	US	D	Expert opinion.	Integrated primary care, not specialist, placements required.	

Notes:

ID Identification code: Number indicates the quality level (Table 2.1) of research. The uppercase letter is a sequential identifier within the level for a published and peer-reviewed resource.

Loc. Country in which the research was located: AU Australia; CA Canada; F French; Int. international; NO Norway; SW Sweden; UK United Kingdom; US United States of America.

Sub. Subject area: D Dental; DCP Dental Care Professionals (Hygienists or Therapists); M Medical, O Other healthcare or inter-professional.

Table 2.3 Summary of additional resources (grey literature, abstracts, personal correspondence, press, etc.) grouped by quality level

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Quality level 3					
Barnes & Taylor, 1993	UK	D	Prospective controlled study.	Support materials improve student placement experience.	n=37, 70% response rate.
Feldman, 2004	US	D	Controlled group study.	Students more productive on placement but no difference in examination results.	ADA type 2 satellite clinic settings.
Quality level 4					
Barnes & Taylor, 1992	UK	D	Programme evaluation.	Programme viable. New staff student relationships support learning.	Student perception data.
Barnes, 1999a	UK	D	Programme evaluation by alumni survey.	Alumni valued their placements. BDS more than DCPs.	Project work not valued.
Barnes, 1999b	UK	D	Programme evaluation.	Placements valued for skill development and nurse support.	n=51 BDS students, 89% response rate.
Boehm <i>et al.</i> , 2005	US	D	Questionnaire survey of schools.	Growth in use of satellite clinics.	Changes between ADA surveys.
Boorberg, 2000	US	D	Audit of clinical records.	Placements beneficial to patients and students	n=442 children screened.
Booth <i>et al.</i> , 2003	AU	D	Programme evaluation.	Placement evaluated positively though students felt initially under-skilled.	Initial evaluation.
Cockerell <i>et al.</i> , 2002	AU	D	Programme evaluation.	Placements increased orientation towards previously unfamiliar host service.	n=24 students.
Davis <i>et al.</i> , 2005	US	D	Factor analysis of alumni ratings.	Placements valued by alumni.	Bivariate analysis but response rate ~50%.
Elkind <i>et al.</i> , 2003	UK	D	360° programme evaluation.	Outreach in adult dental care is viable and educationally beneficial.	Participant evaluation.
Elkind <i>et al.</i> , 2005c, 2006b	UK	D	360° programme evaluation.	As Elkind <i>et al.</i> , 2003 but also student paired working is problematic for nurses.	Project final report and update
Fox, 2001	US	D	National survey of schools.	School-dentists' organisation partnership essential for outreach success.	Based on ADA 1998 survey.
Heller <i>et al.</i> , 2004	US	D	Pre-post comparison of attitudinal scores.	Placements increase clinical confidence and diminish gender differences in confidence with special needs groups.	n=516 students across a decade.
Herzmark, 2004	UK	D	Survey of schools.	Placements differ in mode of delivery but costs per student-day are similar.	Small sample of English schools.
Hind <i>et al.</i> , 2005	UK	D	Programme evaluation via analysis of clinical assessments.	Placements permitted skills development in paediatric dentistry.	Placement is one session alternate weeks.

Table 2.3 Summary of additional resources ranked by quality level (continued)

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Hogan, 1999	US	D & M	Survey of schools.	Describes community-based learning and related issues.	Detailed.
Hunter <i>et al.</i> , 2005	UK	D	Pre-post test of confidence scores.	Clinical confidence increased over placement period.	n=18
Jacobson <i>et al.</i> , 2000	US	D	Case study.	Integrated reflection on placement experiences may improve patient management.	1 week placements.
Leake <i>et al.</i> , 2001	CA	D	Review of case studies.	Issues include funding, ownership and duration of placement.	Detailed.
Lennon & Turner, 2003	UK	D	Survey of patients in GDS.	GDS Patients overwhelmingly supportive.	n=45 patients.
MacNeil <i>et al.</i> , 2000	US	D	Programme evaluation.	Short placements in private practices considered successful.	n=45 junior students, 30 practices.
Meyers, 2004	AU	D	Expert opinion.	Programme description. 10 to 20% drop in activity if supervising.	Placements: 20 weeks rural plus 20 weeks metropolitan.
Murray <i>et al.</i> , 2003	US	D	Programme evaluation.	Extended placement encouraged skill development though students felt ill-prepared.	Interim evaluation.
NDWU, 2005	UK	D	Review of programme evaluations.	Outreach benefits training. Issues re funding and partnerships	Interim evaluation.
Neumann <i>et al.</i> , 2000	US	D	Survey of dentists' societies.	Outreach activity increasing. Partnerships may allay dentists' fears.	n=58 dental societies surveyed.
Petersson <i>et al.</i> , 2003	SW	D	Programme evaluation.	Students and supervisors found outreach training valuable.	
Stewart & Treasure, 2005	UK	D	Case study.	Outreach benefits understanding of families.	Annual family visits.
Susi & Romberg, 2003	US	D	Pre-post test of self-rated attitudes and clinical records.	Students appear more socially aware and faster on return from placement.	Variability reduced by placement experience.
Taylor <i>et al.</i> , 1995	UK	O	Survey of placement programmes.	Placement programmes require careful resourcing and management.	Included dental outreach placement. Single institution.
Tennant <i>et al.</i> , 2003	AU	D	Programme evaluation.	Outreach increases orientation to underserved.	83% student response rate, n unspecified.
Thistlethwaite & Leahy, 2004	AU	O	Action research.	Social interactions aid understanding of new cultures.	
Young <i>et al.</i> , 2005	UK	D	Case study.	Home visits educative.	GDC queried programme.
Quality level 5					
Ali <i>et al.</i> , 2006	UK	D	Letter in opposition to proposal.	Questions the suitability of a potential outreach placement.	Specialism rather than general dentistry
BDA & LTSN01, 2002a	UK	D	Expert opinion.	Varied placement schemes. Funding an issue.	n=8 schools represented.

Table 2.3 Summary of additional resources ranked by quality level (continued)

<i>Resource</i>	<i>Loc.</i>	<i>Sub.</i>	<i>Basic design</i>	<i>Major finding</i>	<i>Comment</i>
Boyle <i>et al.</i> , 2002	AUS	M	Expert opinion.	Observational placements aid learning of psychosocial aspects of health.	Supported by some evaluative comments from students.
Eaton, 2005	UK	D	Expert opinion.	Barriers are case mix, supervisor training and funding	Predicts increase on use of outreach.
Elkind, 2001	UK	D	Expert opinion.	Workshop report describes placement programmes.	Several schools with varied programmes.
Elkind & Blinkhorn, 2001	UK	D	Expert opinion.	Describes a new curriculum.	Description of curriculum development.
Formicola <i>et al.</i> , 1999	US	D	Expert opinion.	Increase emphasis on patient care.	Suggested curriculum development.
Fredekind <i>et al.</i> , 2004	US	D	Expert opinion.	Placements with underserved provide varied learning experiences.	
Kinirons, 2003	EI	D	Expert opinion.	Staff and students evaluate placements positively.	Placement of 8 weekly sessions.
Lennon <i>et al.</i> , 2003	UK	D	Expert opinion.	Placements in UK primary care settings feasible and provide quality learning experiences.	
Marshall & Formicola, 1999	US	D	Expert opinion.	Programme successful if: educationally sound, patients satisfied and access improved.	
Parry & Greenfield, 2001	UK	M	Expert opinion.	The increasing use of placements risks damage to the learning potential they offer.	Supervisors may become overloaded.
Rao, 2003	UK	M	Expert opinion.	Outreach a tool of improving orientation towards elderly.	Improves team and service awareness.
Sanders & Ferillo, 2003	US	D	Expert opinion.	Describes a new curriculum.	Proposed curriculum.
Snelgrove, 2005	UK	D	Expert opinion.	Outreach in GDS requires funding.	Question in Parliament.
Thornton, 2004	US	D	Expert opinion.	Placements address access issues but schools lose income.	n=12 students each year.
UTHSCSA, 2004	US	D	Expert opinion.	Placements provide culturally diverse experiences.	n>30 settings.

Notes:

ID Identification code: Number indicates the quality level (Table 2.1) of research. The lowercase letter is a sequential identifier within the level for these additional resources.

Loc. Country in which the research was located: AU Australia; CA Canada; EI Republic of Ireland; SW Sweden; UK United Kingdom; US United States of America.

Sub. Subject area: D Dental; M Medical; O Other healthcare or inter-professional.

This body of literature is now reviewed from four perspectives: the higher education institution, the placement host, the student and the patient.

2.5.2 The Higher Education Institution Perspective

Higher education institutions (HEIs) bear a responsibility to ensure that the academic standards of awards are maintained and *securely managed* (QAA, 2006). The standards for UK dental schools are specified by the GDC (2002) and the Quality Assurance Agency for Higher Education (QAA, 2002) in addition to those applying to all HEIs (QAA, 2006). There are additional protocols included in a code of practice specifically relating to placement learning (QAA, 2001; UCEA, 2005) though anecdotal evidence suggests that these protocols are rarely followed to the letter (Fell and Kuit, 2003).

The quality management of outreach training programmes is a significant factor in their organisation and operation. This section first considers programmes' purposes, then their quality assurance and curricula, before briefly considering their sustainability.

2.5.2.1 Purposes

Current UK outreach training programmes appear to have a variety of aims. Several programmes stress providing students with experience of specific patient groups (Elkind and Blinkhorn, 2001; Elkind *et al.*, 2005a; GDC, 2004f, 2005a; Hind *et al.*, 2005; Hunter *et al.*, 2005). Some programmes include in their objectives both teamworking and experience in delivering dental services either in the SPDCS or the GDS though the latter is sometimes observational rather than clinical working (Taylor and Turner, 2002; GDC, 2004d,f,h, 2005g). The objective of such experience may be *to ensure readiness for practice focussed on needs of the population* (*Options for Change*, 2002) as primary care settings are considered to be more patient centred. This objective of ensuring familiarity with the demands of the workplace was recommended more generally by a national commission of inquiry which noted the value of work experience for undergraduates (NCIHE, 1997). Further, increasing students' appreciation of dental public health is an aim of some programmes including Sheffield's (Harris *et al.*, 2003; Appendix B13).

The drivers for expanding US dental outreach training programmes a generation ago were mostly increasing cultural awareness and serving the under-served (Born and DiAngelis, 1986; Hamby and Miller, 1990; Foreman, 1994; Hamilton *et al.*,

1997; Formicola *et al.*, 1999). More recently programmes increasingly stress clinical rather than social objectives (Marshall and Formicola, 1999; Boehm *et al.*, 2005). Gaining an understanding of practice management is a less common objective (Jolly, 1978; Hanby and Miller, 1990; Sanders and Ferrillo, 2003).

While not an educational aim, a secondary motive for recently expanded outreach programmes may be the liberation of School resources to accommodate an expanded intake (GDC, 2004d; DH, 2005b). Outreach is considered a partial solution to one of those resources, dental school teachers, being in short supply (Eaton *et al.*, 2006).

A summary of major reviews of UK work experience from the HEIs' perspective (Harvey *et al.*, 1998) recommend long block placements to improve undergraduates' work readiness and support academic learning. Experienced stakeholders in such schemes state that for the placements to offer valuable learning opportunities they need to be purposeful with those purposes being appreciated by all stakeholders (Blackwell *et al.*, 2001). Further, they agree that placement quality is enhanced if the programme is structured, monitored and managed. This aspect of the HEIs' perspective is considered next.

A seminal review of US outreach training cautions they are not a panacea and highlights both their complex management problems and the need for them to be integrated into the curriculum (Bailit, 1999b).

2.5.2.2 Managing programme effectiveness

Commentators have called for evaluations based on concurrent controls and for larger, longer-term studies (Entwistle, 1992; Eaton, 2005). Two US national surveys also conclude that such programmes are rarely evaluated for effectiveness (Gardiner and Lotzkar, 1975; Bailit, 1999b). This concern for evaluation of outreach programmes was reiterated in a recent call by the GDC following its inspection of all UK undergraduate teaching (GDC, 2006a). In the case of one programme the GDC inspection team's initial concern was dispelled on closer enquiry (GDC, 2001).

Evaluations of effectiveness in the UK include those of pilot programmes in the GDS and adult restorative dentistry based on stakeholder perceptions and clinical work undertaken (Taylor and Turner, 2002; Lennon *et al.*, 2004; Elkind *et al.*, 2003, 2005a,b). While they report concerns regarding sustainability the programmes were considered educationally worthwhile and acceptable to stakeholders. The longest established UK programme, based in the CDS, was originally evaluated in a similar manner and deemed viable and educationally beneficial (Holloway and Dixon, 1977). That same though developed programme was recently evaluated against students' elicited expectations and found to *more than fulfilled their expectations* and enhance their clinical skills (Blinkhorn, 2002). Another long-running programme in the CDS was evaluated as broadening students' experience and enhancing their preparation for practice (Rock and Foster, 1982). A third stable UK programme conducted a pre-post comparison of students' self-reported confidence in paediatric dentistry and found the programme *a valuable adjunct to undergraduate teaching* in this field (Hunter *et al.*, 2005). The recent evaluations of effectiveness cited above indicate thorough programme evaluations and close monitoring of pilot outreach training programmes in the UK. However, they are programme evaluations and uncontrolled studies rather than research.

Three aspects of the organisation of outreach training programmes that potentially impact on the effectiveness are: the mode of attendance; the duration of placements and them being situated away from the dental school.

DiBiagio (1973) asserts that the commonplace longitudinal experiences gained through short weekly visits are ineffective in altering students' attitudes when compared to block placements. On the other hand, medical outreach programme staff considered longitudinal placements more effective in changing students' attitudes (Erney *et al.*, 1991). Based on UK dental students' perceptions of their outreach experiences, evaluators concluded that the relative merits of the two modes of attendance were unclear (Barnes and Taylor, 1992). The quality of the evidence (Table 2.1, page 63) does not permit firm conclusions to be drawn.

The duration of a placement was a significant determinant of US students finding outreach training to be a positive experience with placements of fewer than 10 days

considered inadequate (Thind *et al.*, 2005; Weaver *et al.*, 2004, 2005). Only one eighth of students experiencing 12 week placements considered them too long. Postgraduate medical placements need to be sufficiently long to allow students to settle and benefit from their experiences (Rismark and Sitter, 2003; Christner *et al.*, 2004). A narrative review of evidence concluded that longer placements were more effective in changing students' behaviour and career choices (Hogan, 1999).

Longitudinal placements rather than block placements were considered preferable for forming good supervisory relationships and encouraging a positive orientation towards the service (Erney *et al.*, 1991). There is support for this approach from the improved skills learning within medical schools (Remmen *et al.*, 2001).

Providing student support when students are distant from their university support networks is considered problematic by programme staff and external reviewers (Brennan and Little, 1996; Meyers, 2004; GDC, 2004d, 2005c). In one study, student nurses on placement were reluctant to raise the problems they encountered unless their university tutor visited them in person (Brown *et al.*, 2005). An alternative solution was to have students attend placements for four days each week with a day adjacent to a weekend to help facilitate both formal and informal support networks (Feldman, 2004).

However, the diverse and weak nature of the evidence prevents firm conclusions being drawn.

2.5.2.3 Curriculum management

The evidence regarding curriculum management does not meet the standards of rigour expected by those familiar with biomedical science. Nonetheless, narrative programme evaluations and anecdotes have been reported.

The delivery of a programme at a distance and possibly by a third party creates additional problems (Soble, 1971; QAA, 2004). Partnership with key workplace staff can assist integration with the main programme but often this partnership is absent (Brennan and Little, 1996; Little, 2000). In the absence of such partnership, isolated workgroups may develop local practices by adaptively interpreting teaching-related policies based on local regimes (Trowler, 2004, 2005).

While some dental specialists recognise an outreach placement's potential for raising students' awareness of their work others have concerns over its appropriateness for undergraduate learning (Maclusky *et al.*, 2005; Ali *et al.*, 2006). In one case in the US, outreach training was established for service rather than educational reasons without careful attention to curriculum development and weaknesses became evident in its educational value (Bennard *et al.*, 2004). The problems of balancing service and educational needs can be overcome to provide students with a case mix matched to prepare them for general practice (Henshaw *et al.*, 1999; Chávez and LaBarre, 2004).

2.5.2.4 Sustainable programmes

The financial aspects of outreach training programmes are not the focus of this review. However, for HEIs and dental services considering these programmes financial viability is essential and this aspect is briefly considered here. Securing adequate recurrent funding has been identified as a barrier to programme development by various stakeholders (Lennon *et al.*, 2004; Eaton, 2005; Elkind *et al.*, 2005c; Snelgrove, 2005; GDC, 2006a).

UK dental services have costs associated with hosting students, as students are less productive (2.5.4.2, page 81) than the dentists required to cease working to supervise them (GDC, 2004a). The combined service provision of three students is similar to that of the dentist (Jong and Field, 1972; Holloway and Dixon, 1977; Rock and Foster, 1982; Lennon *et al.*, 2004).

The operating environment for funding healthcare and education is different in the US. The clinical work undertaken by students in dental schools generates income and its loss is significant (Thornton, 2004). Timetabling placements outside normal working periods has avoided this problem (Fredekind *et al.*, 2004).

In Australia, where as in the US it is the norm in community clinics (ADA type 1 settings) for dentists to continue treating their own patients while supervising students, supervision results in a 10 to 20 per cent fall of their own clinical activity and this is accounted for when setting their activity targets.

The removal of supportive funding regimens placed US and Canadian programmes at risk (Born and DiAngelis, 1986; Levine *et al.*, 1986). While financing adequate supervision is an important issue the use of existing clinics may reduce financial costs compared to establishing new satellite clinics (Cinotti *et al.*, 1999; Leake *et al.*, 2001; Huynh-Vo *et al.*, 2002). Conversely, a year-long outreach placement was considered to manage the financial burden of Australian dental schools (Tennant and McGeachie, 1999). There community clinics' service targets were reduced when trainees were being hosted.

More generally, both capital and recurrent costs depend on the position of the outreach scheme on the spectrum of placement types (Fig. 2.01, page 8), the extent of nursing support provided and whether the scheme is funded as healthcare or as training. For example, a programme using existing community services and funded as healthcare may incur low capital costs but need to maintain service levels to assure no loss of income. The various models described above both incur and meet costs in different ways.

There are also non-financial costs to operating and expanding programmes of placements. Repeatedly placing students or increasing the numbers of students placed in a primary care setting risks over-burdening staff with additional responsibilities (Parry and Greenfield, 2001). Any consequent decrease in hosts' enthusiasm may reduce the quality of available learning opportunities.

To justify themselves, it was claimed, outreach training schemes must demonstrate their benefit to the community (Jong and Field, 1972). This may be achievable for immediate activity, however, but probably not for any long-term benefits to the quality of dentists so trained.

Planning for sustainability in outreach programmes is essential if they are to provide long-term benefits.

2.5.3 The Placement Host Perspective

The data on host perspectives are mainly anecdotal or from programme evaluations. Overall, dental staff express positive attitudes to students' *interest in and respect for patients* and overwhelmingly wish to continue hosting students

(Frankl *et al.*, 1993; Bennard *et al.*, 2004; Lennon *et al.*, 2004). They report perceived benefits to themselves or their practice in hosting students. These benefits include:

- keeping better informed through knowledge exchange and better developed through critical reflection with students (Pau and Croucher, 2001; Howe, 2000, Christner *et al.*, 2004)
- students gaining positive impressions of the services (Tennant *et al.*, 2003) even when aspects of the placement are unpopular (Lerner *et al.*, 1971). Though some findings in this respect are equivocal (Miller and Heil, 1976; Beasley 1993; Jones, 1993; DeCastro *et al.*, 2003)
- increased future recruitment to underserved areas (Eaton *et al.*, 2006)

There are also perceived problems for staff arising from conflicts between service demands and educational demands. These are associated with:

- the inadequacy of students' competence (Heitke, 1984)
- patients seeing different students on their return for further treatment (Heitke, 1984)
- mismatch between students' course requirements and the available case mix (Elkind *et al.*, 2003)

The maintenance of service levels is a concern for outreach placement staff as student absences, lateness or slowness inconveniences patients and reduces patient throughput (Elkind 2001; Elkind *et al.*, 2003). The effect of students' pace was considered as a component of sustainability (2.5.2.4).

Medical GPs consider posts with a teaching element more attractive and identified a number of positive effects of outreach training: improved facilities, rewarding teaching experiences and increased first-post appointments and retention in similar services (Erney *et al.* 1991, Rabinowitz, 1993, Howe, 2000). Negative factors included being distant from the University, a lack of support locally and students not matching the placements' expectations (Howe, 2000).

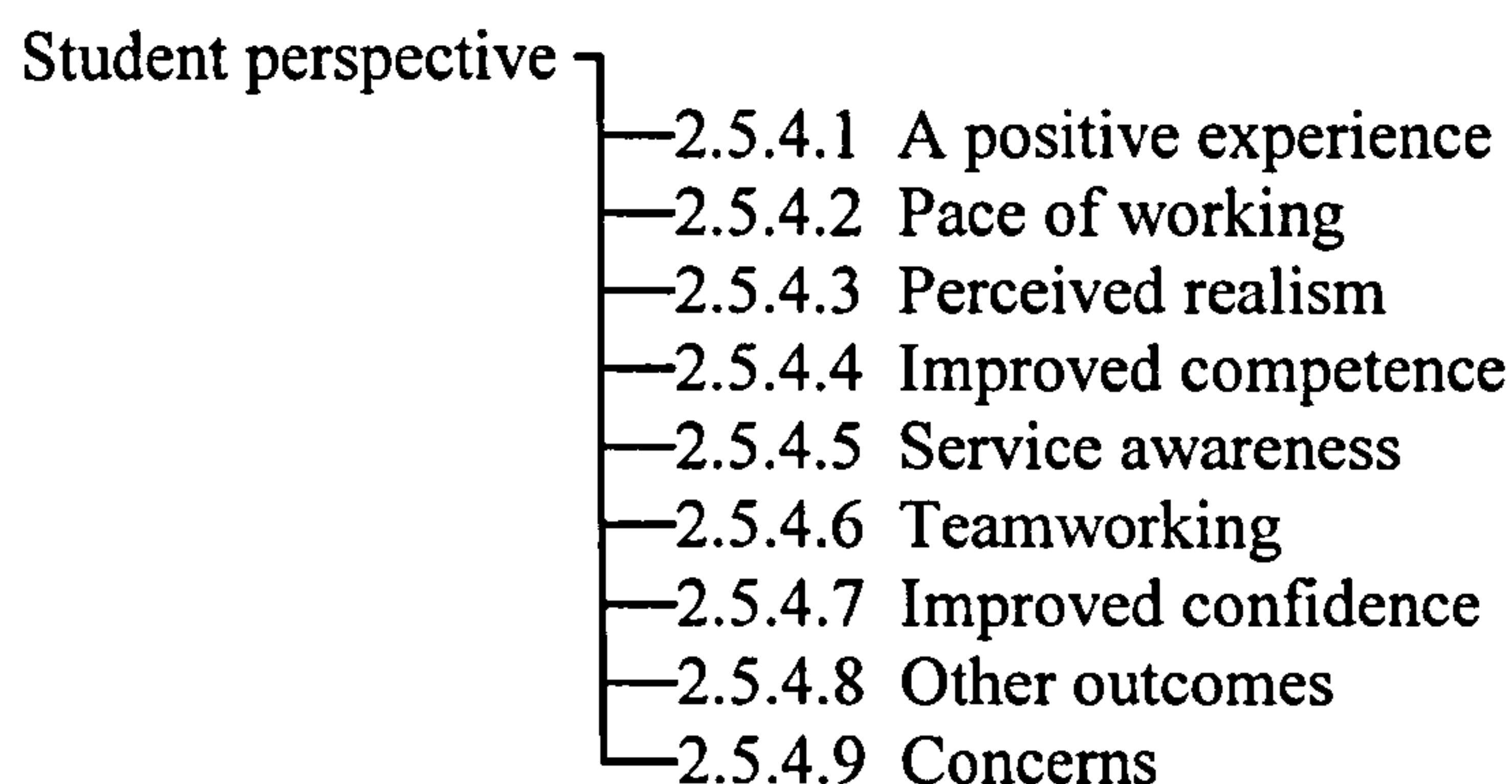
Some hosts have concerns regarding these types of programmes' intrusion on the doctor-patient relationship to the detriment of care despite some evidence to the contrary (Howe, 2000; Doshi and Brown, 2005).

In counterbalance, employers in general perceive a dividend from their involvement in placement programmes from universities becoming more responsive to their needs (NCIHE, 1997).

2.5.4 The Student perspective

Students' perspectives on outreach experiences form a large fraction of the literature. This section first considers overall satisfaction then the benefits and the concerns they raise (Fig. 2.19).

Figure 2.19 Topic map for the student perspective section



As has been noted before, the evidence of student perception is not robust. Most literature relating to students in outreach reports either indirectly, as surveys of student opinion or annotated accounts of their clinical activity.

2.5.4.1 A positive experience

Practically all evaluations state that students find outreach training a positive experience whether dental or from other healthcare fields (Lerner *et al.*, 1971; Dummett, 1974; Jong and Field, 1972; Caine, 1975; Gardiner and Lotzkar, 1975; Winkley *et al.*, 1991; Frankl *et al.*, 1993; Taylor *et al.*, 1995; Desjardins, 1996; Vrahnos and Maddux, 1998; Jacobson *et al.*, 2000a,b; MacNeil *et al.*, 2000; Reeves, 2000; Pau and Croucher, 2001; Murray *et al.*, 2003; Elkind *et al.*, 2005b). Anecdotal reports support this finding (Kirkham, 2001; Guitierrez and Soto, 2002).

A national US survey (Weaver *et al.*, 2005) quantified the prevalence of this satisfaction at 64% with longer placements being rated more positively (Thind *et al.*, 2005).

Satisfaction alone is not an indicator of the success of in education (Murray, 2002). An RCT of Australian medical outreach found students attending placements with enhanced learning opportunities found them more enjoyable and rewarding than those attending standard placements (Wade *et al.*, 1998). The enhancements identified students' learning needs, matched placements to these needs, incorporated visits to related services and discussed them with the general practitioner. Attention paid to tailoring learning opportunities and promoting reflection may benefit students' perceptions of the programme.

2.5.4.2 Pace of working

One aspect of students' performance often included in programme evaluations is their ability to keep to a schedule of appointments. In retrospective analyses of clinical activity the productivity of students on outreach training was double or treble that of their peers in the hospital and this increased pace was achieved in a single week on placement (Jacobson *et al.*, 1999b; McCurdy *et al.*, 2003; DeCastro *et al.*, 2005). A similar productivity increase was noted when a satellite poly-clinic with provided high levels of individual nursing support to students (Bartlett and Woolford, 2003). All dental students in Blinkhorn's evaluation (2002) and hygiene students over several years reported increased pace of working (Winkley *et al.*, 1991; Butters and Vaught, 1999). Others have compared the productivity of outreach students to an experienced dentist. It was found it to be about a third or a little greater in terms of both pace and service payment generation (Jong and Field, 1972; Holloway and Dixon, 1977; Rock and Foster, 1982; Lennon *et al.*, 2004).

Students generally prefer an outreach clinic over the dental hospital to learn time and resource management (Elkind *et al.*, 2005b). They consider the application of theoretical knowledge in a primary care clinical situation consolidates their learning (Lerner *et al.*, 1971; Lennon *et al.*, 2004).

2.5.4.3 Perceived realism

Outreach training experiences are often characterised by students as more ‘*real*’ or typical of their probable working futures than the hospital-based norm (Soble, 1971; Vining, 1984; Winkley *et al.*, 1991; Jacobson *et al.*, 1999b; Skelton *et al.*, 2001; Petersson *et al.*, 2003; Woronuk *et al.*, 2004; Elkind *et al.*, 2005b). Contrasts with dental hospital experience were evident in students’ reflection (Mofidi *et al.*, 2003) and in multi-institution surveys of outreach training (Bailit, 1999b; Ayers *et al.*, 2001; Elkind, 2002). Students found the placements to be more patient-centred and encouraged a wider perspective on providing care.

2.5.4.4 Improved competence

A second commonly self-reported benefit of outreach training is improvement in students’ clinical competence although most of the evidence is of low quality (Comer *et al.*, 1987; Frankl *et al.*, 1993; Elkind, 2002; Blinkhorn, 2002; Elkind *et al.*, 2003; Susi and Romberg, 2003; Lennon *et al.*, 2004). A recent controlled study has shown superior performance by outreach students in final clinical restorative assessments (DeCastro *et al.*, 2005). An uncontrolled study of clinician assessed procedures showed student competence improving with time in outreach placements (Woronuk *et al.*, 2004) while another showed competence stabilising rather than improving (Kiyak and Brudvik, 1992). Low levels of competence on graduation were linked by US alumni to inadequate patient supply during training (Holmes *et al.*, 1997).

No effect of almost all final examinations was found with dental students or medical students (McCurdy *et al.*, 1999; DeCastro *et al.*, 2005). The rationales for these studies include testing for placements away from the schools’ clinical setting having different academic or clinical standards. These findings suggest that current examinations are insensitive to the skills developed on outreach. In psychology, small but significant increases in examination and supervisors’ scores have been associated with placement attendance (Reddy and Moores, 2006).

One facet of increasing competence and another frequent finding from evaluations is students’ frequent belief that their treatment planning has become more holistic as outreach training increases their understanding of the complexities of providing

care (Lerner *et al.*, 1971; Khosla, 1972; Jacobson *et al.*, 2000; Kirkham, 2001; Elkind, 2005). This aspect of their work was a main difficulty perceived by undergraduates on transfer to general practice (Benbelaïd *et al.*, 2006). It was a key theme in students' post-outreach reflections (Mofidi *et al.*, 2003) and almost all students in a Manchester study reported improved treatment planning skills (Blinkhorn, 2002). Returning outreach students started including full social histories in their records and providing learning support materials for outreach increases students' appreciation of holistic approaches (Boston and Marks, 1993; Harris *et al.*, 2003). Other students were also almost invariably able to discuss observed ethical dilemmas from placements and such reflection is believed to enhance professional development (Strauss *et al.*, 2003; Sharp *et al.*, 2005).

Again, as summarised in Tables 2.2 and 2.3 (page 64), the quality of the evidence on improved confidence is weak.

2.5.4.5 Service awareness

Inexperience in practical and administrative matters associated with general dental practice was a main difficulty perceived by French outreach students (Benbelaïd *et al.*, 2006). Many placement experiences give students new insights into unfamiliar services and leave positive impressions of those services (Winkley *et al.*, 1991; Hamilton *et al.*, 1997; Barnes, 1999a; Cockrell *et al.*, 2002).

Experiencing the work of other health professionals while on dental outreach was considered by students to increase their understanding of wider healthcare (Lerner *et al.*, 1971, Formicola *et al.*, 1999; Elkind, 2002; Lalumandier *et al.*, 2004; Eaton *et al.*, 2006). This was also observed with medical placements (Khosla, 1972; Rao, 2003). An RCT of general practice attachments found they greatly increased students' contacts with other healthcare professionals (Wade *et al.*, 1998).

2.5.4.6 Teamworking

Returning to the core dental team, the value of students learning about teamworking or operator-assisted working through participation as a team member on placement is noted in several evaluations (Comer *et al.*, 1987; Elkind *et al.*, 2005b; Young *et al.*, 2005). Students report feeling they became part of that team

(Blinkhorn, 2002; Lennon *et al.*, 2004). Being accepted into a team was, for Scottish nurses and a Norwegian health worker, related to inextricably linked social and practice factors (Cope *et al.*, 2000; Rismark and Sitter, 2003). In the latter respect, acceptance was *earned* through competent authentic contributions to work activities and this was recognised by increased responsibility.

2.5.4.7 Improved confidence

Turning next to confidence in clinical working, evaluations of students' self-reported confidence showed improvements in providing care for a range of patient types (Stiefel, 1979; Block and Walken, 1980; Kiyak and Brudvik, 1992; Heller *et al.*, 2004, Lennon *et al.*, 2004; Hunter *et al.*, 2005). This effect was observed across almost all students (Comer *et al.*, 1987; Blinkhorn, 2002; Elkind, 2003). Supporting evidence indicating this improvement is available from analysis of students' reflective essays and from anecdotal reports (Kirkham, 2001; Mofidi *et al.*, 2003; Young *et al.*, 2005). A descriptive report notes an initial fall in confidence as students feel *thrown* in at the deep end on finding tasks more difficult in the *real-world* setting (Wilcox *et al.*, 1977; Frankl *et al.*, 1993).

There is US evidence from factor analysis indicating *hands-on clinical experience* is the single most important factor in building confidence on medical outreach training (Harrell *et al.*, 1993).

2.5.4.8 Other outcomes

There is anecdotal evidence of outreach students' increased awareness of potential career opportunities and practice management (Jolly, 1978; Comer *et al.*, 1987; Pau and Croucher, 2001). A US national cohort survey found placement experiences affected the practice plans of 43% of students (Weaver *et al.*, 2005).

UK evaluations identify improvements in dental students' preparedness to treat a greater variety of patients such as those with special needs or children (Barnes and Taylor, 1993; Blinkhorn, 2002; Elkind, 2002; Young *et al.*, 2005).

Despite the aim of US programmes being increasingly clinical rather than cultural (above 2.5.2.1, page 73) evaluations report positive student perceptions of placements for learning how to provide *culturally competent patient care* (Blue,

2000). Experiencing placements in unfamiliar communities is considered valuable learning by staff and students (Lucas and Young, 1967; Lerner *et al.*, 1971; Jong and Field, 1972; Khosla, 1972; Gardiner and Lotzkar, 1975; Heitke, 1984; ADEA, 2004; UTHSCSA 2004; Andersen *et al.*, 2005; Weaver *et al.*, 2005).

Medical students valued placements in socio-economically deprived areas even where the programme is pre-clinical (ADA, 1999; Rubin, 2004; Thistlethwaite and Leahy, 2004; Stewart *et al.*, 2007; Gadbury-Amyoy *et al.*, 2006). Anecdotal evaluations of some programmes addressing patient diversity report positive effects in students' attitudes while others are more equivocal (Robinson and Bagramian, 1974; Kinne and Stiefel, 1979; Block and Walken, 1980; Mofidi *et al.*, 2003; Rao, 2003).

Alumni whose programmes engendered preparedness for treating diverse populations more often expressed intentions of treating such populations (Smith, Ester and Inlehart, 2005). Most US students considered outreach training improved their ability to serve minority groups (Weaver *et al.*, 2004, 2005). Though valued, placements providing experience serving patients with special needs (Levine *et al.*, 1986; Davis *et al.*, 2005) produced only small improvements in students' attitudinal scores (Moosbrucker and Giddon, 1966) or had a negative effect (Miller and Heil, 1976; Grantham and Block, 1983). In those studies no precautions were taken to avoid the effects of any response shift (6.3.3.3, page 185). A medical paediatric placement did not attract students to the specialism (McCurdy *et al.*, 1999).

2.5.4.9 Concerns

Notwithstanding high overall levels of satisfaction, students when prompted have raised concerns regarding aspects of some outreach training programmes. They refer to concerns over the following:

- meeting the clinical activity requirements of their undergraduate course as a whole (Grantham and Block, 1983; Booth, *et al.*, 2003; Elkind *et al.*, 2005b),
- ensuring an adequate supply of patients (Barnes and Taylor, 1993; Elkind *et al.*, 2005),
- their preparation for participation in the programme (Taylor and Turner, 2002),
- initially unproductive relationships with staff (Winkley *et al.*, 1991),

- travel or accommodation (Erney *et al.*, 1991; Wade *et al.*, 1998; GDC, 2005g; Young *et al.*, 2005).

UK students experiencing a longitudinal experience programme of about 40 days felt they would benefit from it being longer (Barnes, 1999a).

In summary, the student perspective typically commended outreach training for providing realistic working environments, often with unfamiliar patient types or communities and students' integration into a dental team. As a result of the experience students perceive their productivity, competence and confidence to improve and their treatment planning becoming more holistic. However, the vast majority of the evidence to support these views arises from uncontrolled programme evaluations, anecdote and expert opinion.

2.5.5 The Patient Perspective

Patients are key stakeholders in outreach training programmes as their cooperation and consent are required for students' clinical work. Outreach experiences during training are considered by supervisors to yield benefits for patients in the longer term through the production of more competent graduates with improved awareness of patients' and communities' needs (Boyle *et al.* 2002; Elkind, 2002). The lack of a sufficiently patient-centred approach within (at least) US dental schools and the UK NHS (Bailit, 1999a; Boorberg *et al.*, 2000; DH, 2000a) together with the need to secure an adequate supply of appropriate patients for student treatment are drivers for the use of outreach training (Bailit, *ibid.*; Elkind, 2001; DH, 2002; Eaton *et al.*, 2006). Several surveys and programme evaluations have reported patients' perspectives on dental outreach training.

Almost all patients (98%) in a UK pilot of outreach in the GDS had *extremely positive* attitudes towards the programme and its development (Lennon *et al.*, 2004). An earlier study found patients accepted junior healthcare students on community placements (Reeves, 2000). Indirect anecdotal evidence from US outreach programmes operating a generation ago suggests patients enjoyed being involved, were supportive and were willing to be treated by students (Jong and Field, 1972; Gardiner and Lotzkar, 1975; Frankl *et al.*, 1993).

Surveys from medical specialities in several countries indicate that, despite the supervisors' worries most patients like being involved in student training and feel special and proud of their opportunity to use their ailment to benefit students (Simons *et al.*, 1995; Jones *et al.*, 1996; Lynøe *et al.*, 1998). A variable minority preferred to decline to participate in student training. Gaining explicit patient consent was important in securing positive patient attitudes. Importantly, some medical examinations in these studies were more intimate than dental examinations.

A thorough evaluation of the Manchester programme noted that patients appreciated the service provided though their expectations had to be managed (Elkind *et al.*, 2005c). One objective of many outreach programmes is improving access for the community to oral healthcare (Desjardins, 1990; Field, 1995). Two reports of UK programmes across a number of institutions identified improved access as a common feature (Elkind, 2002; NDWU, 2005).

Other advantages for patients have also been reported. The high quality of students' treatment in a PDS setting was identified (Lennon *et al.*, 2004). Qualitative data in medical education described stakeholder perceptions including perceived benefits from longer discussions and positive attitudes to helping students to cope with difficult situations (Howe, 2000).

Evaluations of early US outreach programmes identify disadvantages for continuity of care for patients. Where patients' needs cannot be met during one students' attendance they experience unsettling changes of provider (Heitke, 1984).

From the patients' perspective outreach training programmes can provide a generally acceptable form of treatment with additional benefits for some relating to longer interactions and contributing to students' training. However, the rotation of students through placements may risk continuity of care.

2.5.6 Generalising findings

The external validity of findings from individual programmes is limited because of differences between national cultures, dental education systems and health services. Further, there are organisational differences between programmes. Even within the

UK, programmes differ in their aims and there is considerable variation between schools' programmes by stage in the course, distance from the school, management control of the setting and the nature of the clinical experience (CHDDS, 2006). Equally importantly, the quality of the evidence is limited.

2.6 Concluding remarks

Dental outreach training, that is clinical training in primary dental care away from the dental hospital and school, has been said to be more effective for dental education from the perspective of all stakeholders.

The move towards outreach training may have accelerated in the UK due to the logistic and economic challenges of increasing the dental workforce.

Placement teaching can emphasise content, acquiring skills or developing the learner. Skills develop in stages and supervisory models aid learners' mastery of skills in their zones of proximal development. Some argue that such learning is more firmly embedded when gained in a working context than in a separate educational environment.

The literature of the effects of dental outreach training placements is limited to low level research: largely expert opinion and programme evaluations based on stakeholders' perceptions and counts of clinical activity. Leading proponents of community-based learning have highlighted the weakness of the evidence base for such programmes and called for scientific research into their educational outcomes.

2.7 Rationale and Aims

There is only weak evidence for the educational benefits of outreach training despite a widespread belief in their potential value. A variety of educational and political authorities have called for research to address this deficit.

Therefore, the overall aim of this research was to evaluate dental outreach training. Three studies were conducted with different objectives.

1. To identify the range of experiences and interpretations of staff supervising or supporting students in primary care outreach training
2. To determine the educational value of outreach placements in primary care settings through the student experience of outreach
3. To compare the effectiveness of dental outreach in a primary dental care setting and a traditional, hospital-based training to increase confidence and competence in treating a variety of dental patients with common dental problems.

The Research Environment

This research was conducted as part of the development of the dental outreach programme at the University of Sheffield's School of Clinical Dentistry. Students undertook five or six week block placements hosted by existing primary care facilities in a programme phased over three years. Each year was a significant stand-alone development building on previous phases. Those phases were:

1. A small group of volunteer students to undertake block elective placements developed from a small scale longitudinal placement in a single community dental service establishment to encompass a range of settings and locations within primary care
2. The development of a number of these or other placements to accommodate half a cohort of senior dental students on block outreach training placements
3. The further development of those placements to accommodate the whole cohort of senior dental students.

The first two studies would be carried out in first phase of the programme. The findings of these studies would inform the design of the third study which would be conducted in the second phase.

Chapter 3

Methodology

Both education and, in particular, dental education are research areas that draw on a large number of disparate research disciplines rather than having their own distinctive methodologies (Norman, 2002). Each discipline brings its own perspective on what constitutes sound research. This chapter compares two methodological paradigms with fundamentally competing epistemologies that can be employed. After considering positivist and relativist paradigms it outlines the chosen approach. Finally the implications of these strategic choices are discussed. The methods for the component studies are detailed within each respective chapter (Chapters 4, 5 and 6).

3.1 Introduction

Two competing paradigms dominate research: positivist and relativist. The former is commonly referred to as the scientific method and has its origins in logical positivism, a philosophical approach asserting that meaning can only be attributed to observable verifiable events. Positivist research involves careful measurement

of a limited number of variables within a tightly controlled experimental framework in which the observer's values are held to be irrelevant.

In contrast, the relativist paradigm embraces a more complex and holistic notion of meaning. Observations in relativist research are typically qualitative, contextual and acknowledged to be dependent on the researcher's perspective.

In the realm of western medical research positivist methods generally prevail. However, in educational circles they are perceived to create knowledge that does not apply in other contexts (Cook, 2002). Instead, appropriate methods for probing large complex social activities such as educational programmes are increasingly held to be the relativist methods (Evans, 2001). At the interface between these two cultures are calls for medical education to be evidence-based (Harden, 1999; Murray, 2002).

The term evaluation is used in the title of this thesis. For educationalists the term evaluation, used before the 1930s to mean testing learners, became reserved for the appraisal of educational programmes (Popham, 1975). Moving beyond earlier approaches assessing efficiency (Cubberley, 1909, 1919), evaluations then measured programmes against their educational objectives (Madaus and Stufflebeam, 2000). Later evaluation also stressed development, professionalism, expansion and integration. Essential criteria for an evaluation in medical education are considered to be its utility, feasibility, propriety and accuracy (Curran *et al.*, 2003 after Stufflebeam).

Evaluation and research share many features. Research is systematic investigation designed to develop or contribute to generalisable knowledge. Evaluation in education, however, is concerned with summatively or formatively assessing the general merit or specific local worth of a unit of educational activity (Guba and Lincoln, 1989, 2001). Evaluation distinctively sought and weighed evidence across *qualitatively distinct alternatives* unlike other forms of higher education programme assessments such as monitoring, review or validation (Lindsay, 1989).

Evaluation, like research, may be classified as objectivist (positivist) or subjectivist (relativist): the former's utilitarian approach evaluating explicit knowledge as opposed to the latter's pluralist tacit knowledge (House, 1978). Objectivist

methods are judgemental and often value-laden whereas subjectivist ones are informative and developmental (Stringer and Finlay, 1993). This distinction is explored in the next two sections of this chapter. Of relevance to this research is House's characterisation of evaluations with managerial and decision making objectives as requiring a consensus on goals. Herein lays a potential problem as the utilitarian approach requires *a single standard of social utility against which to compare* which may be difficult to achieve among multiple stakeholders (House, 1978). Developing programmes compete for curricular space with diverse programmes with competing stakeholder priorities. The method should identify an appropriate standard. Where a standard can be achieved, questionnaires or interviews are considered suitable tools for summative evaluation (House; 1978; Ashcroft and Palacio, 1996). In a reaction to these criterion-referenced approaches a more contingent method considering goals and inputs in addition to processes and outcomes was developed (Elton and Laurillard, 1979 also Scriven, 1967; Stake, 1967a,b, 1975; Madaus and Stufflebeam, 2000).

The features and advantages of each of the positivist and relativist paradigms are now considered. The descriptions draw on introductory texts by Anderson (1998), Popkewitz (1984) and Bowling (2002).

3.2 The Positivist Approach

Positivism is the dominant paradigm of quantitative scientific methods. Underlying this approach is an assumption that a mathematical model exists which describes the outcomes of a process as a function of input and process parameters. These variables may be measured and some, preferably most, controlled. Changes in the measured outcome can then be attributed to the changes in the inputs.

Initially applied in the physical sciences to identify causal relationships and 'laws' describing material phenomena, positivist principles have been extended to the study of humans as groups or individuals. Positivists, in this context called behaviourists, seek to extend knowledge of human behaviour by identifying similarly reliable and valid descriptions of social interactions – positive facts – by assuming that human behaviour is a response to external inputs.

Positivism asserts a single objective reality or truth which can be measured reliably and is subject to laws that can be tested. The empiric or observable is measured and its meaning for participants is irrelevant to the study. Starting from a theory, relationships between the observable in social phenomena can be posited, their consequences predicted and then tested against empirical data. This is the hypothetico-deductive method.

Given sufficient numbers of similar incidences of a phenomenon and if certain distributional conditions are met then statistical theory may be applied to data and the significance of findings estimated.

Claimed characteristics of positivist research include:

- Being experimental, quantitative and objective
- The hypothetico-deductive method
- Detachment of the researcher from the subject
- Close adherence to predetermined protocol
- Analysis is predetermined and often statistical
- Outcomes are generalisable.

Within the positivist paradigm the randomised controlled trial (RCT) represents the gold standard of evaluative research using primary data, surpassed only by systematic reviews of a number of such RCTs. A trial would succeed the generation of a new idea and its initial testing and development. The trial's purpose is to test the effect of an intervention in a controlled experiment. A trial may in turn be succeeded by other research to assess the applicability of the development in less rigorously controlled settings across different environments and times. The main merits of RCTs in clinical medicine are that it is considered the best method for measuring efficacy of an intervention by reducing bias and avoiding false conclusions. Groups are balanced for known and unknown potentially influential factors through randomisation of individuals to groups.

The limitations of RCTs are their cost, feasibility and their questionable external validity given the inherent artificiality of their staging.

RCTs' features include:

- Preset linear protocol for conduct of the experiment and analysis of results
- Focus on a small number of preset outcome variables
- Variables measured using validated assessments
- Sufficient subjects, given the magnitude of the anticipated effect and the discrimination of the measure, to be likely to detect any difference between groups with a known degree of certainty
- Random allocation to parallel intervention and control groups
- Balanced group allocation checked by baseline assessments
- Assessors and participants, where practicable, blind to the allocation
- Close control of the groups' experiences
- Follow up assessment of key variables
- Statistical analysis, where feasible, to estimate the significance of findings.

These features combine to provide a powerful method for experimentation which permits the attribution of quantified causation with a known degree of certainty. Such an approach can produce a robust measure of the efficacy of an intervention.

Factors such as the validity of the assessment tools employed and the levels of recruitment and retention of subjects both improve the quality of an RCT. Additionally, the standardised conduct and reporting of the trial according to an international standard, CONSORT, (Moher *et al.*, 2001) increases transparency, facilitates peer review and aids the dissemination of findings.

There is debate over the appropriateness of applying this positivist paradigm to human behaviour. In the public services it may have stifled development (Smith, 1995). Even some who espouse the 'realist' view of causation reject RCTs as legitimate tools to address causal claims in social queries (Pawson & Tilley, 1997). The literature review identified criticism of RCTs for unacceptably withholding a good, their artificiality and their contingent findings. However, the overriding advantage of RCTs is their ability to predict the magnitude of an effect following an intervention.

The alternative predominant paradigm is now described in some detail.

3.3 The Relativist Approach

The relativist paradigm assumes that a profound understanding of a social interaction cannot be obtained through experimental manipulation under artificial conditions and meaningful descriptions cannot be reduced to a small number of quantitative observations. Rather than seeking to prove a hypothesis in search of the truth, the relativist method tries to understand the sense people make of a particular situation.

The premise of the relativist paradigm is people's thoughts are all they have to make sense of their world. There is no reality for people beyond the world they construct from these perceptions. Effective interactions in a situation require negotiation or accommodation of individuals' constructions towards a shared meaning. New or changed situations require a new consensus to be reached. The 'truth' or reality is therefore contextual and subjective (Pring, 2000).

Where a situation involves multiple groups of participants, relativists accept that groups may construct different and even conflicting truths in a given situation. Individuals' constructions within a group may vary and individuals may simultaneously hold conflicting constructions of a single phenomenon. The aim of relativist research is to describe not only the consensual views but also the range of views held including any discrepant perspectives.

The methods employed may include the researcher as an active participant in the phenomenon being studied to uncover the implicit meanings stakeholders attach to their and others actions. More commonly the researcher either discusses with stakeholders or observes and interprets their actions. Whatever the degree of interaction, the researcher's world view is recognised to influence their interpretation of phenomena.

In selecting a suitable interviewer there is a dilemma. An interviewer closely involved with either the subjects or the topic of study will have preconceptions liable to predispose their interpretation of data towards their existing conception. An interviewer with no involvement with the subjects or topic is liable to lack the understanding (working construction) to appreciate the significance of the data.

Consequently, it is normal to make explicit the researcher's stance and previous engagement with the situation. As a precaution against misinterpretation, emerging or interim findings are often presented iteratively to the subjects of the research for correction, clarification or validation (Bloor, 1997). So multiple observations are analysed to build ideas and general descriptive statements and construct general hypotheses which may subsequently be tested through further observations.

In terms of educational evaluation this approach has been termed *fourth generation evaluation* (Guba and Lincoln, 1989).

Claimed characteristics of relativist research include:

- Being undertaken in the natural setting
- Multiple qualitative strategies or methods may be used inductively
- Being emergent rather than closely predetermined
- Researcher's stance is made explicit and is considered reflexively as their role is interpretive
- Researcher seeks holistic view
- Not requiring a large number of subjects though subjects should be representative of the range of participants
- Analysis is iterative and simultaneous rather than linear
- Outcomes are contextual hypotheses leading to greater understanding.

Quality standards are set, as with quantitative research, for the conduct and reporting of qualitative research. A review by Mays and Pope (2000) identified two central criteria of rigour: validity and relevance. They also distinguish between generalising findings in quantitative research by applying statistical logic and the conceptual logic required in qualitative research, for example, by including unusual cases or incidents disproportionately to ensure the full range is encompassed. A standard UK checklist for qualitative research is that of the Critical Appraisal Skills Programme (CASP, 2002a). However, quality checklists for qualitative research are the subject of much debate.

This qualitative approach is said to provide a deeper understanding of the phenomenon studied. The paradigm holds that there is an active relationship between thinking and reality in contrast to the passive one which is the only one recognized by positivists.

3.4 Mixing the Methods

To be evidenced-based, dental education's curriculum developments need to combine a series of perspectives: evidence of stakeholders' needs; implementation of practicalities; the intervention's acceptability as well as its effectiveness (Dagenais *et al.*, 2003). Neither paradigm can meet all these needs alone. Rather than limiting the strategic choice of method to one or the other a more pragmatic *post-post-modern* strategy mixes the methods drawing on the advantages of each.

In practice, science progresses neither through purely relativist inductive nor purely positivist deductive reasoning (Kell and Oliver, 2004). As Murray (2002) reminds us, RCTs in complex interventions such as medical education require qualitative methods *to explore the relative importance of the various components of the intervention and to provide meaning and interpretation of the findings*. Mixing the methods in a *bimodal* process permits a broader understanding and measurement of intervention efficacy (Nau, 1995). As Pring (2000) concludes:

The qualitative investigation can clear the ground for the quantitative – and the quantitative be suggestive of differences to be explored in a more interpretive mode.

Conducting the research in two phases, first qualitatively and secondly, a trial, would combine the strengths of each paradigm. It would make sense of the outreach placement phenomenon in terms of the meanings participants construct in response to their experiences and this requires a relativist approach. Then a positivist, quantitative method would determine the effectiveness of the intervention. A randomised controlled trial provides the method most suited for this aim. The appropriateness of such a trial would be enhanced by designing it around the findings of a qualitative study. In particular, the factors associated most closely with the placement outcomes perceived to be of greatest significance could help identify the research question to be addressed in the trial.

In the first phase, two stakeholders most immediately involved in the placements are the students and placement staff. These two groups may have developed different constructions of outreach placements and their effects. Consequently,

separate studies of those groups' perceptions should simplify analysis and reporting.

Among staff there is the possibility of contrasting interpretations of the placements between and among the principal sub-groups, dentists and nurses. There may therefore be advantages in gathering data from a number of members of the teams at each placement site using a method which helps explore the range of responses. Questionnaires, despite being simple, reliable and inexpensive (Fitz-Gibbon, 1996), lack the flexibility and responsiveness required in new and developing situations. In work teams, *collaboration in the process of forgetting unfortunate events* is common (Argyle, 1994). Individual interviews reduce barriers to discussing sensitive matters and permit the exploration of interesting topics at greater length. Focus groups on the other hand can be used to check both the meanings attributed to words and the variety of views held especially if contesting views are held (Wall, 2001).

The communal response of a focus group may also bolster the confidence of junior staff in contributing data especially if these staff are initially asked to confirm, correct or expand on statements made by others. Operating data collection in placements as part of the working day may encourage the reporting of practical detail.

Based on the principle that if you want to know if a restaurant is good you ask the customers, not the cook, learners' perspectives on educational experiences are increasingly elicited in higher education as a measure of effectiveness (Brown and Atkins, 1991; also Silver and Silver, 1997). However, caution is required when interpreting students' responses as the validity of student perception as a measure of educational quality is widely questioned (Falk and Lee Dow, 1971; Beard and Hartley, 1984; Dwyer, 1972; Scriven, 1995; Finch *et al.*, 1997; Bingham and Ottewill, 2001). Limiting responses to areas both within their experience and conscious expertise is deemed to ensure validity (Scriven, 1995). Further, what learners want may not be what they need.

Properly applied, both quantitative and qualitative research tools can be employed rigorously together to support stronger scientific inferences than when either is

employed separately (Schuwirth and Cantillon, 2005). The success of such a mixed method depends on drawing on the strengths of each perspective to contribute to the overall design.

Both phases of the research could be strengthened by triangulating findings between both quantitative and qualitative data relating to the implementation of the outreach programme and its outcomes.

3.5 Strategic decisions for this research

Several decisions from this methodological argument shaped the research.

In the first, qualitative, phase of the research these decisions were:

- Two studies would investigate students and placement staff perspectives separately
- The staff study would, where practicable, include dentists, nurses and any other staff involved with the students
- The aim of the studies would be to identify the range of stakeholder experiences and stakeholder interpretations of outreach placements
- One specific objective of the studies would be to identify key learning outcomes of the outreach programme
- Both individual interviews and focus groups would be used to gather data
- To enhance the opportunity for value-free data collection, capture of reflexive accounts from participants and analysis, with limited contamination from hidden cultural values, these processes should be executed by someone not already embedded in the dental school
- Analysis will be inductive and iterative
- Interim findings would be validated by presentation to respective groups and by triangulation against other available sources of data.

Decisions shaping the second, trial, phase of the research were:

- The trial's primary outcomes were to be selected from the key benefits for students identified in the qualitative study
- The trial could take place at a stage in the development of the School's programme when half the undergraduate cohort can be placed in outreach

settings and students remaining in the dental school would provide a concurrent control for those students allocated an outreach placement

- Professional development should be provided to ensure supervisors share some common understanding of the purposes of the placement and their supervisory role
- Any clinical assessment should be undertaken in a naturalistic environment similar to a primary care setting.

3.6 Implications for the design of the research

Those decisions and other aspects of the methodological arguments had implications for the design of the research. These were:

- To maximise naturalism and hence tend towards testing effectiveness rather than efficacy, the design should minimise disruption with the students' outreach or dental hospital experience during the intervention period
- Ensure the interviewer is well briefed about outreach programmes in general and familiar with the School's programme but has no influence over the students or placement staffs' futures.
- Gather data from other related sources such as students' clinical record books for analysis and triangulation against trial findings
- Monitor the variety of placement experiences by location and timetable block through administrative data and debriefing discussion with each student after the follow-up assessment.

3.7 Concluding reflections

The methodological debate above recommends a mixed-method design that is logical and matched to the requirement of evaluating the effectiveness of outreach placement as a component in undergraduate dental education. That evaluation may serve multiple purposes. For the development of the programme it is evaluation to inform managerial decisions regarding the programme's development. The study also serves the purpose of research into the outreach training approach in general through the study of a particular programme.

On a personal level another purpose was being served. The *educational researcher appropriates, exploits, reformulates and verifies ideas that have their roots in*

social movements (Popkewitz, 1984). My involvement with this research was triggered by a belief in the value of placement learning which was reinforced by my reading Illich (1971) as an impressionable undergraduate. The evaluation tested my belief and my capability to test my belief.

During the pilot phase of the programme there was a need to identify potential problems rather than conceal them if further developments were to be well founded. I believe this necessity and my determination to be objective countered any predisposition, on account of my belief in placement learning, towards misinterpreting phenomena positively or biasing the method. The research team were reflexive in addressing this potential problem and my previous involvement in quality assurance, with its culture of identifying and tackling weaknesses, aided objectivity.

Research requires funding which is likely to be allocated not only on the basis of scientific merit but also closeness of match to funders' political objectives (Coffield, 2004). Funding bodies may consider it advantageous for the research methods to be acceptable to influential decision-makers in the dental school. Two methodological factors are relevant in this respect. Firstly, the use of a researcher from outside the dental school to give an independence of approach to the studies. Secondly, employing a trial which is the method most respected by the medically trained clinicians who could later implement change. A third feature, the subject of the research being one of particular current interest to governing institutions in the health service, may have encouraged funding but the researchers have tried to avoid this distorting the method.

There are social, political, service and educational drivers for change discussed in the literature review which suggest possible advantages in the use of outreach training placements. However, Bailit (1999b) refers to a dearth of *hard data* on the impact of outreach programmes and calls for further research. The method outlined above provides a robust evaluation of the educational benefits of an outreach programme.

Chapter 4

Perspectives of placement staff on outreach training

Abstract

Objectives: To explore the perceptions of placement staff hosting students on dental outreach training.

Intervention: Six-week block placement for 20 undergraduate and therapy students supervised by local dentists and supported by clinic nurses in 11 primary care clinics.

Methods: Semi-structured interviews and focus-groups with 32 staff across ten placements. Responses were audio-recorded, transcribed and then content analysed. Interim findings were validated by presentation to placement representatives for comment and by triangulation with another researcher at each stage of analysis.

Results: Overall placement staff were positive about the benefits to students including inculcating a more holistic, pragmatic view of health care and wider awareness of dental careers and the potential role of outreach training in dental

education. Benefits to staff included a sense of satisfaction as host, contributing to dentistry's future and local recruitment, having to reconsider routine decisions for explanation to students and social benefits for the dental team.

Staff asked for greater attention to be paid to: communicating students' prior competence; engaging interest in non-clinical work, and developing the supervisory role.

Conclusion: Primary dental care settings can be a valued adjunct to dental education. Staff enjoyed helping students and perceived benefits to themselves. Careful management of the programme is required.

This study was published as Smith, M., Lennon, M.A., Brook, A.H. and Robinson, P.G. Perspectives of staff on student outreach placements. *European Journal of Dental Education* 2006; 10(1): 44-51. A full reprint is included in Appendix A20, page 283.

4.1 Background and Objective

Placement staff in various roles hold key positions in an outreach training programme. Students rely on them for induction into new learning environments, selection of suitable patients, preparation of surgeries for appointments, supporting and supervising the work, providing and fading support as necessary, assessing work and guiding subsequent reflection. Host staff may be called on when students need to celebrate an achievement or recover from a problematic experience. An appreciation of their perspectives may help to develop an effective outreach programme.

Previous studies of host perspectives are mainly programme evaluations rather than research. These refer to concerns regarding maintaining services levels and tensions between service requirements and students' needs. Positive perceptions related to finding teaching rewarding and developmental, indirect future benefits to recruitment or retention.

Most studies consider the perceptions of small numbers of senior staff. The exploratory interviews and focus groups of this study provide an appropriate method for understanding the various roles of all staff involved.

The aim of this study was to identify the range of experiences and interpretations of staff supervising or supporting students in primary care outreach training.

4.2 Method

4.2.1 Design

The study took a qualitative approach using semi-structured, exploratory interviews and focus group interviews with placement staff approximately one month (range 2 weeks to 4 months in one case after a vacation) after the end of the placement.

4.2.2 Settings

The placements involved full-time clinical working to local protocols in nine CDS and two DAC establishments in northern England. Placements were selected from within the students' and School's networks of contacts and were commended as suitable placements by local Directors of Clinical Services and consultants in Dental Public Health. The local dentists were checked for suitability as supervisors in a similar manner and through scrutiny of their curriculum vitae through application for and subsequent granting of honorary lecturer status within the School. All staff were briefed and offered training in the supervisory role.

The placement students were ten fourth-year dental undergraduates who volunteered to participate during their six-week elective period. In addition, all ten second-year hygiene and therapy students participated for three weeks. Six of the undergraduates and all the hygiene and therapy students were female. Students were briefed beforehand on their responsibilities and given details of web-based and telephone support channels. Those who were unfamiliar with their placement made earlier visits to meet staff and tour the site.

The placements commenced after Easter 2003 with all students starting on the same day. Most students attended placements in groups of four, the maximum group

size. After the third week, when the hygiene and therapy students finished their placements, the undergraduates in these placements were attending in pairs. Several students were placed in pairs throughout. Two hygiene and therapy students, who returned to locations where they had previously worked as dental nurses were alone at their placement.

All students maintained a record of their clinical work while on placement in a format similar to an established method used in the Dental Hospital. Undergraduates also undertook elective projects related to community health or the outreach programme itself.

4.2.3 Sampling and recruitment

To ensure data encompassing a wide range of first-hand experiences, a purposive sample was used comprising supervisors and nurses who were considered by their local managers to have been most closely involved with the students daily throughout their placements. A number of managers and administrators were also included.

All the staff approached agreed to participate and were interviewed or included in focus groups. In many cases the supervisor most closely involved with the student was first interviewed alone in their office. Other staff were then either interviewed or, particularly with larger placements or those later in the schedule, had data collected in a focus group sometimes without the principal supervisor present. In one case staff had met in advance to discuss the points they wished to raise. Data were collected first in visits to locations hosting a number of students then to those taking students singly.

The list of categories and the spread of items within each data category were monitored as data were collected until saturation occurred with no new analytical categories emerging. At this point visits had been made to ten of the eleven locations used. The location not included in data collection was the most distant and took a single hygiene and therapy student whose own account of their placement was typical of their groups' reported experiences (Chapter 5, page 132).

Thus ten undergraduates and nine student therapists were supervised in these placements.

Both at the point of arranging visits to placements and again at the start of each interview or focus group the interviewer introduced himself and stressed the purpose of the study as evaluating the outreach placements rather than assessing the performance of individual students or staff. He requested permission to audio record the session, gave a guarantee of confidentiality and stated the intended mechanism for reporting summaries of the data. At this stage staff were asked if they remained willing to continue. All staff approached agreed both to continue and to audio recording.

Data were collected from thirty-two staff in seven individual interviews and six focus groups of two to eight staff. The number of staff included may be considered large for a qualitative study but was selected to capture variations by placement setting, number and type of student attending and staff roles.

4.2.4 Development of the interview guide

Potential areas for enquiry were identified from the intended learning experiences and outcomes mentioned in the pilot's project bid (CCDH/SCDS, 2002) and external guidance for students placements (QAA, 2001; GDC, 2002; SYWC *et al.*, 2003; UoS, 2003). The resulting preliminary guide was used to frame open-ended questions and covered five broad topics:

- students' development while on placement,
- School organisation of the placement,
- hosts' organisation of the placement,
- supervision of the students and
- any effects on the hosts.

4.2.5 Data Collection

The researcher (MS), who was not involved in the planning or operation of the placements, was provided with a complete set of the planning documents and thoroughly briefed on the programme's development and intentions.

The 'funnel' approach to enquiry (Hammersley and Atkinson, 1983) was employed to engage the interviewees and avoid the interviewer prescribing the agenda. Starting with a broad question such as "How did the placement go?" then, in response to the interviewee's reply, the discussion was narrowed towards one or more the above topics or branched following apparently productive lines of enquiry. No single pre-determined path was taken through the topics but each topic was covered within each interview or focus group interview. In addition the constant comparative method, in which data collection and analysis took place alternately, allowed subsequent interviews to chase new leads.

Where attitudes were expressed the interviewer typically repeated his understanding of the statement to check equivalence of meaning by interviewer and interviewee (Fielding, 1993). Atypical responses or emphatic statements were often checked by returning to the point towards the end of the session. Where topics of interest did not arise spontaneously the interviewer raised them as questions or presented them as anonymised data collected elsewhere for comment.

All interviews were conducted either in placement offices or meeting rooms to reduce evaluation apprehension. Early interviews were with those placements having longer standing connections with the School through the pre-existing Community Programme and those taking the greatest number of students. New leads and emerging lines of inquiry informed and refined later questioning, corroborated data and identified exceptions. Data were collected until data saturation was achieved with the last two interviews generating no new categories.

The combination of an interview with the principal supervising dentist followed by a focus group with other staff attending tested the range of views held by placement staff. While senior professionals such as the dentists might have no difficulty in expressing their views in an interview with an unfamiliar interviewer, it was observed that younger staff and especially nurses were often relieved to hear that their views would be collected as a group.

The interviews typically lasted 45 minutes and focus groups lasted 40 to 75 minutes.

Data were transcribed verbatim from the audio tapes by the interviewer within a few days of recording to minimise interviewer recall bias and allow constant comparative analysis.

In accordance with normal practice at this time for studies evaluating curriculum developments there was no attempt to seek the approval of an ethics committee. However, an outline protocol for the study was developed with two of the placements' clinical managers and circulated to each placement with a covering letter from the outreach programme's director introducing the interviewer and requesting an opportunity to evaluate the placement and its effects.

4.2.6 Analysis

The principal analytical strategy was content analysis. The verbatim transcripts were subjected to line by line coding of the concepts and ideas expressed (Bowling, 2002). Initially the interviewer coded all responses. Later, responses were only coded where they introduced a new category or represented an extension or variation of an existing category. Next, similar coded responses were grouped into categories before collapsing these categories into themes. This grouping was revisited several times and revised in the light of emerging data and shifts in conceptions of the categories.

A tentative thematic framework was identified from the categories and data indexed for mapping and interpretation for reporting (Ritchie and Spencer, 1993). Besides the themes, common strands woven through each theme were identified. The results are presented within that analytic framework of themes and strands. Verbatim anonymised comments were used from the transcripts to illustrate the detail, range or intensity of certain points being made (Fielding, 1993).

Observer bias was reduced by the recruitment of an experienced interviewer (MS) from outside the Dental School but with experience of organising, providing and supervising placement learning. He was thoroughly briefed on the outreach project and observed chairside supervision in a dental hospital and a simulated general practice before data was collected. Observer bias was further diminished by a second researcher (PGR) checking the analysis at three stages. First, early coding

was checked against the transcripts to ensure reliability. Secondly, the emerging categories were checked against the data. Finally, the ultimate organisation of the categories was checked against the primary data and interim categories. A presentation of the findings was made on two occasions to groups of the original participating staff from several placements for respondent validation.

In the results section the data are presented by the themes that emerged from the data. These themes are the secondary constructions of the analysis and are illustrated by anonymised verbatim quotations.

4.3 Results

Of the 32 participating staff there were 17 dentists, 3 therapists, one hygienist, 10 nurses and an administrator. Half the dentists were male and all remaining staff were female. The staff were from ten placement clinics of which two were DACs and the remainder were part of the CDS.

Overall the staff felt the placements had been of clear benefit to the students and had generally operated smoothly despite initial organisational challenges. They had found the experience of hosting students rewarding if a little disruptive. Most considered themselves fortunate in having a *good student* who contributed to the success of the placement especially by maintaining high professional standards. One placement though did report handling some unprofessional student behaviour.

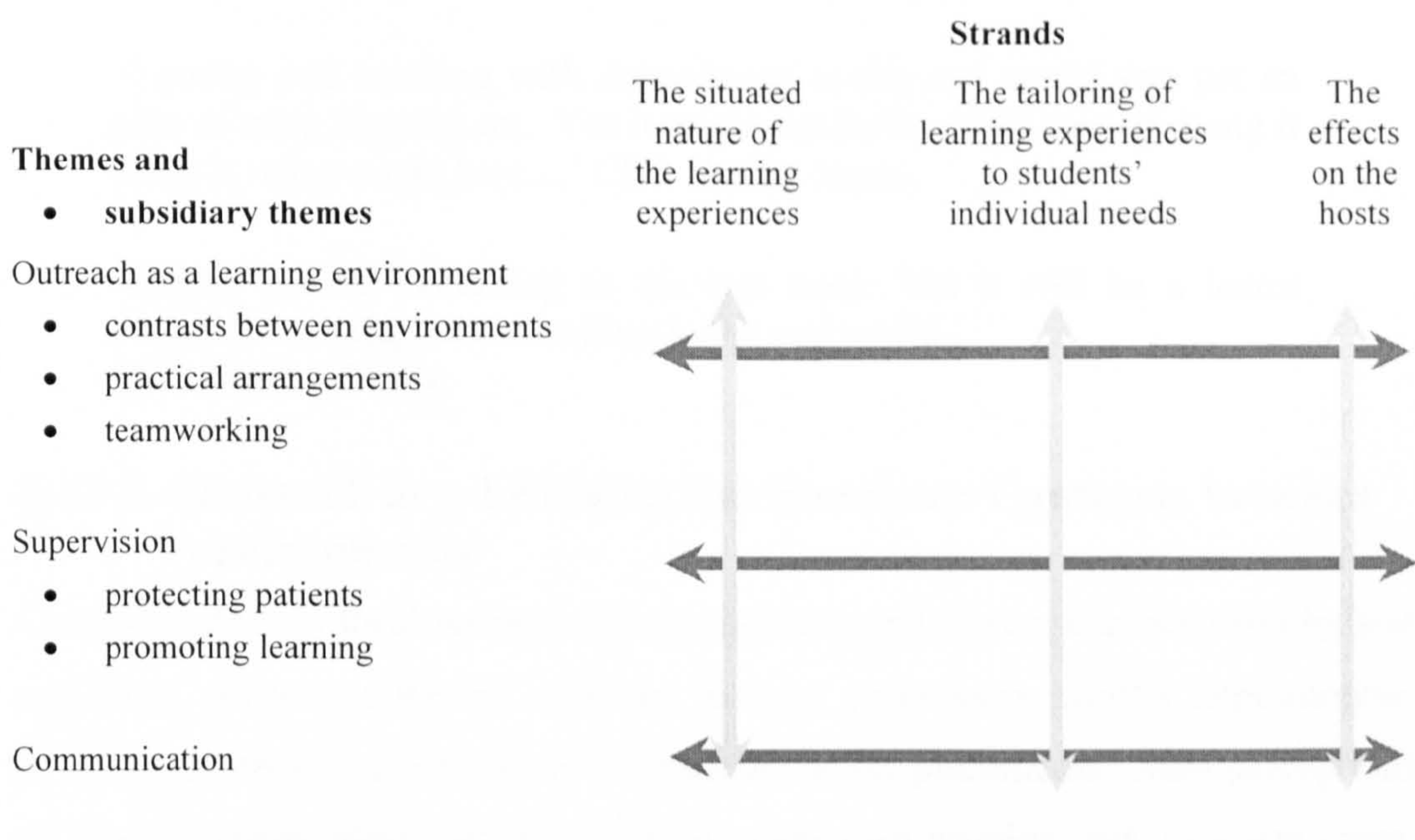
‘The students themselves were good and very effective each in their own different ways... [staff] were quite happy with both... excellent attitude both of them. Wanted to get on and do things, wanted to get on and get experience. Certainly no problems with either of them.’

CDS Dentist Frank

‘One student in particular I had to have in and warn her about her attitude it was so negative that it was having a bad effect on others in the team. Complaints...about patient management and not thinking about things from the patient’s point of view... To give her her due once told she did snap out of it and settled in well.’ CDS Dentist Oliver

Three main themes with subsidiary themes were identified in the analysis. Throughout these themes ran the strands of recurring categories related to situated learning, tailoring learning and effects on the hosts. Together these themes and strands for a matrix (see Fig. 4.01). The themes provide the primary framework for reporting the results.

Figure 4.01 Matrix of themes and strands identified in the analysis of staff perceptions



4.3.1 Outreach as a learning environment

A key theme identified in the analysis was the outreach placement as a learning environment for students. The students' transfer to a new location encouraged a fresh start. However, the new environment was much more than a different physical location. The values of the host services were contrasted with those of the students' dental hospital. The social and professional interpersonal relationships between staff at the two settings were differentiated. There were perceived benefits from the learning environment to students' learning and consequent preparedness for working on qualification. The learning was not restricted to clinical working. Informal discussions between appointments, during breaks and on journeys were considered influential.

‘Plus when she was being taken anywhere she got a chance to talk... in the car... perhaps issues arising from one of the patients... plus careers, dentistry, news, whatever. She just coped with that so well and that helped make other conversations easier.’ CDS Supervisor Jamilla

There was a belief that the placements gave students a wider appreciation of ‘*everyday dentistry*’, potential dental careers and of how dental teams worked. For undergraduates the experiences were seen as developing in the students a more pragmatic view of providing for patients’ needs. Students applying knowledge to unfamiliar populations was seen to reinforce their learning.

‘Coming and working with dentists out in the real world you get an idea of what is going on. Yes it might not be the ideal way of doing it but it is what works here...’ CDS Dentist James

‘It may not be according to the text book, but it will be a learnt behaviour... adapted to working in the real world.’ CDS Dentist Ginny

4.3.1.1 Outreach as a Learning Environment: Contrasts between environments

Contrasts between local settings and the dental hospital were characterised by less compliant patients, different solutions, simpler procedures, shorter appointments and a less restrictive environment for students on the placements. Staff perceptions of dental hospital-based learning drew on their own training and, in a few cases, working there supporting students.

‘Within the dental school... you have different departments, the restorative department, the prosthetics department, the perio department, children’s department ...But that’s where this sort of teaching in Community could be so useful to get them looking at the whole picture rather than it as a restorative issue, a perio, or a prosthetics issue... a children’s issue... I think it will produce better dentists as a result.’ CDS Dentist Frank

There was a perception of a need to shift students from the perceived hospital approach to dental treatment to the more holistic approach predominant in host services that were portrayed as more pragmatic, more likely to extract teeth and less concerned with *precision of angles*.

‘A lot of patients that come here... they ... want a tooth out. So whereas [the students] would have preferred a certain treatment option, when it came down to ... just being realistic about what they could do... I think it taught them a bit of pragmatism...’

DAC Manager Keith

‘As a dental student you are very much, its all results driven, you are going and you are looking for fillings to do ... rather than looking at the whole picture... When he saw patients, he’d say ‘Right we need to do this filling, and that filling and that filling.’ And I say ‘Well hang a minute, just stand back. Have you considered how you are going to do these yet? Have you considered that child and that family and how you are actually going to deal with all of this yet?’

CDS Dentist Felicity

There were possible differences between settings. In CDS clinics staff tended to mention links with other health professionals, such as health visitors and an orthodontic specialist, as part of students’ core experience and steps taken to integrate this into the learning experience. Family or patient’s behaviour were referred to as a selection criterion for suitability and there was an emphasis on continuity of relationships with families. DAC staff, on the other hand, tended to draw attention to steps taken to maximise students’ clinical contact, to comment on their pace of work and to stress pragmatic short-term treatments for acute cases.

There was concern that local methods may differ from the hospital’s and so be unacceptable or confusing for students. These differences included materials, treatment planning and patient management.

‘I wasn’t allowed to touch elevators when I was a student. Now I use an elevator on everything I take out... I don’t know whether the students are still shied away from elevators...’ CDS Dentist Gail

‘There were some differences in the composite perhaps and some different materials.’ DAC Senior nurse

‘Maybe the way we do fissure sealing might not be the way she has been taught to do them. Perhaps that was part of the reason why she wanted to see how [the dentist] did it first ... We need some correlation between what we do and what she’s been taught.’

CDS Supervisor Delia

‘I don’t know if they still teach the ambidextrous approach. Being left handed, I did local on the right hand side right-handed but we let her do it her way.’ CDS Supervisor Ginny

‘She would take absolutely ages taking a chart... but here in the real world we were having to leave her spaces between bookings to allow for that. As the time went by she soon got quicker... it took me twenty years to build up speed like that.’ CDS Therapist Joanne

4.3.1.2 Outreach as a Learning Environment: Practical arrangements

Students’ visits to the placements before starting were reassuring to staff and students as they clarified everyone’s expectations of the placement. Induction tours and observation of working for a session were found to help students settle in. Students were described as initially tense and formal in the unfamiliar setting, but generally becoming relaxed and fitting in well surprisingly quickly. There were commendations for students’ ease in dealings with staff and patients and these students were soon treated as *just another member of staff* who was *getting on with the job*. There were also criticisms of students’ poor performance in coping with diversity. Despite having *good students*, as mentioned above (4.3), there was concern over the implications of hosting weaker students.

‘...to start with they were... a bit nervous. I mean it was totally new: new surroundings, new people and totally new environment... and you could see the nerves were there for them, and also to a certain extent for us as well. ...but over the 6 weeks you could see them both personally and in their work in the surgery gaining much more confidence.’ CDS Nurse Fara

‘With a special needs patient it was ten minutes in and [the student] hadn’t appreciated she [the patient] hadn’t understood a word of what was being said to her.’ CDS Therapist Diane

While some disturbance of normal working in the placement clinics was anticipated and considered inevitable this was described this as minor. Staff hosting fewer students may have described more disruption.

Students’ pace improved to about one third of a dentist’s work rate but without the difficult cases. Failure of booked patients to attend caused some quiet sessions, but conversely busy times in a ‘drop-in’ DAC saw staff protecting students from

stressful overload. In both cases students were noted to have tried to ease the situation, which staff had encouraged.

4.3.1.3 Outreach as a Learning Environment: Teamworking

An identified contrast with the larger institution of the dental hospital was the more intimate working teams found in placements. Introductions to teamworking given to students and were described along with accounts of how members of teams cooperated in supporting students. Sometimes such communication was made problematic by staff having different attendance patterns at the placements.

Dental nurses were found to be key members of the dental team. The norm was for the provision of an experienced dental nurse for each student. Without exception this was reported to be invaluable both for enhancing learning and securing the quality of patient care. Supervisors, when they were required elsewhere, were reassured by knowing an experienced nurse was present.

Nurses' knowledge of the surgery and patients allowed students to concentrate on patient care. Later sections (4.3.2 and 4.3.2.1) describe how nurses were helpful in the supervision and assessment of students.

‘We needed a nurse who knew the patients and knew the surgery so the student didn't have to think about any of that. So the right instruments and the right forms would be to hand.’ CDS Dentist
Jason

Opportunities for undergraduates to work with hygienists and therapists were less common. Some unwillingness was described on the part of undergraduates to refer patients for fillings to available therapy students. This was attributed to either ignorance of these therapy students' capabilities or a desire to gain additional experience themselves. Another factor limiting the integration of therapists with the rest of the dental team was some staff's unfamiliarity with the therapists' role.

‘We don't have therapists and [the placement manager] said that they were changing [their duties] so we checked with the GDC site... so we had a list of what therapists were allowed to do.’
CDS Supervisor Georgina

Unanticipated benefits were found from hosting students. There was pride in having contributed to the students' progress and helping to develop the dental workforce of the future. Student contact provided refreshing diversion from routines and social gains from the presence of *new faces*. Moreover, despite staff having some reservations before hosting students, they retrospectively reported positive reactions and a fillip engendered by the students' enthusiasm and interest in their placement operations.

'It was really good... The whole social thing was just great. Yes, we'd say we should do it again...' DAC Nurse Lisa

'It was good to have a different face around the place.' DAC Nurse Lora

Another reported benefit related to recruitment. Outreach provided opportunities to raise students' awareness of the career possibilities in the setting and the attractions of working locally. Indeed a few placements, motivated by the prospect of recruiting the students, organised experiences for them to this end. Several managers made offers of future employment to the students they hosted.

4.3.2 Supervision

Two main facets of the supervisory role were described: providing clinical services for patients and learning experiences for students. Occasionally the two facets conflicted in which case supervisors' ensured that patients' needs took precedence.

Some supervisors who were new to the role found it more onerous than anticipated...

'I certainly got the feeling we were very honest with them and they were being very honest with us. I didn't really have any great nerves about them treating our patients, I mean in the end there was somebody there to oversee and it became very apparent very early that they knew their limitations and even if I wasn't in the room I was listening, the doors were open from the surgery, so I could listen to how they were talking to the patients.' CDS Dentist Francis

... but all found helping students improve both refreshing and rewarding. While commending the students they met, staff were concerned how they would cope with a *poor student*. The general view was very predominantly positive.

‘I took over and it made me feel quite wonderful to have to a chance to demonstrate how to do it.’ CDS Dentist Elaine

4.3.2.1 Supervision: Protecting patients

Strategies for the protection of patients being treated by students involved a combination of patient selection, observation and, where necessary, intervention. Staff were familiar with checking agreed steps of clinical procedures though some, uncertain of the extent of checking required, erred on the side of caution. This process assured the quality of patient care and allowed assessment and feedback for educational purposes.

Behavioural as much as clinical factors were important in the selection of patients for students with acquiescent patients known to supervisors being preferred. In general, the patients seen by students were characterised as nervous, in pain and those less committed to oral health care.

‘We made sure we’d pitched them in with particular patients. ...generally pretty amenable... and with children in particular we tried to give them a fairly gentle introduction... mainly with things like extractions and pretty simple stuff... and then we’d try and give them a little bit more [advanced] once we felt they might be capable and try and push them a bit.’ CDS Dentist Frank

‘Giving him patients of a type we knew wouldn’t break his confidence. So we really had to select patients for him.’ DAC Senior Nurse Helena

‘The selection criteria to begin with were a child used to having local [anaesthetic] and amenable from the behaviour point of view.’
CDS Dentist Joanne

An appreciation of individual students’ clinical experience and capabilities was also important. There was considerable variation in the confidence of staff in gauging the level of students’ competence when making appointments for their early patients.

Early interactions with students were found to reduce this uncertainty, with staff commending students for their professionalism in highlighting their own limitations and seeking assistance before problems arose.

‘She had passed her [Hygiene Operative Technique Course] and we were told she had pretty well passed the [Junior Restorative Course], therefore she was qualified. In our day you qualified when you went out into the big wide world and you were left to get on with it. And I didn’t know then this is exactly what was expected of her. Okay, was she now qualified, she can do everything or whether she’s not so that we could stand over her and check her at every stage.’

CDS Therapist Elanor

Patients almost invariably consented to being seen and treated by a student and this was attributed to a range of steps taken to allay any concerns: mentioning the students presence and involvement when the appointment was made, reminder notices displayed in reception areas and, perhaps critically, using a familiar nurse to explain the situation and support the student in the surgery.

‘When we sent out the appointments we said ‘On this session you may well be treated by a student’... And there were no problems. We gave people the option to change the appointment if they wanted to at that stage. But nobody did.’ CDS Dentist Georgina

The preferred arrangement for working allowed the supervisor to move unobtrusively from being alongside a student, sometimes nursing for them, through to out of sight but still in earshot and easily summoned. Some existing floor plans did not facilitate this and the dentist might be inconveniently placed, even on a different floor. One CDS dentist commented

‘She actually asked would I chairside for her to start with. So she wanted a lot of input. And by the end... I did stand back and I could see she was a lot more confident.’ CDS Dentist David

‘If a patient started to get a little bit agitated then... we would go and sit in the corner. With one pulpotomy we had to take over as the patient was getting restless from having been in the chair too long...’
CDS Dentist Joanne

These examples are typical as staff generally reported reducing their intensity of supervision as their confidence in each student’s abilities grew while making adjustments for the particular procedure and patient.

Dental hygiene and therapy students were already experienced dental nurses. Consequently, they could assist. Conversely, undergraduates were inexperienced in surgery routines and patient management and so supervisors preferred to have an

experienced nurse present to assist and ensure attention to patients' needs. All supervisors valued the nurses' chairside vigilance and appraisals of students' developing capabilities.

4.3.2.2 Supervision: Promoting learning

Staff were invariably committed to, and proud of, providing valuable and enjoyable learning experiences tailored for individual students. Motivators all related to the students; namely their contribution to the work of the clinic, being appreciative and being seen to improve.

'It does depend on the student because you are willing to put in a lot from our point of view when you know that the student is really interested. Then you don't mind putting yourself out...'

CDS Dentist James

'We didn't want to let the students down... and the staff, as a team, I think they worked hard... But we've enjoyed it.'

DAC Senior Nurse Kay

Students' learning was promoted by tailoring learning experiences, support, feedback and coaching as each student progressed. Where students pressed for more or increasingly complex clinical tasks the placements accommodated them where practicable.

'They enjoyed having a bit more freedom here. They realised they're appreciated and they enjoyed building their confidence and understood that they could come to you if they had a problem.'

DAC Dentist Kevin

Students were often commended for their theoretical knowledge but there was concern at their lack of clinical experience of some procedures. Distinct changes in the students during the placement were reported. Students mastered new treatments, gained confidence in checking their own work and managed unfamiliar types of patients more effectively. Part of this development was attributed to the sheltered, supportive learning environment.

'But over the six weeks you could see them both personally, and in their work in the surgery, gaining much more confidence about what they were doing...'

CDS Dentist Fiona

A factor considered relevant to students' improvement was the gradual development of mutually rewarding supervisory relationships through extensive contact.

'We both learned to relax a little, dropped barriers and you could get to what was needed and help them that much easier. There was no escape for them here every day. No, they soon enjoyed it...' DAC Dentist Mary

Techniques for promoting learning varied between individuals and between situations. Supervisors used socratic questioning, discussion, closed- and open-questioning, occasional didactic instruction and demonstration, besides acting as role models.

'I think they need that sort of nurturing and fostering at this stage. It's having to allow them to develop. It wasn't a matter of saying 'You should have done this', 'You should have done that.' No, it was 'How did you see that?'... 'Well I felt that in that situation I might...'
DAC Dentist Ginny

Reflection was encouraged through discussions both before and after treatment and emphasised the need to provide constructive feedback. Examples of good educational practice were recalled including staff explicitly extending students' reflection on cases to generalising and building their working knowledge. Students' engagement with such interaction was a significant factor in developing increasingly productive relationships with supervisors.

Providing firm corrective guidance to students was unproblematic for some supervisors. However, for others there was some discomfort about checking and being judgemental about students' work and giving critical feedback.

'It was... slightly nicer... to write it down and she would have time to ponder it herself and then she could ask me any questions on what I'd written down.' CDS Dentist Diane

'Feedback is... as I understand it, is turning every negative into a positive.' DAC Dentist Kevin

Placements had arranged for students to shadow working dentists so that they might learn from observing a variety of approaches and techniques. A range of

student responses to these situations was described although the direct evidence indicated that staff had adhered to the protocols.

‘When they went out shadowing the reports we got back were that they were very interested and participated and willing to try things out. Very good reports... Asked lots of questions.’

CDS Dentist Diane

‘I think we need to instil in the students the importance of this part of the experience. A disinterested [sic] student does not inspire the shadowing tutor – on the other side though our staff should make sure that shadowing is as educational and interesting as possible.’

CDS Dentist Oliver

‘We experienced difficulty getting trainees to attend shadowing sessions and take them seriously. They failed to appreciate the usefulness of these... to get an insight into the delivery of dentistry outside a hospital environment. I must say they are not the only students who feel this way... Perhaps we need to sell the idea better to them.’ CDS Dentist Octavia

Though some staff doubted that students found observation worthwhile they considered it had unrealised value and others had devised strategies to remedy this situation...

‘Having sensed [students’] reluctance to observe we stopped setting aside non-clinical time [for observation] apart from for visits. Instead, when I was treating any unusual or complex case I’d invite the students in to observe that particular procedure. This found more enthusiasm and with a bit of encouragement it generated further discussion.’ DAC Dentist Max

A range of supervisory styles were described from generally close supervision throughout to initial discussions agreeing stages of work then permitting students considerable freedom to work within that framework. Supervision was partly modelled on the student experiences of supervising staff and their teaching in other contexts. The limitations of both these approaches were appreciated and there was a receptiveness to development in good supervisory practice.

‘I’m just used to being there all the time and I think they need that support... just knowing you’re there.’ DAC Supervisor Ken

‘I think he got a lot out of the placement because I gave him a lot of freedom to do what was needed.’ CDS Supervisor, Henry

‘I was in a dental school in 1982, a long time ago, but *[here]* I have been teaching therapists and it’s a whole different ball game with therapists’ CDS Supervisor Hanif

There was some suggestion that the School adopt a more prescriptive approach in specifying the clinical contact time, target numbers for procedures and suitable health services to visit. This was one of several examples of staff being anxious to meet their responsibilities to the student and to the School. Problems were envisaged by some managers in identifying suitable patients in sufficient number if target numbers of procedures were adopted.

‘I wondered... if there needs to be any sort of standardisation of what a placement should provide ... Does the University need to be more prescriptive? ... If this is creating a core part of the student’s work [or] they could get anything in that 5 weeks.’ CDS Supervisor Ginny

‘We could do with some sort of teaching manual. I don’t know if they provide teaching manuals at Sheffield but with a teaching manual then we would find that very useful.’ CDS Dentist Delia

It was not only the students’ learning of that was promoted by the outreach placements. The experience of hosting students was intellectually stimulating to some staff. They were required to explain procedures to students unfamiliar with primary care. Sometimes they had to recall the rationale for routine actions and this too was considered beneficial. Questions from students were sometimes found demanding. On the other hand some supervision of a single student was at times found frustratingly restricting.

‘They knew... so much more than me from the textbook that it kept you on your toes... Quite challenging but not a bad thing really for trying to keep you up to date.’ CDS Dentist Lora

‘Some of them were a bit uncertain about agreeing to supervise to start with... sort of said ‘Oh, go on.’ when I approached them... They were really good though and found it got them involved in something new and made them think... Afterwards they said ‘Yes, we’ll do it again’ which is what you want to hear.’ CDS Supervisor Ginny

4.3.3 Communication

Placement-School, staff-student and intra-placement communications were cited as important factors in ensuring the success of placements for students. Good communications ensured a shared understanding of the placement's purposes and more practical information, such as the relationship between outreach and other aspects of the course. For example, some views expressed by staff (all lacking personal contact with the School as either student or staff) described uncertainty in such matters as the significance of the clinical assessment grades and elective project work.

'We got everything kind of second-hand somehow... Were we supposed to know about the project?' CDS Dentist Elaine

'No, we'd picked up a good idea of what was needed. That was fine, I think. To start with, I think, what our main concern was how much could she do. And we'd never supervised anyone before... I suppose we just perhaps lacked a bit a more information...'
CDS Supervisor Fara

There was however general awareness of support being available from the School. Responses to queries made were described as being generally prompt and helpful though some were thought vague.

Feelings varied about the information provided on the range and depth of students' clinical experience before the placement. At one end of the scale this information was felt to be sufficient. In some cases the information was supplemented with discussions with individual students. However, those uncertain of individual students' abilities and those inexperienced in working with therapists, made initial appointments for simpler procedures for the purposes of formative assessment. Requests were made by some supervisors for more information about students from the School in the form of discussion or pen portraits.

'We were given a good impression of their strengths and weaknesses. They talked to us about what they'd done at college and what they were, you know things that they hadn't done.' CDS Dentist Kevin

'...at least a little bit of background on their general aptitude, clinical, technical, how they were technically and little bit just about their background...' CDS Dentist Frank

Communication between staff and students was often considered rewardingly effective with a good rapport being achieved during the placement. Staff enjoyed the evident interest these students had displayed in the clinics' work. In other cases that rapport was slow to develop and students appeared less engaged with the placement.

'They were fantastic... part of the team and joining in...it was just great, the nurses loved it... especially the interest they showed in our work' CDS Dentist Lenka

4.4 Discussion

This qualitative exploration of the perceptions of placement staff involved in outreach training found staff saw benefits to students in working in a smaller primary care clinic with nursing support and immediately available individual supervision by a dental generalist. Staff actively supported the outreach placements in primary care settings as an enhancement to students' dental education. They identified benefits to students in increased and broadened clinical experience, teamworking and in applying theoretical studies to new communities. Staff also discovered unexpected benefits from hosting students. Effective communication and adequate resourcing were perceived critical success factors. Although efforts were made to find a full range of views among participants there was a strong preponderance of positive opinions expressed. There was some disruption of clinics' normal working but many unanticipated benefits. These findings can be used by dental educators who are planning or evaluating outreach programmes.

The discussion of these findings is divided into five sections: the relationship of this to other studies, the contrasting settings, aspects of supervision, the value of nursing support and matters relating to applying the findings of this study elsewhere.

4.4.1 Relationship to other studies of outreach

Whereas most research into stakeholder perceptions of dental outreach placements has focused on students or patients' (Blinkhorn, 2002; Elkind *et al.*, 2005; Lennon

et al., 2004), four published studies report the perceptions of placement staff in some detail.

Lennon *et al.* (2004) investigated a pilot of outreach in two GDP personal dental services (PDS) placements each of several surgeries in north-west England taking six students for one day in each of eleven weeks. The students, with prior experience of CDS working, had dental nurse support working in a busy environment developing both their clinical and interpersonal skills. The practice principals held positive attitudes and staff perceived unspecified benefits to both the practice and the volunteer students.

An evaluation, reported by Elkind *et al.* (2005) investigated a satellite-clinic placement in adult restorative dentistry adding to the students' CDS outreach experience in children's dentistry. The students worked in pairs without individual nursing support for a day each week for their fourth undergraduate year. The report focussed on operational matters and noted that staff carried a high responsibility and required support.

In the US, Frankl *et al.* (1993) considered a scheme of annual block experiential learning visits to the same dental practice with some paid clinical working and nursing in the junior year. Mentoring of students renewed staff enthusiasm for dentistry and staff enjoyed making a contribution to dental education. The students also provided assistant support in the practices at a time of workforce shortfall. Placement staff noted a drop in previously self-reported levels of student confidence on arrival on placement and students finding *some of the tasks considerably more difficult than they had anticipated*.

The fourth study did not evaluate a clinical working placement but day visits to interview staff, who reported being encouraged to reflect critically on their practice, and patients (Pau and Croucher, 2001).

A longitudinal study of Canadian social work students joining communities of practice noted the benefits to placement staff learning in having students question their routines and offering alternative viewpoints (Paré and Le Maistre, 2006). This supports the findings of this research.

A doubt expressed by staff related to coping with a hypothetical poor student. This concern was reported among UK medical general practitioners (Howe, 2000).

Whilst the findings of all the above studies are consistent, the present study is unique for several reasons. It obtained more detailed data from a greater number and wider range of staff. Moreover, its method and narrower scope permitted greater rigour and closer investigation of the phenomena thus categories emerged in this study that are novel. The participation of large numbers of staff with varied roles and their observed engagement in focus group discussion are likely to avoid non-response bias and evaluation apprehension.

4.4.2 Contrasting settings,

The observed differences in priorities of the two types of setting used for placements apparently influenced their supervisors' portrayals of the learning experiences they understood the students to require (4.2.2, page 104). The CDS emphasis on managing children, working with families and anxious patients reflects their remit (HC89(2)) while the staff from DACs reflect theirs by stressing providing prompt access to care and meeting immediate needs. There may be advantages to the breadth of available learning experiences in outreach schemes by placing students in both settings.

The interest in the use of hospital protocols and procedures familiar to students risks subverting the placements' primary care perspective. This highlights the critical importance of good communication and here again professional development could be used to reaffirm the staff of the valuable insights they bring to undergraduate training from their setting-specific approaches developed through experience.

4.4.3 Supervision

The fruitful supervisory relationships reported may well have been encouraged by the placements hosting students full-time over several weeks and the informal discussions during visits to other health services. Perceptions of students developing increasingly productive relationships with supervisors, an appreciation of teamwork and an awareness of careers support this view. These outcomes and

students' professionalism have not been reported hitherto but were reported by students attending these placements (Chapter 5, page 132).

The tensions created for supervisors in balancing the needs of patients and students are well known (RCS, 2001; Hartley *et al.*, 2003; Spencer, 2003; GDC, 2004a; SDS, 2004). Staff strove to maintain normal service levels, gained patients' consent to be treated by students and intervened if problems arose. No participants felt the integrity of patient care was compromised.

Supervisory styles varied in the degree of permissiveness, ranging from close individual supervision throughout to allowing students considerable freedom to undertake procedures deemed to be within their developing capability (4.3.2.2, page 118). Variation in another dimension of supervision ranged from detailed advance discussion of each anticipated case with undergraduates and later review on completion, to brief feedback to students concentrating on the quality of their work. Grading was embarrassing for some and an opportunity for discussion for others.

Both the variety of practice and the lack of confidence in supervising suggest a role for professional development in building on the pilot. This would be an additional benefit to placement staff. Such development was organised in consultation with placement managers (Smith, 2004) before the next cohort of students attended placements. The need for this development, the variations in practice and the range of perceptions of that role discussed above may all be linked to the inexperience of many of the dentists in this supervisory role.

4.4.4 Nursing support

Outreach students in earlier studies have stressed the importance of nurse assistance (Rock and Foster, 1982; Lennon, 2003; BDA & LTSN01, 2002; see also 5.3.1.4, page 143). Not cited in those studies is another invaluable role for nurses reported here. Their role in supervising students both in terms of protecting patients but also in providing feedback to students was identified by the nurses themselves and by the supervisors who bore the responsibility for these matters. However, this exciting opportunity for developing team work carries a significant

cost. To get the most from outreach an adequate supply of nurses requires funding. This finding also argues against the approach of students working in pairs used in some outreach (Elkind *et al.*, 2003; 2006b) and other programmes (Qualtrough, 1994, 1996, 2001). Further, nurses in this study were interested and engaged in supporting students in contrast to the nurse dissatisfaction noted when supporting students who worked paired (Elkind *et al.*, 2006a).

4.4.5 Relationship to Educational Theory

The findings of this study are broadly in agreement with the summary model of teaching in an outreach training setting represented in an activity diagram (Fig. 2.17, page 59). The sources of that model are derived from diverse literatures. The model suggested the community served and the local culture (rules) would influence the teaching activity and these influences were observed. However, two findings of this study absent from the model are the importance of nursing support and the positive effect on the reflective learning of staff.

The reported practice of providing students with feedback beyond their immediate experiences to help them construct new understanding matches the double cycle model for clinical teaching to broaden working knowledge (Cox, 1993, see Fig. 2.15 page 49). Through discussion of individual patients, supervisors encouraged students to identify similarities or contrasts with other cases, theories or expectations and so develop generalised solutions. The favourable staffing ratio in the outreach setting and the variety of available cases may encourage such an approach as observed in dental schools (GDC, 2006a).

The reports of supervisors learning from students resonates with reports of apprentices interactions with old-timers in an expansive placement (Fuller and Unwin, 2003a).

Supervisors' own professional learning experiences influencing their approach to supervision of students matches the Biddle and Ellena model of teaching (Fig. 2.08). Those experiences may partly explain the range of views, and in some cases there were doubts, over when supervisors should direct or take over and how best to encourage students and judge the quality of work. Identifying students'

zone of potential construction and applying appropriate support from the available coaching models of *cognitive apprenticeship* was sometimes problematic. Low levels of confidence were expressed in some aspects of interaction with students. While in others, students were given the *space* and *power* to develop until they felt able to ask questions (Hay, 1993). These preliminary observations suggest that this range may be associated with previous supervisory experience and that supervisor development might be warranted.

A switch to using hospital protocols and procedures rather than local ones was suggested by some staff on the grounds of easing students' transition to placement working by not confusing them with alternative approaches. These participants may not have fully appreciated the key aim of providing *boundary crossing* experience in primary care settings in contrast to their experiences in the dental hospital setting. An alternative approach to aiding reducing the perceived student stress of boundary crossing might be to further develop the *connective* aspects of the placement reflected in the data: students experiencing wider professional activities, the application of social theories of learning and partnership between the School and the placement.

4.4.6 Applying the findings

As in all research, these findings should be interpreted with care. Interviewing staff some time after the placement may have encouraged detachment and reflection but may have introduced recall bias. Staff members' own training experiences may also have biased their perceptions of placement experiences especially in contrast to students' hospital-based experiences. To reduce these effects two forms of data cross-checking were used within this study. First, the triangulation against other studies supports validity. Secondly, the preliminary analysis was presented to groups of placement staff and separately to their managers and directors for discussion to validate the analysis. These checks should reduce the effects of any recall bias, mood bias (Jorm and Henderson, 1992) or observer bias. The interviewer's lack of previous contact with the participants and their work also enhanced validity by permitting the use of naïf questioning to return attention to critical incidents or reflections.

Limitations on the wider application of these findings arise not only from the conceptual generalisation issues discussed above but also from the context of this research. These were block placements rather than one day a week attendance and other programmes may have different purposes or operate in other healthcare or educational cultures. Moreover, the placements took place at a time of change in therapists' duties when it is likely that many dentists were unfamiliar with their developing role. In addition, the nature of primary dental care is changing in the UK with a new general dental service contract introduced in 2006 (NHS, 2005), a greater role for walk-in services and a review of salaried primary care services (DoH, 2002, 2004a). Also, the DAC and CDS settings provided contrasting experiences both in terms of their patient profiles and their purposes and the learning experiences they offer. Further, the emergent nature of the programme probably exacerbated communication problems and limited placements' preparations for hosting students. However, the external validity of these findings is also supported by triangulation with other studies and the continued development of the programme.

In addition to the professional development areas already indicated, the points discussed above may be pertinent to planning outreach programmes. Specifically, taking account of the differences in learning experiences by setting, encouraging both the development of productive supervisory relationships and good practice in generalising learning from students' experiences, and acknowledging the central roles of nurses in support, supervision and promoting learning.

The findings of this study relating the development of good supervisory relationships to frequent and prolonged contact with students prompt further investigation of the relative merits of block and longitudinal placements, the variation in learning experiences by setting and confirming by quantification the effects of placements compared to a traditional curriculum. The last of these is addressed in the quantitative part of this research and is described in Chapter 6.

In conclusion, placement staff in this pilot held positive attitudes towards outreach and reported productive teaching and learning experiences. Further, the study suggests potential benefits by increasing consistency in some aspects of teamworking and communications. More importantly these findings provide an

invaluable framework for dental educators who are planning or evaluating outreach programmes.

4.5 Summary

The principal findings from this study of outreach staff perceptions of placements might be summarised as the key effects on the participants, enhancements to student learning and the critical success factors for an outreach programme as follows. The study gathered data from many and varied staff and employed procedures to reduce bias in data collection and analysis. The context of the research was atypical in being substantial block placements grafted onto existing primary care services.

Key effects for the students were the benefits the settings provided. In particular the following features were identified as strengths promoting students' learning:

- Primary care settings offered learning experiences in *everyday dentistry*
- Nursing support was important in maintaining adequate supervision, building students' confidence and learning teamworking skills
- Supervisory relationships developed with time and became more productive.

Further,

- Settings differed in the learning opportunities they provided perhaps reflecting their services' priorities: the CDS provided continuing care mostly for children, whereas DACs provided care for acute cases
- Styles of supervision varied considerably in the exercise of control over clinical work and the extent of discussion with students and these variations may be linked to many staff being inexperienced supervisors.

Possible enhancements to students' learning included:

- The clinical techniques students were learning were thought to differ from those in the dental hospital, though there are risks to students' experience of a primary care placement in addressing this.

- Briefings on the student's capabilities and the placement's purposes were considered potentially beneficial.

Key effects for the staff were:

- Students stimulated staff self-development and brought social advantages
- Participants found hosting students gratifying and enjoyable, while giving them a sense of contributing to the future of dentistry.

Critical success factors for an outreach training programme were:

- Staff had positive attitudes to the outreach programme and, given adequate resourcing, considered it feasible.
- There was some lack of confidence among staff in undertaking their supervisory responsibilities, principally uncertainty probably arising from inexperience and professional development was considered appropriate.
- Significant resourcing is required to provide supervision and support for students and the necessary levels of preparation for staff
- Effective communication between the School staff and the placement staff is required to ensure placements provide appropriate learning opportunities
- Tensions exist between the treatment needs of patients and the learning needs of students, though the integrity of patient care was not compromised

However,

- There were a few reports of patients not consenting to student treatment.
- While hosting hypothetical weak students was perceived as a potential threat, staff commended the actual students they had hosted for their professionalism.

These main findings are consistent with those from other studies though the contexts of other outreach programmes studied vary considerably. The data are compatible with and resonate with current educational theory for placement learning including situated learning and boundary crossing.

Chapter 5

Student perspectives on their outreach experiences

Abstract

Objective: To explore students' experience of their outreach placements.

Intervention: Six-week block placement for 20 undergraduate and therapy students in existing primary care clinics to work supervised by local dentists.

Methods: Semi-structured interviews with all 20 students. Interviews were audio-recorded, transcribed and then content analysed. Findings were triangulated by reviewing by a second observer and against peer-run focus groups. Interim findings were validated by presentation to students for comment.

Results: Overall, students were positive about their experience and the potential role of outreach training in dental education. Students described: gaining greater experience of new types of patients and their communities; learning from broader clinical experience, alternative approaches and practicing or observing dentistry in different settings; the benefits of working as part of a multi-disciplinary team; and, acquiring a more holistic and pragmatic view of health care. Many students

reported gaining greater confidence, wider awareness of potential careers in dentistry and a greater sense of realism from their experience. Some reflected on their own training needs.

Students also discussed the importance of preparation for, and return from, the placements and the relative merits of different styles of supervision.

Conclusion: Dental outreach training can provide students with valuable learning experience in a range of areas but requires careful management to ensure a common understanding of the programme's purposes and anticipated outcomes.

This study was published as Smith, M., Lennon, M.A., Brook, A.H., Ritucci, L. and Robinson, P.G. Student perspectives on their recent dental outreach placement experiences. *European Journal of Dental Education* 2006; 10(2): 80-86. The published version of this paper is reprinted at Appendix A20, page 291.

5.1 Introduction

Student perceptions are central to both assessing quality and targeting development in educational programmes (Gordon, 1993; Stringer and Finlay, 1993; QAA, 2005). The published studies of UK outreach dental education programmes often include students' perceptions (Rock and Foster, 1982; Blinkhorn, 2002; Lennon *et al.*, 2004; Elkind *et al.*, 2005b; Hunter *et al.*, 2005). Recurring findings in these reports resonate with those from studies elsewhere (Mofidi *et al.*, 2003; Decastro *et al.*, 2003) and include:

- students' appreciation of nursing support and supervisory support,
- placement experiences improving students' confidence, pace of working, team working and patient management, and
- students experiencing new types of patients and procedures.

However, often these studies are programme evaluations rather than research, conducted by programme staff or are based on anecdotal data. Moreover, the outreach programmes being evaluated were either longitudinal with attendance one day a week or less, or short placements of no more than two weeks. Their type was

typical of the middle of the spectrum of placement types (Fig. 2.01, page 8) often sharing staff and procedures with the dental school. The programme researched in this study is a block placement of several weeks grafted onto existing primary care services and supervised by their local staff.

The aim of this study was to determine the educational value of outreach placements in primary care settings through the student experience of outreach.

5.2 Method

5.2.1 Design

The predominant method in this study involved qualitative interviews of dental students returning from outreach placements. The interview data were also triangulated against data from peer-run focus groups and quantitative data from students' clinical record books.

Semi-structured, exploratory interviews were conducted with students between two and four weeks after their return to the Dental School at the end of the placement. This timing allowed a period for reflection.

5.2.2 Settings

The selection of the placements and preparation of the supervisors were described previously (4.2.2, page 104). The students' placements involved full-time clinical working to local protocols in nine CDS and two DAC establishments in northern England. Besides providing opportunities to extend students' clinical experience, the placements' predetermined objectives were to enhance their understanding of community dentistry, comprehensive care, health behaviours, the profession's ethical responsibility and a working environment (see B13, page 327).

Students participating in the outreach programme were ten fourth-year dental undergraduates who volunteered to participate for the whole of their six-week elective period and ten Hygiene and Therapy students nearing the end of their course who participated for three weeks. All but one of the undergraduates entered

their course directly after leaving school whereas the therapists had several years dental nursing experience, mainly in general dental practice.

Students provided clinical care for two and a half days each week. Their distribution between placements was described earlier (4.2.2, page 104).

All students maintained records of their clinical work in a format comparable with that used in the dental hospital-based parts of their courses. Undergraduate students also undertook elective projects related to community health or the outreach programme. Students had no quotas of clinical procedures to meet while on placement.

5.2.3 Sampling and recruitment

A formal letter from the Head of Department explained the study to the students, invited their cooperation and guaranteed anonymity (Appendix B1, page 309). Their participation in the study was, and was clearly stated to be, independent of their participation in the outreach placement and that decisions to participate or decline to participate in the study would not affect their progress. All students on placements consented to participate in the study. This agreement was confirmed at the start of each interview or focus group.

5.2.4 Development of the interview guide

The preliminary topic guide for interviews was chosen from the initiative's documentation (Table 5.1) and a preliminary review of the literature.

5.2.5 Data Collection

All undergraduates and most hygiene and therapy students were interviewed individually in an annexe to the dental school in a room they normally used as a study area. No one else was within earshot and the room provided a calm and quiet environment. For their own convenience a group of four hygiene and therapy students were interviewed together as a focus group in a social area in the dental hospital.

Table 5.1 Preliminary topic guide for student interviews

Topic	Indicative range
Overall perception	placement experience, recommendation, suggestions
Placement organisation	information beforehand, induction, typical week on site, team working
Support and communication	between peers, with School, locally
Team working	availability, experiences, referrals, wider team
Patients	cases encountered, communities, treatments
Supervision	who, how, style, effectiveness
Longer-term effects	career, future learning needs
Learning	clinical skills, patient management, about yourself, confidence, responsibility
Outreach placements	general comments on appropriateness
Miscellaneous	accommodation, social aspects, project work

Data were collected in a similar manner to those in the study of staff perceptions described in the previous chapter (4.2.5, page 106). Similar steps were taken to confirm consent to participate and record the interview, minimise both observer and social desirability bias, and verify responses. Emphasis was placed on reassurance that responses were confidential and would be anonymised in reporting.

Ethical approval for this study was not sought. This was the norm for studies evaluating curriculum developments at this time. However, an outline protocol for the study was developed with three students, the Head of Department organising the placements and a representative manager of one of the placements.

5.2.6 Analysis

The qualitative analysis took an investigative approach with content analysis conducted as in the study of staff perceptions described in the previous chapter (4.2.6, page 108). The second researcher (PGR) read all available transcripts and checked about one fifth of the codes. This check was repeated at a later stage to further validate the data.

Two additional techniques were used to assure the quality of these data. Firstly, students' statements relating to the classes of treatment and the volume of clinical activity were triangulated against the results from the subsidiary study of their

clinical records. Secondly, an interim analysis of the data was presented to the undergraduate students (the Hygiene and Therapy student by this time having completed their course and dispersed) as a group by the interviewing researcher for their clarification, comments and further discussion. The presentation communicated the findings within each theme and sub-theme, illustrated with anonymised quotations from transcripts. These students' validated the interim analysis and added explanatory detail.

Two subsidiary studies contributed data capable of further validating the findings of the main study described above. Triangulation between the three studies of the same phenomena but using different methods, contributes to more robust findings.

5.2.7 Peer-run pre- and post-placement student focus groups

One of the aforementioned undergraduate elective projects investigated the pre- and post-placement perceptions of the undergraduates in this study. Being organised and conducted by a peer, such a method was anticipated to avoid any social desirability bias in the main study arising from the use of an unfamiliar older interviewer who was a member of staff. Project staff offered secretarial, developmental and supervisory support to this student in exchange for access to the anonymised data.

All ten undergraduates participated in the pre-placement focus group. Six students participated in the follow-up focus group a few weeks after the placement in a Dental School seminar room. Recording and subsequent transcription were undertaken as described in the main study. Content analysis and reporting were carried out by the student under supervision from project staff.

The findings of this subsidiary study were remarkably similar to those in the main study. The only noticeable differences were the narrower scope of the focus group and students' use of informal and emphatic language. The findings are integrated into the main study's results section.

5.2.8 Quantitative data on students' clinical activity

While the principal study employed a qualitative approach some quantitative data were used to verify the findings. Data were collected from students'

contemporaneous clinical records maintained during the outreach placement and during the previous semester in the dental hospital.

The data from students' clinical assessment record books (clinical logbooks) is an established system that profiles individuals' clinical experience. A parallel system was designed to describe the students' clinical experiences on placement. Each student's counts of patients treated and treatment episodes completed were summed and in the latter case compared with activity in the dental hospital (Figs 5.1 and 5.2, page 159).

Results from the quantitative study are presented at the end of the results section, cross-referenced to the qualitative findings.

5.3 Results

Of the 21 participants, data were gathered from 10 undergraduates and 10 Hygiene and Therapy students. The missing student was unwell and absent for most of the placement..

There were a range of student perceptions of their placement experience. However, all students commended the programme to their peers and to their course managers. Amongst the participants there was a unanimously perceived value of outreach placements as a career enhancing '*get out there and do it*' experience in a '*real*' setting.

'What we see here at the hospital isn't what we saw there [which] was, well, like normal. What we see [at the dental hospital] is people who come in and they're fine... who've not got many medical problems or they're not frightened. They just come in and open their mouths and you get on with the treatment. But when you get out there it's a big eye-opener... good experience.'

Hygiene and Therapy student Carol

The results, illustrated by anonymised quotations, are next reported in greater detail and organised in the six themes identified during analysis. The themes do not correspond to the topics listed in the interview guide but emerged from grouping the categories of data during content analysis. The six themes identified from the data, each with a series of sub-themes are listed in Table 5.2. The major themes

were working in primary care settings, patients and their needs, learning through reflection, building confidence, supervision and organisation.

Table 5.2 Themes identified in the analysis of students' perception

Themes	Sub-themes
Working in primary care settings	Contrasts with the dental hospital The change to working in primary care Pace of working Teamworking and the support of nurses
Patients and their needs	Variety of patients Holistic approach Appreciation
Learning through reflection	Supervisors encouraged reflection Reflection integrated and reinforced earlier learning Reflection on observation
Building confidence	Initial apprehension Confidence building factors
Supervision	Supervisory relationships Intensity of supervision Feedback on performance Nurses role' in support and supervision
Organisation	Students' involvement in organisation Communications Students' preparedness for outreach

5.3.1 Working in primary care settings

Practicing dentistry in a primary care setting in contrast with the hospital setting of students' previous clinical experiences was found to be a broad educative experience that brought unanticipated insights, frustrations and rewards.

Outreach's new and welcoming learning environment away from the School was attractive and students felt they missed little by being away from the School.

'It was the friendliness really that struck me.' Undergraduate Gill

'By the end of the second week you really felt like you could call this your place of work.' Undergraduate Jill

‘We wanted to go there and make a complete break with Sheffield.’
Undergraduate Ian

Four factors were identified among the students’ perceptions of the new setting. These factors were contrasts with the dental hospital, the change to a primary care setting, the pace of working, teamworking and the support provided by nurses, will be described in turn.

5.3.1.1 Contrasts with the dental hospital

Experiences in the primary care setting were contrasted with the dental hospital training familiar to students. While crediting the dental hospital for having prepared them well, students considered its size, procedures and patients were limiting in ways outreach was not

‘You weren’t held up like at the dental hospital, working in stages and waiting for approval to move on. They still checked at each stage, cavity, lining, and so on, but it all went more smoothly.’
Undergraduate Holly

‘So I got a sense of continuity... you could do [a clinical procedure] from start to finish with very little interruption. You felt like the whole process was one continuous process rather than lots of little separate situations. [At the dental hospital] you can spend an hour doing occlusal restorations and stuff, ‘n perfect technique but when you are in a practice situation it is so different that I now think of it as a two-tier thing. When I think about what I did at the dental school six weeks ago it is like two completely different sides of a coin. No way in hell would you do that at all. I didn’t really want to come back.’ Undergraduate Neil

Increased clinical experience was the main motivation for volunteering for the programme. Students contrasted this objective of theirs with the programme objectives that centred on an appreciation of community dentistry (Appendix B12, page 327). Delight was expressed with the volumes of clinical work experienced on placement (Table C.2, page 330 and Fig. C.3, page 334). One student familiar with nursing in general practice felt she was not kept busy.

‘If the aim of this was to get a good experience of community then fine – we did. But our objective was not [the programme’s] objective. From our point of view we wanted lots of practical skills... Five days

a week, treating patients... I probably got more work done in those six-weeks than in two years...at the hospital.' Undergraduate Fara

'What I liked was the way you didn't waste time. It was one patient after another... Not rushed - just kept busy.' Undergraduate Holly

'I just found it too slow, too boring really, and couldn't find anything much to do... not enough 'go' in it for me. Found it a bit dead.' Hygiene and Therapy student Dana

The outreach placements, being smaller establishments with small numbers of students, mostly provided intensive working experiences where students were engaged throughout the day. Some students encountering fewer patients were less busy and less enthusiastic. Staff were available to spend time with students discussing the work with students.

'They were able to spend more time talking through what they were doing or looking for and would sometimes explain it with a sketch or refer me to one of the text books they had there.' Undergraduate Holly

'Whereas in the hospital I do think it is quite easy to sort of go into the background, into the shadows and if you don't want to you don't have to be pushed. Out there [on outreach] there's no hiding place you have to keep at it.' Undergraduate Ian

Students perceived this volume of experience had given them kudos on their return to the dental hospital. A report of a post-placement conversation with a dental hospital dentist illustrates this.

'They'd ask "Where've you been?"

"I've been in community seeing patients 9 to 5."

"Oh, right. So six weeks of proper dentistry then."

And suddenly, like, they have changed. "How'd you get on?"

"Oh, alright pretty much."

And instead of "When you're in practice you'll see what its like" well now I can say "I've spent six weeks in practice so I know pretty much what it's like." ' Undergraduate Neil

5.3.1.2 The change to working in primary care

The change of working environment from the dental hospital to primary care caused a range of reactions. Those unfamiliar with primary care were somewhat

apprehensive. Students returning to familiar surroundings were only concerned about ex-colleagues reactions to their new role. All quickly adapted to their roles within their dental teams.

‘I was terrified. We were in the car and I turned round to [fellow student] and said ‘What have we done? We don’t know anything. What’s it going to be like?’... It was really strange. Monday morning and all that apprehension just went. And [supervisor] said ‘We’re going to let you in slowly. Shadow for the first couple of weeks’ ... In fact we were working within a day or so, but it felt fine because you were not being pressured to do it but because we wanted to do it.’

Undergraduate Ian

‘I was thinking “Oh God. I’ve got to get there tomorrow morning. What time do I have to get up?”... That very first day you were apprehensive but then you just settled in to it after that.’

Undergraduate Jill

‘I was a bit worried about how people would take to me [in my new role as therapist], ‘cos I was coming back newly qualified after being away... It was about learning to appreciate how it works’

Hygiene and Therapy student Diane

The move to a new setting stimulated learning (also section 5.3.5.1 below) as evidenced by students’ enthusiastic and vivid accounts of staff behaviours, patient management and their own learning experiences. However, some students encountered minor difficulties readjusting to learning in the dental school on their return.

‘I’m finding it quite difficult to settle back in here now and remember that I’ve got to get the tutor to check that before I carry on. ... There was none of the queuing up for tutors...’ Undergraduate Lisa

5.3.1.3 Pace of working

Speed of working was an issue both in keeping to an appointment schedule and in avoiding patient fatigue. They all reported marked improvements in this respect with the variation only being in its extent and the effects of increased complexity of work undertaken as the placement progressed. Overall though, from an initial working pace similar to that at the dental school, students indicated they soon gained speed. Some reported achieving a throughput of patients about one third of an experienced dentist (also Fig. C.3, page 334).

‘First they thought we were going to be a lot slower so they didn’t have so many patients in. Then they were shocked at how efficient we both were. I was shocked at how efficient I was. They tripled our number to be what a dental officer would, nearly, between us. Well that’s what they said anyway.’ Undergraduate Neil

‘They’d particularly chosen easy, very easy patients that they thought were suitable for me.’ Hygiene and Therapy student Diane

‘I’d been seeing maybe ten patients a session but occasionally there might be one who wasn’t suitable for me. So even though it was one of my clinical mornings [the dentist] would see that one and I’d observe.’ Undergraduate Karl

5.3.1.4 Teamworking and the support of nurses

Teamworking was identified an important factor in the success of placements for a range of reasons. There were also variations in the capacity of placements to provide teamworking experiences.

There was warm appreciation of the support provided by nurses in clinical, learning and social aspects of the placement. Students reported building good relationships within the dental team through individual nurses support and came to appreciate the value of teamworking for increasing productivity, aiding patient management, and assuring the quality of the work undertaken.

‘I think [what nurses can do is] something that we fail to appreciate, because we are never taught what they do at the dental school and its so rare that we actually get a nurse there.’ Undergraduate Lisa

‘[Nurses] were really easy to work with because they were all so nice and all highly trained so teamworking wasn’t a problem at all... it was just very natural... and with the therapists.’ Undergraduate Ian

‘[I was] learning to appreciate those around me and to have a different role and how that works.’ Ex-nurse and Hygiene and Therapy student Emma

‘Some [nurses] instinctively knew what I was doing and got everything out ready... The more experienced ones, they weren’t... dominant but their presence was known. They weren’t telling us what to do but they were aware of what we were doing... steering. The main nurse... was very experienced... she basically ran the whole operation. She was a really organised and was respected a lot by the

supervisors and she was really good and she was always... on the ball. The other nurses were younger but we all had a good rapport and got on really well.' Undergraduate Meg

The respect accorded by staff to students through professional courtesies and the obvious effort made to develop their practice was an aspect of teamworking valued by students especially as it eased access to learning opportunities.

'I felt like one of the team... Even the nurses were very respectful, they weren't uppity, as I'm sure some of the girls will tell you, nurses can be a bit diss... there's nothing of the second-class citizens here when they don't help you... won't to help you with anything' Hygiene and Therapy student Diane

Where undergraduates worked with or observed hygienists, therapists or other health professionals it gave them insights into the others' capabilities. Some locations though lacked hygienists or therapists to provide experience of the expanded dental team.

'It was good because we did refer patients to [Hygiene and Therapy students]... As well as having time to talk to them and spend time with them and to find out what they could do, what they were comfortable with.' Undergraduate Lisa

A second limitation also related to staffing. Paired working, with two students sharing a surgery and nursing for one another, was viewed as acceptable on occasion when local nursing support was unavailable but inferior to working with a nurse as it limited students' development in teamworking skills. No students reported a preference for paired working.

A final limitation related to the social distance between some students and placement staff. For individual students the age gap between them and the nurses, sometimes exacerbated by gender difference, limited the closeness of working relationships and ease of communication.

'I was part of a team but I found it quite difficult to fit in... in a sense... being quite young myself, the nurses were quite a lot older...'
Hygiene and Therapy student, Dade

5.3.2 Patients and their needs

The communities encountered on placement provided a wide variety of new and formative experiences. There were comparisons between patients on outreach and the familiar dental hospital patients and some noted differences in their characteristics, behaviours and oral health needs. Experiences with patients created a range of learning opportunities. At one end of the spectrum were reports of the need for a more holistic approach matching treatment to the personal circumstances of the patient rather than just to the mouth. Another manifestation of this spectrum was the realisation that treatment was limited by those circumstances.

5.3.2.1 Variety of patients

A common theme was of gaining an impression of the impact on dental health arising from cultural, educational and economic factors. Reported sources of these new perspectives included interactions in the placement, conversations with staff and observation of the surrounding district.

‘I was shocked at how much dental disease there was.’

Hygiene and Therapy student Daisha

‘I had one patient who wasn’t very with it at all. He was difficult to get a history out of. He couldn’t read or write either so... and the way the medical history sheets work they have to read and fill them in. So I had to do that. But it was alright.’ Undergraduate Ian

‘We’d an asylum seeker who ... kept pointing to the phrase on the page, ‘I have toothache’ and you start to think, ...’Where do I stand medico-legally? Do I go ahead and do something when I really can’t communicate with each other?’ So I got my tutors involved and we talked it through with the guy as best we could.’ Undergraduate Lisa

‘I’d a special needs patient ... and it was ten minutes before anyone told me that she couldn’t understand a word I was saying.’

Hygiene and Therapy student Dai

Patients encountered on placement were more varied than those at the dental hospital and this variety was considered more typical of general practice. Unusual patient types named included the less affluent, asylum seekers, different ethnicities, drug users, patients who were infants or children, aged, terminally-ill, illiterate, anxious or phobic, with poor oral health or had special needs. Experiences with

these patients were valued for expanding the range of clinical procedures and patient management techniques employed. Patients were described as more likely to have other problems or poor dental health or to be simply seeking relief from pain. There was a feeling that patients were not selected to meet students' learning needs but were those requiring treatment that lay within the students' competence.

'Lots would come in with... mental problems and anorexia and bad psychological problems as well... you don't really have in the dental hospital.' Hygiene and Therapy student Carol

'I went on this language line telephone thing, because they had very limited English..... You call up and get an interpreter for the language you said you wanted and we talk down the line about what kinds of symptoms of pain. Then pass the patient on. Then back again. That took quite a long time. Then we had to tell them what we were going to do... and do the treatment. And afterwards call them up again and say 'Any problems...' and when they were going to come back.' Undergraduate Gill

Differences in patient mix between CDS and DAC settings were noted by students and a suggested development was moving students round contrasting placements to further broaden their experience (see also Fig. C.3, page 334). A frustrating difference noted by those working in DACs was patients' lack of access to continuing care.

'It would be a good idea to split it and so you do some time in the access centre and in the community so you get a mixture of adult and children's work.' Undergraduate Lisa

5.3.2.3 Holistic approach

There was a feeling that a more holistic approach to dentistry was practiced on outreach compared to their hospital experience with no accounts of more reductive approaches in outreach. This was reportedly manifest by less concentration on clinical technique and more on finding practicable solutions that took into account the patients' circumstances to a greater extent than they had previously considered necessary. Taking detailed histories and drawing on background information from staff helped students appreciate the need to plan treatment compatible with patients' lifestyles and expectations.

‘Very different from the hospital where you do the textbook treatment because you have got good patients to do it on... Out there you just have to do what you can.’ Hygiene and Therapy student Dianne

‘I took very detailed social histories besides their dental histories... so we got a really good feel for them. It allowed you to communicate with them better. So they would go out thinking “Well I’ve understood everything now.” ’ Hygiene and Therapy student Emma

‘Usually, I’d be trying to do something a bit too gung-ho, trying to save too many things. But he’d probably seen this thing so many times, “This is rampant caries and you’re not going to save it. I’ve seen this patient for eight years and know what they act like in the chair” ’ Undergraduate Neil

A more negative appreciation of this holistic approach involved feeling limited by factors including patients’ relative deprivation, *ignorance*, attitudes, competing priorities, their willingness to *abandon responsibility for their mouths to dentists* or the effects of their previous negative experiences of dentistry. These frustrations were not a serious impediment to learning and students felt they had made a worthwhile contribution to the work of the placement in meeting patients’ needs. This negative perspective could be tempered by a growing ability to sense what was pragmatic by taking into account the patients’ circumstances.

‘What with the histories and the nurses giving us information we were able to start at the right level for them and be realistic about what they would be likely to do later.’ Undergraduate Greg

5.3.2.3 Appreciation

Patients reportedly almost invariably agreed to be treated by students who were each aware of only one or two patients who declined. There was gratitude to the patients and the dental teams for allowing them access. There were also reports of patients expressing their appreciation for the care students had taken during treatment. This gratitude could be related to a valued sense of being accorded respect (5.3.1.4 above).

‘Adult patients were more grateful for what you did rather than the ones here in the hospital. They seemed to appreciate it more.’ Hygiene and Therapy student Dade

‘One lady gave me the best compliment ever, a speech therapist, about communication and she thought it was a model of how to communicate... At the end of the day she said, ‘You know, this is the best treatment I have ever had so I’ve no fear of coming back for anything else.’ Hygiene and Therapy student Emma

‘I felt like one of the team. And one thing, ‘specially there the nicest thing there was everyone was treating you with some respect’ Hygiene and Therapy student Diane

In summary, students reported broadening their experience through encounters with more patients and varied categories of patients. Experiences increased the appreciation of the need to plan treatment according to patients’ individual circumstances.

5.3.3 Learning through reflection

Accounts of memorable cases or incidents indicated that some students had reflected on their learning experiences. Some instances went beyond this and reflected on learning itself.

‘So I’ve got to remember that I’m not treating the tooth, I’m treating the child. And perhaps next time I wouldn’t push them quite as much as that.’ Hygiene and Therapy student Dana

‘I’ve only just realised the difference between knowing the theory – and you’ve got to know the theory – and no amount of reading the textbooks will replace doing the procedure. I got that from not just working one day a week but out there doing six weeks.’ Undergraduate Neil

5.3.3.1 Supervisors encouraged reflection

A variety of methods were reportedly employed by supervisors to encourage student reflection. The techniques described included starting the day’s anticipated work, asking for views on interesting cases and problem-based learning approaches. Students’ performance might be commented on after each patient or at the end of a session or the day. Where time permitted, discussion with nurses or supervisors encouraged reflection on their abilities and understanding.

‘I learned how to manage [probable drug users] coming in for prescriptions for things they didn’t really need... We were warned in

the morning briefing... suggested how we should handle them... Then helped us when it came to it.' Undergraduate Greg

5.3.3.2 Reflection integrated and reinforced earlier learning

'Everyday at lunchtime when there was a little dental conference.'
Hygiene and Therapy student Emma

Whilst on outreach, some students realised how the various parts of their course fitted together and noted that experiential learning reinforced earlier theoretical learning. Some such students became more self-critical of their clinical skills.

Outreach experiences, including conversations with staff about of their career trajectories and formative experiences encouraged consideration of career alternatives leaving students feeling better placed to make future career decisions. Some had even reconsidered their career options or intentions. There were also accounts of corrected misconceptions that had been formed from others' second-hand impressions.

'It's like finishing off for me... I don't feel like a dental student. I feel like a dentist in many ways because I have had this experience... All the parts of the course fit together, its not bits of the syllabus but one thing. It is definitely the best way to train dentists.'
Undergraduate Ian

'It did make me realise that if we were so lucky with the people we were working with there then I'd have to be very careful where I choose to go for my VT which is for a whole year so if I get that wrong it could be a really miserable experience.'
Undergraduate Lisa

'I'd had lots of negative feedback about community [dental services] from lots of [hospital-based] practitioners... about it being slow and dull and it was completely wrong. They have no idea what it's like in community...The majority of them are GDPs and not community.'
Undergraduate Neil

5.3.3.3 Reflection on observation

Reflection was sometimes prompted by visits to other healthcare facilities and shadowing others in the dental team. Attitudes to these activities varied from enthusiastic engagement to a deeming these a poor substitute for further clinical

practice. The latter view may have been prejudiced as it was linked to older students' perceptions of a precursor community programme.

'A Downes syndrome case [was] treated in a chair because we were visiting a residential home... I suppose that you can adapt techniques and cope in difficult conditions but still give worthwhile treatment. I also found that I could communicate reasonably effectively with special needs patients and I'd thought that would be much more of a problem than it turned out to be.' Undergraduate Holly

'But, the shadowing, basically everyone I've spoken to from the year above has said that shadowing in community is a waste of time.' Undergraduate Fara

Students were sometimes involved in the organisation of such observational visits or were involved in the selection of suitable activities. Such variations from the daily routine were appreciated most when either its timing *broke the week up* or staff ensured that discussion of the experience encouraged reflection to integrate it with students' other experiences.

'A lot of the trips we organised ourselves, like nursing homes, they had some contacts and we found some and we arranged things... it worked out well' Undergraduate Greg

To summarise, not only had students practiced skills they had both reflected on their experiences and been encouraged by staff to do so.

5.3.4 Building confidence

This section details a key theme in the data: improving their confidence in clinical situations. Increased confidence was linked to the additional clinical experience, bolstered by immediate individual feedback, opportunities to re-apply skills and appreciative comments from patients and, crucially, supportive supervisors. There were accounts of greater focus and self-criticism as confidence improved. The placement experience was unanimously viewed as a significant step towards becoming competent to practice and becoming able to *tackle most things*.

5.3.4.1 Initial apprehension

As previously mentioned in relation to encountering a new working environment (5.3.1.2 above), early anxieties concerned speed of working, unfamiliar patient types, being expected to undertake unfamiliar treatments, and, in one case, returning to a team in a new role. This apprehension disappeared as the situations were encountered, with reassuring support, and dealt with. For example, in treating children (an aspect of dentistry with which all students were clinically inexperienced before attending outreach)...

‘We were guided because we hadn’t treated [children before] and it was ‘Oh God I don’t know what to do’ [with] a needle an inch and half long and a little mouth it’s quite scary at the beginning but we picked up the skills and patient management. Something I really enjoyed... gradually.’ Undergraduate Fara

‘The thing with minor oral surgery is that you have to be heavily supervised, one-on-one with a tutor, so you don’t get that much opportunity to do them [in the dental hospital]. So on placement it was quite useful because this is something I am quite nervous about, picking up a scalpel and using it in a patient’s mouth. Like I said they gave us really good supervision on that, just like we would get here... But we had to explain that we had not done much of that before and as soon as we did they were more than happy to supervise us on that.’ Undergraduate Lisa

5.3.4.2 Confidence-building factors

Increased confidence was attributed to repeated opportunities to re-apply skills, appreciative comments from patients (5.3.1.1 and 5.3.2.4 above) and, it was stressed, supportive supervision (5.3.5 below). Achievements on placement were viewed as significant steps toward becoming competent to practice. Being accepted both professionally and socially as a working member of a dental team was an important factor in this progress.

‘What I wanted and got was a realistic view of what dentistry is like without the confines and artificiality of the dental school... They just said ‘Look, you do it. If you get stuck... and you should know by now what you can and can’t do... I’m next door.’ And, first of all you were going in... ‘I’m not sure...’ later you developed, knowing what’s right and what’s wrong. What has developed most is my ability to make decisions... I wanted to apply what I’ve learnt for myself and see if I could sort it out.’ Undergraduate Neil

‘Much more confident. It was seeing so many patients ... that paid off.’ Undergraduate Greg

‘I feel much more confident. I feel willing to go out there and sell myself to a dentist now.’ Hygiene and Therapy student Dade

With growing confidence there were reports of greater focus and understanding of what to achieve during an appointment. Communicating with a wider range of patients could allow a more individual and relaxed approach. Examples and suggestion of appropriate vocabularies and registers improved rapport with patients. There were descriptions of experimenting with new approaches to match language and formality to specific situations, including non-English speakers, the rest of the dental team and especially with children

‘I can laugh and joke with patients now whereas before I was very high-handed and wouldn’t talk to patients during treatment.’ Undergraduate Ian

‘A young child with trauma – he’d been hit in the face - was quite memorable. He came in upset and I talked slowly and quietly reassuring him... and he came in for review the following week and basically he was sorted out and he was quite pleased and OK. So that was quite good and him being a child was a factor in there...

You know you have to explain it to the child, explain it to their parents and explain it to your supervisor... all in three separate ways.’ Undergraduate Meg

‘I started to learn the jargon that children use. Rather than say ‘I’m going to numb it up now’ I’d say ‘I’m going to use the magic water’ and I felt a bit stupid for a while telling them things like that but it gets a better effect.’ Hygiene and Therapy student Daisha

The increase in confidence in working in clinical settings and being able to cope with working in a dental practice were key themes in these data.

5.3.5 Supervision

A recurring theme in explanations of the benefits of outreach placements was the productive working relationships with supervisors. The reported styles of supervision varied widely but factors preferable to those available in the dental school were the ready availability of individual support and opportunities for discussion.

5.3.5.1 Supervisory relationships

The prompt availability of supervision was valued by all participants, who contrasted this with the delays in the larger dental hospital setting where the student to staff ratio is about ten to one.

‘Obviously they came and checked things, but it wasn’t the same ‘You have to get this checked and then this checked and then this checked’ that we have here... There was none of the queuing up for tutors and eating into your time.’ Undergraduate Lisa

There was acceptance and appreciation of a wide range of supervisory strategies including apparently mutual learning experiences, leading questioning and formal tutoring. Individual students reporting contrasting approaches to dentistry between supervisors portrayed this as a stimulus to questioning rather than being confusing. Common features of the supervision were enthusiasm, encouraging support and reassurance. This approach gave a sense of freedom to practice in a controlled environment.

‘We started to realise... that you can actually decide to do something different and not have the same opinion as your tutor provided you can argue your point.’ Undergraduate Lisa

‘A nice environment to do things for the first time because it was very chilled out... it wasn’t obvious that... they were watching... He had no qualms about telling us if... we had done something stupid... He’d make you do a tutorial on the subject so that he could understand exactly where you were coming from... It made you think... Because you wanted to impress them it makes you really try and...push the boundaries.’ Undergraduate Ian

‘The main one supervisor... was alright... well maybe he was a bit aloof. They gave us the feedback OK, tips, advice, etcetera. It was just with the non-dental stuff... you couldn’t talk about it.’ Undergraduate Fara

Any failures to develop good supervisory relationships were attributed to brief contacts between student and supervisor or one supervisor’s less approachable manner.

5.3.5.2 Intensity of supervision

Invariably, the intensity of supervision was observed to reduce as supervisors' confidence in the student's ability increased. However, this trend varied depending on the complexity of patient management and treatment both of which tended to increase as the student's capabilities became apparent or developed. Occasionally, supervisors nursed for students where close observation was needed. Those supervisors not beside the student were normally available nearby if needed. There was a perception that supervisors' were reluctant to stand watch over students and to prevent student stress and, in some cases, the supervisors' own embarrassment.

'They left us, to an extent, to just get on with it, because they knew that we could do things.' Hygiene and Therapy student Emma

'Supervision? Brilliant. It was so good in terms of just them getting to know what we were capable of and its so hard to do that now. They left us, to an extent, to just get on with it, because they knew that we could do things... With the more complicated things, if we were doing any endodontics or anything like that they would obviously come and check our access cavity and check that we had found all the canals and whatever, and using the right materials.'

Undergraduate Lisa

5.3.5.3 Feedback on performance

Oral feedback was often given after each patient including useful tips, explanations or discussion and supplemented by formal wider-ranging review meetings particularly in the early days. Such frequent, close contact helped form increasingly productive supervisory relationships with staff.

'Obviously they were assessing us [but] we didn't feel that was the only reason we were supposed to be there. They were our friends...advising us... and giving insights into why they chose their career path. It was quite interesting to hear their points of view and just speak to them on... level terms.' Undergraduate Meg

While most relationships with staff encouraged reflective discussion and requesting help when needed there were some concerns about potential adverse effects on assessment grades of seeking any assistance.

'Well I avoided getting help because that costs you when it comes to the assessment. The more help, the lower the marks. If I wasn't sure

then I'd check but it was at the back of my mind to not ask if I didn't need to. If I really didn't know what I was doing I'd go and get help.'
Undergraduate Fara

The aspects of supervision relating to grading of their work and providing feedback were considered to be dealt with in a manner similar to that in the dental hospital or more generously. Similar variations in the consistency of grading were reported including allowances made for the difficulty of the case. A noted difference though was an apparent lack of confidence in grading, at least initially.

'There was that marking scheme in the book, the log book, so they just looked at that, followed that.' Hygiene and Therapy student Carol

'They were a bit unsure. We tended to get a lot of higher marks than we would have got in the dental school. But it is the same as it works in the dental school in that you get some tutors who mark you higher than others... But once they had got the hang of it, it worked well.'
Undergraduate Lisa

Some supervisors understanding of the capabilities of Hygiene and Therapy students' pace of working was limited with unrealistic initial expectations later explained to the student as arising from their limited experience of an expanded dental team.

5.3.5.4 Nurses' role in support and supervision

Dental nurses were considered a valued adjunct to supervisors' support. They gave immediate informal feedback on the progress of the procedure and the patient. They also attended to all other matters allowing the student to concentrate on the procedure in hand.

'I felt that there were people there to help me and they knew what they were doing, especially the nurses... I felt that they were working with me... It seemed so much easier there and to tell you the truth, I think it all revolves around the nurses. They knew what I needed and they were like our training wheels.' Undergraduate Neil

'With the nurse there you didn't need to know where things were... So... because everything is handed to you anyway you could just get on with the treatment and concentrate on that.' Undergraduate Karl

Overall, students were overwhelmingly positive in their appreciation of the ready availability of detailed feedback, encouraging supervision and opportunities to discuss with staff matters relating to their work.

5.3.6 Organisation

There was a range of perceptions of the organisation of the programme during the first year of the pilot programme. Some found it well organised while others considered it poorly organised particularly with respect to meeting the student's non-clinical needs relating to their elective assignment. Data in this section on the organisation is presented in four sections: the involvement of students, pre-placement preparatory visits, communication between the parties involved and students' preparedness for the programme.

5.3.6.1 Students' involvement in organisation

Involvement in organising placements or learning experiences varied considerably. High levels of involvement either from the outset or once on placement could be seen in some cases. With placement staff some students were...

'...working out what we were doing as we went along. A lot of the trips we organised ourselves... I really enjoyed it and got a lot out of it.' Undergraduate Lisa

'I arranged it myself and was the only student there. I'd met [a supervisor] from there before and organised it from that.' Undergraduate Holly

Less proactive approaches in shaping learning experiences were sometimes associated with problems such as unclear expectations of the placement, goals ill-suited to the placement's setting, feelings that placements were ill-prepared, unrewarding shadowing experiences and problems with transport or completing the project.

'Sometimes I got the bus... except that every time I got the bus I was late and they were really not very happy about that... I wasn't late deliberately but it became an issue.' Undergraduate Jill

‘A couple of days I went to a prevention unit and they just spoke about the jobs that they did which wasn’t really of any relevance to me.’ Hygiene and Therapy student Dai

5.3.6.2 Communications

The variation in organisation was linked to the quality of communication involved. In many cases any initial uncertainty on how the placement would operate was resolved by discussions over the first few days.

‘There was all the information before I went. It was brilliantly organised... I turned up and they were ready for me.’
Undergraduate Holly

‘I couldn’t make that [pre-placement] meeting with the placement managers. There was just a timetable and some papers put in my pigeonhole.’ Undergraduate Fara

‘We did have a one-to-one with the clinical director at the end of the first day. Very open... He asked what did we expect from being here.’ Hygiene and Therapy student Emma

Broken chains of communication meant some placements initially could not match experiences to students’ needs or expectations. Usually this was due to a lack of information on individuals’ capabilities resulting in cautious bookings which were often rearranged over the first weeks.

‘It irritated me that they clearly expected us to [observe and visit rather than operate] from the start and yet they knew what I needed to do [for my elective study] and when you speak to any of the people there they go like “Oh. Well, we thought you wanted to look at that place....” I did sort of express my concerns and I did actually go to the person right at the top...’ Undergraduate Jill

‘It could be better if they could find out before what we do and get it all fully booked up... It would help if you could get them to understand just what we can actually do.’
Hygiene and Therapy student Dai

Communication with the dental school while on placement was not portrayed as an important factor in any accounts. The few undergraduates living away on placement who used the provided web-based discussion board would have liked more students to contribute messages. Communication by other means with peers

was available when required but most students felt little need to maintain contact. Students' communication difficulties were few.

'Over the two years I've got quite close to some of the others... It did feel as if we were at different ends of the earth and you wanted to know what they were doing and if you were fitting in with what they were doing. Sometimes you'd see a text that someone had extracted a deciduous tooth and you'd think 'Ooo... I wish I'd been doing that.'

Hygiene and Therapy student Emma

5.3.6.3 Preparedness for outreach

The data contained several instances where students credited the dental hospital with having educated and trained them appropriately to benefit from their placements. However, there were apparent implications for the development of inter-disciplinary learning.

'[Greater integration] would be excellent because we're having to work together. The whole of dentistry is changing with more emphasis on... a team effort... So why shouldn't [undergraduates and Hygiene and therapy students] be together for some of the clinical and the lectures.' Undergraduate Ian

Visits to placements before starting were valued by students unfamiliar with the setting.

'I'd visited [the placement] before the start and we'd talked about what I would like and what could be fixed up there... my preference for seeing special needs patients... for my project. That helped.'

Undergraduate Holly

Overall, students considered placements feasible and that they would certainly benefit everyone on their courses provided, in a few cases, that the organisational difficulties were addressed.

Figure 5.01 Patient numbers treated by students on placement by course and setting

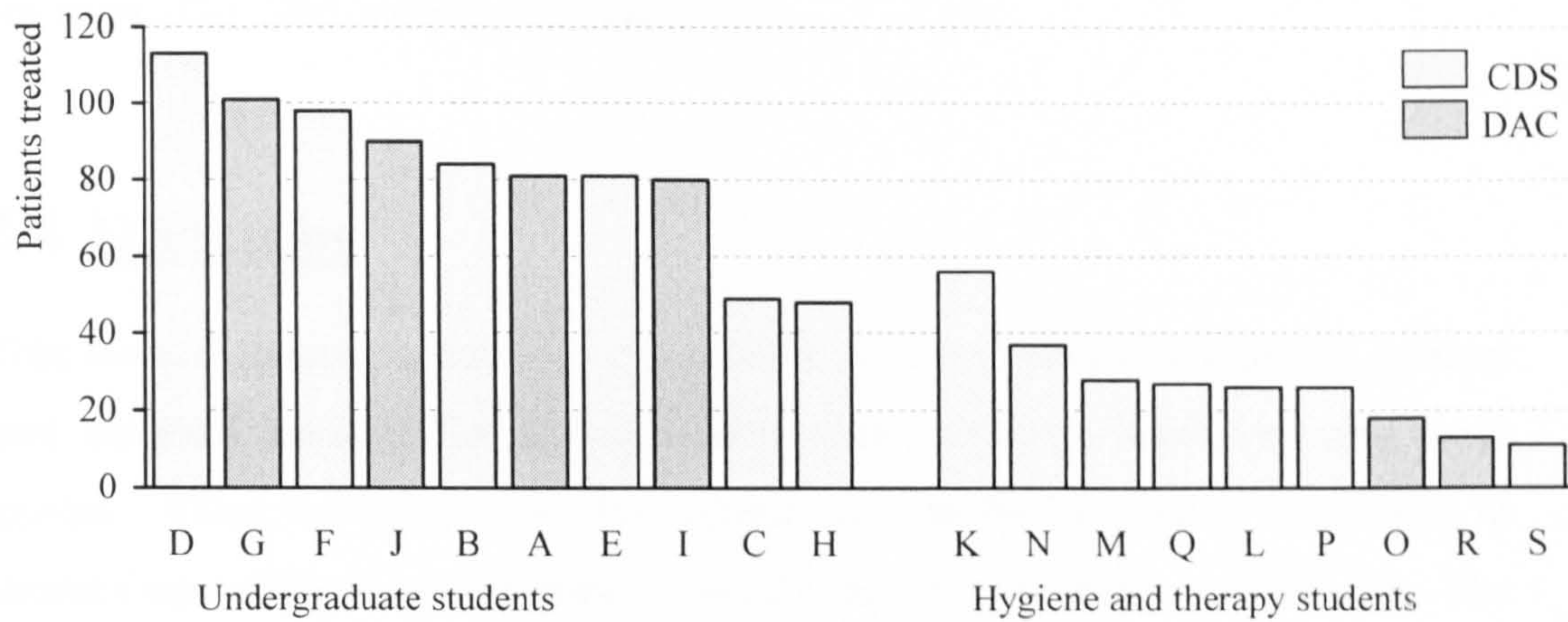
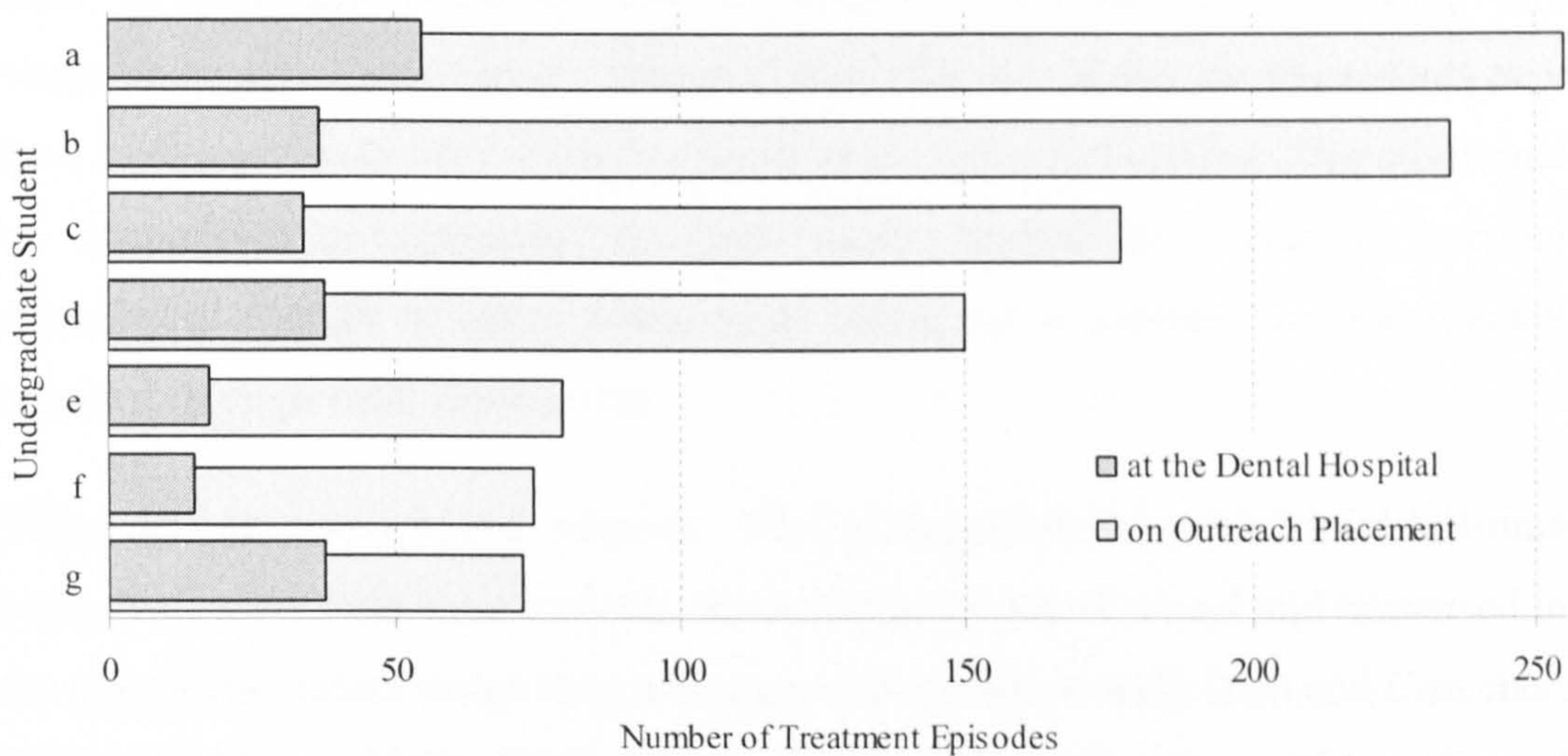


Figure 5.02 Undergraduates’ clinical activity on six-week placement compared with their activity in the dental hospital



Data from both outreach and dental hospital were available for 7 of the 10 undergraduate students. Dental hospital activity data are for the semester prior to students attending outreach training.

5.3.7 Findings from the subsidiary quantitative study

The findings of the subsidiary quantitative study of students’ clinical records support their assertions (5.3.1.1 and 5.3.1.3 above) regarding the volume of work and its pace (Fig. 5.01 and 5.02). The mean number of patients encountered per week was 14.4 (range 7.8 to 18.5) for undergraduates and 8.4 (range 3.0 to 17.7) for Hygiene and Therapy students. Comparison with the previous semester in the

dental hospital indicates approximately double to five times the number of treatment episodes while on outreach, representing six to sixteen times the activity per week (Fig. 5.02 and Fig. C.2, page 333).

5.4 Discussion

This research assessed students' perceptions of the educational value of primary care outreach learning through qualitative semi-structured interviews and focus groups. Value was placed on the volume and variety of clinical experience in primary care clinics, nursing support and immediately available supervision. The new learning environment was expansive and influential in developing teamworking skills especially where the extended dental team was available. Confidence and, particularly for undergraduates, a more holistic and pragmatic view of treatment planning were developed. Attitudes to shadowing and observation were more varied. Students' own efforts to shape the placements may have been associated with rewarding experiences and relationships. Organisational or communication problems in some cases limited the intended learning experiences though in many cases were either not a problem or one quickly resolved through early discussions.

These data are novel in two respects. Firstly, they relate to a substantial full-time block placement with most students distant from the dental school and immersed in the placement culture rather than making one-day visits weekly (Pau and Croucher, 2001; Blinkhorn, 2002; Harris *et al.*, 2003). Secondly, that culture allowed students to gain new insights into a primary care ethos largely undistorted by the influence of dental school staff and protocols or concerns regarding treatment quotas reported as concerns elsewhere (Grantham and Block, 1983; Jessee, 2002; Elkind *et al.*, 2005b).

The findings are discussed under six headings: learning; holistic and patient-centred approaches; supervisory practice; and, informing programme development. The relationship of this study to educational theory and other research are then discussed.

5.4.1 Learning

As noted in this study, the application of theories learned at dental school in a new and applied setting appears popular among students (Stringer and Finlay, 1993; Desjardins, 1996; Jacobson *et al.*, 1999b; Elkind *et al.*, 2005b). Such application and is said to increase understanding (Jacobson *et al.*, 2000; Murray *et al.*, 2003). In particular, theories relating to patient management and public health are believed to gain meaning once applied in clinical settings (Holloway and Dixon, 1977; Taylor *et al.*, 1995; Stone and Campbell, 1997) and there is some supporting evidence for this occurring in outreach training practice (Harris *et al.*, 2003). The data in this study relating to reflection aiding knowledge transfer and development support the constructivist model of learning. This model is demonstrated where learners, operating in new settings restructure previously constructed schemas which are insufficient for a complete understanding of the situations encountered to form new understandings, for example in the use of humour in patient management. Accretion of new experiences to adequate schema, bolsters understanding as, for example, in encounters with new types of patient. Finally, the model recognises the fine tuning that improves students' mastery through repeated practice of practical skills learned recently or only theoretically, for example in the large numbers of clinical procedures proudly reported by participants in this study.

A key theme in the data, reflection, was linked to this learning. Students were encouraged to reflect and guided in their reflection. Time pressures in a dental school made such supported learning difficult (Pee *et al.*, 2000). Outreach encouraged students to move beyond the practice of routine procedures to dealing with problematic situations in ways more typical of professionals in these settings. They were routinely applying broad principles to choose appropriate courses of action. In this respect the outreach placements matched Schön's higher level characteristics of a course related work placement, or practicum (Schön, 1987, see page 51), for developing the recognised key professional skill of reflective practice (QAA, 2002; GDC, 2002, 2004, see page 31). Students' reflection resulted in an integration of learning from distinct curricular components of their courses, both reinforcing and enhancing that learning.

Students working with experienced dental teams developed their skill in teamworking. They highlighted the advantages to learning of having close nursing support. However, this educational opportunity carries a greater cost than, say, students working in pairs providing their own nursing support. If teamworking is an objective of outreach then it is important to secure an adequate supply of experienced nurses. This resource requires both funding and workforce availability. This finding also argues against the approach of paired working used in some outreach programmes (Elkind, 2003) which resulted in nurse dissatisfaction (Elkind, 2006b).

5.4.2 Holistic and patient-centred approaches

Another identified benefit was increased understanding of a holistic approach to patients needs when treatment planning. This approach in a problematic curricular topic (Gordon and Kress, 1987) matches current theories of public health as manifest in:

- health promotion and the reorientation of services to match needs apparent in recent NHS policy (2.2, page 8);
- increased emphasis on patients' subjective experiences as evident in quality of life indices; and,
- being an antidote to the limitations of the bio-medical model of hospital-based care (5.3.2.3, page 146).

These benefits to both teamworking skills and the holistic and pragmatic approaches to treatment planning are emphasised as key learning outcomes in the two benchmark statements for dental education (QAA, 2002; GDC, 2002).

5.4.3 Supervisory practice

There was wide variation in supervisory practice which may indicate opportunities for development. The perceived low levels of confidence among some supervisors and with supervisors evolving their new roles reflect observations among staff themselves (4.3.2.2, page 118). There may be benefits in training supervisors to establish a common understanding over learning experiences, assessment and styles of supervision. One approach used in subsequent training for placement staff used critical incident case studies based on data from this study. The event and

available visits to be dental hospital also presented models of assessment and supervision from experienced faculty.

5.4.4 Informing programme development

Effective communication of individual students' experience and requirements to placements would allow better matching of learning experiences to students' needs. Subsequent groups of students communicated to placement managers a profile of their clinical experience and a note of any preferences or concerns.

There was an apparent relationship between the degree of student involvement in the arrangement of placement and finding their placements and the relationships they formed more fulfilling. This association may be explained as the locus of control (Phares, 1957) of placement organisation being perceived by students as being located with them had a beneficial effect. Conversely, if the locus of control being considered to lie with others was associated with multiple minor problems, less activity and dissatisfaction. There are two possible explanations for the association. Self-motivated and well organised students may shape their placements to meet their needs. Such an effect was observed among social work students (Paré and Le Maistre, 2006). Alternatively, effective staff involve students in the organisation of their placements increasing their commitment. In the absence of evidence to discriminate between these possibilities the development of both staff and students may be beneficial. Staff might be encouraged to involve students in organising their learning experiences and students may need development in negotiation skills to help shape their placements (Beach and Vyas, 1998). The benefits of such negotiation in adapting to reconstruct oneself to adopt a new role, i.e. Beach's consequential transition (1999), have been observed in social science placements and among US youths entering employment (Auburn *et al.*, 1993; Beach and Vyas, 1998; SSRC, 2000).

5.4.5 Relationship to Educational Theory

Drawing on diverse sources the review of the literature on learning in the workplace was summarised as an activity diagram (Fig. 2.17, page 59) and the findings of this study broadly fit that model. However, the underlying influences

listed under *division of labour* did not explicitly refer to the beneficial effect on learning of nurses noted above, nor did the *outcomes* include increased awareness of matters peripheral to the profession such as career trajectories and allied services.

Staff concerns regarding the adequacy of their supervision (Chapter 4) would appear to be ill-founded as students wholeheartedly praised the supervision (5.3.5, page 152). The reported support, appreciative comments, constructive feedback and opportunity to repeat procedures suggests supervisors were identifying zones of proximal development and allowing students the freedom to practice in a controlled environment (5.3.5.1, page 153). The constructivist coaching technique of fading supervisory intensity as students progressed was a finding of both studies (5.3.5.2, page 154). A main aim of any professional development may be to reassure staff about their supervisory ability rather than provide specific information or develop particular skills.

The data in this study relating to observation, practice, reflection and questioning supervisors' different approaches all support the constructivist model of learning describing the *transfer of knowledge* being achieved by *tuning and restructuring knowledge* (Rumelhart and Norman, 1978, see 2.4.2.2, page 24). The use of different vocabularies with patients and within the dental team (5.3.4.2) matches the models of bedside teaching (2.4.4.1.2, page 48)

It is conceivable that a student on outreach placement could experience learning at all three of Schön's levels of coaching (2.4.4.3, page 51). With, say, an unfamiliar clinical record-keeping software *follow me* may be appropriate; *joint experimentation* in devising treatment plans tailored to patients' lifestyles; and, in general patient management, the *hall of mirrors*.

Matching current theory and professional requirements, reflection reportedly was encouraged and promoted learning (5.3.3; 5.3.4). However, reflection on observation, a recommended coaching technique in cognitive apprenticeship, was more problematic (5.3.3.3). To further encourage this good practice, subsequent student cohorts' projects work successfully included a reflective element (Pee *et al.*, 2002).

There are a number of links with educational theory associated with the *boundary crossing* to a primary care setting. Observations in this study supported the initial apprehension and *reality shock* on arrival, rapid adaptation and its accompanying confidence building especially in relation to preparedness for practice (5.3.4.1; 5.3.1.2; 5.3.6.3). Students needing to negotiate their learning experiences with unfamiliar placement staff being critical to their workplace performance and enculturation resonates with theories of transition (Beach and Vyas, 1998). The complementarity of course and placement experiences (Auburn *et al.*, 1993) were supported by student reports of their preparedness for the transition to placement but not by some descriptions of their unsettling return to the dental hospital

The placements may be viewed as a form of *legitimate peripheral participation* granted to students by the dental teams. Accounts of the teams' friendliness and students' sense of belonging affirm this (5.3.1; 5.3.5.3). Visits to healthcare elsewhere were sometimes less valued and this may be linked to these either being experiences divorced from core activities or their not being legitimated.

Features of Proctor's model of teaching resonate with reports of student achievement inspiring supervisors and local expectations of learners (Fig. 2.07, page 43).

Finally, student accounts of their interactions with staff being developmental for those staff parallel those of Fuller and Unwin's apprentices (2.4.3.4; 5.3.5.1).

5.4.6 Relationship to other research

Students' perceived benefits in this study triangulate well with those reported in other outreach programmes (2.5.4, page 80). Their use of the phrase 'real-life' to describe such experiences is widespread in describing outreach (ADA, 2000; Elkind, 2002; DeCastro *et al.*, 2003, 2005; Mofidi. *et al.*, 2003; University of Glasgow, 2004). Moreover, the full involvement of students on placement – the *strong sensory component* - enhances learning (Soble, 1971). Other evaluations of outreach have found that students' anticipated easier transition to practice and increased their awareness of possible careers as observed in this study (Desjardins, 1996; Lennon *et al.*, 2004; Woronuk *et al.*, 2004; Thind *et al.*, 2005). Nursing

students transferring to the workplace experienced high levels of anxiety (Bain, 1996) termed a 'reality shock' (Kramer, 1974) paralleling the findings in this study.

Likewise, the curricular developments suggested by these students have been proposed elsewhere. For example, rotating students around settings to increase the variety of experiences (Tennant and McGeachie, 1999) and increasing the opportunities for inter-disciplinary groups of students to learn together (Horsburgh *et al.*, 2001; QAA, 2002; GDC 2002, 2004; Freeman, 2007).

The students related the depth of impression their experiences made on them to immersion in a longer, full-time placement where they soon became accepted, socially and professionally, as members of staff albeit trainees. The relative merits of full-time block placements (DeCastro *et al.*, 2003; Meyers, 2004) and the one day a week longitudinal placements of other schools (Rock and Foster, 1982; Pau and Croucher, 2001; Blinkhorn 2002; Harris *et al.*, 2003) cannot be compared in this study and may warrant further research. Further, the noted impact of students' social acceptance and relationships with team members confirms the relevance of social theories of learning and suggests future lines of enquiry to identify the local contributory conditions producing these benefits.

Students finding the primary care setting a more convenient and less limiting setting than the teaching hospital environment with patients characterised as typical, matches the literature (2.2.2; 5.3.1.1). Counterbalancing this, the supply of appropriate patients illustrative of particular processes is not assured (Elkind *et al.*, 2003) and supervisor and learner will need to take learning opportunities as they are presented by attending patients' needs. This may be considered an educational disadvantage of the *real life* aspects noted in primary care settings.

Locally, a review of the nursing literature on work placements noted that entrants to the profession assessed as competent but with minimal workplace experience were anxious and found tasks more difficult in the *real-world* setting, a phenomenon described by as a *reality shock* or being *thrown in* (Kramer, 1974; Wilcox *et al.*, 1977; Frankl *et al.*, 1993; Bain, 1996). Additional workplace experience during training was a suggested solution. Similarly, in Scotland student nurses embarking on outreach training placements found their lack of expertise

exacerbated the problems of transition to a new environment (Cope *et al.*, 2000). In both cases supportive mentoring was a proposed solution.

There may be a positive effect from *reality shocks* following transition to a workplace in stimulating the kind of learning directed at change and self-development needed to operate effectively (Candy and Crebert, 1991).

The findings from the two subsidiary studies, an analysis of the clinical work undertaken and the peer-run focus group, triangulated well with the results of the principal study. This triangulation is reassuring evidence of the absence of reactive effects and recall bias in the main study. Other strengths of the method and execution of the study were:

- the inclusion of all but one of the students with their wholehearted cooperation,
- the avoidance of faculty staff involvement in data collection, and
- the rigour in verifying and validating the analysis.

Qualitative research is used to capture range but the overall tenor of students' perceptions was positive. This is essentially a quantitative finding and so warrants further research using a more appropriate method.

The literature review also noted considerable overlap among the purposes of outreach schemes but variation in contexts and practices (2.5.2.1, page 73). Schemes addressing inequalities in workforce distribution through raising students' awareness of the underserved are internationally widespread and there is an emphasis in many US extramural programmes on serving unfamiliar cultures and providing additional access to care. Some schemes stress comprehensive care and holistic approaches and others, practice management.

The placements were located at a time of change in therapists' duties when many dentists remained unfamiliar with their role (Ross *et al.*, 2007). Some placements could not provide opportunities for expanded team training and others' preparations were limited by the emergent nature of the programme. Further, these placements did not benefit from being fully integrated into the timetable. The students' emphasis on developing clinical skills may reflect a predisposition among these volunteers but may also be a common trait among undergraduates since it is

reported elsewhere (Jessee, 2002; Collado *et al.*, 2004; Pousson *et al.*, 2004; Elkind *et al.*, 2005b,c). The potential for misinterpretation of the concepts constructed by students described in the introduction also applies. However, the steps taken to minimise recall, social desirability and observer bias may have restricted other threats to validity.

In conclusion, from their own perspective, outreach training can provide students with valuable learning experience in a wider range of areas than the purely clinical experience they anticipated. Its new environment can refresh and reinforce learning and provide rewarding learning experiences in teamworking, public health dentistry and treatment planning. However, careful preparation is required to ensure all learning experiences are matched to students' needs and the programme's objectives.

5.5 Summary

The main conclusions from this study of student perceptions of outreach placements might be summarised as follows.

Students identified the following key effects as strengths of the programme benefiting themselves.

- Primary care settings offered 'realistic' learning experiences in dentistry
- Social acceptance into the team reduced barriers to participation and increased access to learning opportunities
- The quantity and variety of clinical experience
- Nursing support was important in increasing the pace of working and in building students' confidence and teamworking skills
- Undergraduates developed a more holistic and pragmatic view of treatment
- Outreach increased students' knowledge of peripheral professional matters such as career possibilities and broader issues in healthcare.

Further,

- Settings provided contrasting learning opportunities: the CDS provided care mostly for children, often continuing care, whereas DACs provided care for acute cases.
- Interactions with supervisors varied widely and were valued.
- Students considered the outreach programme had a contribution to make to their courses

Critical success factors for the programme identified by the students were:

- Effective communication between the School and placement staff.
- Wide range of experiences on which to reflect including the application of theoretical learning.
- Immediately available individualised support and guidance.
- Being accepted as a member of a dental team, socially and professionally. This may be associated with a block placement.
- Being involved in shaping the learning opportunities. This appeared to be associated with finding the placement rewarding.

Possible enhancements to students' learning included:

- Ensuring teamworking possibilities included all the expanded dental team.
- Interdisciplinary learning in other parts of the course might support outreach.

These main findings are consistent with those from other studies though the contexts of other outreach programmes studied differed in important respects. The findings are also compatible with educational theory .

Chapter 6

A randomised controlled trial of outreach training

6.1 Abstract

Objectives: To compare the effects of outreach placement and traditional hospital-based training on students' ability and confidence in treatment planning.

Design: Randomised controlled trial

Intervention: Five-week block placement in existing primary care clinics, to work supervised by local dentists (n = 24). Control group (n = 25) attended existing hospital clinics.

Treatment planning ability:

Method and Outcomes 1: At follow-up, students took a history from a standard simulated patient who rated their performance using the Arizona Clinical Interview Rating scale (ACIR). Students then discussed their treatment plan with assessors blind to the allocation. The assessors scored four aspects: dental history captured, social history captured, appropriateness of treatment plan (showing cognisance of

full history) and inclusion of wider issues (patient's children's needs and wider health promotion).

Results 1: Groups were comparable at baseline. At follow up ACIR scores for interviewing skills did not differ significantly. The outreach group scored higher (mean 4.4, SD 2.1) than the control group (mean 2.8, SD 1.9) for capturing a social history ($P = 0.01$) and appropriate treatment planning (means, SDs 5.6, 2.1 and 3.9, 2.3 respectively, $P=0.01$). There were no significant differences between groups' scores for the dental history obtained, nor for inclusion of the wider issues.

Treatment planning confidence:

Method and Outcomes 2: At baseline students self-rated their global confidence on a five-point Likert-scale. These measures were repeated at follow-up, augmented by a global transition judgement and a then-test of confidence.

Results 2: Groups were comparable at baseline. The outreach group scored higher ($P=0.05$) in the transition judgement (mean 3.7, SD 0.9) than the control group (mean 3.1, SD 1.1) indicating their perceived increase in confidence was greater. In the then-test the outreach group considered their baseline ratings of confidence were over-optimistic (mean then-tests scores 3.2, SD 0.9 and baseline 3.7, SD 0.5) while the control group thought theirs were accurate (mean then-tests scores 3.8, SD 0.7, $P<0.01$, and baseline 3.6, SD 0.8). Follow-up scores for global confidence did not differ significantly between groups.

Conclusion: Dental outreach training was significantly more effective than traditional hospital-based training in improving students' ability to capture relevant points of social history from a patient and to consider them when planning treatment. That training also improved students' self-rated confidence in tackling clinical situations. Students' insight gained on outreach (for example through experiencing increased diversity of patients) shifts their internal scales of confidence so complicating the measurement of change.

This study was published as two papers full reprints of which are included in Appendix A21 and A22, pages 298 and 303 respectively.

Smith, M., Lennon, M.A., Brook, A.H. and Robinson, P.G. A Randomized Controlled Trial of Outreach Placement's Effect on Dental Students' Clinical Confidence. *Journal of Dental Education* 2006; 70(5): 566-570.

Smith, M., Lennon, M.A., Brook, A.H., Blinkhorn, F.A., Blinkhorn, A.S. and Robinson, P.G. A randomised controlled trial of the effect of outreach placement on treatment planning by dental students. *British Dental Journal* 2006; 201(Education supplement): 27-31.

6.2 Introduction

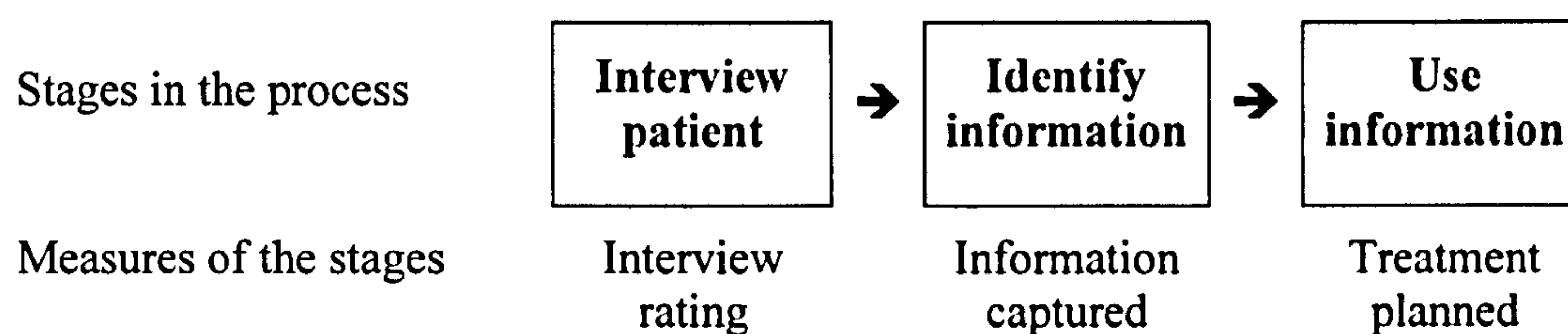
The second year of the developing outreach programme was designed to place half the fourth year undergraduate cohort in placements, with the remainder experiencing the existing hospital sessions of clinical work. Thus that year was designed to provide a window of opportunity to evaluate outreach experimentally in a randomised controlled trial using those students not going on outreach as concurrent controls. This chapter describes that trial.

The qualitative evaluation of students' and placement staff perceptions (Chapters 4 and 5) identified the importance of sufficient suitable patients; a variety of patient types; well-informed supervision; and a shared understanding of the programme's objectives. Highly valued educational outcomes were increased confidence in tackling *anything that comes through the door* and using *real world* approaches to dentistry. These attitudes were associated by the students with increased competence in treatment planning that took into account the patient's cultural and social circumstances. These findings informed the choice of outcomes in the trial of outreach dental education.

The aim of this randomised controlled trial was to compare the effectiveness of dental outreach in a primary dental care setting and a traditional, hospital-based training to increase confidence and competence in treating a variety of dental patients with common dental problems.

The construct of treatment planning underpinning this study (Fig. 6.01) has three stages: firstly, interviewing the patient, secondly, identifying relevant information and thirdly, using that information to plan treatment. The second stage was subdivided into capturing the dental history and the social history. Similarly, in the third stage a distinction was made between treatment planned with the patients' immediate and medium-term needs and treatment planning associated with 'wider' issues such as health-related behaviours or the family's needs.

Figure 6.01 The three stage process of treatment planning



The first stage, interviewing, and the associated capture of a dental history are familiar and well practiced tasks for senior dental students. Consequently, we hypothesised that outreach experiences would not improve performance in these respects. The remaining stages, collecting relevant information from the social history and using that information to plan appropriate treatment were hypothesised to benefit from outreach experiences.

In summary the hypotheses in this study are;

- Outreach has no effect on interviewing and capturing a dental history
- Outreach has a positive effect on students' capture of a social history
- Outreach has a positive effect on the appropriateness of treatment planning
- Outreach has a positive effect on confidence in everyday clinical situations.

6.3 Method

Randomised controlled trial comparing the outcomes of dental undergraduate outreach to primary care settings using those who remained in the dental hospital as a concurrent control.

6.3.1 Objectives

This study was carried out in five main stages. They were, in outline:

1. undertaking the baseline assessment of the selected population of students;
2. random allocation by the School of all fourth year students to outreach placements (experimental group) or hospital experience (control group);
3. *either* the attendance of the intervention group at locations for a five-week, full-time outreach placement in one of four primary care settings, working clinically three or more days a week and visiting related healthcare services or completing a project relating two patient case studies to indicators of local public health (Harris *et al.*, 2003),
or the attendance of the control group at their normal dental hospital timetabled clinics;
4. follow up data collection; and, finally,
5. comparison of outcomes between experimental and control groups.

6.3.2 Sample, Liaison, Recruitment and Permission

The target population was all UK dental undergraduates in the later stages of their courses. The accessible population for the study was all 54 fourth year undergraduates at the University of Sheffield, School of Clinical Dentistry. That School is reasonably typical of UK dental schools (Table C.3, page 331). A small number of the cohort, 5 (9%), were not available for the whole of the experimental period as they had previously elected to study overseas. These students, together with any who declined to participate in the study or joined the cohort after the baseline assessment, were excluded from the study.

A phased plan was devised to explain the outreach programme to the students and involve them in designing the study to ensure its acceptability and that they made an informed decision to participate. First, some four months before recruitment the

protocol was devised in collaboration with the cohort's student representatives. These representatives were briefed on the programme and the intended study, given draft copies of the protocol (lacking only the details of the assessments) and asked for their views and suggestions. This request was repeated following revisions to the protocol. Secondly, three months before recruitment, the protocol was presented to the whole cohort in a talk and then refined in collaboration with them through immediate and later discussions.

Finally, students were sent an initial letter of introduction and an information sheet describing outreach and its place in the Dental School curriculum together with a broad description of the trial (Appendix B3-5, page 312). In the final stage, a research assistant (MS) contacted each student to discuss the project and to recruit them (Appendix B6, page 315).

The sample size was calculated *a priori* based on pilot data collected from the previous cohort.

Figure 6.02 Self-assessed global transition judgement of confidence

Your training should prepare you to be able to diagnose, plan and provide treatment for a range of people presenting with common dental problems.

Think back to before your outreach. Compared to then, how much has your **confidence** that you can tackle a range of people presenting with common dental problems changed? Is it...

1. Worse than before
2. About the same
3. A little better
4. Quite a lot better
5. A lot better
6. A great deal better.

An estimate was made using a global transition judgement to rate students' self-assessed change in confidence in treating a variety of people with common dental problems (Fig. 6.02). Responses were scored 1 (worse) to 6 (a great deal better). Mean scores in students who had been on outreach were 5.00 (sd 1.00) and 3.36 (sd 1.14) in those who had not. Calculating the standardised difference and using

Altman's nomogram (1991) it was estimated that a sample of 20 students would yield a power of 90% to detect a difference of this magnitude at an alpha of 0.05. The study's eligible sample comprised 49 students so a recruitment rate of 41% was required. For practical purposes it was decided to recruit the entire cohort.

This research project did not create additional difficulties for the School in the selection of students for placements. In the previous year, 2003, there had been more volunteers for the pilot than there were places. Students returning from that experience had praised the programme to their peers and three of them had given enthusiastic presentations to the following cohort of students (the intended sample of this study). As a result of these and the other preparations for recruitment described above, many students had, about three months before recruitment, already expressed a wish to go on outreach. Therefore the School, regardless of this research, decided to randomly allocate students to the outreach programme.

Block randomisations were achieved in three stages:

1. to timetable blocks during the year
2. to experiment or control groups
3. to specific placements (study group only).

First, the School's administrator allocated the 49 eligible students to one of three consecutive five-week timetable blocks. In the second stage, the students' names within each block were organised in alphabetical order of surname by the School administrator. Only the total numbers of students allocated to each block was communicated to the research team. The research assistant (MS) used an electronic random number generator to allocate blank places in the lists to outreach or hospital-based groups. A third stage allocated individual placement locations to those assigned to the outreach group. Only after recruitment and completion of the baseline assessment were the ordered lists of allocations and names paired. Then allocations were announced.

Liaison

The study protocol was developed in collaboration with:

- the cohort's dental student representatives and the fourth year student body;

- the Outreach Programme Management Group including the Deans of The School of Clinical Dentistry and the Medical Faculty and a Consultant in Dental Public Health for one of the placement Primary Care Trusts;
- the School's Teaching Committee;
- Dental service managers and staff from the placements.

Permission

Permission for the study was gained from the North Sheffield Research Ethics Committee (NS2004 2 1862, 26 February 2004) and the Sheffield Teaching Hospitals' Trust Research Department (STH13657, 31 March 2004).

Table 6.1 Summary of variables

<p>Principal Variables</p> <p>The educational outcome variables selected after the qualitative study and of the construct underpinning this trial were:</p> <ol style="list-style-type: none"> 1. Students' competence in contextualised treatment planning, and 2. Confidence in working with new dental patients.
<p>Primary independent variable</p> <p>Placement.</p>
<p>Potential confounders and mediators</p> <p>Several variables were identified as potential confounders and mediators.</p> <p>At baseline those variables were:</p> <ul style="list-style-type: none"> • Motivation for student choice of dentistry as a career • Confidence in clinical practice • Clinical experience at the end of year four, semester one • Clinical competence at the end of year four, semester one <p>During the study those variables were:</p> <ul style="list-style-type: none"> • Type of placement setting (CDS or DAC) and location • The experience of supervisors • Numbers of students attending the placement concurrently • Numbers of sessions of non-clinical activities undertaken on placement • Student attendance on placement • Number of clinical sessions worked • Number and type of treatment episodes completed.

6.3.3 Variables

Table 6.1 summarises the study variables. The two principal variables were the educational outcomes selected after the qualitative study. They relate directly to the aim of this trial.

6.3.4 Selection and development of measures

This section describes the selection and development of measures to capture the variables listed above. First the competence measures, then the confidence measures and finally the baseline measures.

6.3.4.1 Competence in treatment planning and clinical confidence

The General Dental Council's guidance (2002) on dental students' ability to plan their patients' treatment is clear. Students should learn to carry out diagnostic procedures, formulate treatment plans and relate them to comprehensive dental care of both children and adults. *Comprehensive care* is taken to include the dental public health aspects of care and includes applying *an understanding of the social, cultural and environmental factors which contribute to health or illness*. Dental undergraduates must learn to plan their patients' treatment taking account of patients' individual treatment needs, family backgrounds and community characteristics. This outcome has been identified in other outreach programmes and in the qualitative study of students and staff perceptions of outreach (Lerner *et al.*, 1971; Henshaw *et al.*, 1999; Blinkhorn, 2002; Mofidi *et al.*, 2003; Strauss *et al.*, 2003). For example, 29 of 30 students taking part in Blinkhorn's (2002) uncontrolled study of dental outreach reported improved skills in treatment planning.

That skill of treatment planning was posited in this study as being achieved through the three stage process shown in Fig. 6.01 (page 173). Ability to treatment plan was assessed using an Objective Structured Clinical Assessment style case study with measures matching those three stages.

Confidence in a variety of clinical activities is an essential attitude for a dentist. As well as feeling confident to undertake the procedures students must also recognise

the limits of their ability and have the confidence to stay within them. All but one of the 30 students in Blinkhorn's study (2002) reported greater confidence after an outreach placement and this was a key finding in the qualitative study of student perception study (5.3.4, page 150).

Use of these two approaches in addition to the earlier qualitative studies allowed triangulation to corroborate assessments, increase the reliability of the judgements and add value by providing richer detail of the effects of outreach (Cushing, 2002). In the remainder of this subsection the development of each of these two assessments is described.

6.3.4.1.1 Objective Structured Clinical Assessment style case study

An Objective Structured Clinical Assessments, (OSCA) including an oral assessment (*viva voce*), was used to assess treatment planning ability. Assessment in a clinical setting using a patient actress, rather than a purely written assessment, was chosen to increase its face validity. The OSCA was explicitly used to assess the outreach intervention rather than the individual student. The data collected were used to reflect the conceptual model by assessing the ability to interview a patient, collect and collate relevant information formulate an appropriate treatment plan.

The researcher attended a seminar on assessment in Objective Structured Clinical Examinations (OSCEs) provided by the Institute of Learning and Teaching in Higher Education. Other elements of development and calibration are described below and relate to the case study, the evaluation of interviewing skill and the evaluation of competence in history taking and treatment planning.

A case study was developed by the research team guided by three broad requirements. First, the case should be typical of one seen in a General Dental Practice in an area of high deprivation. Secondly, it should suggest a range of alternative treatment plans. Thirdly, it should provide opportunities for students to consider the following when taking a history and planning treatment.

- Patient's access to dental care: geographical, time and childcare
- Patient's educational level
- Diet of the family

- Dental history of the patient
- Dental anxiety
- An appropriate solution for pain relief
- A plan for repeated visits by the patient that is cognisant of her social factors
- A plan for prevention of dental disease for the patient
- Consideration of her children's unmet dental treatment and preventive needs
- A multi-disciplinary approach to health promotion in this family.

6.3.4.1.2 The Simulated Standard Patient

Patients or people simulating patients have long been used to train and assess clinical students (Barrows, 1993). The 'patient' was an actor selected from a bank of experienced professional simulated patients to match the required history (Fig. 6.03 and Appendix B8, page 318). She was then trained to play this role. First, she discussed the role and the requirement for standard responses and then she played the role with faculty dentists. After further discussion to develop the role, with the 'patient' adding her own detail, the portrayal was honed and standardised in a surgery setting with students from the previous cohort. These 20 assessments were spread over two weeks.

Figure 6.03 Outline history of the simulated patient

The patient is a 25 year old mother and single-parent to children aged 7 and 3, with no other family living in the same city. The family live in disadvantaged circumstances in a flat on a council estate served by a few small shops and an infrequent bus service. Their home is 3 miles (5km) from the surgery and as they do not have access to a car the journey entails a change of buses.

The family diet of convenience foods and sweet drinks is evident from the shopping in her bag. The mother is a moderate smoker drinking about seven units of alcohol a week. Unemployed, she has low educational attainment.

The elder child has poor oral health and rarely cleans his teeth. Neither child visits the dentist.

The mother has no history of regular dental treatment and poor attendance for appointments. She wants such things 'over and done with' even if that requires the extraction of posterior teeth. She has many severely decayed teeth. This visit to the dentist is prompted by persistent severe pain in an upper left back tooth.

6.3.4.1.3 Assessment

Assessments of students' skill in treatment planning were selected and or designed to match the three stages of the conceptual model described earlier (Fig. 6.01, page 173). The first stage of the model required a measure of the process of interviewing. The second, measures of the data collected in the interview and finally, the third, ratings of the resulting outcome, the treatment plan.

6.3.4.1.4 Interviewing ability

A literature search identified a range of approaches to measuring interviewing ability. Objective checklists of elicited facts are commonly assessed by clinicians (Helfer and Hess, 1970; Helfer *et al.*, 1975a,b; Pfeiffer *et al.*, 2001) or the simulated patient (Stillman, 1976, 1977; Broder *et al.*, 1996) though these are outcome rather than process measures. Two studies analysed videotapes of clinical interviews to code interviewers' communication behaviours though such recording was considered overly obtrusive for this study (Vannatta, 1996; Roter *et al.*, 2004). Other studies have used patients to rate their affective response to an interview using Interpersonal Communication Effectiveness and Involvement Scales. These approaches provide less direct measures of interviewing skill and did not prove discriminating when used with unusual case studies (Logan *et al.*, 1999). The remaining technique, the Arizona Clinical Interview Rating Scale (ACIR), was an acceptable sixteen-item, construct-validated and proven measure of the process of clinical interviewing skills (Stillman *et al.*, 1977).

Each item is rated on a five-point scale and the scores summed to calculate a single ACIR score (Fig. 6.04 and Appendix B10, page 322). ACIR has good discriminative validity and responsiveness to changes in students' interviewing skills during their training and in evaluating medical curriculum developments (Pfeiffer *et al.*, 1998, 2001). It has been successfully applied to dentistry to evaluate a patient instructor programme (Broder *et al.*, 1996). Moreover, ACIR has successfully identified changes in students with a smaller sample (n=40) than in this study (Wagner *et al.*, 2005). During piloting, discussion resulted in small changes being made to the descriptors to match the case study and the dental, rather than medical, setting.

Figure 6.04 The Arizona Clinical Interview Rating Scale

i. <u>Organisation</u>
5 Progresses through the major subsections in proper sequence.
3 The interviewer covers all of the major subsections of the history but in an improper sequence.
1 The interviewer omits major subsections of the history
5 Questions directed to areas which are primarily relevant to the subsection of concern.
3 Generally seeks information relevant to the subsection of concern, but on a rarely requests information related to other areas.
1 Questions directed to irrelevant areas, indicating an apparent lack of organisation.
ii. <u>Timeline</u>
5 Complete information obtained pertaining to the chief complaint logically, systematically, and chronologically following the progression obtaining most of the pertinent information.
3 At times information not obtained pertaining to the chief complaint in a chronological order, but obtained most pertinent facts.
1 Information obtained in a haphazard fashion, resulting in the omission of pertinent data.
iii. <u>Transitional Statements</u>
5 Progresses from one subsection to another utilising transitional statements which assure the mother that the information being sought is necessary and important.
3 Sometimes introduces subsections with transitional statements, but fails to do so at other times.
1 Progresses through subsections illogically, mother left feeling uncertain of the purpose of questions.
iv. <u>Questioning Skills</u>
5 In areas dealing with a lot of potential information (e.g., history and review), he asks forced choice questions so narrowing in on the pertinent positive and negative points that need further elaboration.
3 The interviewer uses forced choice and leading questions to obtain information.
1 The interviewer asked all leading questions. (e.g., "Your child has never had diarrhoea, has he?")
5 The interviewer asks questions and / or takes notes ensuring smooth progress with few unnecessary delays in the dialogue.
3 At times, the interview is marked with unnecessary pauses which temporarily break the continuity of the interview.
1 Interview is conducted with long pauses which break the continuity of the interview.
5 Did not repeat the questions unless clarification / summarisation was necessary.
3 Occasionally repeated questions seeking duplicate of information because of the interviewer's failure to remember the data.
1 Frequently repeated several questions seeking information previously provided.
5 At the end of a specific line of inquiry (i.e., history of present illness, past medical history, the interviewer summarised the data obtained in an effort to check accuracy and completeness.
3 Sometimes summarised data at the end of a specific line of inquiry, but failed to do it consistently.
1 At the end of a specific line of inquiry, the interviewer failed to summarise the data obtained.
5 Questions asked and information provided during the interview were concise and understandable; free jargon or if a jargon was used, the words were immediately defined for the mother.
3 The interviewer sometimes used medical jargon during the interview, failing to spontaneously define the terms for the mother unless specifically requested to do so by the mother.
1 Questions asked and information provided to the mother were confusing, difficult to understand and contained much jargon.
v. <u>Documentation of Data</u>
5 The interviewer seeks verification of the mother's responses seeking further specific information.
3 The interviewer at times will seek documentation of data, but not always.
1 The interviewer makes no attempt at verification, accepting information at face value.
vi. <u>Rapport</u>
5 Maintained good eye contact with the mother during the interview.
3 Did make some eye contact; however, the frequency could be increased.
1 Made no attempt to maintain eye contact with the mother.
5 Was attentive to responses and allowed completion of statements without undue interruptions.
3 Was usually attentive but on a few occasions interrupted the mother unnecessarily.
1 Often interrupting statements without allowing her to complete her train of thought.
5 Seemed responsive to possible concerns expressed regardless of immediate relevance and explored them in sufficient depth.
3 Able to detect concerns expressed unrelated to the child's present physical problems, but failed to explore them sufficiently.
1 Insensitive to concerns expressed if not directly related to the presenting problem. Avoid discussing possible problems areas.
5 Provided positive social reinforcement and feedback e.g., occasional smile, nodding, praise.
3 Nether overly positive nor negative in dispensing feedback and reinforcement.
1 Provided little support or positive social reinforcement. Stress was on negative attributes.
5 At the end, encourages the mother to raise questions and provides an opportunity for this
3 At the end, gives opportunity to discuss or question but neither encourages nor discourages her (e.g. Is there anything else?)
1 At the end, the interviewer does not provide the opportunity to discuss any additional points or ask any additional questions.
5 At the end of the complete interview, summarises all pertinent information, allowing mother to affirm or disaffirm the data
3 At the end of the interview, summarises all pertinent information, but does not give her the opportunity to respond.
1 At the end of the interview, makes no attempt to summarise the information.

(Stillman *et al.*, 1976)

Patients can be trained to use the ACIR, thus the simulated patient was so trained after learning her role (Broder *et al.*, 1996; Pfeiffer *et al.*, 1998, 2001). She practiced first with faculty, some feigning incompetence, and later with 20 students.

An external clinician assessor supplemented the patient ratings by assessing audiotape recordings of the interviews omitting the non-verbal items *vi a* and *d*.

Inter-rater agreement between the patient and clinician's scores using ACIR for the pilot data was assessed using rank correlation (r_s). The rank correlation was 0.81, which indicates good correlation. To enhance the reliability of the data in the substantive study, the mean value of the patient's and the clinician's score for each student was used after standardising the scores.

6.3.4.1.5 Assessors of clinical competence

Students' ability to collect and collate relevant information about the patient and formulate an appropriate treatment plan was assessed by two clinicians based on students' written treatment plans and a *viva voce* examination. Dentists external to the School were used for these assessments to reassure students that performance would not affect their course progress and because they could be masked to the intervention. Both assessors were experienced dental teachers, familiar with community dentistry and used to interviewing students.

They conducted the assessments unaware of the allocation of students. Students were asked not to say anything that might indicate their allocation. To test the effectiveness of these steps the assessors independently recorded their impression of each students' allocation (Appendix A.8, page 320).

The two assessors, working with the research team and the patient actor, refined the assessment scheme before and during the pilot assessments.

6.3.4.1.6 Assessment Criteria for the history and treatment plan

The assessment criteria were devised in parallel with the case study. Integral to this development were the two clinician assessors. They independently reviewed students' written records of the patient's history and treatment plan before

supplementing this interim assessment with an oral assessment in the style of a *viva voce* examination. Over 16 trial assessments they refined the criteria to arrive at the checklist described in Fig. 6.05. The assessment scored competence in four dimensions: dental and social histories captured (3 items and 2 items respectively), appropriateness of the treatment plan (4 items) and the inclusion of wider issues (2 items). The 11 items were coded 0 to 3:

- 0, not present in the written or oral report;
- 1, hesitantly present only on prompt;
- 2, readily present on prompt;
- 3, spontaneously present.

Figure 6.05 Assessment criteria for the history and treatment plan

Dental History captured

- Diet of the patient
- Attendance pattern of the patient
- Oral hygiene of the patient

Social History captured

- Patient's access – transport problems
- Patient's access – childcare problems

Treatment Plan

- An appropriate solution for pain relief
- A plan for repeated patient visits that is cognisant of social factors including:
 - Unlikely to attend for many visits
 - Patient's wishes
- A plan for prevention of dental disease for the patient that is cognisant of her social factors

Wider Issues within the plan

- Identifying if her children have unmet dental treatment/preventive needs
- A multi-disciplinary approach to health promotion in this family

Codes 0 to 3 were applied to each of the eleven items marked •.

The items were coded

0	if not present in the written or oral report,
1	if hesitantly present only on prompt,
2	if readily present on prompt or
3	if spontaneously present.

Codes within each of the four groups were summed to give scores.

Possible scores for the four dimensions range from zero to 9, 6, 12 and 6 respectively. The first two dimensions relate to the second stage in the construct of treatment planning, identifying information and the last two relate to the last stage, use of information (Fig. 6.01, page 173).

These assessments are subjective, therefore to increase reliability the mean score of the two assessors was used as the measure.

As this outcome involves skills and attitudes there was a danger that repeated assessment would prime the students creating reactive effects. For this reason this variable was not measured at baseline.

6.3.3.3 Confidence in clinical working

Confidence has been defined as *a belief in one's own abilities to do something in a specific situation* (NIACE, 2004). It is internal and inherently subjective.

Confidence cannot be directly measured but self-reporting by student of their perceived confidence is commonplace (Cushing, 2002; Morgan and Cleave-Hogg, 2003). It is a dynamic quality as it changes with time (Golembiewski *et al.*, 1976). Its measurement in intervention studies may therefore be complicated by a response shift in which the experimental group recalibrates its baseline impression of confidence as a consequence of the intervention itself (Howard *et al.*, 1979a,b; Norman, 2003 Kidd *et al.*, 2004).

There are a number of techniques for measuring change in subjective assessments. Global ratings report subjects' overall impression. In transition judgements subjects assess the degree of change from an earlier condition usually to their current state. Then-tests, sometimes termed post-then tests, have subjects retrospectively assess pre-intervention levels at follow up.

Response shift in internal scales of confidence makes global judgements difficult to interpret between groups at follow up (Carver and Scheier, 2000). Transition judgments or then-tests are recommended methods for avoiding errors arising from

response shift (Howard and Dailey, 1979; Sprangers and Hoogstraten, 1989; Locker, 1998).

Consequently, confidence in tackling a range of patients with common dental problems was measured self-reported by students using global transition judgements, global judgement and a then-test.

Figure 6.06 Self-assessed global transition judgement of confidence

Your training should prepare you to be able to diagnose, plan and provide treatment for a range of people presenting with common dental problems.

Think back two months. Compared to two months ago, how much has your confidence that you can tackle a range of people presenting with common dental problems changed? Is it...

1. Worse than before
2. About the same
3. A little better
4. Quite a lot better
5. A lot better
6. A great deal better.

6.3.3.3.1 Self-assessed global transition judgement

The first self-assessment of confidence presented the context for the questions then sought a transition judgement (Fig. 6.06). The responses presented ranged from *Worse than before*, coded 1, to *A great deal better*, coded 6.

6.3.3.3.2 Self-assessed global judgement

The global judgment questions for students' confidence used the format of questions that detected improvements in confidence in specific clinical procedures in Elkind's study of outreach at Manchester (2003). This question (Fig. 6.07) was used at baseline and follow up. Available responses on a five point Likert-style scale ranged from *not at all confident*, coded 1, to *totally confident*, coded 5.

Figure 6.07 Self-assessed global judgement of confidence

How *confident* do you feel that you can tackle a range of people presenting with common dental problems?

1. Not at all confident
2. Lacking in confidence
3. Undecided
4. Reasonably confident
5. Totally confident.

6.3.3.3 Then-test for confidence

As a check against students' internal scales of measurement for confidence changing during the intervention period, a Then-test was used to compare internal scales at baseline and follow up (Fig. 6.08). Possible responses on a five point Likert-style scale ranged from *Poor*, coded 1, to *Excellent*, coded 5. Pilot data indicated that there would be no such shift in internal scales of confidence.

Figure 6.08 Then-test for confidence

How *confident* do you *now* think you were at tackling a range of people presenting with common dental problems two months ago?

1. Poor
2. Fair
3. Good
4. Very good
5. Excellent.

6.3.3.4 Baseline characteristics

In order to ensure the groups were broadly similar after random allocation, data were collected on factors likely to confound or influence the success of the intervention. These factors included the clinical ability of the student, their clinical experience and their motivation for the choice of dentistry as a career.

The competence of the student was assessed by their average mark in all clinical assessments throughout the first semester of the fourth year of their studies. Likewise, clinical experience was assessed by the number of procedures they had undertaken by the end of the semester before the placements. This information is used routinely for student assessment in the School and students' permission to access these data was gained as part of consent.

As reported in the qualitative studies (Chapters 4 and 5) the volunteers in the previous cohort appeared to be highly motivated. Therefore, motivation for the choice of dentistry as a career was assessed again using data already collected for programme evaluation. The questionnaire had been validated for use with dental students and discriminated between the motivations of medical and dental students at the University of Manchester (Crossley and Mubarik, 2002).

6.3.3.5 Potential confounders and mediators during the study

A number of factors during the study may have confounded or mediated the relationship between the intervention and the outcome. These factors included the number of clinical sessions worked, numbers of patients treated of each type and number of clinical procedures undertaken. These data were extracted from students' clinical logbooks or self-declarations summarising their experience. Students' clinical logbooks are an existing system in continuous use over many years.

The effect of the outreach may have been mediated by the type of placement (CDS or DAC) and its location, the experience of supervisors, the numbers of students attending the placement at the same time, the numbers of sessions and non-clinical activities undertaken on placement and student attendance on placement. These data were collected and sub-analyses used to explore possible relationships between them and the educational outcomes.

6.3.4 Procedures of the assessments

The procedures for the conduct of assessment are described in chronological order: the baseline assessment then the follow-up assessment.

6.3.4.1 Conduct of the baseline assessment

Students, having consented to participate in the study, were individually handed the explanatory letter and baseline questionnaire away from the Dental School. Two students not present were approached in the same manner the following day.

The researcher administered the baseline assessment and answered students' questions. Students were allowed whatever time they individually needed, typically three minutes, to complete and return the questionnaire into a locked box.

Baseline assessment data were entered and verified before the students were individually notified of their intervention allocations.

6.3.4.2 Conduct of the follow-up assessment

Students attended for follow up assessment the day after their placement ended. Half the students in each of the three blocks finished a day earlier than the others. Consequently there were six days of follow up assessments. These were conducted in a simulated general dental practice, an annexe to the School. Students were given introductory information describing the assessment at least eight weeks in advance.

Three rooms were used for the assessment. An office with two work desks for students was used for the written components of the assessment. Both desks had light boxes for viewing radiographs. Nearby was the single chair surgery used for interviewing the simulated patient. The microphones were unobtrusive but clearly visible on the chair's instrument tray. The third room was used for the *viva voce* with the two assessors.

On arrival each student's identity was checked by the administrator who explained that the assessment was of the outreach programme and not related to their progress on the course, confirmed their consent and listed the stages of the assessment.

The student then completed the questionnaire (Appendix B12, page 325). On completion the questionnaire was collected and the student was given: the chart and notes, orthopantomograph and self-declared medical history of the patient (Appendix B7, page 316). They were also given a lined sheet for history taking

and another for recording the treatment plan. The student had five minutes to study the standardised information and was allowed to make notes if they wished.

After five minutes the student was escorted from the office to the surgery. Five points were made by the researcher *en route*:

1. You are to interview the patient to take a full history and formulate a treatment plan. You may wish to discuss that treatment plan with the patient. You have 15 minutes and there will be only the two of you in the surgery. If you run over that time someone will tap on the door and remove you. If you finish before then simply excuse yourself and return to the office.
2. Use information from the chart and radiograph rather than an examination of the patient as we are using an actor to simulate the patient so obviously their teeth are not actually those in the case study.
3. Stay in your role. You are a dentist meeting this patient for the first time. Allow the actor to stay in her role as the patient.
4. There are microphones by the chair but they should not get in your way. More importantly, if you need it there is a light box on the wall for the radiograph.
5. Remember it is not you but outreach that is being assessed. Nothing that happens can harm your progress in the course.

The student was introduced to the 'patient'. Fifteen minutes later, if the student had not emerged, the interview was called to an end.

The student then returned to the office for five minutes to write up summary notes of the history and treatment plan. These notes were photocopied for the assessors and the observer. Meanwhile the simulated patient rated the student's interview skill using the ACIR scale (Appendix B10, page 322).

The clinical assessors independently reviewed the student's sheets and provisionally coded the first eleven items on their OSCA recording sheets (Appendix B9, page 320). They then compared codes, discussed them and agreed a plan for the points and questions they wished to raise in the oral assessment.

At the end of the assessment, to avoid distorting the data, students were asked not to discuss the assessment with others. Most students were due to depart after the assessment for either an elective study or hospital rotation elsewhere, so reducing contacts between students.

After the oral assessment the clinical assessors independently revised their scores then discussed any differences before recording their final scores for each of the four items.

One of the assessors later listened to the recordings of the students interviewing the simulated patient and scoring the students' performance using the ACIR scale.

After all six assessment days, the researcher (MS) listened to both patient interview and oral assessment tapes in random order. He scored them and compared the scores with those of the clinician who carried out the same two assessments in a check for reliability in the clinician's applied standards.

6.3.5 Analysis

The two groups were compared for baseline characteristics. At follow up, after describing all variables for the two groups and making simple comparisons of potential confounders, statistical analysis by t test or Mann-Whitney U test was used to compare the outcome measures between the groups. Data were also compared between groups using analysis of covariance and checks made of the effects of likely potential confounding and mediating factors using multiple regression analyses. Baseline scores were included as covariants in these ANCOVA analyses (Rausch *et al.*, 2003). The significance level used throughout the analysis was $P = 0.05$.

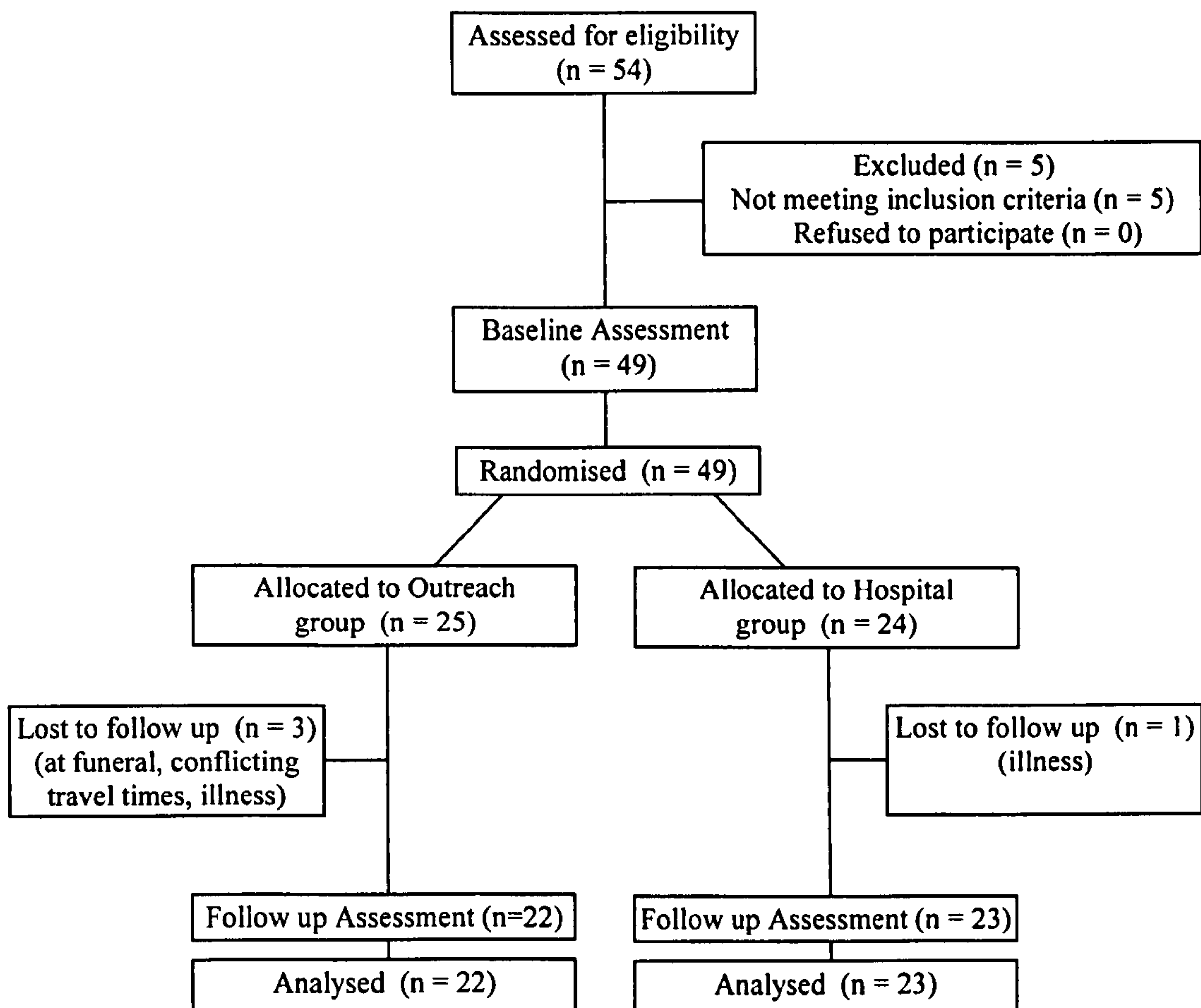
Finally, intention to treat analyses (substituting data for those lost to follow-up) of group comparisons were made for the outcome variables using two imputations for missing data. The first used substitution of the sample mean (Wright and Sim, 2003) and the second with the more parsimonious sample mean plus one standard deviation for the control group and the mean minus one standard deviation for the outreach group (Sackett *et al.*, 2000).

6.4 Results

Of the 54 students in the cohort 5 were excluded as they were studying overseas for part of the intervention period. All 49 eligible students consented to participate. The flow of student numbers through the stages of the trial is shown in Fig. 6.09.

Two outreach group students lost to follow up for the clinical assessment completed and mailed the paper-based self-assessment within two days of the assessment date. So, for the self-assessed parts of the trial only one outreach group student was lost to follow up and 24 students' data were analysed

Figure 6.09 Trial Profile



Fourteen of the 25 students in the outreach group were female as were 15 of the 24 in the hospital group. Practically all the students were in their early twenties having progressed to the Dental School following their secondary education. Four students were overseas applicants and random allocation placed them all in the control group.

6.4.1 Baseline

The groups were similar at baseline for all measures (Table 6.2). Those measures assessed motivation for the choice of a career in dentistry and clinical competence, experience and confidence.

Table 6.2 Baseline measures in outreach and hospital-based groups

	Outreach Group n=25 \bar{x} (SD)	Hospital Group n=24 \bar{x} (SD)
Motivation for the choice of dentistry as career		
Status and security	16.4 (2.5)	15.6 (1.8)
Nature of the occupation	11.7 (1.7)	11.0 (2.2)
Career opportunities	12.1 (1.8)	11.6 (3.0)
Patient care and working with people	8.6 (1.1)	8.7 (1.1)
Use of personal skills	8.3 (1.2)	8.0 (1.5)
Interest in science	10.2 (1.8)	9.7 (2.5)
Self-assessments		
Global Confidence	3.7 (0.6)	3.6 (0.8)
Global Competence	2.6 (0.6)	2.8 (0.9)
Clinician assessments		
Clinical experience	48 (20)	51 (14)
Competence	62.4 (1.5)	62.6 (2.3)

6.4.2 Follow up results: competence in treatment planning

The variables relating to competence in treatment planning were the OSCA scores for:

- ACIR
- dental history captured
- social history captured
- treatment plan was appropriate, and
- inclusion of wider issues.

Of the outreach group 22 of 25 students attended the OSCA and 23 of 24 of the hospital-based group. Of those lost to follow up, two were males and all from different placements. Explanations for absence were family commitments, illness and conflicting travel arrangements. The responses for both groups for all the OSCA scores met the requirements for parametric analysis.

Table 6.3 summarises the scores from the OSCA. It indicates that the outreach and control groups performed similarly for the interviewing skills, capture of dental history and inclusion of wider issues. The outreach group scored higher for capturing the patient's social history and for the appropriateness of the treatment plan.

Table 6.3 Follow up measures from the OSCA case study

	Outreach Group n=22 \bar{x} (SD)	Hospital Group n=23 \bar{x} (SD)
ACIR	39 (12)	40 (9)
Dental history captured	5.0 (3.5)	4.8 (3.0)
Social history captured	4.4 (2.1) **	2.8 (1.9) **
Treatment planning was appropriate	5.6 (2.1) **	3.9 (2.3) **
Inclusion of wider issues	2.6 (1.7)	2.3 (1.4)

** Significant at $P = 0.01$ in t test

Intention to treat analyses for the capture of social history gave a significance value, p , of 0.01, using the sample mean as a substitute value. The more demanding imputation using one standard deviation above mean for the outreach group and one standard deviation below for the hospital group gave a p value of 0.07. The same analyses for the appropriateness of treatment planning gave $p = 0.01$, using the sample mean as a substitute value and 0.09 for the more parsimonious imputation.

In summary, outreach had a positive effect on students' capture of a social history and the appropriateness of their treatment planning. As hypothesised, it had no effect on their capture of a dental history.

6.4.3 Follow up results: confidence in working

Of the outreach group 24 students supplied self-assessed confidence data and 23 of the hospital-based group. Illness caused the loss to follow up. The responses for both groups for the self-assessed scores met the requirements for parametric analysis except for the global assessment of confidence for which non-parametric analysis was used.

Table 6.4 summarises the confidence data. The two groups performed similarly for the global assessment of confidence. The outreach group scored higher for the transition judgement and the Then-test of confidence.

Table 6.4 Follow up results relating to confidence in clinical working

	Outreach Group n=24 \bar{x} (SD)	Hospital Group n=23 \bar{x} (SD)
Global transition judgement	3.7 (0.9)	3.1 (1.0) *
Global judgement	4.0 (0.5)	4.0 (0.6)
Then-test	3.2 (0.9)	3.8 (0.7) **

** Significant at $P < 0.01$ in t test

* Significant at $P = 0.05$ in t test

In intention to treat analyses the Then-test remained significant with the significance value, p , remaining under 0.01, using either the sample mean or the more stringent imputation using one standard deviation above mean for the outreach group and one standard deviation below for the hospital group as substitute values. The same analyses for the transition judgement of confidence gave $p = 0.05$, using the sample mean as a substitute value and 0.1 for the more parsimonious imputation.

In summary, outreach had a positive effect on students' self-assessed measures of change in confidence whether measured by Then-test or transition judgement. It had no apparent effect on their global assessment of confidence.

6.4.4 Effectiveness of assessor masking

The effectiveness of masking the assessors to the allocations was evaluated by the assessors' stating their perception of the allocation at the end of each interview. One assessor could not predict 37 of 45 students' allocations, but predicted 7 correctly and 1 incorrectly. The other assessor could not predict 24, but predicted 11 correctly and 10 incorrectly. Masking was therefore deemed to be effective.

6.4.5 Results relating to the volume of clinical work

Students' self-declared summaries of their clinical experience over the intervention period showed that the outreach group treated over twice as many patients (mean 68, SD 18, $n=24$) as the hospital control group (mean 30, SD 23, $n=23$, $p<0.001$, see Table C.2, page 330). A similar marked difference between the groups was noted in the number of treatment procedures undertaken (Fig. C.3, page 334). Taking, for example, the number of simple plastic restorations undertaken in the semester the outreach group treated almost three times as many (mean 44, SD 15, $n=24$) as the hospital control group (mean 15, SD 9, $n=23$, $p<0.001$).

6.4.6 Exploratory analyses: other predictors of the outcomes

Analyses of covariance and multiple regression were conducted to explore the relationships between the dependant variables (students' confidence with new patients and competence in treatment planning) and potentially predictive factors

measured at baseline (career motivation, gender and the intervention setting). In the case of the last predictor this subanalysis considered only the outreach students.

The number of patients treated during the intervention period was considered as a factor but a descriptive analysis of the variable showed its data to be closely related to the allocation (Table 6.5 and Table C.2, page 330). This predictor is confounded by the intervention and consequently excluded from the analyses of data for both groups.

Table 6.5 Patients treated by the outreach and hospital-based groups

	Outreach Group n=24 \bar{x} (SD)	Hospital Group n=23 \bar{x} (SD)
Number of patients	68 (18)	30 (23)

All analyses confirmed the bivariate analyses.

Two predictors accounted for 24 per cent of the variance in then-test results. The standard coefficient of the intervention was 0.4, $P = 0.01$, for the second predictor, baseline clinical experience it was 0.3, $P = 0.04$.

The intervention and students' gender (male) accounted for 33 per cent of the variance in capture of a social history. The standard coefficients were 0.4, $P < 0.01$, and 0.3, $P = 0.01$, respectively.

Addressing the wider issues in treatment planning was predicted by the setting for outreach. (CDS vs DAC: 0.5, $P = 0.01$) and number of patients treated (0.4, $P = 0.03$).

To summarise, in these exploratory analyses, in addition to the effect of the intervention, a number of predictors were associated with measures of the outcomes. Clinical experience before starting the placement was linked to higher

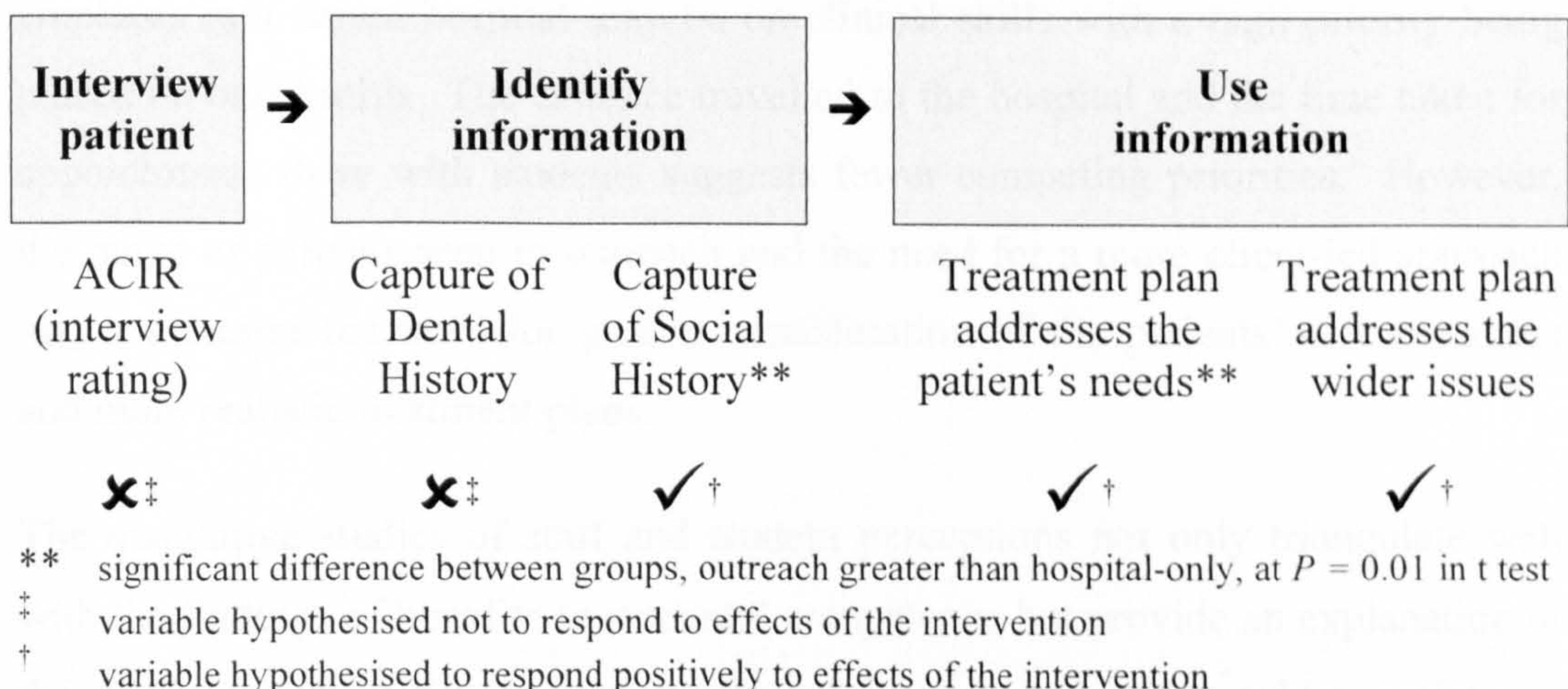
then-test scores. Being male was associated with higher scores for the capture of a social history. CDS placements and the number of patients treated were associated with the inclusion of wider issues when formulating a treatment plan.

6.5 Discussion

This randomised controlled trial found outreach training to be more effective than hospital-based training alone in developing students' confidence in clinical working and their ability to capture the pertinent points of a patient's social history and to incorporate these in treatment planning. These findings may be of value to the many schools currently planning the introduction of new or expanded outreach programmes.

The discussion section of this chapter is divided into three main parts. Firstly, the findings of the trial are summarised then discussed in relation to other studies, policy recommendations and the study's hypotheses, before considering probable contributory factors for the benefits observed. Secondly, links to educational theory are discussed. Finally, the validity and appropriateness of the method are discussed including the intention to treat analysis.

Figure 6.10 Measures related to the construct of treatment planning and hypotheses



6.5.1 Discussion of the Findings

This randomised controlled trial found outreach training more effective than traditional hospital-based training alone in improving students' ability to capture relevant points of social history from a patient and use this information appropriately when planning treatment. These benefits of outreach and the absence of improvements in interviewing skills or capture of a dental history confirmed our hypotheses (6.2 and Fig. 6.10). Outreach training is also beneficial in increasing students' confidence in providing everyday dental care for patients.

These experimental data confirm qualitative and anecdotal reports that community outreach experiences increase dental students' confidence (Comer *et al.*, 1987; Mofidi, 2003; Lennon *et al.*, 2004; Elkind *et al.*, 2005) and competence (Blinkhorn, 2002; Woronuk *et al.*, 2004) and so address concerns about the rigor of evaluations (Bailit, 1999b). Further, they support policy makers' recommendations to use outreach in primary care to develop *professionals who are best suited to providing appropriate... care* (Options for Change, 2002) through heightening students' awareness of community needs.

The hypotheses that outreach experiences would not improve competence in the familiar tasks of interviewing and taking a dental history but would have a beneficial effect on confidence and competence in capturing a social history and planning appropriate treatment were supported. It may be that dental schools can teach basic skills of interviewing and taking dental histories, however, the emphasis in a dental hospital may be on clinical skills with a high priority being placed on oral health. The distance travelled to the hospital and the time taken for appointments there with students suggests fewer competing priorities. However, the range of patients seen in outreach and the need for a more client-led approach may emphasise the need for greater consideration of the patients' circumstances and more realistic treatment plans.

The qualitative studies of staff and student perceptions not only triangulate well with the findings of benefits to students' competence but provide an explanation of the trial's results. For example, outreach students treated a wider variety of patients in *real world* settings, staff discussed patients' histories with students and

both believed students' treatment planning became more holistic. This triangulation supports the decision to adopt a mixed-methods approach for this study.

The measurement of self-assessed change in confidence was complicated by shifts in students' internal scales of confidence. Whilst simple cross-sectional comparisons at follow up revealed no difference between the groups, the then-test indicates that the experience of community-based outreach encouraged students to revise their internal scales of confidence. Therefore the simple comparison at follow up was undermined because perceptions of confidence had changed in one group of students presumably as a consequence of their educational experience. Moreover, the then-test indicates that students who have been on outreach now believed they had been over-optimistic about their confidence before their placement. Put simply, they realized afterwards that some of their earlier confidence was misplaced. This newly gained insight is reflected in the difference in transition judgments between groups.

Response shift, in May and Kruger's (1988) model of development might be consequent on the unconscious incompetent gaining conscious incompetence. Their new insights into requirements of working in the new setting redefine their associated scale anchors for assessing confidence.

There is anecdotal evidence supporting this explanation from school staff conducting a study (Frankl, *et al.* 1993) of US block placements. They...

observed that students may feel quite confident about their abilities prior to going [on outreach] and then once working... they find some of the tasks considerably more difficult than they had anticipated.

This appreciation of what is actually involved in working may be a partial explanation of the response shift and suggests that students require close support while they adapt to the *real world*.

Other studies had linked increased self-assessed confidence with increased competence in clinical situations (Harrell *et al.*, 1993; Carlisle, 2000; Elzubeir *et al.*, 2001) though studies of postgraduates suggests they are not correlates (Stewart

et al., 2000; Barnsley *et al.*, 2004). Such a parallel increase in competence and confidence was found in this study.

Wagner *et al.* (2005) used the ACIR to successfully identify changes in students' interviewing skills with similar sample size to this study ($n=40$, $\Delta M=9\%$, $P<0.01$). This suggests that our lack of difference in groups' ACIR scores demonstrated an absence of change rather than inadequate instrumentation.

A recent US study (DeCastro *et al.*, 2005) found that pseudo-randomly selected volunteer students attending outreach satellite clinics over several years graduated with greater restorative competence and more clinical experience though the multiple testing analysis risked type I error. DeCastro suggested the former benefit may be the result of the latter. This theory is also a plausible explanation for the increases in competence observed in this trial though, as De Castro also suggests, perhaps the favourable supervision ratio and nursing support are other relevant factors. These factors, our student's learning being situated in a working primary care environment, the effects of block or longitudinal attendance and the effects of different settings all require further research to identify which aspects of the outreach experience deliver benefit.

The benefits of outreach experience did not extend to the more frequent inclusion in treatment plans or to the wider issues of the patient's children's needs or multi-disciplinary health promotion, except for the small number of students attending CDS settings (Table C.1, page 329). The CDS being more family and continuing care oriented than the DACs, whose focus is more towards the immediate relief of pain, may have been influential in this respect. More generally, it may be that while five-weeks outreach experience had helped students move to a more holistic consideration of the patient's needs, this improvement had neither extended to consideration of the whole family nor to matters which were not predominantly dental in nature. Alternatively, the students may have deemed these issues of secondary importance whilst considering a patient experiencing severe pain.

The exploratory analyses may have implications for both future research and policy. The effects of the pre-placement clinical experience of students, the setting being CDS or DAC and the number of patients treated were all associated with

educational outcomes. There may be benefits to further research into these factors and their effects. There may be implications for the design of outreach training programmes both for the type of locations used and the positioning of outreach experiences in students' learning trajectories.

In conclusion, this trial found outreach experiences as an adjunct to traditional hospital-based training were effective in improving students' ability to capture a patient's social history and to plan appropriate treatment in the light of that social history. These findings support further development of outreach in dental education as a contribution to achieving community public health objectives.

6.5.2 Links to educational theory

Transferring from the relatively sheltered learning environment of the dental hospital clinics to *real world* service-led primary care setting appeared to result in students shifting their internal scales of confidence, as indicated above. The response shift complicates the measurement of change by self-assessment methods. This developmental change in the way students relate to and participate in activities as a result of transformative experiences is what Beach (1999) refers to as *consequential transition*. Not only is there a shift of the activity in space and time but a new set of social activities to accommodate with a consequent *developmental coupling* of training hospital and workplace experiences. In adapting to the new setting students are required to reconstruct their definition of what is required of them and in doing so reassess their view of their own confidence and competence against this new standard. This may explain the observed response shift.

The observed response shift in students' confidence may be associated with new insights into working in primary care and so resonate with theory suggesting *boundary crossing* confers advantages.

6.5.3 Discussion of the Methodology

Randomised controlled trials provide powerful evidence of effectiveness provided they are properly conducted and reported. The conduct of this trial meets the standards for reporting clinical trials as specified by CONSORT and CASP. Tables 6.6 and 6.7 outline the criteria met by the reporting of this study.

Table 6.6 CONSORT checklist for reporting an RCT

SECTION & topic	Description	Met
TITLE & ABSTRACT	How participants were allocated to interventions	✓
INTRODUCTION	Scientific background and explanation of rationale.	✓
METHODS	Eligibility criteria for participants and the settings and locations where the data were collected.	✓
Participants		
Interventions	Precise details of the interventions intended for each group and how and when they were actually administered.	✓
Objectives	Specific objectives and hypotheses.	✓
Outcomes	Clearly defined primary and secondary outcome measures and, when applicable, any methods used to enhance the quality of measurements	✓
Sample size	How sample size was determined and, when applicable, explanation of any interim analyses and stopping rules.	✓
Randomisation Sequence generation	Method used to generate the random allocation sequence, including details of any restriction.	✓
Randomisation – Allocation concealment	Method used to implement the random allocation sequence, clarifying whether the sequence was concealed until interventions were assigned.	✓
Randomisation – Implementation	Who generated the allocation sequence, who enrolled participants, and who assigned participants to their groups.	✓
Blinding (masking)	Whether or not participants, those administering the interventions, and those assessing the outcomes were blinded to group assignment. When relevant, how the success of blinding was evaluated.	✓
Statistical methods	Statistical methods used to compare groups for primary outcome(s); Methods for additional analyses, such as subgroup analyses and adjusted analyses.	✓
RESULTS	Flow of participants through each stage (a diagram is strongly recommended).	✓
Participant flow	Specifically, for each group report the numbers of participants randomly assigned, receiving intended treatment, completing the study protocol, and analyzed for the primary outcome. Describe protocol deviations from study as planned, together with reasons.	✓
Recruitment	Dates defining the periods of recruitment and follow-up.	✓
Baseline data	Baseline demographic and clinical characteristics of each group.	✓
Numbers analysed	Number of participants (denominator) in each group included in each analysis and whether the analysis was by 'intention-to-treat'. State the results in absolute numbers when feasible (e.g., 10/20, not 50%).	✓
Outcomes and estimation	For each primary and secondary outcome, a summary of results for each group, and the estimated effect size and its precision (e.g., 95% confidence interval).	✓
Ancillary analyses	Address multiplicity by reporting any other analyses performed, including subgroup analyses and adjusted analyses, indicating those pre-specified and those exploratory.	✓
Adverse events	All important adverse events or side effects in each intervention group.	✓
DISCUSSION	Interpretation of the results, taking into account study hypotheses, sources of potential bias or imprecision and the dangers associated with multiplicity of analyses and outcomes.	✓
Interpretation		
Generalisability	Generalisability (external validity) of the trial findings.	✓
Overall evidence	General interpretation of the results in the context of current evidence.	✓

Moher *et al.*, 2001

Table 6.7 CASP checklist for RCTs

Item description	Met
<p>1. Did the study ask a clearly focused question? <i>Consider if the question is 'focused' in terms of:</i></p> <ul style="list-style-type: none"> – the population studied – the intervention given – the outcomes considered 	<p>✓</p> <p>✓</p> <p>✓</p>
<p>2. Was this a randomised controlled trial (RCT) and was it appropriately so? Consider:</p> <ul style="list-style-type: none"> – why this study was carried out as an RCT – if this was the right research approach for the question being asked 	<p>✓</p> <p>✓</p>
<p>3. Were participants appropriately allocated to intervention and control groups? Consider:</p> <ul style="list-style-type: none"> – how participants were allocated to intervention and control groups. <i>Was the process truly random?</i> – whether the method of allocation was described. – how the randomisation schedule was generated and how a participant was allocated to a study group – if the groups were well balanced. Are any differences between the groups at entry to the trial reported? – if there were differences reported that might have explained any outcome(s) (confounding) 	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
<p>4. Were participants, staff and study personnel 'blind' to participants' study group? Consider:</p> <ul style="list-style-type: none"> – the fact that blinding is not always possible – if every effort was made to achieve blinding – if it matters in this study – the fact that we are looking for 'observer bias' 	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
<p>5. Were all of the participants who entered the trial accounted for at its conclusion? Consider:</p> <ul style="list-style-type: none"> – if any intervention-group participants got a control-group option or vice versa – if all participants were followed up in each study group (was there loss-to-follow-up?) – if all the participants' outcomes were analysed by the groups to which they were originally allocated (intention-to-treat analysis) – what additional information would you liked to have seen to make you feel better about this 	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
<p>6. Were the participants in all groups followed up and data collected in the same way? Consider:</p> <ul style="list-style-type: none"> – if, for example, they were reviewed at the same time intervals and if they received the same amount of attention from researchers and health workers. Any differences may introduce performance bias. 	<p>✓</p>
<p>7. Did the study have enough participants to minimise the play of chance? Consider:</p> <ul style="list-style-type: none"> – if there is a power calculation. This will estimate how many participants are needed to be reasonably sure of finding something importantd for a given level of uncertainty. 	<p>✓</p>
<p>8. How are the results presented and what is the main result? Consider:</p> <ul style="list-style-type: none"> – if, for example, the results are presented as a proportion of people experiencing an outcome, such as risks, or as a measurement, such as mean or median differences... – how large this size of result is and how meaningful it is – how you would sum up the bottom-line result of the trial in one sentence 	<p>✓</p> <p>✓</p> <p>✓</p>

Source: CASP, 2002b, omitting items relating to the local application of findings

This study provides strong evidence of the effectiveness for an increasingly popular educational programme for which there has been an acknowledged lack of scientific evidence. The use of a randomised controlled trial provides high quality evidence avoiding potential selection bias from recruiting volunteers and any temporal effects arising from other curriculum developments or learning experiences.

Features of the trial that increased the external validity of this study related to the choice of researcher, the study sample, the intervention and the OSCA assessment. These are now detailed in turn.

The researcher was not a member of faculty but had successfully worked with this and other cohorts of Sheffield dental students to obtain confidential feedback. Using such a person to recruit students was intended to reduce potential anxiety relating to recruitment decisions by reassuring students that their decision whether or not to participate would not influence the opinions of faculty staff toward them and hence would not affect their progression through their course.

The sample were almost a whole cohort of a School which may be considered typical UK dental schools judged by its ranking at this time in ratings for quality and quantity of student intake, teaching and research (Table C.3, page 331).

The intervention used four independent outreach locations, reducing the effects of any idiosyncratic features of individual placement locations. Further, placements were attended by three blocks of students. Both these features enhance the validity of the trial.

In the OSCA the validity of the study was enhanced by the patient's case being unexceptional, the skills assessed were everyday requirements of many dentists, the chosen setting was a typical surgery and blinding of the assessors to the intervention was successful. Further, the clinical measure of treatment planning achieved construct validity and reliability thorough development and practice. A factor in ensuring this validity was assessment by clinician assessors familiar with the NHS primary care sector that engages most of the dental workforce. While other treatment plans might be argued the assessments rewarded approaches that acknowledged the patients' condition, preferences and circumstances. In an

unpublished study the researcher asked staff at each placement to agree on their treatment plan for the case study presented to them as a paper-based description with supporting chart and radiograph. There was a remarkable similarity in responses though the CDS's plans were more likely than the DAC's to address longer term issues and health promotion.

The similarity of the assessment to the School's final examination vivas may have been an attractive feature of the trial for these students who were less than a year from preparation for their finals. Each student was promised and given immediate feedback on their treatment plan and viva performance by an independent observer of the assessment whose own comments were supplemented by the notes made by the assessors.

The failure of trainees to self-assess their performance accurately in clinical situations has been reported elsewhere (Regehr *et al.*, 1996; Harrington *et al.*, 1996; Manogue *et al.*, 1999). It has been suggested that other variables distort students' self-assessments (Regehr *et al.*, 1996). In the current study there are some potential factors which may distort the students' self-assessment of confidence:

- For administrative and logistical convenience, the self-assessment was conducted as students arrived for the practical test of competence. At this time the students may have anxieties regarding their performance under test conditions that influence their self-perception (Everson *et al.*, 1993).
- Changes in students' internal scales of confidence as a result of their intervention experiences are likely to distort global judgements but are, perhaps, less likely to distort transition judgements or then-tests.
- Students' feelings of disappointment or resentment with their allocations may have prejudiced their self-assessments at follow-up.

However, in programme evaluations, Kiyak and Brudvik (1992) and Wanigasooriya (2004) found self-assessed confidence, and Revere and Hunt (2000) found other self-assessments of clinical performance to be reliable measures for evaluating clinical training.

Debate remains regarding different approaches to intention to treat analysis (Wright and Sim, 2003; Higgins and Green, 2005). What is clear is that loss to follow up that is less than 10% and random has little effect on comparisons (Wright and Sim, 2003). This was confirmed by substitution with sample means and only challenged when the imputations assumed a 'worst case' outcome for missing data.

If a bimodal approach is adopted as suggested (Nau, 1995), then these quantitative findings prompt further qualitative studies to establish the factors of the intervention experiences associated with the observed benefits. Alternatively, a more focussed study of students' pre-placement expectations of placements and their preparedness might aid reduction of any barriers to effective boundary crossing and increase the benefits of placement experiences.

6.6 Summary

This summary presents the main findings of the trial starting with those relating to the stated hypotheses, then methodological matter and finally, indications for further research.

6.6.1 Findings of this trial relating to its stated hypotheses

The findings of this trial relating to its stated hypotheses (6.2, page 173) are

- The null hypothesis that outreach training has no effect on students' interviewing skill and their ability to capture a dental history was supported by the findings
- The hypothesis that outreach training has a positive effect on students' capture of a social history was supported by the findings
- The hypothesis that outreach training has a positive effect on the appropriateness of students' treatment planning was supported by the findings in that the plan was better matched to the patients' needs and circumstances.

- In connection with wider aspects of treatment planning, those related to the family unit and addressing their diet or smoking habits, the findings did not support the hypothesis. It was speculated that the six-week duration of the outreach training was insufficient to develop this change in students
- The last hypothesis that outreach training has a positive effect on students' confidence in everyday clinical situations was supported by the findings.
- The measurement of students' clinical confidence is complex.

6.6.2 Findings relating to the trial's method

Findings relating to the trial's method were

- The deployment of a disinterested party, independent of the students' involvement with the curricular aspects of the placement, as researcher for recruitment to the trial and handling the target population's queries appeared to be a successful strategy for allaying potential fears and enhancing recruitment and retention.
- The self-assessed global judgement of confidence in clinical working was an ineffective measure of change because of response shift. The global transition judgement and then-test proved responsive to the effects of the intervention and this may recommend their use in future studies.
- Participant self-assessments may benefit from being separated from other potentially stressful assessments to avoid any associated anxiety influencing self-perception or the reporting of self-perception.
- The OSCA with standard simulated patient interview and viva had face validity arising from the everyday nature of the case and the realistic presentation in a surgery. It also had construct validity with reference to the skills construct used in this study. This approach proved both acceptable to participants and effective as a measuring instrument. It was, however, resource intensive to develop and stage.

6.6.3 Trial Findings and further research:

Further research suggested by the findings of the trial were

- The exploratory analyses suggest hypotheses which might be tested in further research.
 - The benefits of outreach experiences to students' appreciation of the broader aspects of treatment planning are dependent on the setting (CDS or DAC).
 - The number of patients treated on placement is associated with the benefits to an appreciation of the broader aspects of treatment planning.
 - There are gender differences in the benefits to skill in capturing a social history resulting from outreach training experiences.
- The trial does not identify which factors in the placement experience lead to the observed benefits. Other studies including the qualitative studies presented in Chapters 4 and 5 suggest as factors the favourable supervision ratio, patient availability, close nursing support, the learning being situated in a working primary care environment. These factors and the effects of block or longitudinal attendance plus the effects of different settings all require further research to identify which aspects of the outreach experience deliver benefit.

Chapter 7

Summary, Conclusions and Recommendations

7.1 Summary

This phased programme of qualitative and quantitative research identified the perceptions of stakeholders in a developing undergraduate dental outreach training programme, identified some critical success factors for that programme and then compared the educational benefits to students of the programme with those of the traditional, hospital-based programme. Highly positive attitudes to the programme were observed among stakeholders who generally resolved the minor problems that they encountered and discovered unanticipated benefits arising from their interactions. Effective communication between stakeholders and the resourcing of both supervision and nursing support were identified as important factors for successful placements. The trial of outreach training demonstrated important and significant benefits of the programme on students' confidence in providing everyday dental care for patients and their competence in treatment planning.

This summary is divided into two sections. First the summary of key findings and aspects of the method. This is followed by a brief summary of points relating to the research as a learning activity.

7.1.1 Key findings and aspects of the method

Programmes of outreach training of different characters and with different purposes are under development across the English-speaking world. Their development may be intended to increase professional preparedness, to address misdistributions in service provision, to increase students' awareness of a particular aspect of dentistry on initial qualification or to provide additional clinical experience for students. In the UK, ensuring services are available for all communities and increasing the profession's commitment to NHS dentistry are political concerns though not the primary concerns for the Dental School in this programme.

While there are evaluations of these programmes there is little scientific evidence that they are educationally more effective than the traditional programmes they supplement or replace. Establishing and operating these programmes requires considerable resources. This research is therefore well timed to inform these programme developments. There is evidence for this in the ready acceptance of papers arising from the research for publication and the interest shown in conference presentations, symposia and workshops internationally.

The studies' positive findings provide reassurance and encouragement to curriculum planners to invest in outreach training programmes. The qualitative findings indicate some of the facets of the programme requiring resourcing, for example, nursing support for students and arrangements to ensure effective communication between the School, placement staff and students.

The method employed in the qualitative study of placement staff perceptions proved effective with an independent researcher gathering frank comments and being in a position to use *faux naivety* to gather more detail. Interviewing a range of staff from many of the placements provided opportunities for triangulation and testing the variation in perceptions.

Staff were proud of the challenging learning experiences typical of their setting they had provided for students, the interest the students had shown in their work and the progress they had seen the student make while placed with them. While not confident that their various approaches to supervision and support were what the School expected or required, they had observed their relationships with students progressing and becoming gradually more productive and rewarding. The professional development that staff requested in this field was provided both annually within the programme and by attendance at external events. Intense debates at these events over educational approaches and the suitability of learning experiences are evidence of supervisors' and nurses' concern to assist students towards professional competence. As staff experienced a number of students having attended placements they became more familiar with students' typical capabilities and the variations between individuals. Requests for more information on students before they start their placements reduced with time. The overwhelmingly positive attitudes among staff to the programme encouraged further development so that the programme is being increased in duration from six weeks to six months for all students.

The parallel study of student perceptions benefited from a peer-run focus group whose findings triangulated reassuringly well with the main study's findings. The candidness of the students' responses in both studies may well have resulted from the absence of staff associated with their assessed curriculum. While focus groups are a resource intensive means of gathering data their responsiveness to local circumstances and their opportunities for internal triangulation between participants has resulted in their deployment in subsequent years for monitoring programme delivery.

The principal findings of this study were that students valued the quantity and 'realism' of the clinical experiences and appreciated the nursing support for its positive effect on their confidence and productivity. Students also noted the variations in supervisors' approaches and saw advantages in a wide range of approaches. Supervisory relationships were valued for their closeness and the breadth of understanding they permitted. Providing favourable staffing ratios in supervision and individual close nursing support has heavy resource implications

for outreach programmes. The students' suggestion of providing multiple contrasting placements in different settings for each student to even out the differences in experiences at different settings is being implemented in the next phase of programme development. This is only achievable with the planned increased duration of the programme as both student and staff perception suggested placements needed to be several weeks long to allow them time to settle and benefit.

These qualitative studies informed the design of the trial of outreach training. Two key educational benefits to students were identified by both placement staff and students: increasing confidence in providing treatment and increasing competence in appropriately contextualised treatment planning. These became the two primary variables for the trial. The effectiveness of recruitment to the trial may be accounted for by the repeated detailed explanation provided for the students, both orally and in writing, of the purposes of the outreach programme and the rationale for the trial. Retention to follow-up assessment too was high.

The development of the measure of competence, the standardised simulated patient encounter and oral assessment of the students' treatment plan, was resource intensive but proved effective. The apparent authenticity of the commonplace case and the staging of the assessment may have contributed to its success. The iterative approach to developing the assessment, refining both the case history and the assessment scale through repeated trials, increased its discrimination and honed its appropriateness. This form of assessment is recommended.

The findings are consistent with other studies of dental outreach training and with other literature of workplace teaching and learning. The data support constructivist theories of situated learning and the greater impact such (perceived to be) *real* and expansive learning experiences have on students in a service-led setting compared to a dedicated teaching establishment.

The difference in students' learning experiences between primary care settings, noted in both sets of studies, is a potential area for further research to identify their distinctive educational advantages. There may also be value in researching any lost opportunity costs to students' learning in other fields resulting from these being

away from the dental school. Despite identifying two benefits of outreach placements for students' development, the research does not identify which factors of the placement experience are effective in producing those benefits. This is another area for investigation. Further, any effects of variation in the duration of placements or the students' mode of attendance are beyond the design of this study but are important variables to investigate to inform the design of outreach programmes.

In summary, taken together these studies found positive attitudes among stakeholders regarding the value and practicality of outreach training programmes for providing productive teaching and learning experiences. The qualitative studies identified the importance of inter-stakeholder communication and adequately resourced clinical support and supervision as factors contributing to the programme's success. Key educational outcomes for students were increased confidence in treating patients and competence in contextualised treatment planning. Outreach experiences were confirmed in the trial to confer benefits on students in these two respects when compared with their traditional programme. These findings encourage the further development of this and other outreach programmes.

7.1.2 The research as a learning activity

This study is original in that no other randomised controlled trials of dental outreach training have been reported. That trial's design was based on qualitative studies which were distinctive in involving a large fraction of the placement staff across diverse roles and a study of student perception which was triangulated against peer-run focus groups. While the methods employed were standard techniques they were applied to a programme integrated into existing primary care services much more than programmes with large satellite clinics or polyclinics in hospitals. Also, the study developed a new instrument for assessing competence in treatment planning.

The publication of the papers from the component studies indicates that this work is an important contribution to knowledge. There is an acknowledged paucity of scientific evidence the effectiveness of outreach training in dentistry (Bailit,

1999b). This research addresses that shortfall. The qualitative studies also add to the literature new understandings of the dental nurses' role in supporting and supervising students and the benefits to them in undertaking these duties.

The third criterion relates to the thesis being my own work. I have acknowledged the contribution of others in the development of this work and in the preparation of papers for publication. Substantially though I have carried out the research under the guidance of my supervisor.

Finally, in view of the emphasis in the literature review on reflection as a key contributor to professional development, I will briefly consider this research as a learning experience. Reflecting on my experience of this research I note a number of transformative effects. Inevitably a few years engagement with dentists, dental care professionals and dental students has brought some understanding, however shallow, of dentistry and the preoccupations of dental professionals. I have transferred from other previously experienced work placement contexts some understandings of their working and had to construct new conceptions for some aspects of the dental outreach placement. Many of my pre-existing project management skills were readily transferred to organising this research and strengthened through transformation. In the qualitative studies, my skills in operating focus groups and interviews were honed and adapted in the new, more rigorous setting. New skills were developed in qualitative analysis. Later, the trial required new statistical techniques to be learned and applied. The production and approval of research protocols and writing for academic publication were developmental experiences. My presentation style required some adaptation for academic audiences and I made in-house presentations for the purpose of supporting the programme's development which were given at an early stage in my development of an appreciation of dental academics' concerns. Further, my understanding of some theoretical frameworks in educational fields was developed too late to inform much of the research. Consequently, I can now envisage enhancements to the conduct of the fieldwork and to the published papers.

My engagement with this research has been enjoyable, interesting and developmental. My critical thinking skills have improved and besides any gains to

programme evaluation or the knowledge base for outreach training, this research has been worthwhile on a personal level.

7.2 Conclusions and Recommendations

The conclusions and recommendations from the research are organised in four sections.

- 7.2.1 Conclusions relating to policy
- 7.2.2 Conclusions relating to research
- 7.2.3 Recommendations for policy
- 7.2.4 Recommendations for future research

7.2.1 Conclusions relating to policy

- Incorporating outreach training programmes in primary care settings into dental courses can provide valued learning experiences in students':
 - clinical experience as indicated by the increased the number of patients and range of patient types encountered,
 - team working within the dental team,
 - socialisation into the profession,
 - awareness of inter-agency working beyond the dental team.
- Further, those outreach programmes have demonstrable benefits over traditional curricula alone for students'
 - competence in taking a social history,
 - competence in formulating an appropriate treatment plan
 - confidence in everyday clinical situations.
- Effective communication between stakeholders is important in ensuring appropriate learning opportunities for students on placement.
- Marked contrasts exist between students' clinical learning experiences in different outreach settings. The most obvious of these is that the majority of

patients encountered in dental access centres are adults while in community settings they are children. There are also differences in case-mix between the two settings with acute cases predominating in the dental access centres and continuing care in the community settings.

- The confidence of staff new to outreach training in matters relating to assessing and supporting students may be improved by development.
- The provision of close nursing support for students' clinical working enhanced their development, aided patient management and was reassuring for both patients and supervisors.
- The provision of adequate supervision, nursing support, and surgeries for students on placement requires appreciable additional resources.

7.2.2 Conclusions relating to research

- A disinterested party outwith the faculty was used as the researcher to recruit to the trial, gather data and process it. This strategy was successful in enhancing recruitment and retention and encouraging frank discussion in interviews and focus groups.
- Global self-assessments of confidence were adversely affected by shifts in students' internal scales of confidence rendering them ineffective to measure change over time. However, response shift could be accounted for by using global transition judgements and the then-test which both proved responsive to the effects of the intervention. This may recommend their use in future studies.
- Participant self-assessments may benefit from being separated from other potentially stressful assessments to avoid any associated anxiety influencing self-perception or the reporting of self-perception.
- The standard simulated patient interview in a surgery and assessment viva had face validity arising from the unexceptional nature of the case and the realistic setting. This assessment proved both acceptable to participants and effective as a measure. However, it was resource intensive to develop and stage.

- Social practice theory, in particular the tool of the activity diagram, appeared to offer a model for summarising and analysing the teaching and learning interactions of outreach training.

7.2.3 Recommendations for policy

- Schools might valuably consider including outreach programmes that are closely linked to existing primary care services in their courses. Such programmes enhance students' clinical, team working development and preparation for employment.
- There may be benefits in students attending multiple contrasting outreach settings to ensure breadth of experience.
- Developing long term partnerships with staff in primary dental care settings may improve their ability to support and assess outreach students.

7.2.4 Recommendations for future research

- The length of placements has not varied significantly in these studies. Further, some outreach training programmes are intensive block placements while others are longitudinal programmes of more brief visits over a longer period and educational and organisational arguments could be mounted in support of either type of scheme. Further research is required into both the effects of varying the length of placements and the relative merits of the two modes of attendance.
- This research trial provides some preliminary indications of which factors in the placement experience lead to the observed benefits. Other studies including this research's qualitative studies suggest as factors the favourable supervision ratio, patient availability, close nursing support, the situated nature of the learning. These factors and the effects of different settings both require further research to identify which aspects of the outreach experience deliver benefit. A phenomenological study of one or both of the identified benefits of outreach experiences might be an appropriate method.

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- Further, in researching other experiences relating to outreach training the perspectives of communities of practice and activity theory may provide useful analytical tools. Qualitative interviews or focus groups with students while on placement might provide data for analysis using these frameworks to identify learning practices and factors contributing to that learning. A comparative study of learning practices in different outreach settings might identify their distinctive features.
 - Transition judgements and global measures combined with then tests proved effective measures of subjective internal judgements of confidence in clinical working despite response shifts attributed to boundary crossing experiences. Such measures in a repeated measure design may prove useful in researching the effects of boundary crossing between clinical settings. Experiments might compare either the effects of repeated transitions to new outreach settings or the relative effects of boundary crossing experiences between different settings.