Using Personal and Academic Development to reconcile Research with Learning and Teaching in a model for Scholarship in Higher Education

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Abstract

This thesis traces the contested scholarship between the three activity topics of learning and teaching, research and academic and professional development. 11 published articles and 7 others that have been prepared for publication were used as exemplar articles for analysis. This included the history and context of the writing and the way in which the three topics hold together and the patterns or relationships that can be seen between them. Most of the articles aim to bring something new to the public arena and challenge the current status quo in Higher Education. The **Learning and Teaching** articles show active ways of developing learning and seeing things in a new light rather than absorbing knowledge, constructing or working from educational theory. In particular a curriculum is defined for all stakeholders. There is no necessity for teaching and learning to be the same as research but on occasion it helps for it to be "research like". **Research** articles are on collaborative qualitative research and detailed reviews of scientific research in my discipline. In my educational research articles I stand up to the dominance of subject-based research. **Development** articles articulate the practice and facilitation of individual and group reflection methods. They also further the networking, pan-organisation, pro-person approach of academic developers. The analysis produces a dynamic model for Higher Education scholarship that opens up space for academic development and the neglected area of professional and personal development. In particular, some articles articulate and demonstrate the role of academic developers in evaluating research. There is no evidence for the need of a single nexus to fulfil a magical link specifically between learning and teaching and research because links already exist within academic and professional development and through existing border subjects of curriculum, reflection, professional ethics and evaluation.

I am grateful for the guidance I have received to create this analysis of my written work. From this it is possible to position myself academically as a developer.

Glossary and Writing Conventions

Terms used with a specific meaning in the text

Space

This term is used to define an activity in Higher Education that has a high degree of autonomy. Four such spaces are defined in the model presented in 6.1.1 (see page 389). They are learning and teaching, research and individual and academic development.

Border

This term is used to define an activity in Higher Education, which does not have a high degree of autonomy and appears to link the spaces together. These are listed as curriculum, reflective practice, ethics and evaluation (see 6.1.1. page 389)

Reference Abbreviations Used

Front matters such as this “Glossary and Writing Conventions” and “Abstract” remain unnumbered and so are referred to by name. However, as can be seen from the Table of Contents all other sections are numbered up to three levels. It is therefore possible to abbreviate referring to numbered sections with a number alone. 1 refers to the “Overview” and subsections such as the “introduction” can be referred to as 1.1 and more specific sections within this such as “overall aim” as 1.1.1 commonly placed in brackets at the end of a sentence (1.1.1). The exemplar articles such as

> *Sweet, J., and R. Ellaway. (2010) "Reuse as heuristic: from transmission to nurture in learning activity design." Innovations in Education and Teaching International 47: 215-222.*

each have a reference number (in this case 2.2.1) and is listed in section 5.2. It is from this list that those articles that have been published can be clearly identified from those that remain currently as manuscript in preparation for publication.

Tables and figures are numbered at a fourth level. Thus, for each three figure section such as “Introduction in the Overview” given above (1.1.1) the first Table will be labelled 1.1.1-1 for clarity and a second Table as 1.1.1-2.

1 Overview

1.1 Introduction

1.1.1 Overall Aim

The aim of this thesis is to trace the contested scholarship between three themes of Learning and Teaching, Research and Academic Development in order to understand their nature and relationships in Higher Education more fully. Further, to demonstrate original concepts that make a significant contribution to knowledge in the academic fields studied.

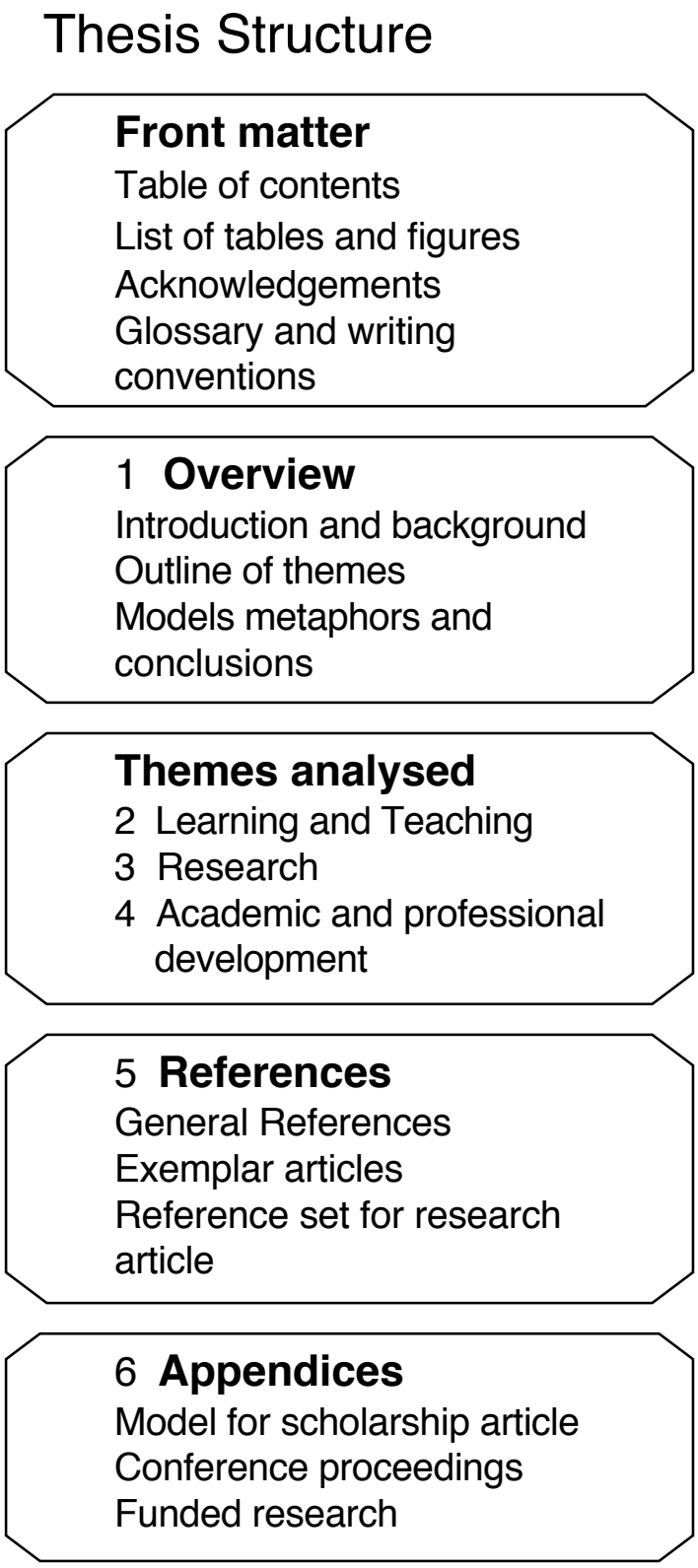
1.1.2 Thesis structure - Overview

The structure of this Thesis is outlined in Figure 1.1.2 -1. It draws the content into five groupings, which have been placed in sequential boxes for clarification. The first box in the figure is the unnumbered Front matter. Detail is given here in the tables of contents, list of tables and list of figures. In addition, the Front matter contains the customary acknowledgments, a summary as an abstract and an additional glossary and writing conventions guide for the reader starting on page 9. Also the figure shows the Overview (Section 1), which introduces the background and aim of the thesis. In addition, it gives a personal chronological account of my academic writing in Higher Education, from which three themes of writing activity emerge. Specific exemplar articles I have written are chosen, introduced and an explanation given on how they came to be written. The writing is then investigated more fully to identify links or bonds between the themes and to engage more fully in current educational literature. Patterns or relationships between themes are explored by way of a commentary on a model that emerges from my scholarship. I offer reflections on my professional development as a research practitioner by outlining how I piloted much of my work through interactive conference proceedings and presentations and completed funded research. Finally, I consider future

developments with reference to on going funded research projects. The exemplar articles are introduced and analysed in the three themes of writing activity, Learning and Teaching (section 2), Research (section 3) and Academic and Professional Development (section 4) see Figure 1.1.2-1. Thesis Structure

The exemplar articles are subject to a technical discussion analysing their place in the writing theme and the nature of that subject theme. Some articles represent an unconventional eye on the subject and often challenge the status quo. Some articles sit more comfortably within definite subject classifications than others and this context and situation is evaluated. Of a total of 19 exemplar articles, 12 have been published. The total list of exemplar articles can be seen in second reference set in the references (section 5.2). Please see Glossary and Writing Conventions section in the front matter on page 9 to explain how these referencing abbreviations are used. References have been divided into three sets for easy viewing. References for practically all articles are referred to in the overview or elsewhere are placed in a single list at the back of the thesis in the general references (section 5.1). For added clarity the exemplar articles are listed fully in 5.2 as mentioned above. In addition, research article 3.2.1 refers to 170 references reviewed over a twenty-year period (see writing conventions on page 9 for the conventions used to refer to articles in this number format). Because of this large number of references they are placed on their own at the end of the thesis (in section 5.3) for easier reference when reading this paper. Finally Figure 1.1.2-1. Thesis Structure refers to the appendices. The first appendix is the published article (6.1.1) that provides the basis for a possible model for scholarship in Higher Education based on a paper given at the HERDSA Conference in Adelaide in 2007. Also, relevant to my position as a research practitioner, I list my contributions to conference proceedings and presentations (see 6.2) and funded research projects are listed in 6.3.

Figure 1.1.2-1. Thesis Structure



1.1.3 Learning outcomes - Demonstrating an original and significant contribution to knowledge - a summary

All of the exemplar articles were written because there appeared to be something that was missing or could be added to current knowledge. To do this they all include a critical appraisal of previous work in the topic.

Critical appraisal of previous work

Learning and teaching

A transmission mode of teaching was assumed in the JISC funded project I was involved with investigating reusable learning objects. In this the teacher would be discovering materials and presenting them to students. I saw this as a lost opportunity for active student learning. I describe an alternative nurturing approach (after Pratt, 1998) where over 50 students were scouring digital resources effectively and sensitively (2.2.1).

I discuss some innovative teaching practice in dental technical training for clinical dental students with a colleague and delve into the education literature to discover thinking that counters many presuppositions found in conventional dental training (2.2.2). This article is a start in attempting to bring a critical appreciation of the education literature into dental education. The need for this was reinforced by reviewers at the British Dental Journal who invited me (as lead author) to write an educational innovations article (2.2.3) for them as a way of making the other articles in the series more accessible and free of "education speak" (3.2.3; 3.2.4 and 4.2.3) leaving 2.2.3 as a reference guide and stand alone novice guide to the educational literature.

I review the available literature on Curriculum, with special reference to medicine and health care and find the models wanting and supply an alternative all-stakeholders model (2.2.4). The central place for consideration of the patient appeared largely missing in previous models. I then reviewed the literature on "Inclusive curriculum" which, strangely to me, appeared to centre practically exclusively on disability. I

prepared an article, which attempted to challenge narrow concepts of inclusivity, for a new journal. My emphasis was not only to "consider" patients but also "include" them within the curriculum. This development illustrated in 2.2.5 was accepted for publication in "Learning and Teaching in Higher Education (LATHE) but then on later consideration by the Journal panel was rejected as not fitting their current views on "inclusive curriculum".

Research

The close description of twenty years of animal research and citations in 3.2.1 is a critical appraisal of this specific literature, the like of which has not been published. Certainly a further evaluation of errors made (see 3.2.2) and harm inflicted (see 4.2.5) of experiments in such a specific experiment-by-experiment appraisal has not so far been published. Recent cultural changes may enable this kind of critique to be publishable within the scientific journals.

The research into chairside teaching, its evaluation and recommended practices (see 3.2.3, 3.2.4 and 4.2.3) was a first significant entry into the published literature and was based on the perceived need for a literature that was largely missing on teaching specifically given at the chairside in dentistry.

My article on "Research-led" (3.2.5) is a critical appraisal of the literature on research and learning and teaching. Griffiths (2004) falls for the dominating research theme over that of teaching. I challenge his view that research-led teaching should imply teaching led by subject research. This fails to account for the usual possessive sense that would be used for anything else other than teaching. I attempt to reclaim "research-led teaching" to mean teaching that is led by research into teaching itself.

Academic development

"Opportunities in Educational Development" 4.2.1 is an appreciative critical review of the literature. I had the opportunity here to construct a potential educational development unit for a Healthcare university for a chapter in a book I was editing on effective learning and teaching. Educational development itself is changing very quickly so I included conference proceedings and networked material to draw together what I could see would be the optimal central and distributed unit suitable for the time and near future.

> *"Educational standards, no matter how scientific, are culturally derived." (Hutchins, 1968).*

It appears this needed to be said 40 years ago and is perhaps even more appropriate today. Once agreed or instituted, ideas such as the need for academic standards can so easily become assumed and concretised. My review of the literature revealed little in the way of theoretical grounding for the recent debate on educational standards in Higher Education. In 4.2.4 I describe a unique bricolage approach to the understanding of quality and standards using physical modelling and historic epic literature on National Standards. I recorded how this developmental workshop elicits further critical appraisal of the literature as participants argued and aligned themselves with different views.

I approach academic and individual development drawing from a number of critical reviews of the literature 4.2.1, 4.2.7 and 4.2.8. However, one commonality is an awareness of individual and professional responsibility and the importance of theoretical grounding and methods of engagement in reflective practice such as the Intensive Journal (Progoff, 1992) and Action Learning (Weinstein, 1999).

In the "Research led: identity" paper (4.2.6) I criticise the loosely held popular views on multiple identities and return to Jung (1971) for his warnings on identification which can only give temporary respite from finding one's own identity. I critique concepts on reflective practice, especially those that are methods of assessment in disguise in 4.2.8

to draw out a position statement to pull away from prescriptive forms of reflective practice.

I then critique the progression of published announcements on personal development planning advocated by the QAA. I attempt to appraise the theoretical basis for the different pronouncements and provisions of progress files and personal development planning (4.2.7).

Conduct and Execution of research

Appreciative inquiry (AI)

A framework (Cooperrider and Srivastva, 2003), found to be useful in previous academic development research (for example 4.2.3), is used throughout. Although originally used as an organisational management tool its use is advocated in evaluation (Preskill and Catsambas, 2006) and research (Reed, 2007). In addition, although far from complete, a social constructivist approach especially to the understanding of learning and teaching (Bruffee, 1993) and academic development has been attempted through using constructivist grounded theory (Charmaz, 2009). These two link closely for as Reed (2007) says, “AI is one form of social construction in action, sensitises the researcher to the language practices of clients, "subjects", and participants”.

Design and methodology for investigations

The analysis of disparate academic articles necessitates a qualitative approach. Quantitative data that could be retrieved such as word counts and frequencies or numbers of references may bring little of value to the understanding of the articles and how they stand together. Therefore methods approaching grounded theory (Morse et al, 2009 p14) were used in this study following many of the concepts outlined in Morse et al (2009) where they describe a second-generation approach to grounded theory. Early grounded theory was originally almost entirely based on the analysis of interviews

(Glaser and Strauss, 1967) but second generation researchers advocate the analysis of documents (Charmaz, 2009 p134 and Morse et al, 2009 p242). However, the underlying methods (outlined by Corbin, 2009 p52) of "Doing comparative analysis" and "Asking questions of the data" are the major thrust of sections 1.3 − 1.7 of the thesis and the original data set in three themes of learning and teaching, research and academic development provides the "Theoretical sampling" base. A sequential and iterative process of "Writing memos" was instigated from the start of the research. Emphasis in the research followed Corbin's (2009 p41) idea that "The analytic process is first and foremost a thinking process". Also that "Analysis should be relaxed, flexible and driven by insight gained through interaction with data rather than being structural and based on procedures".

However, some structure to the analysis can be a useful adjunct especially if the processes involved do not impose preconceived ideas. One such method is the use of qualitative analysis software such as Atlas.ti, which I have found particularly useful over many years in previous research (for example 3.2.4; 4.2.2). All articles were therefore converted into text files and entered into Atlas.ti software, viewed and open coded non-thematically. Prior thematisation was avoided to prevent preconceived ideas completely dominating the analysis. I have never used the original Straussian practice of line-by-line coding and moved beyond Glaser's incident by incident coding (Charmaz, 2009 p136) to open codings to any meanings that can be derived from a word, phrase, sentence or paragraph. These analytical components contribute to the overall conclusions and modelling shown in 1.6 and 1.7. As explained by Clarke (2009 p214) grounded theory provides a general way of generating theory and producing ideas based on empirical research.

Theoretical interpretations

Reference is made to the educational literature throughout. However, in 1.6 and 1.7 the original article themes are brought under scrutiny and concepts of autonomous activity in Higher Education are introduced. This is undertaken by way of a commentary on a published article (see Appendix 6.1.1 - peer reviewed conference proceedings). Taken together, interpretations are made from the exemplar articles submitted here resulting in a set of relationships between the very different autonomous components of Higher Education activity – learning and teaching, research and academic and professional development. In addition, consideration is given to the bonds and links between these vital components. The need that some authors have for a dichotomous nexus between teaching and research is critically discussed as a model for scholarship in Higher Education is constructed, which draws in a range of counterbalancing concepts.

Analysis of data evidence or outcomes

Interpretation of articles is facilitated by a sequential approach of placing the work in chronological order of personal development (1.2). The major impetus for their creation is outlined in the three theme overview sections (1.3 − 1.5). A possible nexus between the themes and article contents are reviewed in 1.6. An interpretive model for scholarship and further development of concepts is discussed in 1.7.

1.2 Background

1.2.1 A Short Academic Biography - Student Days

I joined the third cohort of students in 1967 at the new dental school in Cardiff, hailed as the shortest dental course in the country although it later aligned itself to others with an additional 6 months. There was some excitement about being at a new dental school in a new building with a new group of staff. Teaching techniques were variable and some experimental. Most were apprenticeship modelled, watching the master at work and

following, by example, under a sarcastic gaze. Some teachers tried setting us tasks to learn by and from ourselves. I think that we were being used as guinea pigs for some of the discovery modes of teaching that were being tried at the time, expecting the students to collectively discover things for themselves along the lines of Bion's (1961) leaderless groups. This was not what we were expecting and did not seem to work well for us as we were so used to very specific prescription and direction on our course. Ergonomics featured strongly but was taken with a narrow interpretation of "time and motion" with a mind-set of reducing time to complete or reduce the numbers of components used in dental procedures. This was far from the holistic trends in current ergonomics. Apart from a time every Friday when all members of staff were instructed to engage with students in small groups and talk about "treatment planning" in their field, academic staff were generally research driven especially as the new electron microscopes had just become available enshrined on the top floor of the new building. The academic environment was not served well by a disconnection between research and a long tradition of teaching by humiliation. I supplemented my academic experience with evening classes in the Continuing Education department and extensive reading of the psychologist Carl Jung (especially Jung, 1959 and Jung, 1971). In my final year I completed and won a national essay competition on ethical dental practice where I bemoaned the general lack of consideration of social and psychological factors in dentistry that I thought needed to be considered from my wider reading.

1.2.2 Dental practice and part-time teaching

On qualification I entered directly into a dental practice in the south of England, which was a world apart from academia. After just three years I was back studying for an MSc degree in London. This provided me with the inspiration and evidence base to specialise further in Periodontology. However, at the time I questioned the attitudes of some

researchers who appeared to have a cavalier approach to humans and abuse experimental animals. I was to write on these topics later (3.2.1, 3.2.2 and 4.2.5). Eight years after qualification in 1980 I started part time teaching at the Royal Dental Hospital in Leicester Square. Early publications were brief; critiques of animal experiments at the Royal College of Surgeons Dental Unit (Sweet, 1985a) and a rebuff to requests that dental practitioners should help fund these experiments (Sweet, 1985b). In practice, I developed a system of periodontal diagnosis and treatment with hand instruments, and working with an instrument manufacturer, designed and researched sharpening techniques. I extended my teaching to Guys Hospital where it was my turn to use a scanning electron microscope, studying sharpened instruments placed on magnetic putty inside the machine. I produced a series of publications in journals that dental practitioners would read explaining practical clinical methods that worked for me (Sweet, 1986b; Sweet, 1986c; Sweet, 1987a; Sweet, 1987b; Sweet, 1987c; Sweet, 1987d). I also published short articles on my concerns of the lack of representation of Dental Practitioners (Sweet, 1986a; Sweet, 1990) who, at the time, did not have a dedicated professional College with the accompanying professional identity. Soon after this I revisited the psychology literature and gained much from reading Ira Progoff (Progoff, 1953; 1956; 1983; 1992). I was pleased to shake off heteronomy - an understanding by continual reduction of one thing to the next and instead take an holistic approach centred on an understanding of relationships and movements within these relationships, which can be conducted in an Intensive Journal (Progoff, 1992). It was much later in 2010 that I became a certified Intensive Journal Consultant earned from completing an Advanced Studies training programme, which involved studying much of Progoff's published work. Whilst the practical aspects of clinical work and designing suitable plans of action and taking them through to conclusion was satisfying, I was yearning to follow up interests more academically which seemed impossible working in a

dental practice where patient demands for attention would always come first and there was not the collegiate academic stimulation that comes from working as part of faculty in a department.

I moved to a part time specialist periodontal practice in 1988 and also took on a role of parenting for four years and during this time attended Cardiff University Philosophy department and studied ethics and attempted to find a satisfactory way to understand the ethics of the use of experimental animals in my dental speciality. This has proved to be a never-ending search but eventually led me to the work of Levinas (Levinas, 1969; 1984; 1991; 1998). Although he has little to say about animals at all in his ethics, in his philosophy, following Rosenzwieg (1985), he appears to embrace moments where a person can respond to another and take responsibility in an individual way outside of any rational system (like the good Samaritan) in addition to and independent of a community justice system, and has the potential of being worked into a more comprehensive understanding of ethics for sentient beings (Critchley, 1999).

1.2.3 Full-time academia

I finally accepted a full time teaching post in Trinidad in the West Indies in 1993 and took on the teaching research and administrative elements of an academic and started to engage with the literature more fully and write an article on the curriculum I had developed (Sweet, 1995). I completed a Postgraduate Certificate in Educational Development at Glamorgan in 1998. I gained this based entirely on the educational work I was conducting in Trinidad fulfilling the Staff and Educational Development Association (SEDA) learning values and objectives (SEDA, 2010).

Following the Dearing report in 1997 the new millennium heralded interesting times in the UK, so I was fortunate to return to a full time academic post in the UK in 1998 (Dearing, 1997). I found that I had a place to help other lecturers who had not trained in education or were not familiar with the literature. I joined the Institute for Learning and

Teaching (ILT) in 2000 and became an advocate and secretary for Wales. I was asked to be the lead editor for the book "Effective Learning and Teaching in Medicine, Dentistry and Veterinary Education" for a joint publishing venture between ILT and The Times Higher Educational Supplement (THES) (Sweet, Huttly and Taylor, 2003). In this book I was able to write about educational environments with Ron Brown (2.2.3). Ron was a dental technologist lecturer at the Dental School in Trinidad. We were continually in dialogue about teaching ideas. He had more years experience than myself but practically no reading of either educational tips or pedagogy. I devised a way of incorporating some of our ideas to provide an economy of time and maximising of student engagement.

I duly expanded my range of understandings of educational development and became a qualified educational developer as holder of the Fellowship for the Staff and Educational Development Association in 2003. Educational development was a part time activity for me as I was a full time lecturer. I was disappointed that I had no Educational Development Centre to call my own or contribute to at either my original University, which was going through a merger takeover, or the new one it was to become. I did, though, have the opportunity to put the possibility into being virtually by the writing of a Chapter in the Effective Teaching book on Opportunities in Medical, Dental and Veterinary Educational Development (4.2.1). In this I was able to outline a possible educational development centre and incorporate as much good practice into it as I was aware of at the time. During this period of preparing for the Fellowship I also conducted a research project on the location of educational development in my Healthcare University, which showed that this activity was primarily centred in different departments and not at higher School levels (4.2.2). I was very much involved in the initial interest and dismay with which another Dearing report implementation, Progress Files, was being considered by universities in Wales. Unfortunately, the major thrust of most

universities was to implement PDP as quickly as possible, tick the box, and move on to dealing with the next imposed requirement from outside the University. Towards the end of this process there was also a drift towards thinking that Personal Development Planning (PDP) and Progress Files should be considered from a departmental discipline perspective. Making personal development subject specific appeared to me to favour a shallow approach. I advocated trying to engage with the theoretical basis behind this activity and by informing it in this way to deepen and facilitate creative self-development (see 4.2.7). A further legacy from the Dearing report was the provision of National Standards in Higher Education. I was a representative for a time on the Higher Education Academy Council where we fought off narrow prescriptive "Standards" but had relatively little time to discuss a philosophy or practical options. A paper was foisted on us to agree to and once completed the Council was effectively disbanded to a small advisory rump. I yearned for a wider consideration of what Standards could mean and how they could be applied and found that freedom in presenting two workshops on Standards at SEDA Conferences and worked the findings into a paper (4.2.4).

A colleague and I recognised the need for improvement in chairside teaching at the Dental school so this led to a funded research programme into chairside teaching resulting in three publications, which were provisionally accepted by the British Dental Journal. These were primary research to investigate the perceptions of staff, students and dental nurses (3.2.3); peer evaluation of these findings (3.2.4), and an exemplar scenario illustrating good chairside teaching practice (4.2.3). Through the review process, the referees requested that the articles be published with as little educational jargon as possible, but suggested that a further article be written specifically to engage with the educational literature as a fourth article in the series for publication (2.2.2) see page 69. I completed the primary writing of all the articles and my colleagues corrected and improved the writing in places.

As senior lecturer teaching undergraduates Periodontology at Cardiff Dental School I was invited to join a group Assemble, Catalogue, Exemplify, Test and Share (ACETS) investigating reusable learning objects (RLOs) in a project funded by the Joint Information Systems Committee (JISC). The original protocol assumed that a teacher would prepare the materials and transmit these to a student somehow. I could see the value of inverting this process and delegating the search for RLOs and their new deployment to the students themselves using a completely different teaching philosophy. One of the organisers of ACETS graciously agreed to collaborate with the write-up with the role of clarifying the overall context of the ACETS project whilst I would be completing all the details and findings of my approach (see 2.2.1).

1.3 Theme of Learning and Teaching

It is surprising that the very latest paper (2.2.1) I published on learning and teaching as late as 2010 should still be about breaking away from the transmission mode of teaching. In the ACETS project that I joined, it was assumed that teachers would be selecting online materials and presenting these findings to students in some kind of presentation. Strangely, in IT often a traditional mode of teaching is assumed, and we discovered this to be true for dentistry also (3.2.4).

For my part, I thought it was a mistake to try to concentrate on student learning styles to make the teaching more student centred. Not only have the foundations for learning styles been questioned (Coffield et al. 2004) but they also fit too comfortably with the transmission mode of teaching. Using the metaphor of the petrol pump (Austin 2010), a recognition of individual learning styles fits with the further metaphor that some students should be filled up with unleaded, some with unleaded extra, some with diesel and a special few with gas (LPG). On the contrary, a gain in student centeredness was achieved by inverting the bias of the ***teacher's*** approach from that of transmission to that of nurturing based on concepts by Pratt (1998). This left the students with the onus

of engaging in research-like activity selecting out digital materials for themselves and from the granular components to construct communication materials of their own. This article is clearly part of the genre of educational literature on learning and teaching, centring on the interface between teacher and learner. I felt that it was important to publish my exemplar findings as not only was there a need to turn tradition on its head, but also to describe the richness of the learning experience that was achieved for most of the 50 or so dental undergraduates by offering an alternative to it. Having control over both the selection of electronic resources and their assembly to create educational materials for their patients elicited care and attention to evidence. They all felt they had a duty to ensure that what they were saying was correct. Their creative work also allowed them to modify what and how they were going to say it, showing great sensitivity to the needs of the end-users. Interestingly, other members of staff at the dental school had a completely different perception of the students and thought of them as children who could not make any decisions for themselves! These staff were generally using transmission mode or apprenticeship mode teaching with old-fashioned sarcastic feedback and humiliation. My exemplar project was an attempt to make a break from teaching in a dysfunctional family (Bernstein, 1996) to that of a community of learners (Lave and Wenger, 1991) and this was largely achieved and needs to be disseminated. This paper also illuminated the power of applying educational theory to a situation that can have such practical effects.

In addition to this project I was very fortunate to be afforded the opportunity, by the British Dental Journal to bring to a wider readership, aspects of educational theory and thinking that dentists could bring into their practice, especially those involved in teaching (see 2.2.2 page 69). As dental educational adviser at the University of Bedfordshire, I have found that the number of dental vocational trainers, who are taking the PG Cert Dent, have used this article as a reference source. In the limited space available I was

able to introduce the topic of educational theory on more traditional individual learning and teaching psychological territory. I was then able to broach the more unfamiliar social aspects of adaptation, which appear as cornerstones to modern educational thinking. Throughout the paper I was able to give working examples on how useful theory can be.

Some ideas are so basic. Students must get into the right mood and get the overall picture before moving into the specifics of learning content detail. The importance of briefing and debriefing for learning is based on social learning theory. Some understanding of Gagné's (1965) theory of learning with performance change could help to identify more clearly when a dental tutor could help a student and, alternatively, when students could be best self-directed. Perry's (1999) work strongly recommends that tutors will gain more engagement with the learning process of the work they do, if it is recognised and acknowledged rather than just praised or damned. I was also able to indicate more clearly the link between theory and practice by referring to my own research on public reflections (Sweet, 2009) and the value of interprofessional communities for learning (Sweet, Sweet and Locke, 2010). The Paper ends with a rallying call for scholarship where I follow Andresen's (1996) concept that scholarship entails the upholding of what is valued by its community practitioners in the broadest possible sense. It is suggested that this process of dialogue between colleagues will raise standards of good chairside teaching practice.

The learning environments paper by Ron Brown and myself (2.2.3) was the outcome of many dialogues about learning and teaching whilst I was at the new dental school in Trinidad in the West Indies. The approach here was quite different. We were largely analysing methods that Ron Brown had devised over the years to cope with the tremendous changes in emphasis in the dental undergraduate curriculum. Earlier in the last century dentists were given a full dental technician training and following this went

on to carry out clinical work. However, the dental course by the end of the century had moved away from technical aspects and preparing the student academically for more intricate clinical procedures and the raft of new clinical governance issues. The net result of this was that the dental technical course for dental undergraduates was greatly squeezed. And the overriding aim had changed too. They were no longer expected to construct the dentures and bridges themselves, but it was essential for them to be able to monitor the standards of work they were receiving to be able to criticise poor work, understand why it was poor and give the necessary feedback to a technician.

Ron had devised various strategies to deliver this new kind of course. I followed this up with what I then called evidence. On reflection, this may have been too strong a term to use for my literature review for where authors had described similar methods, with varying degrees of critical theory behind it. Perhaps the most interesting contrast of theories and resulting contrast in practice are found where we compare Dick and Carey (1990) who articulate what is a traditionalist view that practical skills can be taught in a linear way, doing one right thing after another. This is contrasted with Mayberry's et al. (1993) view that what is critical in skills training is a clear knowledge of results and a range of errors that impede getting to a planned result.

As lead editor for text on effective learning and teaching there was no sign of the chapter on “Curriculum” from the designated author by the deadline date I had set. Publication of the book was delayed for nearly 6 months whilst I researched and completed the chapter. This was a time in medical and dental education where certain small groups broke away from the mainstream tradition of lectures and preclinical studies to advocate problem based learning and competency-based learning. The medical education unit in Dundee had been influential in advocating a more student centred subject and community integrated approach. It appeared to fail to highlight the central place of a patient in the process and to acknowledge the importance of interprofessional education.

I attempted to draw these important issues into an all stakeholders curriculum model (see Figure 2.2.4-5)

In the curriculum chapter I started right at the beginning when new students would be entering the course and considered what and how they would experience their learning. As I researched the topic I could see that curriculum reached far beyond the student teacher interface and the syllabus designed by the teacher. The publication history of this article illustrates some of the political nature of curriculum and in particular inclusive curriculum where the submitted article was rejected at the last minute before the publication date. As I explained earlier in the article on page 1 there seemed to be an inherent conflict in the wish to manage student diversity but provide equal opportunities and ensure that everyone is treated the same whilst respecting difference. Politically different forms of disability appeared to be differently defined. A clear difference being that between hearing loss which is defined as a disability, and visual acuity loss (that is correctable wearing glasses), which is not. Where should disabilities around the mouth or with the mouth be placed? A key point in my understanding of these issues came from my reading of MacEntee (2006) which seemed to represent a third-generation of thinking from the original medical models of “burdens of disease” to “disability” to a concentration on “coping and adapting strategies” that permit the person to draw on their own values and beliefs and cultural influences around them.

So for the dental clinical situation I asked the question does the clinician know best? Interestingly, literature revealed little link between patient perceptions and professional clinical findings. I therefore proposed that with the input of quality of life findings from the patient I would be able to have a new stream of data to help make overall management decisions on patient care. I then attempted to justify how using appreciative questions rather than deficit ones might gain the most useful results. In addition, to gain the best possible guidance for patient care I suggested utilising a little used resource. In purely

medical or dental terms this would mean using exemplar patients who have achieved the best possible clinical improvement. But that is not what I suggested. What I suggested was that the most useful existing patient who could act as mentor would be one who has reached an optimum situation. This could be that their condition is stabilised clinically or that they have reached an optimal health condition from their own perspective.

So what I was suggesting was not earth shattering. However, at a clinical level for the students, it was something new to formally collect patient perceptions of their health and to consider these alongside clinical findings. But perhaps more alien still was the concept of using patients to help and advise patients.

However, the publishers of the journal could clearly not see the pivotal place in my argument of third-generation thinking that avoided the upfront stigmatisation of patients and provided patient self perceptions and exemplar patient perceptions to meld with clinical findings, which traditionally would alone have dictated a patient's treatment regime.

On reflection I think I should have attempted to guide the reader through the theory that I was attempting to use in practice. Perhaps there was too much dental detail that confused the issue.

1.4 Theme of Research

Over 30 years ago I became interested in the topic of Periodontology. I was mostly interested in the correct treatment of patients. Because I was teaching part-time in a dental school, I was also looking out for evidence for best practice and what to teach. Although not directly relevant to humans and to clinical treatment of humans the reputation of animal experiments to provide research information was generally held high in the profession. However, to me, the use of animals in research, especially for something as non-life-threatening as Periodontology, was fraught with difficult ethical

problems. There was the issue of transferability of results. How valid could they be? And the more like humans the animals were the more ethical problems arose in using them. I attended the animal research unit of the London Hospital when I was doing my MSc and was appalled to see monkeys kept for the duration of their experiments in what looked like the travelling crates in which they must have arrived.

What seems most unacceptable to me was that the experiments were not carried out by veterinarians who would understand the animals their anatomy and physiology but by researchers who had no such background. The veterinarians appeared to have a standby and mop up role. It was also plain to see that some experiments were not carried out very carefully and so were subject to scientific error or that the animals were harmed.

So, largely before the influx of published systematic reviews and meta-analyses, I decided to review a small cohort of published reports of nonhuman primates subject to periodontal research over 20 years. I investigated the nature of the experiments and treatment of the animals and the citation success of the articles in ways that had not been published before.

The review of the first primate research article for publication describes the nuts and bolts of the experiments. It describes which journals experiments were published in, where the experiments were conducted, what types of experiments were carried out and which ones were highly cited. This showed a very stable genre of publications in number and type over a period of 20 years. To me, the things that stood out were a relative reduction in the use of the rhesus monkey, which from the timing in reduced use was caused by the ban on exports of these monkeys from India. Practically all the experiments involved relatively conservative techniques, which entailed the killing of animals rather than the investigation of less invasive diagnostic techniques, which could be applied to humans.

I read through the 170 papers looking for scientific errors in design and application and was horrified by the number and type of errors that could be identified. My thinking was that in an overview of the ethics of the use of these animals for research, a first stage would be that the experiments were done with minimal error. If the methodology was flawed at the start, then the work could not be justified on that score alone.

In the Humanities it is common to rebuff published arguments, but in the scientific literature good work is cited and poor work is most often allowed to wither on the vine. It is only in unusual journals such as *Science, Technology, and Human Values* that science and social science is questioned. With the number of studies examined and the range of errors discovered, it was possible to derive an index for error that may help, if later published, in the critical evaluation of animal experimentation. Rescher (2007) makes the important point that error is not only a blank in the canvas of knowledge but is filled in with what should not be there. Clearly the Journals have a duty of care to ensure that the articles they publish should have a minimum number of errors, so that they are not misleading.

The chairside teaching research was started because my collaborating colleagues and I recognised that dental teaching was not all what it might be in the Dental School in which we were working. To make a start we reviewed the perceptions of chairside teaching stakeholders to see if they shared our views (see 3.2.3). The method to study each of the stakeholder types was different and can be explained in the following way. Dental tutors were hardly likely to be available at the same time and some did not get on. However, without exception, they seemed to enjoy talking about their teaching. We thought that the student and nursing groups might find individual interviews intimidating and focus groups would provide a useful consensus view and that a group introductory light lunch would be appreciated. A qualitative analysis drew attention to the fact that students did appreciate good teaching in the clinic but that was not what they always

received. Interestingly the opinions of the dental tutors often did not match that of the students and the dental nurses. In particular, dental tutors, or many of them, were not keen on interprofessional education, whereas students saw peers and dental nurses as useful resources for the learning.

The second paper was more of an evaluation of the first using dental tutors from around the UK to verify and confirm the results. The two most powerful recommendations were for improving the quality of chairside teaching and educational training for dental tutors doing it. From a phenomonographic analysis (after Marton and Booth, 1997) these dental tutors could be placed into five groups from general dental practitioners and subject specialist consultants to teacher trained practitioners and dental educational developers. Following on from this, one of the points the students made in the first paper was that their learning was improved when the dental tutor allocated to supervise them was well matched.

The higher education literature has been somewhat confounded by the issue of how learning and teaching is related to research. Certainly, some of the terminology has helped to create confusion. Also, academics from certain subjects have found that full integration of learning and teaching and research is possible and strongly advocate that it should be the same for everyone else.

I strongly make the case that "research led teaching" should mean research into teaching, rather than subject-based teaching that contains research. I map out where researchers and novice students might be placed in a discipline and find them both at the periphery: the researcher expanding the boundary and the novice trying to get in. I attempt to integrate this into Pratt's (1998) model of teaching biases and Brew's (2006) model of research themes in trying to hunt down the links between learning and teaching and research.

I tried out other ideas such as relating learning and teaching and research as separate professions and apply interprofessional style links between them. I am warned off calling different objects “the same” or “different” by Gergen and Gergen (1997). I then attempt, from Kolb (1984), to analyse the differences and similarities between appreciative apprehensions, largely linked with learning and teaching and a critical comprehension, linked with research. When writing this I did not have the benefit of the Trowler and Wareham (2008) analysis of the Nexus between learning and teaching and research and what it can mean to each. It is with this insight that I've developed a later section on the Nexus (1.6).

The review of periodontal research (3.2.1) was a straightforward description of a 20-year cohort of research and the stakeholder perceptions study (3.2.3) was a qualitative research study with a focus on the discovery or dissemination of ideas. These are two of four styles of research outlined by Galtung (1983), the others being the study of research processes and the research community itself. The further study of errors (3.2.2) and perceptions of UK tutors (3.2.4), although about and linked to research, were more evaluations of research and teaching, where evaluation is defined as “collection and analysis of quality information for decision makers” (Stufflebeam, 2007: 7). Sweet, Wilson and Pugsley (2008) (see 3.2.4) represent a progressive developmental mode of evaluation where “The evaluator’s primary function in the team is to elucidate team discussions with evaluative data and logic, and to facilitate data-based decision making in the developmental process” (see Smith 1994: 220 in Patton, 2011: viii). Sweet (2007b) (see 3.2.5) falls between all stools. In some ways it is research on the research community itself but is also a reflection on and evaluation of teaching practice and research.

1.5 Theme of Academic and Professional Development

The article “Opportunities in dental medical and veterinary education development” (Sweet, 2003c) (see 4.2.1) allowed me to draw together the issues that I thought were key for educational development in a healthcare University. Early in my time at Cardiff, I was supported by the Registrar (UWCM) jointly with the Staff and Educational Development Association (SEDA) to carry out a study to identify where educational development was taking place (4.2.2). These were exciting times with the creation of the ILT and initiatives taking place in Learning and Teaching forums that had not occurred before. I found that practically all educational development appeared to occur at departmental rather than School level, which might be worrying to those educationalists in Schools where departments are to disappear through reorganisation.

“Tools to share good chairside teaching practice” paper (Sweet et al., 2008) (see 4.2.3) represents a classic attempt by an educational developer to help others to make a difference in their practice. It is an attempt to articulate what dental clinical teachers can do to improve their practice. It sets the scene with a clinical scenario, which is followed by an explanation about each section of the paper and why it demonstrates good practice. In addition to this are provocative questions, along the lines of those advocated in appreciative enquiry, to help the teacher develop and innovate - to move on from their current best practice and to imagine what might be encouraged to implement change.

“Arousing a debate on standards with a bricolage of imagery and text for Reflective Practice” (Sweet, 2010b) (4.2.4) is pitched at a different level. This is an article for educational developers. This serves to indicate the subversive element of educational development – the breaking down of presuppositions. The paper describes a rather high risk strategy of presenting participants at a conference workshop with a group of images depicting a free flow of ideas on standards and text from Victorian epic prose which talks in great length about “national standards”. By breaking through the normal contextual

elements and by introducing an unusual bricolage of imagery and myth, it was possible for the participants to throw caution to the wind and engage in a wider conversation about standards. Voicing their thoughts and feelings as they did, it was as if they were "on stage" and able to pull away from the old assured realities.

"Aligning Progress Files and Personal Development Planning to times of Transition" *(Sweet, 2010c)* (4.2.7) tries to make sense of concepts of personal development through consideration of the eclectic mix of ideas and materials that were presented to educators in Higher Education when the Dearing initiatives were being first introduced. I fear that this initiative has lost its way and has been generally under theorised. I attempt to place the innovation back on track suggesting how a suitable journaling method could be utilised. Under theorising or mis-theorising I thought led to weak positions on personal identity especially where there are strong institutional pressures to identify with subject research in disciplines (4.2.6). I originally saw the interest and position I was taking on the harm to animals in the animal experiments as a personal ethical viewpoint (4.2.5) and much of my understanding and practice of reflection was individually based. It was only on writing articles to clarify and expand my horizons that I could see ethics and reflective practice as important cultural entities in Higher Education that I explain more in the next two sections.

1.6 Nexus – links or bonds

Links or bonds between concepts and manner of writing are first analysed within the original project themes in section 1.6.1 and then specific links between themes are explored and identified if present within the exemplar articles in 1.6.2.

1.6.1 Reflections On Theme Articles

Learning and Teaching and Curriculum

The first three articles (2.2.1, 2.2.2 and 2.2.3) are set in the mainstream of learning and teaching. The focus is on the individual students and their learning and the provision of suitable teaching materials as a resource to facilitate learning. The emphasis, in essence, is on the academic growth of the individual and how the environment around the student can be a stimulus for learning. The essential values must be towards the individual - a focus on creating a future. This learning environment is protected by the teacher and kept appropriate for the learner through an active process of continuing reflective practice. The Staff and Educational Developers Association (SEDA), which has published a set of values that incorporate respect for every learner, have made this process more explicit (see Table 1.6.1-1). The way that students learn demands that teachers sustain a collective scholarship of learning and teaching.

Table 1.6.1-1 The SEDA Values

an understanding of how students learn
a concern for students' development
a commitment to scholarship
a commitment to work with and learn from colleagues
a practising equal opportunities
continued reflection on professional practice

In sum, this represents a collective effort to help individuals learn. Curriculum, however, on reading the articles, is more involved with the setting up and experience of courses organised for students as the students' experience is determined by their learning and the efforts of academic developers to provide learning resources and a learning environment for them. On the one side is curriculum as defined by Kerr (1968) including

all the student experiences both inside and outside the educational institution and on the other side the curriculum as defined by Barnett and Coate (2005) emphasising the role of the academic organising it. However, curriculum from this viewpoint can extend beyond the local remit of students learning and teachers teaching although it helps make this possible.

Research and Evaluation

The research articles clearly set out to establish either an overview and understanding of the nature of a narrow genre of research (3.2.1) or to elucidate the perceptions of all those involved in dental teaching at the chairside in one dental school (3.2.3). The evaluations (3.2.2 & 3.2.4) were using research tools within the context of determining what decisions should be made concerning the conduct of research in relation to error (3.2.2), and whether the findings in one dental school could be extrapolated to dental schools more widely in the UK (3.2.3). Article 3.2.5 on "Research-led: pedagogy lost or found" is one of two articles I wrote in 2006 on the dominance of research in Higher Education and problems it could create for the status and conduct of teaching in Higher Education. I tackle the same issues from a perspective of personal development and quest in 4.2.6.

Academic Development, Reflective Practice and Ethics

Academic development

Academic development entails a collective journey that educators take in attempting to understand their role in improving and changing educational systems and role in helping others become good teachers and researchers. It differs from straight research because it entails working with individuals in their practice as well as organisations and an advocacy is assumed. It contrasts with personal development, which entails a personal self-development approach. This is the section that seems to be missing largely

from the current Higher Education agenda. Without personal development, the possibility of linking higher education with the inner quest is lost. Students can become alienated and lost if they do not find a means of relating their learning activities to how they feel about themselves, whereas, educational development entails relationships with groups of individuals and institutions. A clear set of values (SEDA, 2010) has built up over the years about supporting students within the wider framework of supporting staff and institutions. Concepts of academic development are not universally approved of or liked and part of this is as Mills and Huber (2005: 17) say about scholarship of learning and teaching that a "new conversation about cultivating a pedagogical imagination is occurring at a 'meta-level' in relation to the primary dispositions we have in our disciplinary practice." It is being able to see beyond discipline confines and reach for a generic approach, which is demanding and challenging. As Webb (1996) reminds us development must often include that of University systems, as much as if not more than, inducing individual change.

The first four articles were written clearly in the academic / educational development genre. 4.2.1 described a potential educational development unit at a Healthcare University, and 4.2.2 reported on research that indicated educational development was taking place at department rather than school level. 4.2.3 provided tools for dental tutors to use to improve their teaching and 4.2.4 was designed for educational developers to model methods to rid presuppositions from programmes. 4.2.7 was an attempt to assert the need to consider individual development in University life other than questioning motivation on entry and for employment on exit and to review the value of the Progress File initiatives stemming from the Dearing report of 1997. 4.2.6 argues for multiple ways of working but a single personal academic identity and the occasional use of identification, but to be wary of overpowering research themes in Higher Education. Analysis of the articles originally clustered in Academic and Professional development

revealed two further genres within this theme of ethical considerations and reflective practice, which were demonstrated in 4.2.5 and 4.2.8 respectively.

1.6.2 Specific Links Between Themes

Learning and Teaching and Research

There is a large and vocal literature on possible links between Learning and Teaching and Research in terms of a "nexus" (Jenkins et al, 2003; Healy, 2005; Neuman, 2002). However, from the analysis of my exemplar articles, these two themes are poles apart. Some very successful teaching reported was "research like" (2.2.1) following the recommendations of Elton (2005) but the care and direction towards the goal of student learning from self exploration and presenting findings for peer appraisal is achieved through a teaching programme that follows the SEDA principles rather than a research proposal. The teaching described resisted the temptation towards massification to make teaching manageable and predictable as production research modelled on previous research with an all-consuming need to publish in a discipline. The publication of the reusable learning object investigation was more educational scholarship and reporting on good practice than research. This could contribute to research-led teaching used in the sense I advocate in 3.2.5.

The research in Periodontology (3.2.1) tended to be one off pieces of work often in collaboration with a mentor when the researcher was just starting. The pieces of work were reported along a standard pattern but each showing or confirming a new finding. Even the research into chairside teaching (3.2.3) needed the input of students to gain authentic information on their perceptions, but to pursue this topic intellectually and analytically would most likely not aid their education in becoming a dentist. Bruffee (1993: p34) makes the point that "Only when ethnic background, personal incompatibility, or social immaturity gets in the way of working on the task will it help for

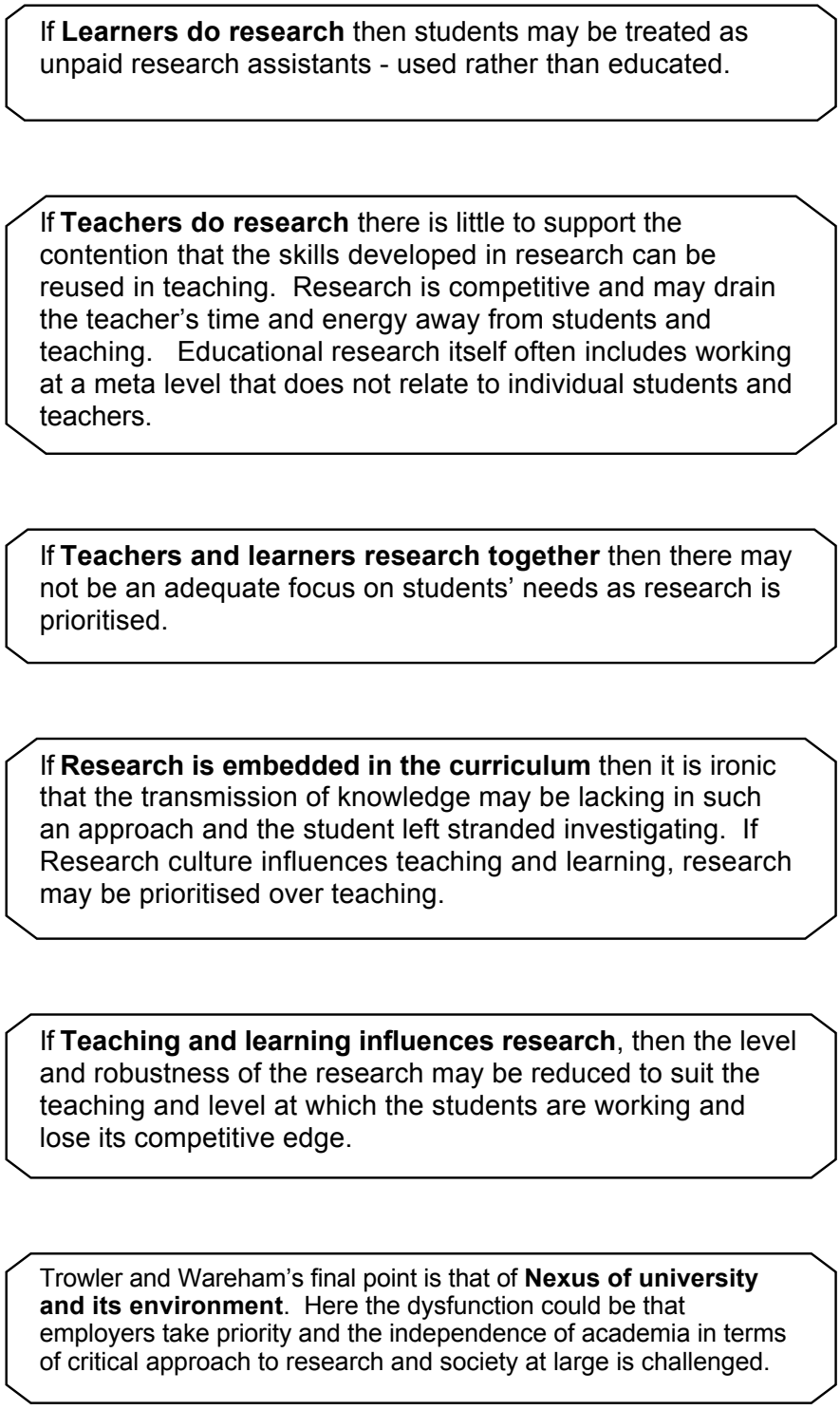
teachers to call attention to the process as opposed to the task". So learning is best kept on track by the provision of learning goals and does not need to delve into the educational process itself except when learning is not happening through cultural blocks and misunderstandings. Especially for vocational education it appeared that a research option could be a valuable part of a learning process but that the kinds of research that I was conducting and reporting on would be better as postgraduate work. In addition much of this entailed collaborative research team approaches that may not even fit taught or research programmes directly.

So there is little in my analysis to support Neuman's (1992) findings for a tangible connection that relates to the transmission of advanced knowledge and the most recent facts from research to teaching or a global connection at departmental level. In particular there was no evidence for the intangible connections she relates except for the "research like" activity, which was clearly demarcated within the undergraduate course in 2.2.1. I have found Trowler and Wareham's (2008) analysis of the "teaching-research nexus" to be the most articulate and useful guide to this area yet.

They make clear what essences of education might be lost through tight connections with research. They call them dysfunctions, which is a good term as it is if the authors are considering cultural issues rather than considering "disadvantages" in a sense of narrow cognitive ideas of learning. There is no one relationship between learning and teaching and research shown in Figure 1.2.6-1 that is without possible difficulties in general terms. All these situations could work if local conditions and support are in place to avoid the likely errors that tend to occur. From this and my own research findings, in general terms, teaching should not be closely bonded to research but instead be "research like" as in 2.2.1 where there should be a focus on appropriate teaching materials that focus on student personal development.

Figure 1.6.2-1 Nexus possibilities

adapted from Trowler and Wareham (2008)



Learning and Teaching and Academic and Personal Development

Much of what academic development is about is the support of the educational processes of learning and teaching and research as a meta-level activity at and beyond the boundaries of disciplines. As reported in 4.2.2, D'Andrea and Gosling (2001) advocated six roles for an educational developer: institutional management of teaching and learning; curriculum development and planning; innovation of teaching and learning strategies; support for student learning; support for research on teaching and learning; and development of academic staff, as being important constituents of educational development work. Evaluation is a topic they do not identify separately but which is an important component (MacDonald 2006 and 2009). Academic development has been advocated as a term with a slightly wider remit towards support for research and teaching generally in fact "all encompassing" (MacDonald, 2009). In my theme, writing it is seen as an activity that spans and encompasses disciplines and not to be seen as a discipline in its own right, but working at a "meta-level" (Candy, 1996). One of the redeeming features of academic developers has been the way in which collectively they are seen to be a supportive network always ready to give advice from their own experience. Whilst being good mentors and coaches there has until recently been some neglect of self-development. During the last 10 years there have also been calls within the community for more rigorous scholarship and at the SEDA Conference in November 2010 for more articulate engaging with theories such as social constructivism (Cousins, 2010). As a member and executive member of SEDA for some years, I have experienced tremendous moments of support in practical ways for instance, to edit a publication (Sweet, Huttly and Taylor, 2003) and try out educational group activities and gain feedback (2.4.2, 6.2.16, 6.2.26) and to pick up new ideas (especially on evaluation and appreciative inquiry).

Academic Development and Research

Academic development as educational development has established itself as having an evaluation role in learning and teaching (MacDonald, 2006). Gibbs (2001) in particular has advocated that Academic Developers research their practice so that there is a stronger evidence base of what they do and the impact that they may have. 4.2.2 was a pilot research project on loci of educational development. However, 4.2.5 presents an ethical evaluation of research work. I see this as part of the role for academic developers. The academic developer is able to take a critical meta-view of the issues and make judgements based on the evidence that is available. This position for the academic developer will become more robust as academic development itself becomes more researched whilst continuing its characteristic soul searching and self-questioning.

1.7 Models and metaphors an overview

Because of my quizzical approach to educational models Tony Brand persuaded me to propose that educational models were more an abuse than use in a debate with him in 2005 at a SEDA Conference 6.2.27 (see conference number 27 in the conference list in the appendix in section 6.2.) He advocated the use of educational models whilst I proposed that they did more harm than good. One appalling feature I criticised was their continual mis-appropriation (for example, see 2.2.2 for misuse of models by Kolb (1984) and Dreyfus and Dreyfus (1986) in 4.2.8). However, as can be seen below I have since weakened or become susceptible to a more reflexive approach. The collection of exemplar articles makes up a personal discourse on higher education activity that I have brought together and from this I have derived a model for Higher Education based on the three major activities of Learning and Teaching, Research and Academic and Professional Development. This is one aspect of reflection mentioned by Willis (1999) of herding ideas together. However, he mentions a further reflective method, which is to

allow whatever images are constructed in the mind's eye and derive a meaning from this. The net result of this kind of reflection was to see a graphic model take form for these major activities (see Figure 6.1.1-1). First of all there appeared a division between the '*individual activities'*, which could be placed below a horizontal line, and wider '*matters of the world'*, which could be placed above it. Learning and the facilitating of learning are to be seen primarily as individual activities and be placed below the line, whilst research, generally speaking, can be seen as discovery in the world. A similar contrast could be made with personal individual development below the line and academic development, which would give a collective voice to developmental activity, above the line. And so " the model" for Higher Education was born with half the space dedicated to learning and teaching and research and half to academic and professional development (see explanation for the Model in 6.1.1. and graphic as Figure 6.1.1-1). I can look to the literature for support for using models. As Skemp (1979) points out, the more inaccessible the direct perception we have of a system we are trying to understand the more we need the support of appropriate models. Shannin (1972: p19) explains how modelling can be used as an exploratory device of scholarship. Modelling, "to bridge the language of theory and that of empirically collected data" allows things to be seen in a new light because a memorable metaphor can bring two domains together into cognitive and emotional relation by using language directly from the one as a lens to see the other.

1.7.1 Presentation and Comments on the Modelling article 6.1.1

I presented the paper 6.1.1 at the HERDSA Conference in 2007 to a few dozen attendees who were quite vocal with their comments during and after the session. With their permission I audio recorded my presentation and their comments. Following the presentation of this paper in Adelaide, Australia, a member of the audience let me know

how empowering she found the emphasis on personal and academic development to be in the model, to support University education beyond subject centred interest. She said:

> *"I'm in academic development at a university. In a very selfish way I would say that this can affect my position. I can take this to Deans of faculties about higher education. Looking at it again I think it can be a tool to disempower those who see their discipline expertise as knowledge, knowledge of the discipline - as the space - as the authority. Because in conversations I have had with Deans in particular, and academics who are in teaching, they always wield this authority of their subject expertise, you know." (Anonymous participant 1 HERDSA, 2007)*

However, there were few in the audience prepared to take on the model in such a moving and positive way. Another female developer was quite vocal taking exception to such a definite division between individual and academic development at the start. But after a little time came back with the following comment where she said:

> *"I realise now why I thought that was in the wrong place -- yes we are the last persons to get developed" (Anonymous participant 2 HERDSA, 2007)*

She was beginning to realise the nature of personal growth and the importance of personal autonomy, which is largely neglected in Higher Education, even by academic developers. The major thrust of the argument for the model I proposed was that there are three major autonomous activities that contribute directly to Higher Education, learning and teaching, research and both individual and collective development. These activities were allocated spaces in the Higher Education model.

A number of other participants were quite affronted by the prominence of development as a major space for activity in Higher Education. In addition, they found generic activities which I named "borders" in the model of curriculum, reflective practice, ethics and evaluation equally unsettling. The perceptions of these participants were of a University where staff and students were "reading" a particular topic and that alone. The "development space", in particular, created in the education model then becomes not

only an annoyance but also a threat to their monoculture. This position is equally vocal and most eruditely expressed by Mills and Huber (2005). Perhaps the personal nature of this model needs to be emphasised more than in the conclusion where it is suggested that individuals construct their own nexus in Higher Education. The model is clearly related to articles that express my views and feelings in a particular context of time and small topic in health care. This is a potential limitation of the model for others in Higher Education, organising and constructing their scholarship. In the model, explanation by use of a nexus is effectively replaced by the four border concepts of evaluation curriculum reflection and ethics, which take up the bonding - linking role, so that the label "nexus" could be eliminated from the figure 6.1.1-1.

What should be added?

One particular feedback comment that came up time and again about the model as presented in 6.1.1-1 was that the participant would have liked overlaps in the form of Venn diagrams, rather than the definite boundaries in this model. At first sight the Venn appears to be a pleasing way to merge, subsume or relate activities too. However, there are many advocates of keeping clear borders or boundaries. One of the most spirited is Bauman (1972) who states that clear borders make the world comprehensible and Bruffee (1993, p122) says "two scientists can only reconcile their incompatible assumptions by a boundary conversation in terms that is non-standard to them both". Venn diagrams purposefully fudge border differences and further toleration rather than reconciliation of differences. Venn diagrams produce little gain except for a feeling of conflict avoidance. It was Schön who stated that Venn diagrams "leave the practitioner essentially stuck in a rut with no expressive power" (Schön, 1963). Surprisingly then, Venn diagrams rarely represent a progressive position and tend to foster the status quo!

Social Arena (SA) and Social Worlds (SW) Theory

At the time of writing the article I had not come across SA and SW theories (Clarke, 2009), which could provide a further framework or alternative to the concepts of spaces and borders. The Social Arena could be Higher Education and the main autonomous themes of Learning and Teaching, Research and Academic and Professional Development could be Social Worlds within that. SW theory ensures that the non-human world is taken fully into account. It is also closely linked to Boundary theory in which boundary topics are negotiated and shared by two or more Social Worlds (Star and Griesemer, 1989).

1.7.2 Future professional development as a research practitioner

My future development includes funded projects listed in 6.3 and development of some topics, which until now have been marginal. I have tested the waters to get some feedback with conference presentations outlined in 6.2. I was asked to "come up with something different" for a group of dental practitioners at a postgraduate training day in Cambridge. This gave me an opportunity to evaluate empirically group activity that is "knot like" (Engeström, 2009) where there is a regular changing of membership. This contrasts with orthodox views of static team building approaches (6.2.6 Vocational Trainers Study Day "From Teams to Knots" Eastern Deanery, Cambridge May 2009). I think there is much to be gained from investigating how static are successful dental practice "teams" and hope to research this in connection with the dental tutor training chairside teaching research.

I have been experimenting with alternatives to standard qualitative software where the researcher decides on suitable coding on analysis. A relatively unknown piece of software from France called Alceste provides automated coding based on linguistic computation. In collaboration with a colleague from Bedfordshire University I presented a paper on "Using self-coding text analysis software to evaluate student coursework" at

the SEDA Conference Brighton in May 2009 (6.2.5). This approach offers great promise in providing insight into relationships that avoid the presuppositions of the researcher. I am working on perceptions of students versus those of staff with reference to interprofessional education. These interpretations will be a next stage in the ergonomic investigations following on from presentations made at the Annual Meeting of the European Society of Dental Ergonomics (ESDE) in Cracow also in May 2009 (6.2.8).

Funded projects

"Collaboration between Subject Centre Health Education Developers' Special Interest Group and SEDA" is the title of a funded project to investigate what is "special" about Medical educational development. Also how or whether medical education should be integrated more with generic academic development would be best answered if their differences and similarities were more clearly understood. I am making a start on this topic by conducting a research project (6.3.2) to gain the views of those who have participated in a series of Higher Education Academy Subject Centre for Medicine, Dentistry and Veterinary Medicine (MedEv) workshops for educational developers in medical education.

"Investigating the educational and training needs of dental chairside tutors in the UK and producing Guidelines for their Initial and Continuing Education" is a project that continues the research that led to the British Dental Journal articles on chairside teaching. This research entails focus groups and a questionnaire survey and culminates in a second UK chairside teaching conference, which has been booked for June 2011. This represents the last of three tranches of funding for Chairside teaching research from The Higher Education Academy Subject Centre for Medicine, Dentistry and Veterinary Medicine (MedEv) (6.3.1, 6.3.3, 6.3.8).

Following is a project that will be funded by the participants of the workshops:

With my Progoffian Intensive Journal Advanced Studies completed in 2010 I am certified to conduct Intensive Journal Workshops in the UK. After 25 years using it as a method of reflection and long standing training programme completed I am keen to offer to facilitate workshops and conduct research into how it can best be integrated in the Higher Education context and extended through e-learning tools.

1.7.3 Conclusions

I have systematically traced the development of scholarship in Higher Education in this thesis describing my position autobiographically and academically. Much of the work in this collection of papers entails new knowledge discovery. Most is not to be taken in the sense of exploring new green field sites. There are not that many new areas left in education except for areas such as Chairside teaching in Dentistry which I helped to initiate in the ground breaking papers (2.2.1, 3.2.3 and 4.2.3)

"The world is out there - but the descriptions of it are not" (Reed, 2007)

Much of the work entails returning to this description. On looking through the corpus of the thesis work I can identify 20 key outcomes that go someway towards answering the original questions raised in the aims to trace the contested scholarship between three themes of Learning and Teaching, Research and Academic Development (see Figure 1.7.3-1). I can now show how I understand their nature and relationships in Higher Education and in particular where I have made a significant contribution through my work. The statements on learning and teaching (see box 1 in Figure 1.7.3-1) show an emphasis on readiness and process. Here there is a focus on activity and engagement with learning as teacher or student. Educational theory and currently marginalised topics are both seen as resources to help take the next necessary turn or challenge. The second box in Figure 1.7.3-1 outlines the research conclusions. I admit the current dominating position that research holds in Higher Education but have challenged this conceptually. I have shown that teachers should take every opportunity to carry out

research into teaching, especially when it covers a new area and to value appreciative inquiry. The third activity space of personal development is shown in box 3 in Figure 1.7.3-1. This is a generally neglected but important space in Higher Education. I argue that it is essential for persons to position themselves and search for their own identity rather than take the quick fix of identification with another person, culture or profession alone. I have argued that this can be strengthened with the right kind of stimulation from neighbouring spaces such as learning and teaching shown in the scholarship model and modes of reflective practice such as the use of the Intensive Journal. The most comprehensively filled box in Figure 1.7.3-1 is box 4 headed academic development. This is probably not surprising because of the nature of academic development. It classically has a practical feet-firmly-on-the-ground approach that allows its practitioners to help others in Higher Education directly on an individual or small group basis. It is also developing a more meta-level approach as academic development attempts to contribute to understanding of organisations and individuals through modelling such concepts as standards. It also has a role of contributing to an understanding of the 'whole picture' of Higher Education, exactly the process of modelling scholarship attempted here. I also argue that with increasing maturity academic development has more than a role of inducting young researchers and teachers. It should also extend its meta-level role to that of evaluating Higher Education and that this should also include research. Boxes 5-8 in Figure 1.7.3-1 contain the four border topics that were identified in the analysis of the exemplar articles. Reference to the scholarship model shows how these topics play a key role in providing the links or bonds between the major activity spaces in Higher Education. Clearly research tools are used by academic developers to evaluate a curriculum. The model invites the balancing process of academic developers evaluating research as mentioned above. I have shown that curriculum needs to span learning and teaching into the resources for academic development. I have also

demonstrated how individual and group reflective practice in teaching links with personal development. I have also argued that as persons enter research so they need to engage with ethical issues if their research has the potential to encroach on others' interests.

Journey's end or new beginning

The process of constructing the thesis was made from a proposal to trace my own scholarship. It provided the impetus to finish drafts that were lingering unfinished. It encouraged me to take in more feedback more carefully from my peers and value academic collaboration. Reflection on it delivered an educational model in which I was able to pull out the space needed for individual journal work and an academic development portfolio. The largest joy for me has been to be guided by my mentors whilst at the same time feel that this has been entirely my own work without compromise.

Outline completed

This is the end of the Overview of the thesis as shown in Figure 1.2.1-1. Each of the major activities are analysed next in sections 2-4, by reviewing exemplar articles for each theme. The activities are section 2, learning and teaching, section 3, research and section 4, development, academic and professional.

Figure 1.7.3-1 Thesis outcomes and scholarship model

Thesis outcomes

1 learning and teaching
Getting to the quick of the assumptions, keep the talking and writing in terms of activity rather than normalisation into concrete outcomes that can go nowhere.

Seeing active ways of developing learning in something proscribed and static.

Presenting relevant educational theory in ways that are readily available.

Maintaining an interest in marginalised topics, which may prove more important in the future as collaborative research projects such as ergonomics, interprofessional education, ethical theories, use of qualitative methods with automated coded data analysis based on linguistic theories.

2 research
Standing up to the dominance of subject-based research.

Integrating development (but not all) within disciplines so subject specialists can be brought on board rather than feel threatened and ostracised.

Undertaking collaborative qualitative research into my educational practice as a greenfield site, and evaluating the results against views taken nationally.

Retaining respect for what critical and appreciative research can achieve in learning rather than normalising the activity into a physical research entity that somehow should be feared and respected

3 personal development
Retaining the focus on individuals in teaching but within the context of good citizenship and emphasising the approach to learning that sees it as seeing things in a new light rather than absorbing knowledge

Supporting Individual development exemplified by facilitating Intensive Journal workshops.

4 academic development
Articulating the activities in Higher Education in terms of a graphic model.

Advocating curriculum, reflection, ethics and evaluation as means to bond and link the more autonomous topics of learning and teaching, research and academic and professional development.

Retaining the characteristic friendly supportive networking pan-organisation pro-person approach of academic developers and to further its values and objectives.

Undertaking detailed reviews of scientific research in my discipline.

Articulating the role of academic developers in evaluating research.

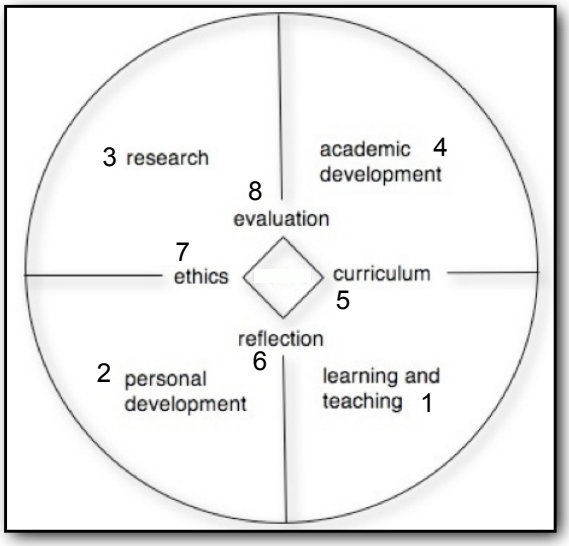
Modelling exploratory concepts of standards with educational developer colleagues.

5 curriculum
Defining and articulating curriculum for all stakeholders.

6 reflection
Articulating, practising and facilitating individual and group reflective practice methods.

7 ethics
Questioning methodologies and ethics of scientific research in terms of error and harm.

8 evaluation
Undertaking an appreciative review of a corpus of academic work and practice using a Grounded Theory approach.



Activity spaces

2 Learning and Teaching

2.1 Introduction to Learning and Teaching

Learning and Teaching is the first writing activity reviewed. Introductory comments and summaries are outlined here in section 2.1 and the exemplar articles prepared for publication follow in detail in section 2.2. Firstly, each article is introduced briefly, indicating its reference section number used in this thesis (explained in the writing conventions section in the front matter on page 9), publication status and reason for selection. A full list of exemplar articles is given in the reference section 5.2. References for all the articles can be found in section 5.1.

2.2.1 Sweet, J., and R. Ellaway. (2010) "Reuse as heuristic: from transmission to nurture in learning activity design." Innovations in Education and Teaching International 47: 215-222.

In this article, I report on how I changed a protocol for the study of the effectiveness of the use of reusable learning objects, from one of teacher centred, to that of student centred. I showed it provided an opportunity to develop a student self-regulated learning design, which contributed to and deepened an environment of evidence-based practice. The modified format produced materials, which were consistently positively received by peers, sometimes for the informative content, sometimes the insight and new ways of looking at the world of work, and on occasion, for the finish of the communication outcome.

2.2.2 Sweet J, Wilson J, and Pugsley L. (2009) “Educational Innovation for Dentistry” British Dental Journal 206: 29-34.

Subject specialists, who have relatively little interest and training in education, dominate dental education in the UK. This paper presents an opportunity to show how educational theory can be applied or have any relevance in dental education. In some ways, it is a plea and an agenda for change and for the professionalisation of dental education in the UK. The central place of the learner, and how learning can be facilitated from a psychological and sociological point of view, is recognised and how different styles of teachers can impact on the learners. Central to the possibilities of change for the better, is the argument for widening and strengthening the scholarship of learning and teaching.

2.2.3 Brown R, Sweet J. (2003) Learning environments - a teacher's strategy. In: Sweet J, Huttly S, et al., and editors. Effective Learning and Teaching in Medical, Dental and Veterinary Education. London: Kogan Page, pp 150-63.

Learning Environments - a teachers' strategy, is a joint chapter written with a dental technologist who was a practical innovative teacher. I tend to work from theory out to practice, so we combined our skills and knowledge, to draw out a range of concepts on how we were facilitating students learning. We reported on the theoretical evidence we could find for the practice, finishing with down to earth practical examples. The chapter illustrates how teaching, from either theory or long standing experience, can produce useful strategies, which are not immediately recognisable from just a deep study of the discipline itself.

2.2.4 Sweet J. (2003) Curriculum. In: Sweet J, Huttly S, et al., editors. Effective Learning and Teaching in Medical, Dental and Veterinary Education. London: Kogan Page, pp 51-70.

In this chapter, I criticise what I call extreme curricula, centred almost exclusively around lectures, problem-based, virtual or competency, that have been put forward for the healthcare professions, finding no evidence that any one is superior. I advocate a curriculum that is realistic and workable and takes into account all-stake-holders. I

model a community, which recognises and values the various people involved. The community has four main branches of student, teacher, patient and co-professional which inter-link. I submit this as a more rounded approach than those that purport to be student-centred and problem-based, as a reaction to the traditional didactic approach.

2.2.5 Sweet, J. (2010) Inclusive curriculum by including the patient prepared for submission to Learning and Teaching in Higher Education.

In this article I attempt to broaden concepts of "inclusive curriculum", by including the patient in the undergraduate dental curriculum, based on third generation concepts of inclusivity. This article is at first accepted, and then finally rejected by the journal editorial board. Innovations also include recording and acting on patient global perceptions of quality of life, as related to their dental condition and to specific dental therapeutic experiences.

2.2 Exemplar articles

2.2.1 Sweet, J., and R. Ellaway. (2010) "Reuse as heuristic: from transmission to nurture in learning activity design." Innovations in Education and Teaching International 47: 215-222.

Abstract

In recent years a combination of ever more flexible and sophisticated Web technologies and an explosion in the quantity of online content has sparked learning technologists around the world to pursue the promise of the 'reusable learning object' or RLO with the idea that RLOs could be reused in different educational contexts thereby providing greater overall flexibility and return on investment.

In 2002 the ACETS Project undertook a three-year study in the UK to investigate whether RLOs worked in practice and how the pursuit of reuse affected the teacher and their teaching. Teachers working in healthcare related subjects in Higher and Further Education were asked to create an original learning design or activity from third-party digital resources and to reflect both on the process and its outcomes. The expectation was that teachers would be the ones selecting and reusing third party materials.

This paper describes how one of the ACETS exemplifiers reinterpreted this remit, challenged the anticipated transmissive model of learning, and instead, gave their students an opportunity to create their own original learning designs and learning activities from third-party digital resources. By describing the educational enhancements, the resulting heightened levels of critical thinking, and sensitivity to patient needs, "reuse" will be shown to be an effective heuristic for student self-direction and professional development.

Introduction

The growth of the World Wide Web has been one of the defining phenomena of our times. In less than ten years it developed from a way for physicists to share research data to a way for millions of people to conduct business, leisure, education and many other information-based activities. This rapid growth has had many dimensions but of particular note has been the rapid development of sophisticated Web technologies and systems and the proliferation of online content, some digitised from existing sources, much of it created specifically for and in the context of the Web. In recent years this has led learning technologists around the world to pursue ideas of 'reusable learning objects' or RLOs with the idea that they could be used and reused in different teaching contexts, thereby providing greater flexibility and return on investment. For the purposes of this paper the IEEE (2002) definition of RLOs as "any entity, digital and non-digital, that can be used, reused, or referenced during technology supported learning" is used.

Despite extensive discussion of the potential benefits of Reusable Learning Objects (Littlejohn, 2003; Wiley, 2000; Quinn & Hobbs, 2000) there has been little evidence available to substantiate any practical benefits in pursuing a reusability approach in teaching and learning. The ACETS (Access, Catalogue, Exemplify, Test and Share) Project was funded as part of the UK's Joint Information Systems Committee's (JISC) X4L Programme in 2002 to collaborate with teachers in Higher and Further Education to explore means of engaging with the reuse of third party materials and the effect this had on their practice (Ellaway, et al, 2005). ACETS commissioned twenty exemplar projects from teachers working in healthcare-related subjects throughout the UK Higher and Further Education communities. Each exemplar case study was to be based around the creation of an original learning design that employed third party digital materials. The creation of each exemplar case study was to incorporate both formative and summative evaluation of each teacher's activities and experiences and was to contribute to an

overall meta-analysis of the issues associated with reuse in the tertiary sector as a whole.

This paper describes the development and results from one of the ACETS exemplar case studies that challenged the anticipated transmissive application of reused materials by adapting reuse to be the core heuristic instead.

Rethinking reuse and learning activity design

The ACETS Project recommended the following five-stage reporting protocol for the development of the exemplar learning activities:

1) identify a single learning objective and find the resources needed to support it
2) plan and design the learning activity using the resources identified
3) create and assemble the learning activity using the located resources
4) deliver the activity recording how it was used to enhance student learning and teaching practice
5) report back on the delivery of the exemplar study consisting of a baseline survey, a reflective diary, a semi-structured interview and a learning design statement.

Following this protocol, a conventional exemplar case study would entail the teacher identifying the learning objectives planning the design and completing the learning activity themselves and it would only be on delivery of the activity that students would become involved. The protocol is essentially a transmissive teacher-led exercise (Pratt, 1998).

By contrast, the project described in this paper required student involvement from the outset and continued throughout, building on past experiences of working together and their IT skills training, to give them the necessary skills and mutual support required to succeed. In short, the students planned their own learning activities in groups, each one creating patient education materials from reusable learning objects.

The student projects

This particular student activity involved 54 third year dental undergraduates (on the five-year training programme at Cardiff University) who had had nine months of hands-on

clinical experience as well as IT training in the form of the European Computer Driving Licence (ECDL) qualification, prior to this exercise. As a result these students started with appropriate levels of clinical experience to help determine what they should investigate and sufficient computer skills and academic understanding to tackle the technical aspects of the exercise.

The students worked in small groups (of between twelve and fourteen) and were given the option to choose their own topic within the context of 'communicating with the patient'. More specifically, each group was directed to create instructional materials of some kind to aid communication with periodontal patients. Each group was also expected to create supporting presentations to share their ideas with their colleagues. In addition, every student was required to keep a written reflective log on his or her progress throughout the course of the project. Each group was encouraged to select just one learning objective that their work would address and they were instructed to use third-party electronic resources wherever possible and to provide as much support as possible within their groups rather than rely on external input. Only if they got really stuck were they to contact faculty or IT support for help.

The project work was conducted in three stages:

- First of all they agreed on the topic they were going to follow and searched for third party materials to use in their work. After four weeks they gave a five-minute presentation to their colleagues showing example resources, learning objects or websites that they planned to reuse in their project. They also recorded personal reflections on what was helpful in their search and judged how successful reality of resource discovery compared with their expectations.
- The second phase involved the projects being worked up more fully with opportunities for collaboration encouraged and explored between the groups. This phase also saw the assembly of their various source materials and learning objects into their final outputs.
- The third phase began with each group presenting their finished materials to the whole class. This coincided with the students completing their personal reflections on how they had sought out their materials, selected what was of value and evaluated what they had learnt from the project. This was structured using the ACETS project's recommended reflective diary format.

Outcomes

An outline of the different communication materials produced by this cohort is shown in Table 2.2.1-1. About a third of the class decided to take up the topic of communicating about smoking, and five groups produced other patient orientated materials. However, three groups decided, after researching their topic in some depth, that it was more appropriate to produce communication materials for professional colleagues who would then be able to pass this information on to their patients as appropriate. One of the more innovative ideas was that of a newsletter for smokers as a way of engaging them with the basic message that stopping is good for you; in this case presenting one argument after another until they were persuaded to quit as well as giving encouragement to those who had already stopped. Two (male) students decided to study the relationship between periodontitis and low birth weight. They defended their decision to create a presentation, with a good handout for their colleagues rather than a leaflet communicating information to patients, pointing out that the current research literature provided conflicting evidence. A small group of students were worried about how to treat HIV patients and what advice they should give to them. Their original intention was to produce a poster and then a leaflet. However, they decided that a greater understanding of both gum disease and HIV and how it affects the mouth could be of interest to all patients, so that they developed a leaflet that was intended to be informative for HIV and non-HIV patients alike.

Presentation

The most common presentation format used was that of the leaflet. These were intended to be used to support communication in regular one-to-one clinician patient situations as well as in a more serendipitous way with patients selecting this information as and when appropriate. Most students were careful to place Website addresses, or telephone numbers at the back of their leaflet to enable patients to gain further help if needed.

The students mostly used the programs they had covered in their ECDL training (such as Microsoft Word and Microsoft PowerPoint) to produce their materials. However, a number had learned new tools and some used Microsoft Publisher in particular for leaflets, and one newsletter had been produced using Serif Page products. Only one student resorted to physical cut and paste.

One common problem identified was that the image quality and resolution on many Web sites was not of sufficient quality to be transferred to printed copy. For one group producing a poster, the facilitator arranged to supply some photographic slides, which were converted to a high-resolution digital format for the PowerPoint poster file. Another group were unable to source a suitable graph from the research literature to illustrate the point they were making. In this case the facilitator was able to find a journal article with a suitable figure for them. More generally the facilitator was able to assist a number of projects by suggesting changes of emphasis or priority when looking at the drafts of a number of the student projects. Some additional AV and IT help was also required to help the students to scan photographic slides, print the posters, and laminate the leaflets.

Student Reflections

Students' reflections were based around the ACETS exemplar reflective diary pro forma questions (see appendix to this article), which ask about the impact of the project from the point of resource discovery, the design process of reusing the learning objects, putting the design process into action and evaluating it, asking what was learnt and gained from it all, whether the participants were likely to try this kind of approach again, and finally the benefits and problems experienced and any advice that could be passed on to other students working in this area.

The written reflections provided rich insights into the content structure and success of the students' learning strategies. Student experiences of resource discovery were quite

variable, depending on their requirements. Clearly there were many Web sites on the subject of smoking that required their consideration, but when it came to specific medical or dental topics, search engines referencing academic journals such as PubMed proved more useful. There was also some unease expressed at the commercial nature and reliability of some of their sources. Although the students were designing their patient communication materials so that a layperson could understand them, the students referred time and again to the need to support these ideas with good scientific evidence. This was reflected both in their formative reflections and later in their presentations where they time and again related patient information back to scientific evidence. Such was the importance of this to the students, that on the occasions where they could not clearly relate advice to primary evidence, they were unwilling to proceed without communicating with professional colleagues to help them to interpret the partial information currently available.

The students' reflections on their learning designs and the resources they used involved both practical issues and a common realisation of the need to be able to work realistically within their own capabilities. The presentations provided an opportunity for the students across the whole group to share their ideas and experiences about reusable learning objects and patient communication. It gave them an opportunity to show their communication materials and to justify the way in which they were constructed. They could also share their reflections on their own projects and their reactions to the work of other presenters in the group. The reflections on outcomes and self-regulated learning illustrated how useful the group presentations were considered by the students and how seriously they took the need to teach and support one another.

Assessment

Although quality assessment for digital resources (such as those held by Merlot Research Group, Inc. at Merlot.com) are reasonably well established, a complex model

for evaluation of the learning objects was not thought necessary as part of this learning activity. Instead, a simple grading scheme was instituted for self, peer and facilitator appraisal with options of ‘unsatisfactory’, ‘satisfactory’ and ‘more than satisfactory’. The majority of the projects were deemed ‘more than satisfactory’ by student peers and the facilitator and none were found to be ‘unsatisfactory’ despite a degree of individual modesty.

Students and faculty concentrated on the learning and process and the collective product of materials, presentation and reflections they would consider were generally “excellent all round” or “very good overall but with few minor concerns” (using rankings from Merlot (Nesbit, Belfer & Vargo, 2002). There were very few projects given the mid range grade of ‘materials meet or exceed standards but there are some significant concerns’ and none were rated below this level.

Discussion

The emergent structure of self-regulated learning can sometimes impinge on the individual student who talks about not having their say in the presentation, despite being generally well disposed to the work in hand. In this student activity it was the presentations themselves, when the students were expressing their thoughts and feelings about their work, that it became apparent that many of them had been engaged with quite fundamental issues and had demonstrated substantial critical thinking and sensitivity to the subject which in turn had informed decisions about the format and content of their final product.

Overall, the projects were shown to have provided positive learning experiences for the students as they gave them ample opportunities to engage actively with one another and collaborate to integrate their thoughts and feelings into their work. The value of the project was, for some, gaining practical insights such as accommodating the special needs and experiences associated with pregnancy. To others it involved making

judgments about the appropriateness of materials for pregnant women on the relation between periodontal disease and low birth weight babies, or reflecting on possible stigmatization of HIV positive dental patients. To others it was about techniques of persuasion such as positive approaches to smoking cessation whilst avoiding scare tactics.

The most common reflective theme was around meeting the need for consistently high standards in clinical practice whilst recognising the value of communicating differently to different patients to accommodate individual needs. Although the information to be conveyed needed to be stated simply, each component needed to be verified from evidence obtained from primary scientific research.

Conclusions

From the teacher's perspective the ACETS project primarily provided a context and an impetus for developing their teaching skills from those of instructor to those of facilitator and mediator. This paper has described how it also provided an opportunity to develop self-directed learning designs, which contributed to and reinforced a culture of evidence-based practice for undergraduate dentistry students.

The approach adopted for this particular activity, and reified in the modified learning design, would be unlikely to work well in a transmission-mode learning environment where students expect to receive materials and instructions from their tutors. The benefits of this modified design are such that it is repeatable, scalable and can be incorporated into an existing curriculum. The project work can be undertaken by single students, or in pairs or threes or fours, and feedback provided as part of presentations to small groups or larger plenary sessions. The learning activities also produced materials which were consistently positively received by peers, sometimes for their informative content, sometimes for the way they provided new professional insights, and on occasion just for the quality of presentation of the activity outputs.

The resulting communication materials can go on to be the starting points for a number of subsequent learning activities within the curriculum. For instance, these materials can be reworked to support communication between colleagues or other clinical professionals, or developed to provide support materials for the whole professional team. The conventional and somewhat technocratic focus on reusable learning objects (Friesen, 2004) prioritises transmissive models based on teachers searching out and selecting the appropriate digital resources assembling them into new learning designs for their students to use. As a result the RLO process is largely conceived as being about the transfer of knowledge from the teacher to their students by means of these learning materials. This paper has presented an alternative, more self-directed, approach where students were required to take responsibility for their own learning and engage with the search for digital materials themselves. As a result, the students were able to take ownership of the topic, reflect on their own learning and make critical judgments about how they were best able to enhance communication between dental professionals and their patients. The reuse of digital content has therefore proved to be an effective (if initially unexpected) heuristic in supporting professional education and one that would seem to provide ample opportunities for further research and development. Furthermore, it emphasises the need for caution in taking the predominant technocratic and technological rhetoric regarding innovations such as RLOs at face value. Rather, the opportunities they afford can be used to widen the range and dimensions of professional teaching and learning.

Table 2.2.1-1 TOPICS AND MEANS OF COMMUNICATION

TITLE	COMMUNICATION TO PATIENTS	COMMUNICATION TO COLLEAGUES
Smoking and Periodontology		
How smoking affects the gums	leaflet	
Smoking cessation	leaflet	presentation
Smoking cessation	poster	
Nicotine replacement therapy	presentation	
Smoking and gum disease	newsletter	
Smokeless tobacco and a replacement		leaflet
cannabis		leaflet
Pregnancy smoking and low birth weight		presentation

TITLE	COMMUNICATION TO PATIENTS	COMMUNICATION TO COLLEAGUES
Other Topics and Periodontology		
Diabetes and gum disease	leaflet	
HIV and gum disease	leaflet	
Holistic therapies	leaflet	
Diet and supplements	leaflet	
Pregnancy and gum disease	leaflet	
Osteoporosis	leaflet	leaflet
Diabetes and hypoglycaemic attack		leaflet
Crohn's disease		leaflet

TITLE	COMMUNICATION TO PATIENTS	COMMUNICATION TO COLLEAGUES
Specific Topics in Periodontology		
Cleaning your teeth – which Website to look at	flyer	
How to prevent gum disease	leaflet	
Electric or manual toothbrushes?	leaflet	
Patient aftercare advice	leaflet	
Guided tissue regeneration	leaflet	
Mouthwashes and toothpastes		leaflet

Appendix ACETS Reflective Diary

Stage one: resource discovery: looking for and selecting third-party materials for use. Where did you look, how did you look, what did you find, how useful is what you found. Are there any restrictions on using it, do you have any other comments?

Stage two: preparation: designing the learning activity and how the reusable learning objects references or investigation will fit within it.

How do you go about the design process, what other resources questionnaires etc are you going to use, how does it all fit together?

Stage three: creation: putting it all together.

How do you put your design into action, what help do you need/get, what are the steps you take, how is the activity to be delivered and used?

Stage four: use and evaluation

How well did the activity go, was it effective, did it make things better than before, and how could you evaluate this?

Stage five: reporting and closure

How do you feel this project has worked for you; what in particular have you learned and gained from doing it? Would you like to carry out this style of project again? What benefits and problems have you experienced and advice would you like to give to others?

2.2.2 Sweet J, Wilson J, and Pugsley L. (2009) "Educational Innovation for Dentistry" British Dental Journal 206: 29-34.

Abstract

Over the past four decades, teaching and learning in higher education has been informed by a variety of educational theories. The various initiatives that have been introduced as a consequence have all sought to improve students' educational experiences. However, such moves have not always been successful, as a series of three articles that the authors produced on dental chairside teaching have demonstrated. The first of these investigated the stakeholders' perceptions of this teaching at one Dental School (3.2.3). The second evaluated chairside teaching on a UK wide scale (3.2.4), while the third provided educational tools to encourage collaboration among clinical educators to share good chairside teaching practices (4.2.3).

What this paper seeks to do is to locate each of these themes within the wider context of a theoretical frame highlighting the need for dental education to be underpinned by such constructs. The aim of this paper is to help ensure that an informed learning experience is achieved for all students engaged in Clinical Dental Education.

Introduction

This paper highlights some of the innovations that have been implemented in learning and teaching in Higher Education over recent decades and suggests ways in which these strategies can be adapted as useful resources for learning in Clinical Dentistry. Historically, educational practices focused on the individual learner. Increasingly the significance of social learning is being acknowledged. We argue that these theories make a vital contribution to an understanding of dental education.

It must be acknowledged that financial constraints will impact adversely upon the infrastructures available to support student learning, especially in the clinical context where a complex infrastructure is required to support chairside teaching and learning. Nevertheless, neither the value of quality teaching, nor the need for scholarship in dental education can be overlooked given the potential contributions that each can bring to this speciality. Clinical Dental Education is not merely concerned with teaching a range of techniques; it is a complex exemplar of situated learning drawing on a whole raft of educational theories and practices in order to produce competent, skilled and autonomous dental practitioners (Lave and Wenger, 1991).

In this paper we consider some of the theories underpinning dental education and explore the role of education research into stakeholders' perceptions of good practice in chairside teaching. This allows us to consider the ways in which scholarship can be developed to enhance the student experience and encourage reflective practice.

Theories of Learning

Much of the groundwork towards understanding learning and teaching was derived from cognitive psychology. For example, Ausubel (1978) showed that giving students an initial overview of a topic helped to enhance their learning. Similarly, van Ments (1990) showed the educational value of debriefing following teaching sessions. These findings have direct application to learning in dentistry. Clinical sessions could be restructured to incorporate both briefing and debriefing. We recognise that to achieve this the traditional high intensity of undergraduate clinical sessions may have to be modified to maximise learning opportunities, since repetitive clinical tasks will impact on opportunities for critical thinking. The single Dental School study reported in this series noted that where a systematic, focused debriefing session had been introduced and retained, students found it particularly useful as an aid to their learning.

Gagne (1965) equates learning with "performance change" and identifies eight phases of the learning process. Given the appropriate positive environment, the early phases of motivation, apprehending, retention, recall and simple generalisation may be achievable by the students themselves. Later phases, relating capabilities learned at one level to higher levels, and performance and feedback, are far more easily achievable with help from a tutor or mentor. What value then has this articulation of learning to clinical dentistry? It could be particularly useful for dental tutors to understand precisely where, when and how in the learning process they could be of most help to students. Recognition of the need to improve clinical performance may be even more important when designing clinical dental courses where self-directed learning is emphasised. Our studies reveal that, at certain stages of learning, dental students prefer help from peers or Dental Care Professionals (DCPs) (3.2.3). Also, at an organisational level we show that dental tutors need to be appropriately matched to different clinical situations (3.2.4). We were able to identify five categories of dental tutor: part-time practitioners, senior academics, intuitive teacher practitioners, teacher-trained academics and dental educational developers. The range of different skills, such as having a wide general practice experience, subject speciality knowledge, teaching ability and educational skills that such diversity brings to clinical teaching, will, if properly channelled, enhance students' learning experiences.

There is an extensive literature on the development of student learning, Perry (1999) traces a path of cognitive development for students from a simplistic categorical view of knowledge of right and wrong to a more complex view of their world, their relationships and of themselves. He came to the conclusion that student development is enhanced as much by the processes of learning as by the curriculum content. He argues that tutors commonly think they have only two options, either to praise or blame. In fact, there is a third and more powerful, option of 'recognition' - the acknowledgement of the learners'

engagement with the learning process. This, he suggests, creates conditions of respect and encouragement for the students that can help them to integrate new knowledge and improve their practical skills. Similarly, King and Kitchener (1994) have identified seven stages that lead to maturity in student thinking. They developed a system of rating scales that can be applied to written assignments to determine the level of reflective judgment that students have achieved (Kitchener and King, 1990). Newly qualified dental surgeons will need to have developed the skills necessary to allow them to identify and address the complexities of decision-making in dental practice. Using the King and Kitchener (1994) approach throughout undergraduate training can help equip graduate dentists with these skills. For Baxter Magolda (2004) a key function of higher education is to equip students with the knowledge, skills and attitudes that they will need in their future professional roles. With regard to clinical dentistry, this highlights the importance of the dental tutor role in facilitating professional behaviour in the student body. There is also a literature, stemming largely from the work of Knowles, on andragogy that characterises adult learning (Knowles and Holtonill et al, 2005). The key feature of this is that students play an increasingly large part in determining the content and objectives of their course (Mezirow et al, 1990). In dentistry, although the content of the course is largely determined by General Dental Council requirements (GDC, 1997), there is still great scope for changes to be made in the ways in which learning outcomes are written so that there is transparency and linkage across all elements of the curriculum. This can enhance student motivation and allow them to see how they can deal with tasks or problems in real life situations (Kolb, 1984).

A further breakthrough in understanding “learning by doing” came from the experiential learning literature. Kolb (1984) argued that learners, if they are to be effective, need abilities that correspond to four stages in a learning cycle:

concrete experience abilities,

reflective observation abilities,

abstract conceptualisation abilities

active experimentation abilities.

Many commentators on Kolb appear to emphasise learning as a rigid movement around this cycle (Moon, 1999; Hull and Mangan, 1994) and fail to credit Kolb's (1984) insistence that much learning involves a struggle and possible resolution of opposites across the centre of the circle. For instance, in a situation of "research" learning inquiry there will be a continual grasping of the *concrete experience* of observations towards *abstract explanations*, whereas clinical practice will make demands for *reflection on findings and evidence* reaching towards *active treatment planning* (2.2.4). From this viewpoint any individual will have strengths in particular parts of these dimensions and will need to develop the skills to operate across the full range if they are to be effective.

We have shown that, in practice, reflection is poorly developed in undergraduate clinical dentistry in the UK (3.2.3 and 3.2.4). Skills based theories currently prevalent in dental school thinking argue that reflection is of little value to both beginners who have little to reflect upon and experts who work intuitively anyway (Dreyfus and Dreyfus, 1986) Fortunately there are alternative theories of educational development as discussed later in the section on the Social Approach to Education. A learning style inventory to enable learners to discover their own characteristics can be useful (Kolb and Fry, 1975). However, there is a danger that students may feel constrained by the results of these findings, trapped by what they may incorrectly perceive as innate traits rather than modifiable characteristics. In reality all dental graduates will need to demonstrate a whole range of capabilities in order to effectively communicate with and treat their patients. Gardener proposed broader curricula to foster more rounded educational talents (reported by Smagorinski, 1995). A call to enlarge both the repertoire of

intelligences and the styles of engagement with learning could lead to a revolutionary shift in undergraduate dental education that would follow the medical example. This would ensure that in addition to a core curriculum, discretionary modules could be selected that would provide a level of creativity and excitement for the students during their training.

A discovering learning style is probably most useful for dental tutors as it reinforces the need for them to broaden their style of delivery and interaction to be able to engage most effectively with a wide range of different students. Adopting a more learner centred approach (Prosser and Trigwell, 1998) where the focus is on helping the student learn, rather than the teacher focusing mainly on the delivery and content of their discipline, can really enhance the student experience. Even more comprehensive is the Teaching Perceptions Inventory designed to allow teachers to summarise their ideas about teaching (Pratt, 1998), and so adapt their style of teaching over time in a more student focused way. Pratt (1998) proposed five perspectives of teaching (Table 2.2.2-1 Five perspectives on teaching) that vary from a transmission mode of delivery to a student centred focus which encourages self directed, autonomous learning. This model has been modified to relate more specifically to dental clinical teaching (2.2.1). However, our study showed that a majority of dental tutors had not analysed their teaching in this way (3.2.3 and 3.2.4).

To maximise learning, students need to know why and how they learn and that learning can be more effectively achieved by active engagement. Learning can be further enhanced by building elements of reflective practice into the course. Writers such as Schön (1983) and Boud, Keogh and Walker (1985) cover the use of reflection in depth. Mullins et al (2001) describe how reflective journals can be used with individual clinical dental students. Such use of reflective journals can help widen learning perspective and support the achievement of personal development goals (Progoff, 1992). Cowan (1998)

has advocated the use of more public reflections to enable students and staff to share their experiences of the learning process. This is a useful strategy to circumvent barriers to learning. Encouraging staff and students to share views on learning and teaching in a periodontal clinic has resulted in a greater understanding of how student clinics can be improved.

The significance of this whole literature has been brought together into a sequence of simple recommended steps for learning (see Table 2.2.2-2). Dental tutors in our single school study (3.2.3) did not emphasise the point that students must get into the right mood and get the overall picture before moving into the specifics of content (see Rose and Nicoll, 1997). Whilst some clearly wanted to organise the material for their students, most did not generally give guidance on how students could organise the material for themselves and so demonstrate that they had learned. Where reflection was encouraged the focus was generally concerned with things that had gone wrong, rather than on what was *then* learned, so that the student could be encouraged to take this learning forward to the next clinical encounter.

Social approach to education

For many theorists, learning encompasses more than can be explained using the psychological approach. Some views are that learning is not only based on activation of past knowledge (Schmidt, 1993) but rather is socially based and culturally determined (Bruffee, 1993). Taken to extreme, this would mean that learning is not so much about individuals simply acquiring new knowledge, but is about the process of social adaptation - of adopting the accepted patterns of behaviour of a discipline or profession. The added value of small group working in co-operation and collaboration (see Bruffee, 1993 and Jaques, 1996) could be explained from this viewpoint. Dialogue in small groups is critical for students' learning. By talking together in groups, students

experiment with being new professionals in an "intermediary culture" that supports the transition into a completely new culture of discipline or professional practice. Clinical briefing and debriefing sessions could play a useful part in this acculturation (Bruffee, 1993). Successful teaching needs to take place as an open dialogue, in a supportive environment that enables critical constructive feedback to be both given and received (Jarvis and Hoford et al., 1998).

If the curriculum is sufficiently flexible there are also opportunities for students from the different dental care professions to learn and practice together, creating interprofessional educational communities of practice that mimic real life working environments (Barr, 2000). Also, encouraging opportunities for 'learning communities' (Shapiro and Levine, 1999) of students who may not normally work or learn together may produce valuable learning outcomes. For instance, a study of physiotherapy, occupational therapy and dental students working together in the dental clinic revealed that the working postures they adopted in the laboratory, had not prepared dental students for the clinical environment. There were multiple individual variations (such as height and handedness) that impacted directly on their working postures. Ergonomic assessment tools enabled the dental students to become more aware of potentially dangerous static postures involved in their routine dental working (Sweet, Sweet and Locke, 2010).

The move to encourage lifelong learning, acknowledges that in a climate of rapid 'technological' and 'cultural' change Higher Education cannot provide learners with all the knowledge that they will need for work and life skills (Nash, 1994). The use of media (Dutton and Loader, 2002) can create opportunities to make visualisation easier and transmission of information wider. Students who are routinely using Web based social digital spaces such as Facebook are starting to use these as resources to prepare each other for an Objective Structured Objective Examinations (OSCEs) by placing home made videos on procedures such as placing rubber dam or assembling a matrix band.

The education literature is still reeling from these kinds of technological Innovations and is as yet unsure how to theorise some of them (Savin-Baden, 2008). Certainly, the commercially available Virtual Learning Environments such as Blackboard have limited file size for uploading multimedia images. They appear to be fundamentally teacher centred and there are limited examples of upload uses by students. Institutions need to ensure that they provide additional means for inclusive student use of shared resources on the Web (Sieber, Briggs et al., 2008). There must be a change from the traditional views of learning as a solitary and isolating activity that allows for the recognition and acceptance of the fact that students can become directly involved in peer tutoring (Falchikov, 2001) assessment (Falchikov, 2005) and even research activities (Jenkins, Breen et al., 2003). This fits with the work of Baxter Magolda (2004) that sees students as adults who actively contribute to the learning process.

Educational research

Educational research is an enormous field (Borg and Gall, 1989) with a methodology that stretches from quantitative standardised tests to more qualitative approaches that allow data collection of the thoughts, feelings and perceptions of teachers and learners. These paradigms are not mutually exclusive. Some of the best educational research comprises a mixed method approach. For example, qualitative interviews with a relatively few dental tutors about chairside teaching could produce sufficient information to construct a questionnaire to survey a much larger population. In our study, a range of stakeholders involved in chairside teaching at one Dental School were sampled using semi-structured interviews and focus groups (3.2.3); the views expressed by representative dental tutors from around the UK were captured In a workshop (3.2.4). This dialogue and hand written field notes, taken at the time, were transcribed. The text was then analysed in two different ways:

Interpretative analysis, here the text was reviewed in small chunks at a time and common themes were "coded" using a qualitative analysis software (Atlas.ti). The accumulation of themes produced a consensus view of the issues (Denzin and Lincoln, 1998).

In depth analysis This was where the text was scrutinised as a whole to produce a number of categories that the whole data could fit into. Although based on individual statements made in interview or transcribed from groups' dialogues, the focus was on collective generality, based on a minimum number of features necessary to produce a category (Marton and Booth, 1997). Whilst this kind of analysis appears to deliver valuable insights to researchers deeply embroiled in their data (Prosser and Trigwell, 1998), Webb (1997) and Engeström (1986) have criticised the private and privileged status of such researchers - hence the value of taking both forms of analysis together.

Evaluation and learning organisations

The terms assessment and evaluation mean very much the same thing in general use and are often used interchangeably. However, in educational terms in Higher Education, their meanings are very different; assessment tends to be used largely when considering the progress of students. Stenhouse (1985) was one of the first to contrast summative and formative assessment strategies. The essence of formative assessment is that undertaking the assessment constitutes a learning experience in its own right. Summative assessment is where a judgment is made regarding students' performance (often with a grade) that can, in dentistry, be used as evidence that they can perform a task. For effective summative assessments to be made it is important to ensure the alignment of assessment with teaching (Biggs and Collis, 1982). From our UK study this is an area for research and development in some schools (3.2.4), with the possibility of useful sharing of good practice. However, in many schools there is confusion about the precise nature of formative assessment (George and Cowan, 1999), which, in their

teaching practice, amounts to continuous mini-summative assessments. Rather than seeing it as a process for grading each task or component on every occasion, formative assessment could be a more reflective process that recognises the range and extent of the work that has been undertaken as well as looking at the outcomes, and ensuring that students receive clear and constructive feedback on their progress. As professionals, new graduates should be able to *self-assess* and experience *peer-assessment* so there is scope for incorporating both these elements within the undergraduate curriculum. Evaluation is the term used when considering the overall effectiveness of teaching and courses (Preskill and Catsambas, 2006). Early evaluations in Higher Education were designed to maintain standards and to ensure that institutions were providing good value for money. Evaluations in Dental Schools include the General Dental Council (GDC) visitation inspections. Unlike research, evaluations are based on judgments that have to be made continuously. Patton (1978) argues that if evaluations are to be meaningful there is a need to ensure a wide range of qualitative data, including interviews with the stakeholders, collected with the specific purpose of determining what and where things could be improved. More recent evaluation literature has suggested that evaluation should not be an external application but that is should be fully integrated into an organisation's work practices since it engages staff, allowing them to use their critical skills and so aid personal and professional growth within the organisation (Preskill and Catsambas, 2006). There is little evidence in our studies that dental tutors were involved with any degree of integrated evaluation processes (3.2.3). Appreciative Inquiry (AI) (see Preskill and Catsambas, 2006) may be a useful approach for dental educators to start to engage in evaluation of chairside teaching, because it helps to maintain the necessary dialogue in the dental team. AI avoids focusing on negative issues; rather this "bottom up" approach to evaluation may be effective because the most important concept in AI is a continuous reference to those elements that are most valued and most

successful in a programme or organisation. Applying AI to the clinical situation, the dental team must focus on the primary goal of patient satisfaction and successful dental care, rather than on areas of discontent. The essence of AI is to start with *Discovery* appreciating "the best of what is". Reed (2007), amusingly, says, "What is important is *Identifying* the relevant *positive deviancy* within each local community and then getting everyone to adopt that behaviour". The next stage is to *Dream* to imagine "what could be". The third critical stage is *Design* determining "what should be". This can best come about through asking provocative questions that bridge *Discovery and Dream.* If excellence is demonstrable somewhere - Why is it only a dream elsewhere? What needs to be done to make it demonstrate excellence in this setting? The final stage is *Destiny* in determining what participants can commit to.

There is also an education literature, which approaches learning from a power relations framework where the analysis moves away from individual learners to focus on the context where learning takes place (Merriam and Caffarella, 1999). Instead of accepting the status quo and insisting that students adapt or leave, this body of literature asks uncomfortable questions such as, whose interests are being served by the programmes offered? Who can gain access to them? Who holds the power to make changes? This literature, which considers oppression and race, class and gender, can serve to help the dental team to examine their own beliefs, assumptions, prejudices and biases in relation to both the teaching and the provision of dental care (Merriam and Caffarella, 1999). McLean (2006) gives a worrisome picture of power structures within universities where money and power are overpowering the capacity for rational examination and argument. This affects both those at the top and delivery end of education where there are "no longer inspiring educational or moral leaders but rather line-managers who brand, budget, market and monitor" At the delivery end, "everyday practice teachers have become deliverers of a commodity, testers, technicians and operatives" (McLean, 2006:

45). We can see these kinds of spin-offs in the clinical dental setting reported in our work (3.2.3 and 3.2.4). Part-timers at the "coalface" see themselves supervising procedures, untrained and unappreciated. Managers avoid educational issues by keep their distance concentrating on quality markers and their research profile.

Scholarship

Scholarship is a multifaceted concept which is currently much in debate; the role of scholarship seems to run through Higher Education from the most conservative and traditional to the most radical and entails the upholding of what is valued in its community of practitioners, in the broadest possible context (Andresen, 1996). Scholarship can involve following tradition by simply keeping a topic or way of doing something alive (Gunn and Prescott, 1999). But it is vital to determine what is of value and what expertise there is in the streams of clinical work and teaching which demonstrate mastery and as such need to be preserved. From the work of Boyer (1990) scholarship of learning and teaching in Higher Education is implied by peer-reviewed publications that demonstrate that work has been evaluated (Hutchings and Shulman, 1999). A willingness to share teaching methods and theories and understandings of student learning at the chairside is likely to create an overall improvement in clinical teaching. This is the process that we recommend in our paper presenting tools for dissemination of good chairside teaching practice (4.2.3), where it is envisaged that dental tutors will be publishing, presenting or discussing aspects of student learning or their teaching in the dental clinic. A further aspect of scholarship that follows on from this is the way in which, by creating a forum for discussion and debate about elements of chairside teaching, ideas and actions are challenged and development opportunities are created (Hutchings, 2003). Providing opportunities to explore different organisational structures and individual approaches to teaching within a clinical environment can help

to promote good practices and so enable positive changes to occur (Olson and Eoyang, 2001).

Conclusion

The aim and purpose of educational theory can be to challenge the status quo and explore and explain new concepts. The education literature continues to show how it has moved on in its understanding of "communities of practice" (Barton and Tusting, 2005), "reflective practice" (Bradbury et al, 2009), and "competences approach, by considering variation (Bowden and Marton, 1998). In fact, Barnett (2005) says that the changing milieu of Higher Education and the wider world is now "super complex", In consequence, lecturers should continually challenge students with examples of uncertainty to get them used to and capable of dealing with it in the real world. This should never be a problem for those charged with the role of teaching at the chairside.

Table 2.2.2-1 Five perspectives on teaching

1. Transmission	Effective delivery of content
2. Apprenticeship	Modelling ways of being
3. Developmental	Cultivating ways of thinking
4. Nurturing	Facilitating individual responsibility
5. Social Reform	Seeking a better society

adapted from Pratt (1998)

Table 2.2.2-2 Six steps for learning

1) Get motivated by getting into the right mood for learning
2) Gain the necessary information in the ways that best suits you
3) Explore the material sufficiently to understand it
4) Organise the material so that it can be triggered from memory
5) Exhibit what you know by testing or teaching someone else
6) Reflect on how you learned, so you know how to go about it next time

adapted from Accelerated Learning for the 21st Century (Rose and Nicoll, 1997)

2.2.3 Brown R, Sweet J. (2003) Learning environments - a teacher's strategy. In: Sweet J, Huttly S, et al., and editors. Effective Learning and Teaching in Medical, Dental and Veterinary Education. London: Kogan Page, pp 150-63.

Introduction

Throughout MDVE, new curricula are being developed which favour a learning and teaching strategy concerned with good communication, generic skills training, core competences, student chosen specialist options and group study skills for life-long learning. For this to happen, traditional subject courses have to be shortened, particularly in the basic sciences and of those that entail memorising facts or carrying out procedures that are not core or central to professional education. Some course leaders, suddenly come up against a situation where they are given less time in which to "cover" their syllabus. However, the ability of students to "uncover" information and understanding in the subject for themselves may be far more important in their professional lives (Wilby, 2001).

Using the working example of dental undergraduate technology as a model, this chapter attempts to show how the teacher can become an agent for change, and use the situation to draw on educational experience and evidence to provide a learning environment in a condensed but more focused course. The specific detailed examples of the components of a dental technology course are located in text boxes so that the chapter can be read from a general MDV context by reading the main text and skimming the specific subject content in the boxes.

Learning and Teaching

Dental Undergraduate Education in Technology

Most undergraduate regulatory bodies are currently recommending that students should experience sufficient exposure to technical training to be able to prescribe a full

range of crowns, bridges and dentures (GDC, 1997). Whether students should ever need to construct a set of complete dentures in the future is contentious. The number of edentulous patients is declining in many countries; from 30% in 1968 to around 13% in 2001 in the UK (Royal Society of Edinburgh, 2001). If the demand for the provision of complete dentures becomes low Bertolami (2001) argues that postgraduate dental specialists should carry them out. An alternative would be to delegate this to specially trained clinical technicians. Even if the dental student performs the routine clinical aspects of constructing dentures, it is doubtful that they would ever have to carry out the technical aspects and so would not need to pursue the technical methodology, in any great depth. The "core" focus in the prosthetic field for dental undergraduate education must therefore be history and examination, diagnosis and clinical stages of denture construction, rather than technical processes.

On the technical side, the challenge is to develop in the student sufficient appreciation of theoretical and practical aspects of technical work in order that they are able to make a detailed prescription for the technician to construct prosthesis. Following this, the student should be able to identify prostheses that have been made to that specification but more importantly, be able to recognise when and in what way they have been made in an unsatisfactory manner. It is also essential that they can understand sufficient theory and know enough about the practicalities of the construction of prostheses. They would then be able to appraise critically the work produced by the technician, and be able to make recommendations for modification where necessary. This philosophy is very different from some current undergraduate dental courses that include detailed technical training. More progressive dental courses release time for clinical and academic work, expecting the technical experience to be completed in a shorter time. The ability and willingness to help the student command a more appropriate focused view on technical work is a particular challenge to the lecturer or instructor in dental technology.

Just as higher education institutions will have a strategy for learning and teaching, so the individual teacher will have a strategy for their own learning and teaching. As Biggs (1999) indicates, the teacher may take on the institutional mandate but has to work out his or her own solutions. The need for reciprocity is identified when he later goes on to say 'The individual teacher improves through reflecting on current practice through the lenses of an operating theory; so should the institution' (Biggs, 1999). The strategy for a teacher is therefore both to follow the institutional learning and teaching strategy and reflect on his or her current practice and on current educational recommendations and evidence to develop a flexible philosophy of teaching that will empower their students' learning. We set out own philosophy of teaching in the anagram EDUCATION

Table 2.2.3-1 Teaching Philosophy Education

Features to be encouraged	**Possible Learning Activities**
Enjoyment	Educational games example crossword puzzles
Dedication	Assignments and Self-directed Learning
Understanding	Debates
Collaboration	Collaborative Learning and PBL
Assessment	Formative and summative assessment
Thought provoking	Plenary session to follow buzz groups
Innovation	Buzz Groups, Reverse Pyramiding
Observation	Self, peer and Group criticism
Never ending	Professionalism and Life-long Learning

EDUCATION (see Table 2.2.3-1 above) should be E as enjoyable as possible. Creating a non-threatening and supportive educational environment for the students can enhance enjoyment experienced, with time protected for critical learning individual and group

activities, which can include games, for example, discipline based crossword puzzles. Learning needs D dedication. This can be enhanced by allocating some work that, as well as being assessed, will encourage self-directed learning, aiming to draw the student towards a state of 'learning for the love of it'. It is not just knowledge but U understanding that is important. Debates, in which differing views are presented and yet where a consensus judgement is secured, can help students appreciate others' views and further understanding. C is for collaboration that can be achieved by appropriate facilitation of learning in small groups, where individuals rely on one another to gain valuable learning experience. Assessment A should be carried out both during learning as an aid to learning for formative feedback, and as a summative exercise to accredit achievement of learning. Teaching should be T for thought provoking. One approach to stimulate thinking is the gathering of small groups into a plenary session, to compare and contrast their different views. Each educational situation is unique and invites the teacher to exploit the educational opportunities with I innovation. Observation and reflection are key learning elements. Students and staff should be open to self and peer appraisal, and wherever possible group appraisal. Never ending is the final strand of educational philosophy, stressing the need for continuing professional education of teachers and the goals of enthusing students for life-long learning.

Once the model for educational development has been drawn up priority can be given to changing or creating specific course elements. It then remains a matter of putting ideas into action.

Teaching strategy

In MDVE, the teaching focus must ultimately be on patient need and possibly on the other stakeholders in a patient's welfare and this must be remembered when designing or improving a course. The teacher should follow the agreed professional guidelines and learning and teaching strategies of the institution where he or she works. In addition, the

teacher will use his or her own teaching philosophy when making decisions on the content of a course and the methods used to facilitate and appraise learning. In order to draw out clearly the general issues that could apply to any MDV topic, the strategy used to design the dental technology course will be explained in terms of concept and evidence. The decision to apply a concept to the course is described in open text and flagged with the heading concept. The source of the andragogical (adult educational) evidence that is applied here is also described in open text and flagged with the heading evidence. Detail on how this evidence may be incorporated into or applied to the dental technology course is shown in the text boxes.

Concept 1 The Overall Picture

Students should be given an opportunity to briefly experience an overview of the course, to understand what it entails, what is expected of them during the learning activities, and in general, what the learning outcomes are and how they will be measured.

Evidence 1:

Ausubel (1978) campaigned for meaningful learning as a reaction against 'rote memorising' commonly used at that time. He showed that organisation of knowledge was important for meaningful learning and that a 'background knowledge' of concepts and principles was essential for problem solving. He recommended the use of advance organisers - a presentation of the entire content in its final form, to be used at the very start of a course. Anchoring of specific detail can then follow in ways, which permit essential links between the parts. (see also Curzon, 2000)

1 Dental Technology example **Course Outline**

As an introduction to the making of dentures, the students are given access to videos and slides, which show both the clinical and technical stages involved. These techniques are also illustrated in the handbook provided for student use, which contains suitable places for students to add queries at the start of their studies and later as a workbook, a place for more reflective comments.

Concept 2 Competency Statements and Specific Learning Objectives and Learning Outcomes

Clear statements that set out core competency requirements for a new graduate, and more detailed learning outcomes for specific courses, can help the student to keep a focus on learning appropriate skills, and help reduce course overload.

Evidence 2

Kirschner et al (1997) set out the case for a study environment in higher education where there is a development of academic and professional competence. They formulate competence to mean that knowledge and skills have been acquired to a sufficient minimum standard. Biggs (1999) emphasises the importance of a focus on

2 Examples of competency statements and objectives for dental technology

Competency statements adapted from AADS (1999):

Restore partial or complete edentulous patients with uncomplicated fixed or removable prostheses. Communicate case design with laboratory technicians and evaluate the resultant prosthesis.

Learning objectives:

To be able to describe the engineering principles related to constructing a cast cobalt/chrome partial denture with special reference to fulcrums, levers and the limitations of metals to be used.

To be able to survey and design acrylic and metal partial dentures and provide a coherent prescription for a dental technician either in writing or verbally.

The student workbook contains all the competency statements and specific learning objectives with room for reflections and annotations. Reference is made to them as a class activity.

'how well' students know, as much as 'what' they know. Specifying learning objectives in advance of their attainment does not preclude other desirable but unforeseen outcomes. Prosser and Trigwell (1999) also argue for the quality of learning outcomes, which they equate with 'ways of understanding'. Students should be able to see relations between elements of their understanding, and that these relationships can be applied in new ways in novel situations. Students need to be drawn into the educational process so that they can understand how they can use the directives to their greatest advantage.

Concept 3 How To Learn Something Practical

Students with a range of ability and approach can be supported to reach adequate levels of psychomotor skills by applying modern conceptions and evidence from research. Enlightened approaches may prevent less able students from an early sense of failure to perform, compared with their more successful peers.

Evidence 3

Dick and Carey (1990) provide some insight into learning psychomotor skills, which, in contrast to cognitive learning, they see as a linear progression of initial plans of interest, through various actions to an evaluation or feedback based on the outcomes of actions. They recommend the use of job-aids – which the learner can refer to in order to gain just the right amount of information needed for that procedure, and so prevent student information overload. Curzon (2000) recommends that psychomotor skills lessons should have a structure of approximately 25% demonstration, 15% verbal explanation and 60% guided practice. The content of courses that develop skills must be 'authentic', as Feil et al. (1990) have shown that skills are very context specific. For instance, skills developed in the laboratory where dentures are made, will not be transferred to the situation of restoring a decayed tooth in the dental clinic. Considerable insight into the acquisition of psychomotor skills is given by Mayberry et al (1993) in their model of motor

skill learning. The model is centred on the need for the student to visualise and have an accurate representation of the desired outcome. There is a case here to leave the 'common sense' practice and start the teaching process from the final outcome working backwards through the sequence of actions and processes to the beginning and only then defining the initial conditions required for success. In addition to the outcome, there needs to be a visualisation of the procedure. This is clearly where a demonstration going through the stages, from start to finish, is invaluable. Dick and Carey's (1990) model focuses on correctness and would discard error. Mayberry et al (1993) sets knowledge of results, the comparison between actual and desired outcomes, as critical in the learning process. Certainly, in a laboratory or simulated clinical situation, error can be celebrated as useful information that can be shared and evaluated with others. A common fault, to which others can be alerted, may prevent them from making this error themselves. Mayberry's (1993) model emphasises the importance of process as well as outcome; the means to the end must be evaluated and justified.

3 Order of Teaching

To allow the students to assimilate course requirements, they are shown an overview of all the various stages of denture construction and give explanations for the different stages. This acts as a template for visual and mental representation of the desired outcome that they can compare to their actual outcomes. Students can then be given practical demonstrations, which will allow them, assess the lecturers' performance and discuss whether the desired criteria have been met. If the students fail to recognize any flaw either deliberate or other-wise it is the demonstrator's obligation to point out these faults. These laboratory courses use manikins (phantom heads) to simulate the patient in the clinical situation, as well as using students themselves as models to take impressions. The students then perform the exercise under close supervision.

Concept 4 Structured Group Learning

Group Objective Structured Clinical Examination, normally an assessment method, can be adapted to be a method of group learning to evaluate common errors and improve knowledge of results. The workstations and objects can also provide a focus for brainstorming with the students integrating their ideas in order to provide an action plan for those demonstrating errors.

Evidence 4

Harden and Gleeson (1979) were the first to describe the Objective Structured Clinical Examination (OSCE) a standardised test for individual students based on their performance at a series of clinical stations. This was developed as a group activity by Biran (1991) and called Group OSCE (GOSCE) and used later by Elliot et al (1994). These authors stress the advantage that this group process permits feedback to be given more easily than the time consuming procedure for individuals. If the assessment and clinical aspects are abandoned, the procedure can be turned into a teaching method in practically any subject to provide an opportunity for group learning.

4 Group Objective Structured Laboratory Learning (G.O.S.L.L.)

The student group is presented with objects on a laboratory bench such as dental models and dentures at various stages of completion. In addition to exemplars, some objects demonstrate constructional faults. The challenge is for the group to be able to order the items correctly to show the chain of events in denture construction. In addition, they must identify the severity of technical faults and means to rectify these where possible. The collection of objects with a range of errors shows the value of all products of the student's activity for learning, whatever the results. A clearer vision of desired outcome and knowledge of results help the student to evaluate the technician's work.

Concept 5 Collaborative and Self-directed Learning

Collaborative learning occurs when all the members of a group have an opportunity to contribute and take responsibility for each other's learning. Self-directed learning occurs when an individual takes responsibility for his or her own learning. Both processes are

learner as opposed to teacher-based and reflect the situation, which will exist when the new graduate is practising, learning from experience and many other resources, both as an individual and as part of a health care team.

Evidence 5

Cafferella (1993) sees many positive effects of self-directed learning and the sense of autonomy it creates: students show independence and can make decisions. He also claims that in the process students are able to reach a further depth of character; be able to articulate clearly the range of learning activities that they can undertake and develop a strong sense of personal values and beliefs. A further claim is coupled with two aspects of collaborative learning, namely, interdependence and interconnectedness.

Bruffee (1993) emphasises that positive interdependence is a learned craft where students learn whilst constructing knowledge, to depend upon one another, rather than depending exclusively on the authority of the teacher. Whilst group activities are widely held as peripheral events and social activities, in most organisations, the new concept here is to place the collaborative effort within the classroom (the learning environment), which classically has been the centre for individual competitive activity. Johnson and Johnson (1999) from their research in schools, find that optimal learning can take place in an environment of positive interdependence, but this does not exclude the possibility of using competition between small groups to enhance motivation. Boyer (1989) stressed the importance of what he called “connectedness”. His was a vision of how education should, through good communication, draw individuals together to share information and pursue collaborative problem solving. Far from leaving the students to their own devices, except possibly with the help of some computer package, he stipulated that, in the end, teachers who serve as models and mentors establish connectedness. In essence, the teacher needs to create materials and an environment where individual students can negotiate their role in the collaborative effort. This may

involve the selection of a topic for self-directed learning that they will later report on to the whole group. The focus is kept on the learners by asking them to present their findings, with the role of the facilitator being to ensure that the objectives of the activity are met to an adequate level.

5 Sharing information about the periodontal / prosthetic interface – jigsaw

This work is carried out in a small group with roles for the membership, which includes chairperson, scribe and timekeeper. Teaching materials are given in writing.

1) A good published review article on the periodontal / prosthetic interface is divided into 6 sections so that, for a group of twelve students, one pair of students will be allocated each section.

2) The relevant sections are given out to the pairs of students for self-study and research, with a requirement that a short presentation will be necessary at a future group meeting.

3) At the meeting, the learning objectives are agreed and pairs of students are given 15 minutes to prepare a joint presentation.

4) Each pair presents a section on the paper for three or four minutes with a few minutes for questions (30 minutes in all).

5) Discussion and feedback to confirm that the learning objectives have been met.

Concept 6 Changing group dynamics to improve learning - Reverse Pyramiding

Undertaking practical tasks can appear to be a tremendous hurdle for some students. A purposeful structured group activity can often help mobilise group strengths that can support and draw individuals along. A structured group approach can provide a sensitive response to the ‘natural’ inclination to prefer the anonymity of larger groups at some

points in the learning process. At other times, learning may be served better by a very small group, which permits cohesiveness and support to achieve a common purpose.

Evidence 6

Jaques (2000) describes how snowballs or pyramid groups can be built up, starting with individual students writing down their ideas on paper. At a second stage they can share their ideas in pairs. As the groups enlarge they can also engage in increasingly complex tasks to avoid repetition. The pairs can then be doubled into fours and finally eights, which can then report back to a plenary session. We use the reverse logic with a reverse pyramiding technique. Colleagues provide support and positive criticism in small groups which, are systematically halved, until the student is working competently alone.

6 Pyramiding and reverse-pyramiding

The class is split up into small groups of 4 and each student is provided with a different plaster model showing teeth with spaces for a partial denture. This allows the students to help each other to produce an outline denture design. After a period of discussion the group is cut by 50%. The student pairs continue a joint discussion until the individual students feel confident enough to carry out a detailed denture design drawing on their own. To complete the learning loop, the students can return to their original groups of four to assess their own and each other's designs.

Concept 7 Self and Peer Assessment

MDVE students will become clinical practitioners who have to make decisions for themselves based on a self-assessment. For instance, a decision to continue treatment or to refer could be of critical importance to a patient. However, some care is carried out more in teams and it is in this situation that it is essential to give and accept constructive criticism. Carefully organised peer assessment of student work may provide practice in this regard.

Evidence 7

Brown et al (1997) make the point that self and peer assessments are not methods of assessment but sources of assessment in which a number of methods or instruments may be used. Boud (1995) suggests that self-assessment be carried out in two parts; firstly to set the criteria for assessment, and secondly to perform the assessment based on the criteria. Boud (1995) thinks that peer assessment should be used to inform but advises against students grading each other. As Brew (1999) states, peer assessment is very different from self-assessment, and involves further processes and potential hazards. Clearly, students may dislike making judgements about their colleagues and may not have developed sufficient skills to either perform an assessment or give appropriate feedback. Boud (1995) says that feedback should be useful but is strongly against phoney or contrived praise that is patronising and controlling. Rather, in a memorable turn of phrase, he says that peer assessment should "affirm the worth of the person and give support whilst offering reactions to the object of attention".

7. Self and Peer Assessed Laboratory Exercises

1) The students as a group generate the criteria for successful completion of the exercise, based on the learning objectives, demonstrations, and tutor support given during the session. The end product to be assessed is usually a dental model with a design or object such as a crown or denture at some stage of construction fitting on to it.
2) The criteria are prioritised
3) The criteria are weighted if necessary and a marking scheme devised
4) Students assess their own laboratory exercise based on the weighted marking scheme.
5) A pair of students evaluate each others laboratory work based on the agreed criteria, and make appropriate comments to their peer, who may adjust their self assessed mark based on this further peer information.

Concept 8 - Learning from Experience

Students often find it hard to see links between one subject and another. Integration of subjects and practical application can help.

Evidence 8

Kolb (1984) states that learning from experience is essential for individual and organisational effectiveness. Students need to learn an appropriate response to their patients needs. Kolb (1984) says all learning is based on the process of inhibition of incorrect responses. Whilst this particular quote may be an overstatement, input to appreciate the patient's position, (such as wearing an appliance) is of great value in managing their needs. Further insight into learning from experience comes from Heron (1996) who distinguishes factual, practical, intuitive grasp of patterns and experiential knowing the presence of a person or thing.

8. Clinical / Laboratory Interface

This is a structured exercise to allow the students to design, construct and wear various denture like appliances. There is an opportunity here to practice working with clinical and laboratory dental materials, to experience the overall sensation of wearing a prosthesis and to study the effects on the periodontal tissues.

The class is divided into three groups to construct an appliance:

a) designed to cover the gums but relieved so not to press on them.

b) designed to cover and rest on the gums.

c) designed to have minimal contact with teeth and gums.

Each student will have an oral examination by his/her peers before and after the appliance is inserted. Students will be instructed in hygiene techniques for cleaning the appliance. They will then wear the appliance for a two-week period. After this period the students will then examine each other for inflammation of the gingival tissue, for levels of plaque accumulation and soft or hard tissue damage. They will reflect on the experience of wearing the appliance, write these in their workbooks and share their experiences in a group discussion.

Concept 9 - Student Assessment of Teaching

Whilst learners must take responsibility for their own learning, there are times when teaching support to facilitate learning may be critical. The kind of impact teaching has on the student experience can vary and may not be obvious to the lecturer.

Evidence 9

There was a surge of interest in student feedback in the 1980s and 1990s with a centrally funded student feedback system project centred at Loughborough (King, 2000). They documented a range of methods from informal channels and staff/student committees to questionnaires, including open and closed questions and free comments. King also points out that it is essential that academic staff voluntarily reflect on their teaching and develop what they do. He also sees the completion of a feedback loop from the lecturers' response to the students' evaluation a crucial exercise. He also notes that care should be taken that students' reactions to unpopular topics are not taken as personal responses to a teacher's ability.

9 Joint Formal and Informal Assessment

Modules of the dental technology course are evaluated by students with a questionnaire filled in at a debriefing last session. With reference to the original learning objectives for the module, questions are asked of:

Self: What and how well did I learn in this module and what did I achieve?

Group: How well did the Group as a whole learn and what did it achieve?

Peers: How did the colleagues I worked with learn and what did they achieve?

Tutor: How well did the tutor facilitate learning?

Module topic: Did the examples chosen to illustrate the topic appear well chosen? Would the module have been better integrated elsewhere in the course?

Once completed, students and tutors can informally discuss their findings.

Conclusion

This chapter aims to show that even if a topic has been demoted in terms of time allocation, a fresh emphasis on teaching strategy can help a focused shortened course become a useful resource for the student. It also aims to show that the andragogical and other educational literature can provide evidence for actions to take to improve learning. There still remains the challenge and risks of attempting something new with our students in our particular situation and the importance of gaining feedback from them on the initiatives taken.

2.2.4 Sweet J. (2003) Curriculum. In: Sweet J, Huttly S, et al., editors. Effective Learning and Teaching in Medical, Dental and Veterinary Education. London: Kogan Page, pp 51-70.

Introduction

This chapter starts with the hypothetical scenario of two applicants for places at a MDV School. The students apply and enter the school successfully and their progress is followed as the chapter unfolds. Students' learning and experiences are the most important aspects of a successful curriculum, together with successful communication and adaptation to a caring professional culture. The contrasting traditional and modern problem based curricula are compared with an all-stakeholders model, which places the community of students, patients, teachers and co-professionals at centre stage. A philosophy of taking every opportunity for learning is advocated. Four contenders are suggested as possible extreme or dominating modes of teaching as lecture-based, virtual-based, problem-based and competency-based. All these approaches offer valuable learning potential, but favouring just one approach to the exclusion of the others does not appear to be supported by the available evidence.

Medical Dental and Veterinary Educational Environment and Curriculum

Applicant scenarios: who is the better candidate?

Jack has always wanted to be a doctor /dentist / vet from the time he first visited his father's group practice in the local town centre. He is an affable well-spoken lad and has been particularly successful in various sports at school. He feels lucky that he has had the opportunity to go to a well-equipped independent school where class sizes have always been very small and where he can also get extra tutoring when needed. Through his father's colleagues he has visited hospital and community clinics over the years. He

has become a team leader in the school's voluntary support scheme where students elect to visit and help the elderly. The girl of his life at the moment is Jill
Jill is from a second generation Caribbean family and attends a large urban Comprehensive School. She is one year younger than Jack but they hope to apply to M/D/V School at the same time. Jill is particularly studious and has done remarkably well at GCSE's and is predicted to do well at A level and the Vocational Training exams she has chosen as well. Apart from enjoying tennis, where she met Jack, she is an outgoing person who makes the most of her part-time job at Burger King meeting all sorts of people. She has been uncertain of what she wanted to do until a year or so ago when she undertook various work experiences. She tried out physiotherapy, optometry and even a bank job as well as M/D/V: and having made up her mind has visited two M/D/V schools as well as a practice and community clinic.

Despite the large number of sons and daughters who do follow their parent's footsteps into the MDV professions, children are not quite born to the MDV professions! In fact, with the current climate of avoiding discrimination and furthering fairness I use the two scenarios of Jack and Jill at careers dental school open days to make the point that from the information given both are equally good applicants. I have made reference to MDV for the purpose of this book. Hidden in the text is the likely story that Jack has to resit so that entry requirements may be higher for him. Also, I would include the friendly advice that not all Universities are the same and that some would not consider resit applicants or give any credit for vocational training qualifications. In addition, I give out a self-questionnaire. The questions touch base with fundamental issues of entering professional life successfully. Clearly, there is a tremendous commitment in terms of time and effort so that the student must be highly motivated and obtain the academic entry requirements.

Questions for a potential applicant

- What is your vision? Why would you like to do M/D/V?
- What A levels or equivalent are you doing and what grades do you think you will get? Have you needed to resit any?
- What have you done or what are your interests that would support your application to become a doctor / dentist / vet?
- What work experience have you done and how have you investigated the M/D/V professions or career alternatives?
- What reasons have you for choosing this School?
- Do you think you will be interviewed for a place here? What do you think the interview will be like?

In MDVE student learning occurs in multiple specialist environments so that work experience is vital for the student to be able to refine their preferences to make a choice of profession. The influence of local conditions can also be critical for successful learning. The interview is conducted mainly to assure the School that these considerations have been made, so Jack and Jill will be retained successfully within the course, qualify and continue life-long learning to the end of their professional lives. When the student is admitted to the MDV School they enter a new learning environment (see Figure 2.2.4-1). Genn (2001: 337) emphasises that those managing the school should appreciate how students perceive this environment. He designates these collective perceptions as the educational climate. In the early years, students are also greatly influenced by the teachers who aim to help them understand how to learn and facilitate learning. The overall context is largely determined for the students by the learning organisation through the curriculum.

Looking at the Curriculum

Views on what curricula means have varied from a narrow 'syllabus' or 'just the content' view to one that includes 'all the student experiences inside or outside the school' (Kerr, 1968). This second view was quite a breakthrough in thinking because it replaced the outmoded view that education is largely about the transmission of knowledge from the teacher to student as an empty receptacle. Kerr's position has a student focus. There is a profound interest in Jack and Jill as learners and how their learning is managed as well as the overall learning environment and what is taught and how it is taught. In addition, this approach acknowledges the "hidden curriculum" - the values and patterns of behaviour that are acquired often incidentally (Harden, 2001). However, some medical curriculum planners have favoured a definition which only includes the planned intended events (Kern et al. 1998) whilst Socket (1976) emphases the importance of the student / teacher relationship and the activities generated by them.

Curriculum as Student Experience

Whatever is planned in the curriculum on paper will differ from what actually takes place. Figure 2.2.4-2 shows a circle model developed from Coles (1977), which indicates the potential for curriculum drift, where student experience begins to, differ more and more from what is planned for them. It is also useful to note that the teachers' perceptions of the student experience may well be quite different again. It is therefore important to ensure that there is continual student feedback even from distant outposts of clinical placement learning. Genn (2001), however, would include all four circles and more in his definition of curriculum that includes 'All that is happening in a [MDV] School'. This definition places the curriculum within a wider context and some of the various curricular elements are placed in Figure 2.2.4-3. The diagram shows the complexity of a modern university, which Habermas (1992: p107-108) says is a "bundle institution". The bundling of functions includes general education and specific training, the research

process, assessment, accreditation and setting of standards and also issues in ethics and policy within society, development of culture, self-development and reflective practice.

Community, Communication and Student Learning

Communication is the essential feature that permits these various roles to function together. The MDV University is also a wide based community of staff and students. The main feature shown in Figure 2.2.4-3 is the emphasis on students and student learning. Learning to learn is an important interest because it is acknowledged that much of current professional practise will become outmoded and inappropriate in just a few years. Although what is learned and how it is learnt is important, no longer is there an obsession with content – for soon much of it may be valueless. Self-development of students to work with change and develop new skills continually for the rest of their lives must be a focus for the planned educational experience.

Student Learning and Professional Mentality

A greater understanding of how a clinical student learns and the role of the clinical teacher can be achieved by considering Kolb's (1984) learning cycle at an individual level. Very briefly, the cycle starts with concrete observation. This is reflected upon and from this abstract concepts are developed and actions are planned. The plans are acted upon to provide further observations. Different individuals are likely to favour one or more of these modes. For instance, Jill may be a more out going active type, spending more time doing things, whereas Jack might be spending more time reflecting on his experiences. This learning theory can also be applied to the professions as a whole which tend to shape attitudes and orientations towards learning, so much so, that Kolb (1984: p183) is concerned about what he terms professional deformation. He proposes that over learning of a specialised professional mentality may actively hinder adaptation

to the changing requirements of an individual's career. If Jill's curriculum and professional mentality are almost exclusively orientated to basic sciences and performing of a range of technological procedures, she may find herself unprepared and inflexible if she advances in her career to become leader of a mixed professional health team. Kolb (1984) was therefore one of the first to attempt to stem the tide of overspecialisation and encourage development of more generic skills such as writing and communication. In MDVE the situation is complex. In "basic science" subjects the nature of learning inquiry (i.e. research) is such that there is a continual grasping toward the concrete and towards the abstract, with fewer demands for reflection or for action planning shown in Figure 2.2.4-4. This contrasts greatly with clinical practice. Here the emphasis is upon reflecting on the data available clinically and in the literature, in order to produce a diagnosis and appropriate plan of action. This activity can also be shown in Figure 2.2.4-4 as a horizontally placed axis of transformation, towards the reflective pole as integrated inquiry and towards the active pole as treatment solutions. In this context the major role of the MDV lecturer is to facilitate well-rounded student learning for academic and clinical life. In Kolb's (1984) learning terms, the aim is to produce self-directed persons who are highly developed in each of the learning modes: active, reflective, abstract and concrete. It is then that they may experience tension and conflict that leads to creativity.

Scope of Curriculum beyond the MDV Institution

Bertolami (2001) extends the range of the curriculum still further to all that shown in Figure 2.2.4-1 - the students, teachers and environment in and beyond the university. He justifies this approach by stating that many schools cannot keep up to date with the teaching and technical advances, which go on outside the schools. Teaching should respond to likely practice demands for when students qualify and, in addition, prepare students for change in the future. Specialists should carry out the tasks and clinical

problems that are becoming fewer in number. Some of this training could be conducted in the Schools and some in specialist centres where the innovations are taking place. Bertolami (2001) sees a major role of the schools is to introduce students to their profession and help student socialisation [or reacculturation to use Bruffee's (1993) term]. This could include the kind of adjustment that Jack would have to make from the didactic environment of public school to a greater degree of self-directed learning at university. Those adjustments could be just as difficult as the changes in culture and values that Jill may have to make to join the MDV professions. Other opportunities Bertolami (2001) sees for development are possibilities for individual students to complete courses in a time span that matches their skills and learning style, which he calls an asynchronous model. Jack and Jill may start the course together but on past performance Jill would be likely to finish sooner in this model. Some of the specific innovations suggested here may prove difficult to implement but the emphasis on the widest possible interpretation of curriculum appears valuable in developing a workable model for MDV curricula.

Harden, Sowden and Dunn (1984) have set out the SPICES strategy as a progressive approach to curricular development for Medical Education (see Figure 2.2.4-5). They contrast a traditional taught course with their suggested alternatives. The traditional curriculum is lecture based and so teacher centred. The material is taught in disciplines with a standard content and teaching takes place centrally in a large teaching hospital using the resources that are available. They present SPICES as an enlightened alternative. They declared this curriculum to be student-centred and problem-based rather than lecture-based. The content is integrated into themes rather than being taught by separate disciplines with much conducted in community-based placements. One of the features of the curriculum is the development of a standardised compulsory core content that students can supplement with optional elective projects. This changing

polarisation towards students learning appeared to be such a fundamental difference, especially with the use of problem-based learning, that curricula were named “problem-based” to contrast them with traditional forms.

Since 1984 the concept of the curriculum has widened and become far more complex so that this simplistic polarity of student or teacher-based learning appears less appropriate. A number of new players now have considerable impact on curriculum. Firstly, there are the direct influences of external agencies that represent the interests of patients, and systems, which universities put into place to assure themselves and those agencies that standards of care are reached and maintained. Secondly, there has been a massive expansion of electronic communication and information, with the possibilities of forming virtual learning environments (VLE). Thirdly, there is recognition that many generic skills, especially those involved with communication, are a necessary part of university education. Finally, there is a recent realisation that working in teams with other health professionals is an essential aspect of good clinical practice and should therefore be also an essential aspect of good clinical teaching. A realistic and workable curriculum is one that takes account of all these influences, but does not lose touch with the human side of nurturing the individual student experience. Figure 2.2.4-5 illustrates the all stakeholders MDV curriculum model.

Outline description of the model

Community

Community here refers to the collective group of students, teachers, other health professionals and support staff, patients and their carers who interact with the student inside the MDV organisation or wherever the student is placed. (This contrasts with the use of the term community-based in the SPICES model that refers to community placements outside the main teaching hospital.)

Communication

Communication with some purpose is essential within the community at all levels and with all members. This can be vital at a personal level between student and patient and student and teacher as well as other members of the healthcare team. Also important for learning are electronic means of communication between students and teacher and student and VLE.

Generic Skills and Interprofessional Education

Critical thinking, active listening and writing skills, given here as examples of generic skills, are required by all health professionals who need to work together as a team when they qualify. It is therefore appropriate that students from different disciplines and professions learn together to work together.

Patient

A focus on the patient in the curriculum can be achieved by stipulating that trainee clinicians will have to develop skills and knowledge to preset standards – they will have to show competency. A further requirement is that clinicians will respect the needs and values of patients and should, where possible, prescribe treatments that are based on sound clinical evidence.

Teacher

The teacher is shown on the right of the diagram, and has been traditionally connected to a discipline, is hospital based and gives lectures. In the problem-based model teachers collaborate to set the learning materials for students. In the all stakeholders model, the teacher is collaborating with other professionals, communicating using information technology and considering how the interests of patients can be safeguarded in the educational process.

Student

The traditional student would attend lectures delivered in discrete disciplines at a main teaching hospital. In the problem-based model, content is arranged seamlessly in themes as they relate to patient case scenarios and learning in placements outside the main hospital is encouraged. In the all-stakeholders model students will be learning and working in a very wide-ranging environment with other health professionals sharing generic and joint subject interests. They could be following systematically themed problems in a core competency-based course or alternatively follow optional specialist projects. They will be continually using information technology to evidence information, to contact colleagues and teachers. The all-stakeholders curriculum would advocate a flexible approach of taking every opportunity for learning, a willingness to take calculated risks, whether with attempted friendships and collaborations or with the use of new technology. Despite the complexity, individual students still inhabit a space in this model. It is possible to envisage Jack working on a generic health care skill issue such as infection control with a student co-professional such as a nurse using problem-based learning. Aware of competency that she must show as a health professional, a further picture of Jill at the computer screen can be conjured searching for evidence about the best treatment for a patient she has just seen with a rare condition. She may then decide to take a special interest in the treatment modality, for instance, as an elective project. Working within such a community there can be no one overriding dominating component.

Extreme Curricula – lecture, problem, virtual and competency-based

There are probably no longer the resources available in most MDV Schools to have the luxury of what Bowden and Marton (1999) call extreme curricula, which try to conduct teaching exclusively using one mode or principle. They identify three possible dogmas as the traditional lecture-based, problem-based and most recently virtual-based learning.

To this should be added competency-based. All extreme approaches, if enforced as a chosen method of teaching may prevent teachers from making professional judgements about how they can enhance appropriate learning for their students as individuals. Each of these potential mono-curricula will be considered in turn. Each mode or method has distinct advantages associated with it, and these can be brought into the all-stakeholders model.

Lectures

Lectures have been used in traditional courses as a blanket means of "delivery" of a body of knowledge to the students who are passively receptive. But it does not have to be like that. Lectures can be a good introduction to a subject, and do not have to be "stand alone"; they can be followed by seminars and other group activities that may be more conducive to learning. For this reason, lectures may be most useful to give a taste of a subject, to inform, rather than for facilitating general learning of a body of knowledge. Another place for lectures may be where participants already know the subject quite well. Students may find it difficult to find an up-to-date appraisal of a specialist topic and could make a request for a lecturer to give a presentation on this. Post-graduate students in particular may want to know the specific views of named experts in their field and would be able to identify various aspects of the presentation and be well placed to ask relevant questions for clarification. From a student point of view there is a positive aspect that lectures enable an equitable availability of teachers. Small group teaching always produces insecurity for some students who feel that their group may not have access to as good handouts or tutor as another group. From a competency-based view, the primary lecturer function is to ensure that all students, with very few exceptions, will reach the required standards. With this approach it is unsatisfactory to give students equal attention and let the student-learning settle into the usual bell curve. Instead, every effort is made to draw those failing students up through

extra tuition or remediation. Jack may be struggling to understand the content of a lecture, and whilst given the opportunity to ask questions, may not be able to articulate them following a lecture. Back-up, with access to handouts or Web-based postings may or may not help. He may do better to have a small group discussion with Jill!

Virtual Learning Environment - VLE

It has been argued that the enthusiasm for virtual learning environments in higher education generally is almost entirely commercially driven (Delanty, 2001) so that a participating university becomes no more than a producer of educational products. It promotes centralisation because once the materials are produced they are held by the university. Delanty (2001) says this creates a polarisation of genuine lecturer and student educational interests versus the commercial exploitation of the university. Others see information technology as a means of revolutionary change to improve and augment learning with the possibilities of students being matched with teachers across or beyond the divides of physical constraints (Wulf, 1993). Agre (2000) is critical of using the term "revolutionary" and says, "…by caricaturing the old and idealizing the new, they falsely posit an absolute discontinuity between the past and the future". However, within MDVE the opportunities for distance learning are great for post-graduates where the mores, values and workings of the profession are known. In fact, because of the distribution of practitioners a VLE may be the only method practicable. Virtual learning alone is limited in undergraduate education where physical contact and involvement in the community of health workers is essential. Information technology should ideally be used as a means to amplify existing forces, and help make communication within the community more effective. Jill will be able to search for information quickly and send this by e-mail to Jack after their discussions. Jack can then start to formulate his questions about the lecture and e-mail these to the lecturer for clarification.

Problem-based learning

Traditional MDVE would entail much discipline based didactic teaching of pre-clinical knowledge to be followed separately by clinical practice. The students are largely left to themselves to integrate the two approaches. A full commitment to integration can be achieved by Problem-based learning (PBL). The disciplines can then become seamless to the student, as they develop questions and learning objectives from case scenarios alone. The tutor shows the problem to the student group, without any suggested objectives. The group is then able to brainstorm the problem using standard procedures, of identifying unknown terminology, stating the issues involved, deducing hypotheses and finally formulating learning objectives. Following this meeting the students carry out self-directed learning. On a later occasion, the students then meet to present their findings, and in a co-operative way confirm, discuss and critically evaluate the information they have retrieved.

Problem-based learning as defined by Mayberry et al, (1991) delivers a curriculum through a series of health care problems, discussed in a series of small group tutorial seminars, utilising a student-centred approach to attain self-directed learning. This methodology has been strongly advocated for use in higher education (Wilkerson & Feletti, 1989) including Medicine (Albanese & Mitchell, 1993) in Dentistry (Ferrier 1990) and also in Veterinary Medicine (Rand & Baglioni, 1997).

Advantages of problem-based learning

Norman & Schmidt (1992) have indicated several potential advantages for students' learning claimed for problem-based learning. Students in PBL curricula may be more highly motivated; they may be better problem solvers and self-directed learners; they may be better able to learn and recall information; and they may be better able to integrate basic science knowledge into the solutions of clinical problems. Barrows (1986) has schematised these points into Structuring of knowledge for use in Clinical Contexts

(SCC); the developing of an effective Clinical Reasoning Process (CRP); the development of effective Self-Directed Learning skills (SDL); increased MOTivation for learning (MOT), as if they were separate products that could be produced in the students. Meta-analysis-type reviews of medical undergraduate education over a period of twenty years (Albanese & Mitchell 1993 and Vernon & Blake 1993 and confirmed more recently by Colliver, 2000) have suggested that when compared with conventional instruction, PBL is more nurturing and enjoyable; PBL graduates perform as well, and sometimes better, on clinical examinations and faculty evaluations; and they are more likely to enter family medicine.

An articulate review paper on problem-based learning in dentistry is by Mayberry et al. (1991) who strongly advocate a PBL approach. They favour this system because of the direct focus on objectives, the emphasis on student responsibility for self-directed learning, and small group peer support and feedback. They recommended the method especially at an introductory level for immersing the students into the cognitive aspects of the subject matter.

However, some authors have concerns about PBL. Ferrier (1990) writes, “PBL gives students burdensome responsibilities for their own learning. What and how much they must study may no longer be clear,” More reservations from Albanese & Mitchell (1993) concern the kinds of backward thinking PBL graduates tended to use and possible gaps in their cognitive knowledge base that could affect practice outcomes. Patel, Groen & Norman (1991) also explain that when medical students are well grounded in the subject and are becoming more fluid in treatment planning difficult cases, they should be encouraged to practice ‘expert’ or ‘forward reasoning’, where it is possible to draw conclusions from highly selected but rather a small number of pieces of information. This contrasts with the alternative hypothetico-deductive PBL approach, so useful at the early stages of learning of the subject, but which may later tend to slow down thinking

processes by producing extensive elaborations that generate errors. Probably the most critical investigation of PBL is that of Fenwick and Parsons (1997) who find it offensive as practiced, because they suggest that the highly selected “cases” do not authentically represent human experience and perpetuate elitism by allowing professionals to construct an imaginary world for their students. They campaign for student interactions with patients in practice where attention is given to their overall well-being of the patient without necessarily the continual pressure to find productive solutions. Straightforward practical difficulties have also been reported by Fincham et al. (1997), who say that “Pitfalls [in the PBL system]… include: weaker students being allocated less challenging issues; dominant students taking on their preferred tasks; and a failure to allocate key issues for research by all members of the group.” They add, “Experience has shown that after a while a [PBL] group develops habits in that particular individuals will tend to take on repetitive roles as presenters or researchers. This can result in a staleness that can hamper the overall effectiveness of the group.”

Clearly, it is only when problem-based learning is used alone that it develops this other worldliness. Unless the tutor system is highly developed in the small groups to give individual support, the total pbl curricula tend to be very centralised and standardised in organisation, which focuses on the completion of learning blocks, problem outcomes and group functioning rather than individual development and practice. There is evidence that PBL is a challenging and active method that can be enjoyable, but there is less evidence for this to be the sole methodology. Albanese’s (2000) excuse is that where there are mixed courses “Jurassic” didactic courses run concurrently include tests and assignments will often force students to forgo a PBL course running parallel with it. Clearly there is a need for appropriate times allocated for self-directed learning and a balance of appropriate assessments in any curriculum mono or mixed.

Problem-based learning has a place in the all-stakeholders curriculum. Used as a simulation method, early in the course, students like Jack will be delighted they are able to take a look at clinical cases as learning tools early in the course. In a protected learning environment he will find that he is given reserved time to research and draw from a number of hard copy and virtual sources seamlessly across disciplines. At a later time in the course, within a clinical speciality, for example, PBL can still be used as part of a teaching programme. It can be used as a means to ensure that Jill has knowledge of a certain range of conditions, by studying carefully chosen and ordered hypothetical clinical cases. By assuring standards the method may link well with concepts of competency that follow.

Influences of External Agencies

There are various external agencies that would wish to influence the curriculum in MDVE. They mostly have the aim to improve patient care and others to improve fairness in society. There are currently political pressures to increase the cultural diversity of students entering higher education for instance from the Council for Industry and Higher Education (CIHE, 2001). This is particularly a challenge in MDVE where standards and fitness for practice are closely associated with the cultural norms of the professions. Draft MDV benchmarks have been issued by the Quality Assurance Authority (QAA, 2001) and are conservative estimates of standards against which curricula from different schools can be measured (Jackson and Lund; 2000). The value of benchmarks for educational courses is that they are agreed elements of content and process by experts in the field and can be used by teachers to assure themselves that core components in their courses comply. However, they have limited use in enhancing standards, unless they are “stretch benchmarks”, more commonly used in service industries, which include elements to which one could aspire, and plan to reach (Park City Solutions, 2001).

Curriculum Stated in Terms of Outcomes or Competency

Mager (1984) sets out the classic mode of organising teaching in terms of general aims and in addition more specific objectives, which clearly describe the new behaviours the students are expected to learn, to what degree and in what context this can occur. More recently, educational programmes have been organised along "learning outcomes". These are items that are predetermined by the teacher which indicate what the student will have learnt by the time they finish the course or module of learning. Quite a number of learning tasks undertaken in MDV clinical work appear at first sight to be merely procedural, and are skills that can and must be learnt, such as taking a blood sample or giving a local analgesic. One way to clarify the learning outcomes required of students is to set out core competency statements (Hendricson and Kleffner, 1998). This involves the use of a set of minimum requirements for skills and knowledge to a particular standard that the students must reach by the time they qualify. This is useful for the student in a number of ways. The core compulsory knowledge and skills can be kept to manageable levels, and what is needed is made clear. When students are assessed, the requirements are criterion-based and not related to the relative abilities within a group of students. There can be time set aside for optional courses in subjects that particularly interest certain students, which can facilitate movement into a specialist area at a later date. When it comes to teaching, efforts are concentrated on ensuring that the entire class pass, by reaching the standard required. This provides an opportunity to help create a climate for the student where the focus is on the collaborative working within the group, rather than individuals working in competition with each other (Kleffner and Dadian, 1997). If Jill is struggling in one particular core course, the group will function at a speed and in collaboration with each other to ensure that she has the minimum knowledge and skills demanded in the learning outcomes. In addition, a competency-based curriculum may make demands for staff to work together from

different disciplines (Hendricson and Kleffner; 1998). However, Stenhouse (1975), Bull (1985), Marshall (1991) and Callender (1992) have been particularly critical of attempts to place all aspects of a curriculum in competency format. They are concerned that a dogma will be created encouraging all aspects of practice outcome to be analysed, and progressively broken down into sub-competencies so that numbers of times a sub-competency has been reached can be slavishly recorded as a quota assessment. Stenhouse (1975: p83) readily admits that the concepts of competencies may be useful at the early stages of an educational programme, but strongly asserts, "knowledge is primarily concerned with synthesis. The analytic approach implied in the objectives model readily trivialises it....the best means of development is not by clarifying ends but by criticising practice".

Fortunately a number of authors who have recently embraced competency have done so as part of an educational process, not as an end in itself. For instance, Knox (1986) and Chambers and Gerrow (1994) see competency as a stage in the process of life-long learning. The beginner soon becomes a novice in the profession, but it is only when he has reached the prescribed standards that he can be deemed competent. After working and continuing learning for a number of years the MDV professional can become proficient and with adequate continuing professional development and experience can reach mastery, the level of experts.

Excellence and Competency - Are They Compatible?

In university mission statements there is often reference to excellence rather than competence. Are the two concepts compatible? As Elton (1996) says most ideas of excellence come from the need for research to exceed current boundaries of knowledge to be worthy of reward. On the other hand everyone has to be taught and it is then more important to avoid incompetence than to have excellence. However, if the major competency statements of minimal levels of skills knowledge and attitudes, are enforced,

but left sufficiently “open ended” to actively encourage those standards to be exceeded, criteria for excellence may have been reached [i.e. highly competent; reflective; innovative; reaching more dimensions than competence (Elton; 1996)]. However, when dealing with people, patients as well as other health care workers, “how things are done” may be as important as the fact that they “are done” at all (King; 1979). Perhaps the raw competencies alone as functions of 'knowledge, skills and standards' described by Kirschner et al, (1997) are missing the attitudinal, affective elements that are essential for a new professional.

Barnett (1994) criticises the simple acceptance of what he called operational competence, making students obey "standards" of external competences derived from the world of work. He sees this as the creation of empty vessels that unthinkingly perform predetermined activities like automata. He emphasises instead that education should entail a task of fulfilling internal demands for students to flourish and free themselves from the constraints under which they are already thinking and acting. This is a return to the primary consideration of the student, with a life story, moving and communicating, learning and developing appropriate skills in their work and internal resources to not only cope with change about to embrace it and work as agents of change.

Rather than a simplistic role for the MDV professional as a deliverer of services we require now, there should be a focus on the future in preparation for uncertainty. To prepare for this he suggests a greater need for reflection, dialogue, critique, development of consensus and practical understanding, as opposed to an emphasis on strategic outcomes.

Brew (1999) worries that an emphasis on having skills or being competent may serve to obscure important issues such as willingness to use that skill in a particular circumstance or judgement on when it is appropriate to use that skill. For instance, Jack may have the

skills to take blood, but is he willing to perform this skill on a high-risk patient? Should Jill take the blood immediately following a glucose injection or after the patient has fasted? Brew (1999) sees the danger that competency-based curricula could lock students into a time warp. She sees self-assessment as an important means to allow students to evaluate and reject those competences that are no longer applicable.

Bowden and Marton (1999) also want to break away from the sense of competence meaning observable units of behaviour in the workplace. They wish to use the term in another way as capabilities of seeing and handling novel situations in powerful ways that integrate disciplinary and professional knowledge. In keeping with this view, when a clinician teaches Jack in a specialist clinic, one aim is for him to be able to focus critically on what he is doing and "see things" from the specialist clinical point of view – to increase his repertoire of such views. His specific skills of taking a detailed history, observation, patient communication, investigations and treatment serve as adjunctive skills and are applied if and when required.

Bowden and Marton (1999) have shown that students need to experience a great deal of variation within a theme of skills that emphasise both relatedness and differences and to develop scenarios that work and do not work to learn and become adaptable to future unknowns. Working with patients produces an infinite range of variation that should be brought into the learning environment wherever possible. The use of variation can be taken one step further in considering curriculum design, which focuses on the student's "way of seeing". Following Bowden and Marton (1999), it is suggested here that curriculum development should begin with an understanding of students like Jack and Jill. The principles of their learning should be analysed and the kind of learning environment that would suit them should be determined. It is important then for the curriculum developer to be open to a consideration of the range of learning experience that will assist students most, rather than finding the most convenient way for the teacher

to deliver. If the curriculum based on learning outcomes of competences as "core" external standards make Jack and Jill successful professionals today, the development of their critical thinking and inner skills of reflection and self-directed learning may be just as important as professionals working in an uncertain future.

Figure 2.2.4-1 The MDVE Context

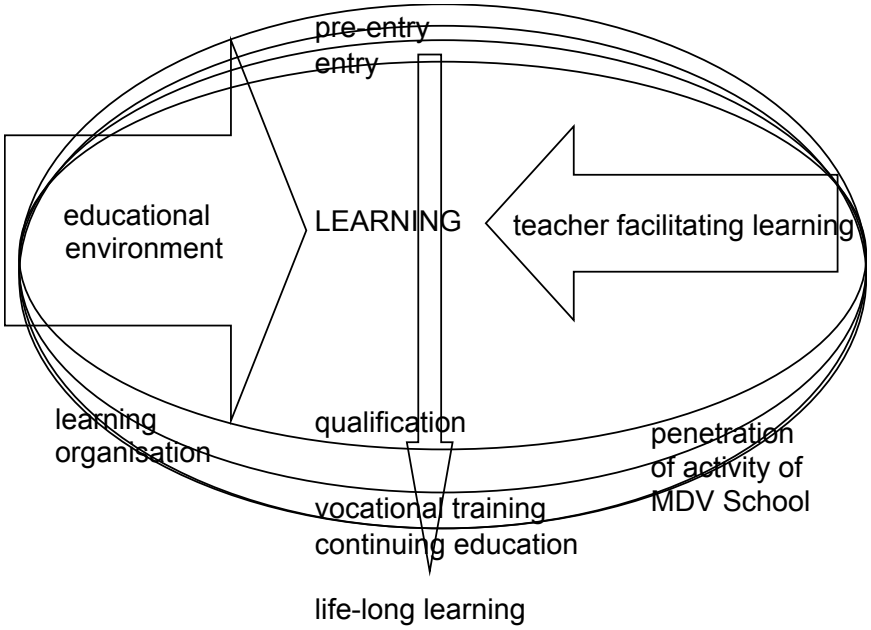


Figure 2.2.4-2 The student learning experience

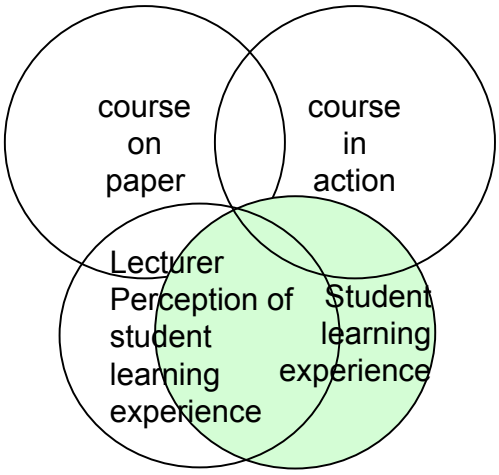


Figure 2.2.4-3 Elements of the Learner Experience

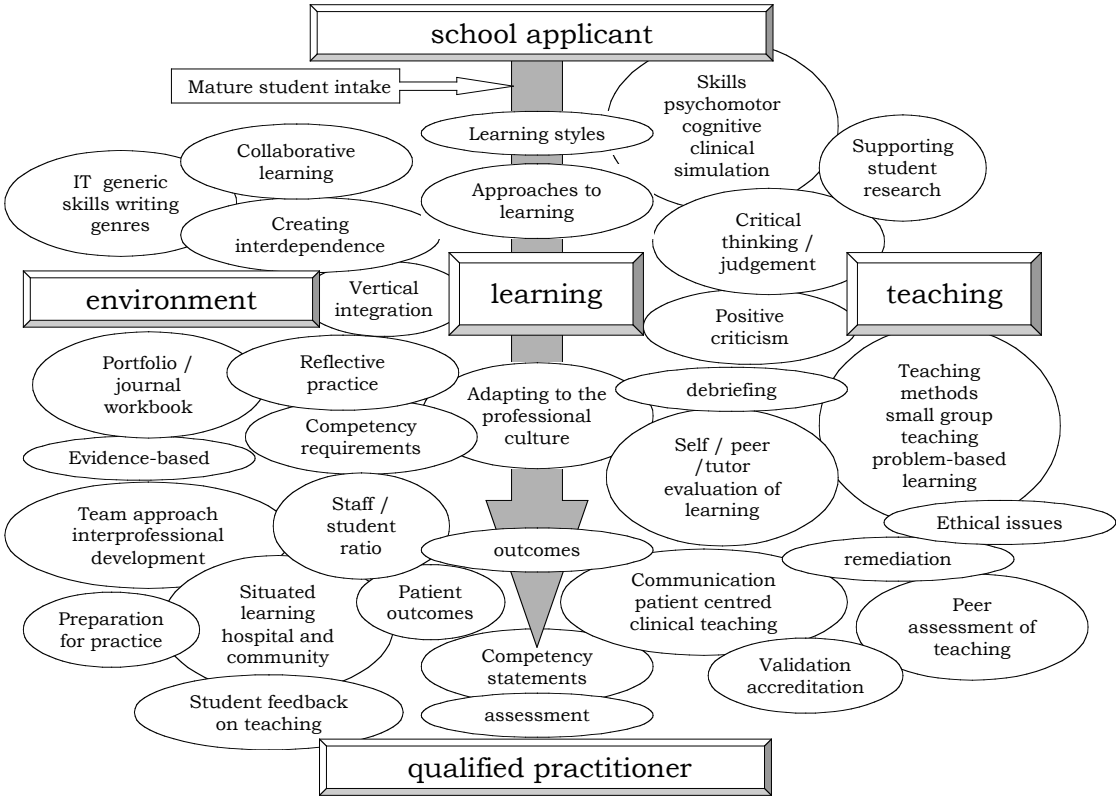


Figure 2.2.4-4 Reflective practice, research and clinical teaching after Kolb

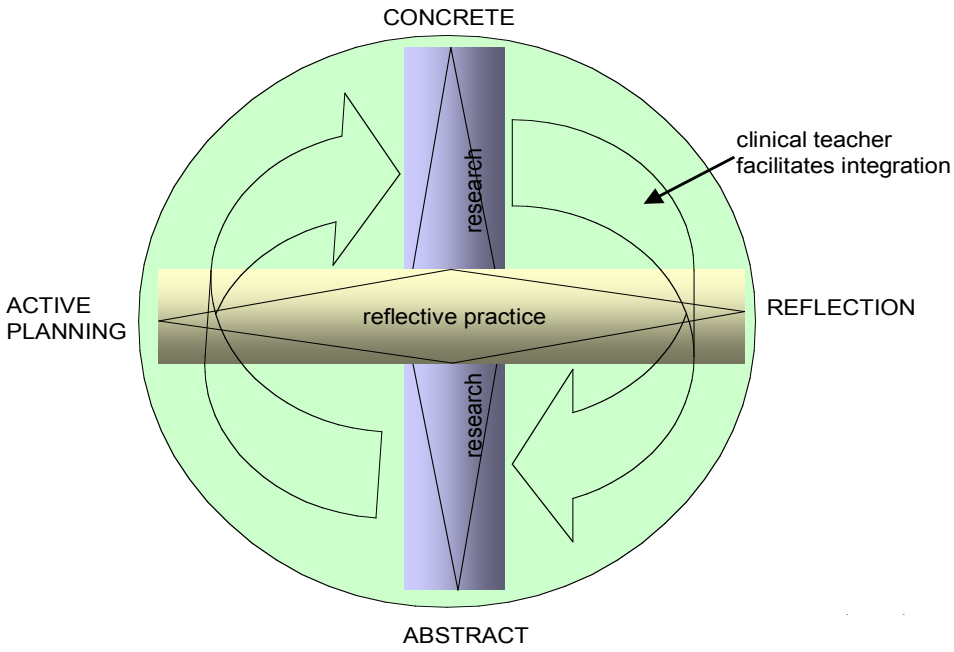
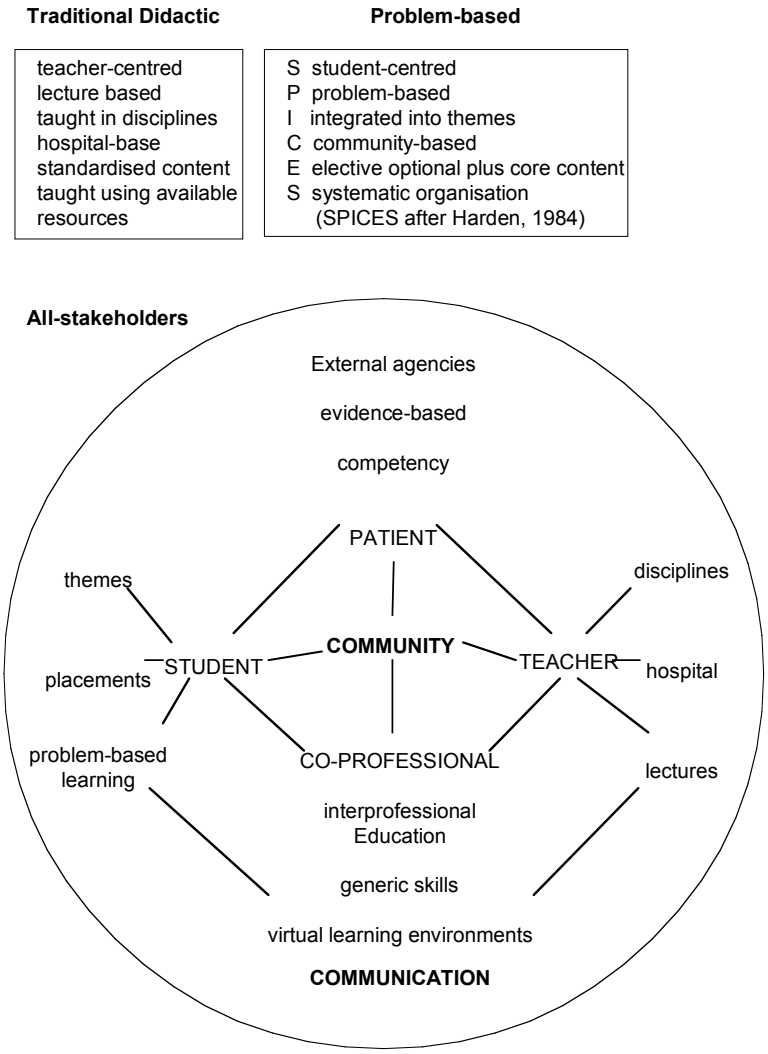


Figure 2.2.4-5 All Stakeholders Curriculum



2.2.5 Sweet, J. (2010) Inclusive curriculum by including the patient. prepared for submission to Learning and Teaching in Higher Education.

Introduction

This article is the story of an educational developer breaking into new ground in a clinical curriculum. No curriculum consists of just the teacher and students in a hermetically sealed unit of the classroom. However, this is particularly true for healthcare related vocational disciplines where students are exposed to clinical work. 2.2.4 describes an all stakeholders community based healthcare curriculum model (see Figure 2.2.4-5 All Stakeholders Curriculum). This illustrates the potential for inclusive community interaction between students, the teachers, patients and co-professionals, which can allow students to emphasise and develop their strengths whilst accommodating to their needs. It also can protect them when they are vulnerable to pressures that could exclude them in some way. There is the potential, if it is used, to engage patients in the process of curriculum development through consultation, feedback and processes of assessment. In addition, the established interprofessional education relationship between nurse and doctor, has for some time been a resource for the medical and nursing student, and with the recent registration of all professionals complimentary to dentistry, which includes dental nurses, hygienists, and dental therapists, they too will also develop a degree of autonomy and influence, and greater scope for academic and clinical interactions. An inclusive curriculum entails arranging ways to manage student diversity that can be included, discussed and valued (ADU, 2006). But at the same time there is a need to develop an understanding of when equal opportunities are about treating everyone the same and when it is about respecting difference (NATFHE, 2005).

Barriers against an inclusive curriculum

Despite the potential for inclusivity, there are a number of influences, which would maintain the status quo. Much teaching is carried out in the medical and dental world following the apprenticeship model (Pratt, 1998), which demands that students model themselves on their lecturers. Even more modern developmental approaches such as problem-based learning can be criticised for teacher hegemony; a world inhabited by scenarios and problems chosen entirely by teachers (Fenwick and Parsons, 1997). In terms of demographics, recent surveys (BDA, 2005) indicate that forty five per cent of current dental students are male and fifty five per cent female. Also 40% are from black and minority ethnic groups. Despite this favourably large percentage for minority groups, most are from an Indian background, so that Bangladeshi and Afro-Caribbean populations are still underrepresented. A mere one per cent of students come from families with an "unskilled" background, and the success of widening participation programs for teenagers has yet to be documented. Entry to Dental school in the UK is limited to a full-time course designed for school leavers, except for the graduate entry schools at Peninsula and University of Central Lancashire (UCLAN). Dental students work a 45-week rather than the usual 30-week year in non-clinical Higher Education, so that extensive religious holidays produce unacceptable absence. Religious fasts can also prove difficult if working in a demanding clinic. One of the greatest barriers to inclusivity in dentistry is the traditional perceived need to admit students without disability, because at qualification they have to be declared fit to practise all parts of clinical dentistry. Current General Dental Council (GDC) policy is to have no specific guidelines, but to not recommend the entry of any student with a known disability that would stop them from practising all aspects of dentistry (Wilson, 2002). On the other hand, partial practice is possible for qualified dentists who have developed disabilities following their dental school years. The GDC argue that the experienced dental

practitioner who becomes disabled is in a position to self regulate him/herself to facilitate safe practice. This, of course, assumes that the newly qualified would not be able to do the same. However, the fresh entry disabled student would be able to adapt (like, in fact, the many who are discovered to be dyslexic once entered into Dental School) with the help of support and academic staff at the university. It would be an exaggeration to say that the newly qualified, or any one else, can perform all aspects of dentistry fully; hopefully just a wide range. Newly qualified dental surgeons experience vocational training, with suitable supervision. All newly qualified dentists, disabled or not, need to grow into a range of activities that make up their practice. As professionals, they must keep within their limits of competence. Tynan (2003) and Tynan in MacDonald (2004) have challenged the GDC suggesting that they set out clear recommendations for the recruitment and entry of disabled students. The manual nature of clinical dentistry must restrict entry into the profession for some. Blind, partially sighted and multiple disabilities would clearly present overwhelming difficulties for a potential student. However other disabilities such as the mobility difficulties, may present more difficulty to the education provider rather than to a potential student. Dentistry involves communication with patients and colleagues, which could be surmounted by some who are deaf or with hearing impairments. Dyslexia is often recognised following entry to the course in a number of dental students in each year.

Does the clinician know best?

A clinician related a case of his attempt at ideal treatment using a medical model of reaching optimal clinical recorded health (Palmer, 2004). This entailed the patient attending his clinic nearly every two weeks for eighteen months. Optimal healing was achieved, but at a cost -- the process was not socially sustainable -- the patient had too much time off work, lost her job and could not afford the continued cost of travel to attend the clinic.

It is proposed here that if patients are given an opportunity to "speak", then it is possible to align a more appropriate therapy for their needs. As an adjunct, sensitivity to their views will create a widening influence on the student learning experience, opening up the curriculum to individual difference and diverse cultures. There is evidence that patient self reports are more reliable than recorded clinicians findings (Locker, 1996) and it is important to record patients' own perceptions of oral health needs, because they are only weakly related to clinical assessments. Clearly, it is possible for conflicts of opinion. As Allen (2003) says, the removal of a tooth could be seen by a clinician as a disaster, and the loss of a number of teeth creating a risk for further disease progression. But, from a patient viewpoint, it may prove a positive experience, through relief of pain and suffering.

Most people's health care needs cannot, therefore, be evaluated on the basis of diagnosis alone (Tate, 2000). But the theoretical base for choosing the additional information has developed in recent years, based on two models (published by the World Health Organisation in 1980 and 1998). There has been a change from a medical model of concerns for increasing burden of disease on the individual of impairment - limitation - disability and finally handicap, to a more enlightened view of how variations in health may play a part in affecting bodily functions and structures - activities - and finally the ability for that person to participate in society (McGrath and Bedi, 2002). They continue to say that surveys based on the medical model such as the short form oral health impact profile (OHIP-14) ask wholly negative questions, whereas the UK oral health-related quality of life profile (OHQoL-UK) focuses on both disease and health states asking negative and positive questions. Still further developments in theory construction are taking place, which emphasise short-term coping and long-term adaptation to impairment and limitation of activity (MacEntee, 2006). MacEntee and Brondani (2006) question a simplistic bipolar negative and positive axis of health and

disease and propose that people work out what disease and disability mean to them based on their own values and beliefs, together with cultural influences around them. They often develop coping and adapting strategies that enable them to reach a positive perspective and acceptance of their condition as part of their persona. This new insight was gained from qualitative analysis of focus group open-ended questioning.

A practical pilot implementation

In the clinical situation, time permitting, there is opportunity to ask such open-ended questions to gain an in-depth understanding of patients' conditions and views. However, where do you start? Dental Specific Quality of Life (DS-Qol) survey profile was chosen as a useful focus for gaining patient perceptions of their current oral health (Kind & Boyd et al., 1998). DS-Qol is aligned to the more recent (WHO, 1998) conceptual framework of both gaining information on global appreciation of oral health and specific deficiencies related to diseases of the oral tissues. It is normally given as a self-reporting survey, but it was easily adapted for use here by asking the patient the questions and the student clinician recording the answers. DS-Qol is brief, consisting of one global appreciation of oral health in response to a visual analogue scale (VAS) indicating worst possible oral health at zero and best possible oral health at 100 and the participant it asked to place themselves anywhere on the scale that day. There are, in addition, five questions which ask if you have any problems with, eating, cleaning your teeth, aesthetics, pain / discomfort, or speech. It has been developed as a dental specific variant of a generic health profile EuroQol [also called EQ-5D](EuroQol Group, 2006), which has the same structure, and VAS depicting best and worst possible general health and questions related to problems with mobility, self-care, usual activities, pain / discomfort and anxiety / depression. EuroQol has been validated against a national questionnaire in the UK (Kind & Dolan et al., 1998) and DS-Qol against the generic profile (Kind & Boyd et al., 1998; Boyd et al., 1998). DS-Qol is brief and can be used on sequential visits to show

changes in perception without giving offence or anxiety. Dorman et al. (1997) showed EuroQol to gain a better rate of return of information than an alternative longer generic profile. The profile's five questions can depict specific problems so that their resolution could be determined from sequential recordings. Most important of all, it can prime the start of a dialogue with the patient to help determine and negotiate good oral health care options.

In addition, a profile was constructed *de novo* to evaluate patients appreciation of their dental visit which is named here as Dental Visit Profile (DVP). Published dental satisfaction profiles such as Dental Satisfaction Questionnaire (DSQ; Davies and Ware, 1982) were inappropriate as they were focused mainly on administrative factors such as cost and access. DVP includes five key closed questions asking, "Has my dental student: explained clearly to me how I can look after my mouth; a friendly approach; explained treatment choices; worked safely and hygienically; and inspired confidence? This is followed by an open-ended question asking if there is anything else that we should know about that you would like to tell us?

The profiles were offered to the student clinicians as an optional resource and used where the clinician thought they would aid the normal process of relevant collection of data for patient care, and where the patient was willing to fill in the DVP. Data was entered into the Cardiff and Vale Trust Patient Management System database and from this an anonymous transcript was produced for educational purposes.

Results

Data collection by student clinicians was patchy at first as they began to understand the principles behind the additional level of information gathering, but enthusiastically taken on by some as they had a means of recording improvements in clinical findings and patient perceptions. Apart for one or two patients, who did not have time, they were mostly willing to fill in the DVP.

Data was used from 61 adult patient consultations by dental students in an outpatient periodontal clinic during periods of study between 2004 and 2006.

Global appreciation of oral well-being

Visual analogue scale readings ranged from 20 to 90 with an average at 61. There were also two peaks of occurrence at 40 and 70. The average score is much lower than those recorded by Kind and Boyd et al. (1998) at either a hospital outpatient clinic at 77 or a community dental clinic at 80, but comparable with walk-in Dental Hospital patients, out of pain, in follow-up appointments at 63 (Anderson and Thomas et al., 2005). Scores were as low as an average of 48 when these patients first attended in pain.

Patient appreciation of oral deficiencies followed the same pattern as in Kind and Boyd et al. (1998) with problems with appearance 62%, pain and discomfort at 42%, eating 21% and speech 10%, which were all scores someway between their hospital outpatient and community dental practice groups. However, the major difference was in response to the question "Do you have problems cleaning your teeth and gums?" with a score of 45% against 8-18% in the other settings. Although there appeared to be generally fewer specific problems declared as the VAS score increased there was no significant difference determined. Patients, even with high scores for overall general oral health appeared to report a number of minor deficiencies mainly to do with appearance.

Feedback on dental visit experience

A positive score was given unanimously for each question asked. This could reflect the very positive experience that the patients have had, or the relatively public way in which the data was recorded. Patients were possibly frightened to give responses other than exonerating the student and system. The open-ended question generated answers showing general satisfaction with dental visits as patient comments included:

"I am treated and feel like an important patient"

"My student is always kind and courteous. She explains clearly what she's about to do and I am confident that she is professional in her treatment."

"Felt very at ease on the clinic"

Discussion

Global oral health appreciation

VAS scores taken in the periodontal clinic were lower than those from a general community clinic reported in the literature. This could indicate that patients with periodontal disease have lower associated perceptions of general oral health. Ng and Leung (2006) claim that their paper is the first to demonstrate that periodontal destruction can directly affect quality of life, but as yet there are no papers that evaluate if successful therapist-centred outcomes correlate with patient-centred outcome. Despite the fact that they state the need for health as a resource, they use the older paradigm deficit index OHIP-14S indicating functional limitation, physical pain, psychological discomfort and physical and psychological disabilities. In principle, the DS-Qol is a more rounded instrument to gain a positive appreciation of oral health and a segregation of deficit factors that may need consideration in an overall treatment plan for a patient. DS-Qol indicates the status of oral health but fails to include patients' perception of need of how they should gain greater oral health. This would be an invaluable new discussion point with which to take treatment forward. I am suggesting the inclusion of an additional patient statement in answer to the question "What do you think you need to gain maximum oral health?"

Deficiencies in oral health

In a periodontal clinic, oral hygiene instruction is a major part of the treatment. It is therefore worrisome that scores of nearly 50% of patients are having difficulty with cleaning their teeth and gums, when a good number of them will have already had

sessions of demonstration, instruction and guidance on choice of oral hygiene gadgets and how to use them for their particular mouths. This area needs close attention and further research.

Appreciation of deficiencies includes the item of "Are you having problems with your speech?" but this item was always related to aesthetics and appearance problems and mentioned infrequently. It would therefore seem more appropriate to include the topic of dental anxiety, which is missing so far from the DS-QoI profile. However, mapping back to source it can be seen that in EQ-5D anxiety / depression is the fifth item in the generic index. It therefore seems more appropriate to include the question "Do you feel anxious about your dental treatment?" as item five in future studies. "Problems with speech", may have slipped in because it is included in some established quality of life indices. Ingelhart et al. (2003) showed that patients' fear and feeling of lack of control of the dental situation reduced their overall satisfaction of the dental visit. They also showed that dental fear was a major reason for non-attendance. It is therefore important to identify dental anxiety and to make provision for allaying it. On an individual patient basis it will be sufficient to ask "Do you feel anxious about dental treatment?" and work on the response of no, a little or a lot. The Corah Dental Anxiety instrument used by McGrath and Bedi (2004) could not be used on a repeated basis, asking the patient if they are "so anxious that I sometimes break out in a sweat or almost feel physically sick"!

Feedback on the patients' dental experience

Patients filling in a questionnaire about their dental visit need to know that their answers are anonymous and yet have been read and taken seriously. Other than some lengthy postal system to maintain anonymity it may be possible to resolve these issues technologically by collecting data using an Ultra Mobile PC tablet on which the patient will be able to write their feelings and views. Reflecting on the questions I realise that

they did not indicate if care was taken not to harm or hurt a patient and the questions did not refer to student dexterity - two very important issues in appropriate dental care. Also the final question was rather indirect. Following on from this study a revised six point DVP will ask if "My dental student: explained clearly to me how I can look after my mouth; explained clearly the treatment choices open to me; made my visit as comfortable as possible; uses instruments in the mouth carefully and effectively; appears to be working safely, hygienically and professionally," and finally "inspires confidence." This will end with a more direct question: "What else would you like to tell us about your visit?"

Removing deficiency thinking?

Is it still necessary to talk in deficiency terms? Could or should the question for instance "Do you have problems eating? be turned into something more positive. There is quite an interesting problem with language. Instead of asking why you're having problems eating, we could ask, "Do you eat well?" Of course this means something quite different from having no problems eating -- it means getting food in despite problems with eating itself! Another option would be "Do you find eating pleasurable?" But the answer to this question could be "Yes, I like my food", but would this elicit a statement that "But still have problems with food getting stuck between this tooth", or would this stay hidden by this approach. Should we have sufficient faith in that important deficiencies will still be brought up and dealt with effectively by initiating the topic in positive health issue terms? Certainly, from the deficit data collected, minor deficiencies appear to be present despite high levels of over all appreciation of good overall oral health. Does much of the deficit mention of problems encourage a trail of trivial fashion statements or vital means to reach for a better quality of life?

The clinician is taught to find fault to examine where health ends and disease begins, to make a diagnosis and communicate this to the patient, but this only has to be one thread

of the dialogue. Are clinicians prepared for the possible rejection of their solution to fight or cut out the disease? In the third wave of thinking about disability MacEntee and Brondani (2006) are not suggesting that persons should remain in the dark from clinical findings, it is just that they should have the space to discuss the issues from their point of view and be free to make their own choices and take ownership of them.

Alternative DS-QoI questions could be

Are you happy drinking and eating your food?

Can you clean your teeth and gums well?

Are you happy with the way your teeth and gums look?

Are your teeth and gums comfortable?

Are you at ease in the dental clinic?

Reaching towards appreciative inquiry

Appreciative inquiry has mainly been used as a tool to improve organisations by reframing and keeping a focus on positive ways to develop (Preskill and Catsambas, 2006). Returning to the All-stakeholders curriculum there is a potential positive resource for patients along a cycle of Appreciative inquiry.

Making the best of what is:

By asking the global overview of oral health we are getting an appreciation of patients' perception of the best of what is. If we include our questions in their new positive format above, it can reinforce a positive perception, but will highlight problems significant to patients if they have to say "No" to one of the positive questions. Problems can be dealt with in the usual way if very urgent or brought into the context and focus of the best that is.

Making the best of what might be:

By asking the patient what they think they need to gain maximum oral health, we are approaching what might guide us to the best situation they think that might be for them. It was an important discovery from this pilot work to realise that DS-QoI alone gave an indication of status but failed to indicate what a person thinks they need.

Making the best of what could be:

This is where clinicians can enter, but not entirely take-over. They will have patients' overall perception of global oral health and hence need for change. Important problems will be highlighted if patients cannot confirm the positive statements about comfort and ease of using their mouths. What the patients think might be the best has been thought through. Clinicians, student, assistant and teacher will have their examination findings, radiographs, photographs, charts, associated risk factors and diagnosis which could provide a typical treatment pathway for these kind of cases with an indication of what is feasible. Should we expect these approaches to align with each other, for as Allen (2003) says clinical and subjective measures are associated moderately only. The unifying theme is that of the best of what could be. With the support of those in the curriculum environment, the views of the patients must make the final decision on the action that takes them towards the best of what could be for them.

The best of what should be:

This is the optimum situation. The patients' conditions will have stabilised clinically or at least reached a point of optimum health for them. This is the point when traditionally clinicians, even those who are teaching, have hurried these patients away so that they can take on more patients with problems. But that is service provision thinking, not seeing the wider issues of a clinical curriculum. Whereas most teaching clinicians are quite content to use as well as serve patients who have diseases that need treatment for

teaching purposes, they are reticent to use, or know what to do with exemplar patients who demonstrate the best of what should be. They have finished treatment - there is little more we can do for them now so they should go back to their general dental practitioners. But what a positive resource we are failing to use in our teaching if we do not hold on to at least some that are willing to engage in dialogue with us - to express their story of dealing with their condition, the treatment and educational setting, the students, co-professionals and finally dealing with clinical academic tutors. With this insight, the profiles we are collecting begin to take on a different aspect, not just as a means of facilitating data entry to improve and align treatment at a particular moment in time, but collected longitudinally will provide a core resource for a patient to express what they feel have been the building blocks to their current position which is the best of what should be. Or alternatively, students can follow these threads and act as advocates for patients, letting the quality of life documentation get them closer to the thoughts, feelings and culture of those they would serve.

3 Research

3.1 Introduction to Research

Research is the second writing theme. Introductory comments and summaries are outlined in section 3.1 and the exemplar articles prepared for publication follow in section 3.2 (see page 139).

3.2.1 Sweet J. (2010) "A review of Periodontal Research publications describing the use of macaques as experimental animals" prepared for the Journal of Periodontal Research

This paper, illustrates the scientific mode in a specific subject of animal experiments in periodontology. From this we can see the form and focus of scientific experiments as they are published. This can be characterised using citations as a means of exploring aspects that are valued and prioritised.

3.2.2 Sweet, J (2010) "An evaluation of errors derived from Periodontal Research publications describing the use of macaques as experimental animals" prepared for Science, Technology, and Human Values

This paper reports on and discusses "scientific error" found in the experiments recorded in the published literature outlined in 3.2.1. It is argued here that it appears to be normal scientific practice to ignore poor publications and cite only better evidence. However, errors can nullify the value of experiments reported, lead to misrepresentation of ideas, waste human resources, and in the case of animal experiments, inflict unnecessary harm.

3.2.3 Sweet J, Pugsley L, and Wilson, J. (2008) "Stakeholder perceptions of dental chairside teaching and learning". British Dental Journal 205: 499-503

This is the first of four papers which report on a collaborative research project to determine the current status of dental chairside teaching in the UK. They consider

evidence of good practice and ways in which the quality of the learning and teaching might be improved. This paper reports on a first stage qualitative case study, to explore the perceptions of chairside teaching experienced by dental students, dental nurses, patients and clinical tutors, at Cardiff School of Dentistry.

3.2.4 Sweet J, Wilson J, and Pugsley L. (2008) Chairside teaching and the perceptions of dental teachers in the UK. British Dental Journal, 205: 565-569

This paper is the second article for the British Dental Journal (BDJ). The findings from the initial research into chairside teaching at one dental school (3.2.3) were evaluated by colleagues, with an interest in chairside teaching, from around the UK. This was carried out by holding a dedicated strand on chairside teaching at “Breaking Boundaries”, a major conference on Healthcare Education. I led and directed this strain topic over two days. The results of the deliberations are contained in this paper.

3.2.5 Sweet J. (2007) Research-led: pedagogy lost or found. Proceedings of the 2006 14th International Symposium: Improving Student Learning. The Oxford Centre for Staff and Learning Development pp111-123.

Universities that would consider themselves research orientated like to use the term research-led in their learning and teaching strategies, but are usually fairly unclear about what it means. Have they discovered a new pedagogy, or is the roller coaster of research ways, making further inroads into the classroom? I find insight into the topic by combining Pratt's studies of perceptions of teachers with Bruffee's social constructivist findings and discover a commonality of space at the edge of a discipline, where the classic researcher is working out from the edge and the student is working in towards the centre of the discipline. However, my conclusion is that research-led is usually used to indicate the dominant role of research over teaching and is more ideology than a rational thought through process. I make the case for the term “Research-led teaching” to mean

teaching, where research into it, or the results or evidence it brings, can provide a lead for teaching practice.

3.2 Exemplar Articles

3.2.1 Sweet J. (2010) "A review of Periodontal Research publications describing the use of macaques as experimental animals" prepared for the Journal of Periodontal Research

Introduction

The case for the use of non-human primates in periodontal research has been continually made in the literature by advocates who use these animals in their own experimental work (Schou and Holmstrup et al., 1993; Caton and Kowalski, 1976; Caton and Mota et al., 1994) emphasising the ways in which non-human primates (with various exceptions) mimic the human anatomy and physiology of periodontal tissues in health and disease. Other researchers such as Page and Schroeder (1982) and Selvig (1994) take a broader overview and suggest that the similarities between humans and non-human primates are far fewer than the other authors would suggest. They propose that the interest in the non-human primates and other animal experimental models should be in the diversity which the various models demonstrate, giving a great range of features to investigate both health and disease. This view is supported by other workers outside dentistry such as Newell-Morris and Fahrenbruch (1985). It is also instructive to note as Bosshardt and Schroeder (1988) emphasise that "periodontitis in non-human primates, either wild-caught or maintained in captivity, is rare in young or mature and still variably infrequent in old animals". The aim of this study is to identify the features of periodontal research using macaques over a period of 20 years and cited over thirty years. In greater detail this:

- gives a demographic overview of this experimentation
- reviews the range of problems to which this research has been applied
- appraises the most cited experiments
- discusses issues raised from the long-term analysis of these experiments

Methodology

The research was conducted on an independently derived sample of academic references. 'The Primate Information Center', an independent specialist organisation collating information on non-human primate research (Seattle, Washington) was commissioned by the author in 1994 to provide references to dental experimentation conduced on species of macaques. 535 references from their database for the period 1966 - 1994 were then narrowed down into a set, which could be analysed with reference to periodontal disease by a process of elimination. References were eliminated from this provided sample if they were not primary sources, or experiments that had been described in a previous article and were not original. For practicality non-English articles were also eliminated. All the remaining references found in the Ovid Medline database with major periodontal mesh headings were retained. The period of research chosen to study 1974-1994 was from the first date the vendor considered the reference set reliable. The sampling procedure delivered a study set of 170 scientific journal articles demarcated by the criteria set. Over half were published in just three periodontal journals (Journal of Periodontology (51), Journal of Periodontal Research (25) and Journal of Clinical Periodontology (22)). The content of the articles was then analysed to give descriptors of the context and experiments carried out. A statistical trend analysis was applied to each 20-year data set. Three main areas of investigation were covered including demographics, the animals used and experimental procedures. In terms of context the country of origin of the experiment and the nature of the laboratory was recorded. Common details about the experimental animals were

recorded which included the species of macaque and the numbers of animals used. Details of the individual experiments revealed their duration, the numbers of procedures carried out on each animal and the category of research. Finally the science citation index was applied to the reference list in 1996 and 2003 to produce an accumulative number of citations over time. The top 12 most cited journal articles were then compared with the total cohort in an attempt to characterise what distinguishes them.

Results

Demographics

Experiments originated mainly from the United States and Scandinavia. The total level of experimentation appeared to be sustained over the twenty-year period. However there appeared to be a decrease in experimentation originating from the United States over time (see Figure 3.2.1-1). However, this was compensated for by a sustained volume of research from Scandinavia and an upsurge from Japan. Research output from both Canada and the UK was intermittent. However, the overall numbers of experiments carried out in the United Stated well exceeded those carried out in all other countries put together. 90% of the published research was carried out in universities. A further 5% was conducted mainly in forces research units in the United States. Commercial or part university / commercial laboratory participation occurred only in the last decade.

Animal use in experiments

The numbers of experiments and animals used per year over the twenty-year period showed a remarkable uniformity with lean years of 1976, 1986 and 1990 balanced by active years of 1981, 1984 and 1988. There was not an even use of macaques across the species. shows that the small species fascicularis was used more commonly overall. The next most common overall, was the M. mulatta or rhesus monkey. However, it can be seen from

Figure 3.2.1-2 that the early experiments were conducted almost exclusively on M. mulatta and in the United States. The chai squared test for trend in proportion of type showed a highly significant trend towards the use of fascicularis (P=0.0005). Fuscata is the large species Japanese macaque and has been used exclusively in Japan. A variety of other species were used infrequently and generally in small numbers.

Experimentation

The maximum duration of the experiments showed a wide variation. One experiment lasted over three years, whilst 20 experiments (mainly from one research laboratory in Scandinavia) lasted 8 weeks. For all the experiments, however, the average was 23 weeks. Overall, the maximum duration of the experiments over the twenty-one years showed a consistent pattern. There is little sign of the experiments becoming shorter or longer over time. An analysis of the categories of research conducted showed that most studies were on disease followed in frequency by surgical techniques, surgical materials or other studies (see Figure 3.2.1-3). Straight-forward surgery appeared to decline after the late eighties as most of the newer surgical techniques investigated involved the use of new materials to be placed in the wound site, many needing a second surgical procedure to remove this material after a few weeks of modified healing. As many as 13 experiments used macaques to test pharmaceuticals, many of which appeared to be only fairly non-specific tests of toxicity. Just 9 experiments were on vaccine development. Most noticeable is the paucity of experimental diagnostic development using macaques (see Figure 3.2.1-3). There appeared to be a trend towards experimentation with more quantifiable outcomes over the twenty years, which was supported by the finding that the numbers of purely descriptive experiments without statistics showed a significant downtrend with the chai squared trend test (p= 0.014).

Citations

A citation is the formal acknowledgement of 'intellectual debt' to previously published research, publicly recorded in the references listed by contemporary authors (ISI, 1994). The Science citation index for 1996 and 2003 was used to study this process over time with this particular data set to produce the total number of citations per year (see Figure 3.2.1-4). The numbers of citations include any self-citations, which could skew the results. One problem that was encountered for the analysis carried out in 1996 was that some authors were indexed in such a way that some articles could not be differentiated from sister articles published in the same year. In these cases a half score was allocated to each paper. This problem did not recur in 2003. Figure 3.2.1-4 shows that the experiments on macaques that attracted most attention were cited by most authors in the decade of the 1980's, with a total of more than 400 citations in each of the years 1982 and 1984. The explanation for these high scores can be found by looking at the distribution of the exceptionally high citation scores, which distinguishes a top dozen journal articles, cited between 59 and 325 times overall.

The Top 12 Cited Journal Articles

The twelve most highly cited articles distinguish a cohort of experiments that can be compared with the total 170 investigated. Apart from one paper on vaccine research (Holt, Ebersole et al., 1988) and one on the relationship between dental plaque and periodontal bone loss (Slotts and Hausmann, 1979) equal numbers of papers are experiments on the study of disease and surgical techniques. Some of these studies were about the right cellular environment to induce a new periodontium (Nyman, Karring et al., 1980; Nyman, Gottlow et al., 1982; Gottlow, Nyman et al., 1984; Lindhe, Nyman et al., 1984). Others included evaluation (Caton, Nyman et al., 1980) and attempted augmentation (Nyman, Lindhe et al., 1981) of surgical methods. This contrasts with the overall group that also includes the study of surgical materials, pharmaceuticals and diagnostics. The most outstanding finding was that for an input of just over 20% of the

total resources into the research sample, Scandinavia steals an equal number of the top cited papers and 62% of the citations. This can be accounted for in part by the interest and citing of members of the same research group. Self-citations in this top cited group at an average of 16.83 approaches the total number of citations per article found in the whole data set of 20.64. However, the average numbers of citations for the top 12 group of 95.91 far exceeds this. The number of co-research workers involved in the research is similar at an average of 3.25 (3.49 for the total group). The average duration of the experiments for the top 12 cited group is much longer at 47.58 weeks against the 23-week average for the whole group (see Figure 3.2.1-5), but the numbers of animals used per experiment is much less at 3.42 (6.16 for the total group) [see Figure 3.2.1-5].

Discussion

An overview of the published papers on periodontal research using macaques shows a remarkably stable investigative process. The numbers of experiments and animals used show an overall stability over the twenty years. However, there is some evidence of changes certainly in the species of macaque used - a trend towards the use of fascicularis away from rhesus. Fascicularis may be the cheapest and easiest of the macaques to obtain and maintain in captivity. However, the government of India ban on the further export of rhesus monkeys to the United States (from 1979) most likely caused the rapid decline of the use of mulatta (rhesus) and increase in the use of fascicularis from 1980. This study uses a third party specialist library course of references in order to reduce possibilities of bias related to selecting references. However, the information centre itself was North American and may have favoured the accumulated of North American references in the original set which was supplied. Despite this, and the fact that the majority of experiments were carried out and reported in journals from the United States, the most outstanding finding was the tremendous success of the Scandinavian researchers for highly cited papers in the mid 1980s. A high level of citation continued for

the highly cited papers and was maintained between the two citation investigations in 1996 and 2003. This was most likely due to the methodical research agenda of a group of periodontal research workers of the time who aimed to secure reproducible methods to reconstruct the periodontal tissues following their loss in periodontal disease by conducting experiments to understand the underlying healing responses. The nature of the highly cited articles emphasised the study of disease and the use of surgical techniques tended to take longer than the average but involved fewer animals. This was possibly because of the considerable length of time required for gaining regeneration and healing of the periodontal tissues following surgery and the prototypical nature of the experimental designs, which generally attempted to demonstrate the possibility of a healing process rather than a clinical trail probability. A feature of the highly cited group and articles overall was the use of conservative investigation techniques such as histology which entailed killing the animals to extract the tissues for examination and relatively little interest in investigating less invasive techniques which could have a closer application to use in humans.

Figure 3.2.1-1 Numbers of Experiments

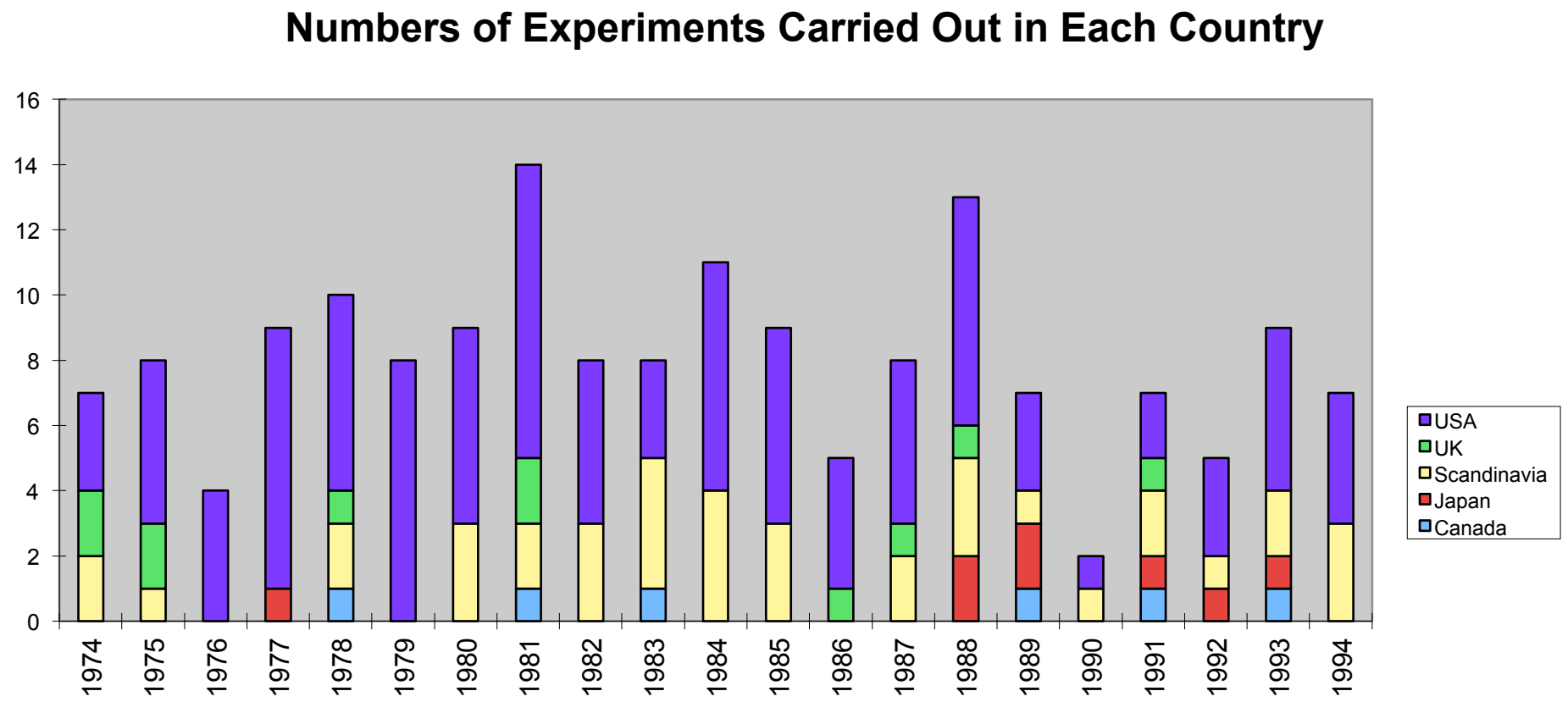


Figure 3.2.1-2 Species of Macaque

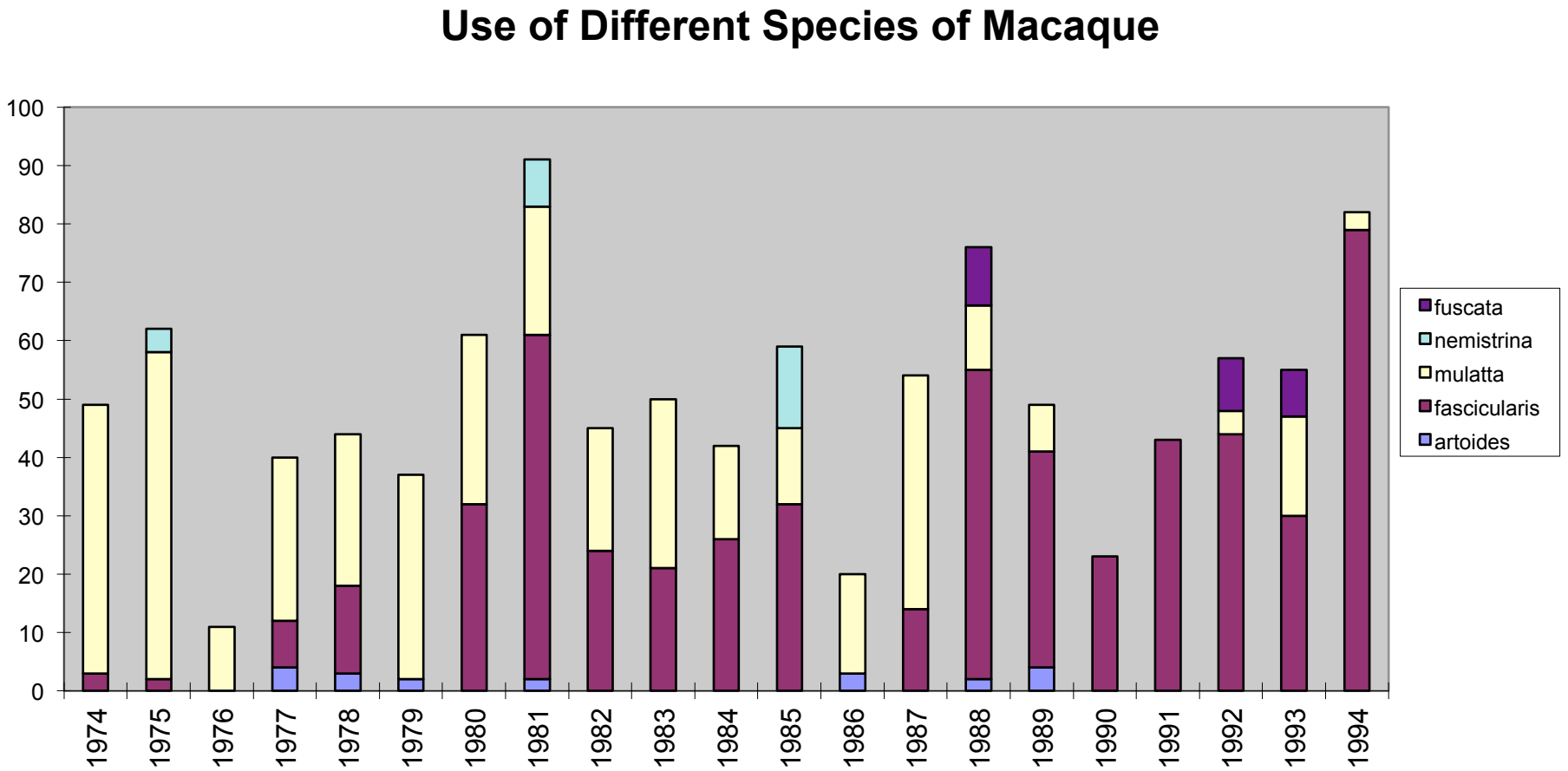


Figure 3.2.1-3 Categories of Research

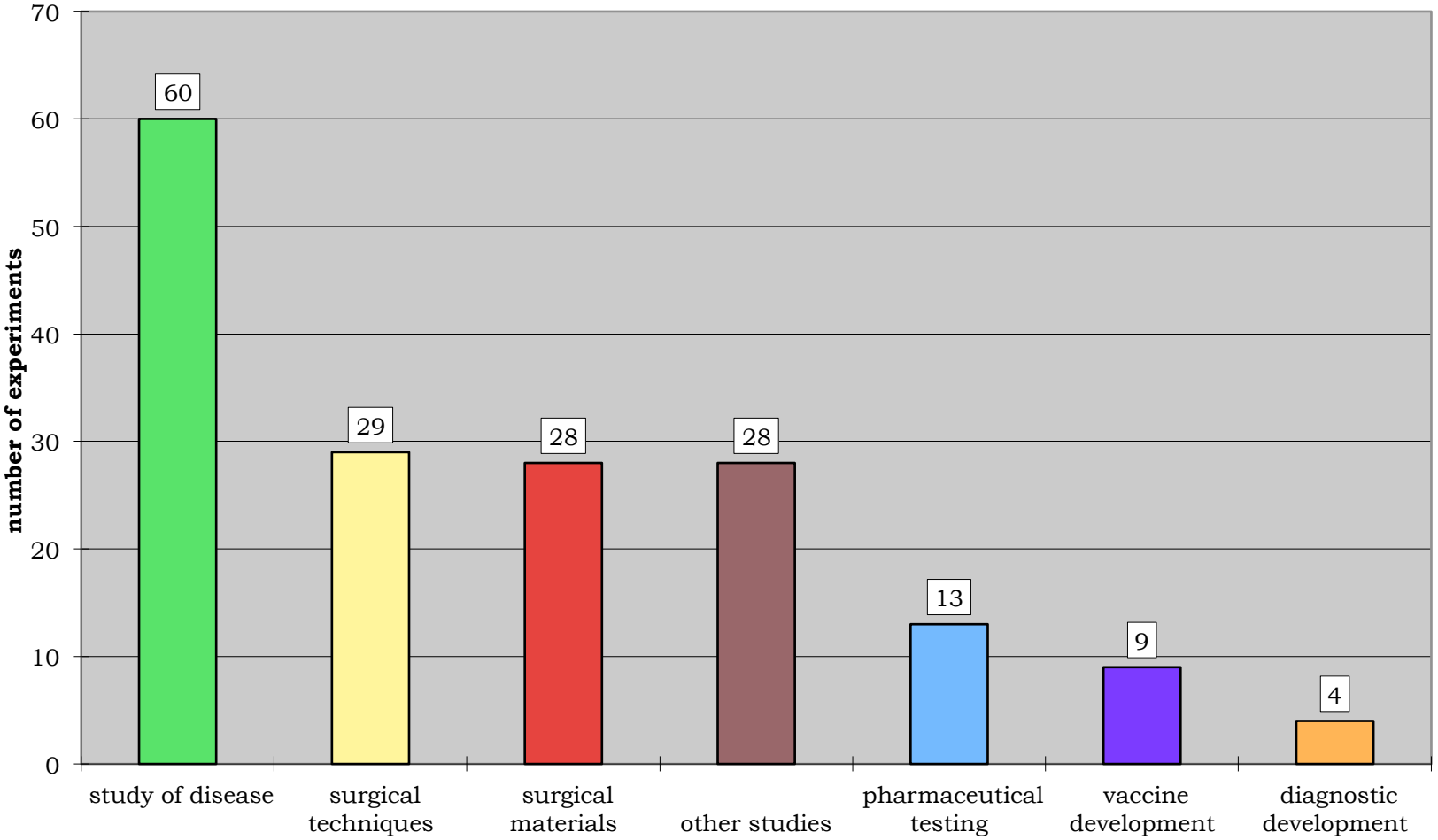


Figure 3.2.1-4 Citations by year

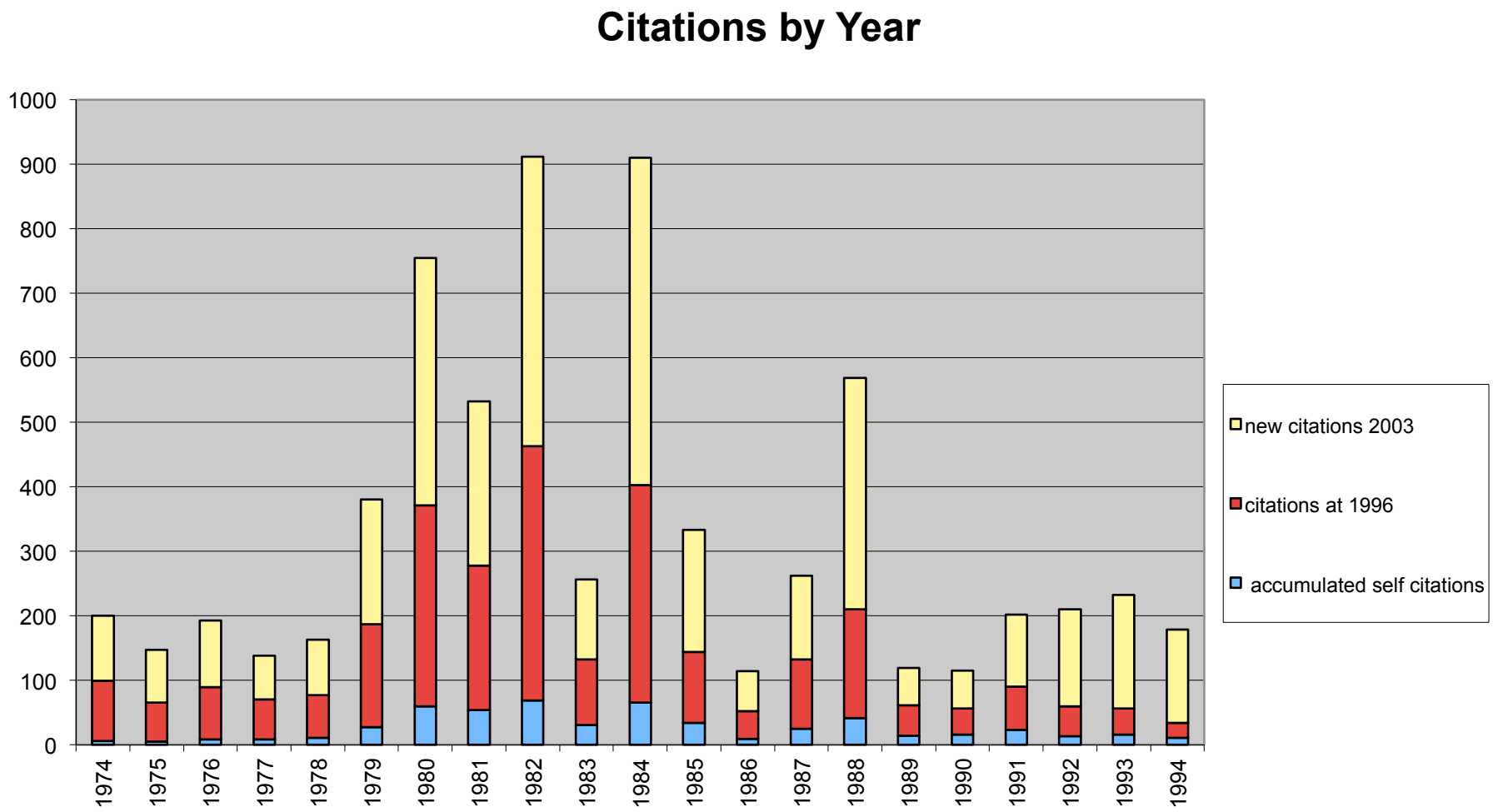
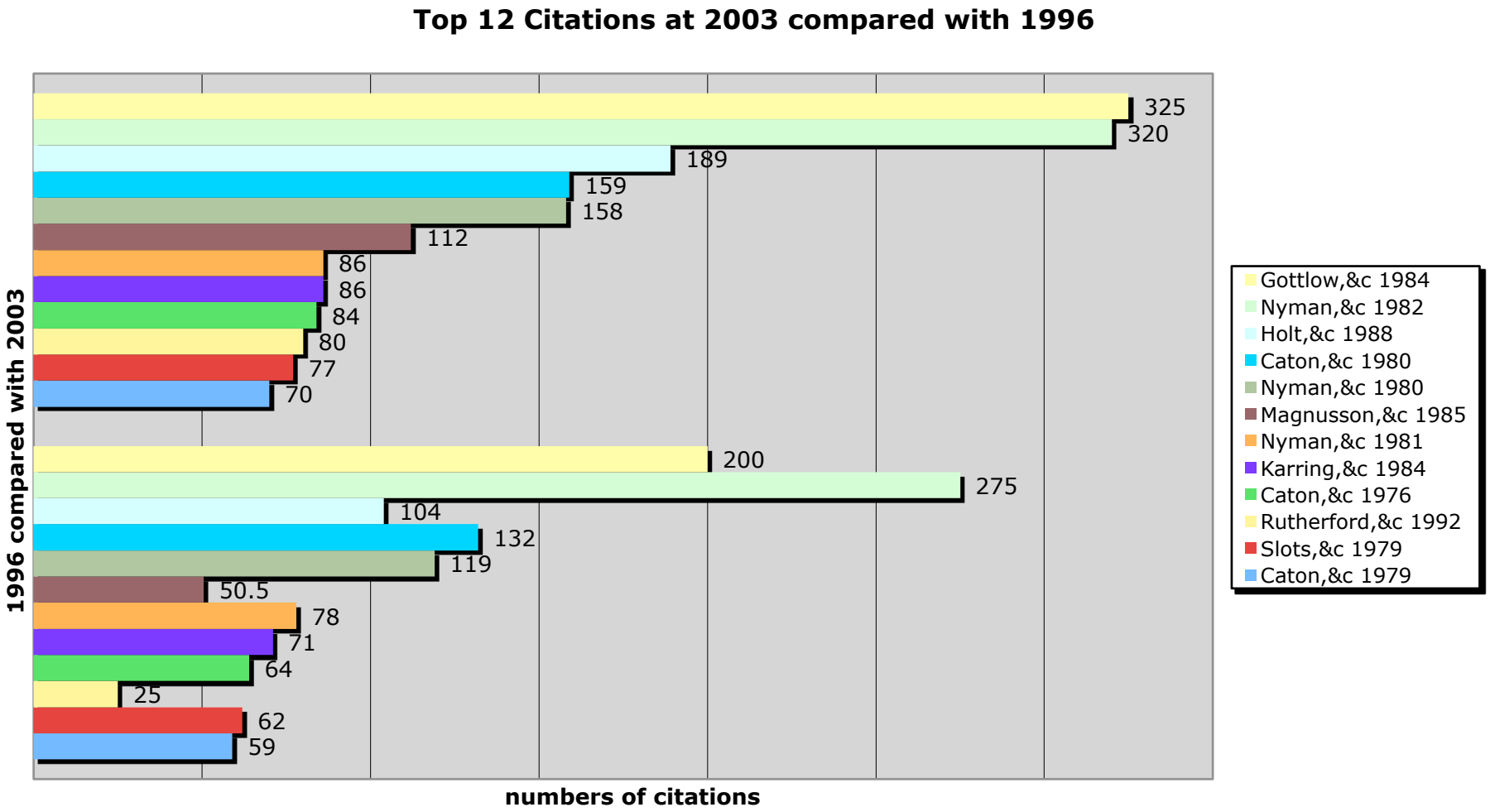


Figure 3.2.1-5 Top citations compared



3.2.2 Sweet, J (2010) An evaluation of errors derived from Periodontal Research publications describing the use of macaques as experimental animals prepared for Science, Technology, and Human Values

Introduction and Review of the Literature

The case for the use of non-human primates has been continually made in the literature by advocates who use these animals in their own experimental work (Schou S, Holmstrup P, et al., 1993; Caton J, Mota L, et al., 1994) emphasising the ways in which non-human primates (with various exceptions) mimic the human anatomy and physiology or the oral tissues including the periodontal tissues in health and disease. Other researchers such as Page and Schroeder (1982) and Selvig (1994) take a broader overview and suggest that the similarities between humans and non-human primates are far fewer than the other authors would suggest. They propose that the interest in the non-human primates and other animal experimental models should be in the diversity which the various models demonstrate, giving a great range of features to investigate both health and disease. This view is supported by other workers outside dentistry such as Newell-Morris and Fahrenbruch (1985). It is also instructive to note as Bosshardt and Schroeder (1988) emphasise that "periodontitis in non-human primates, either wild-caught or maintained in captivity, is rare in young or mature and still variably infrequent in old animals". In a previous study (3.2.1), Sweet identified features of periodontal research using macaques over a period of 20 years and cited over thirty years in an independently derived data set of publications. Included in this were the usual scientific parameters of country of origin and laboratory, an overview of this experimentation, the range of problems to which this research has been applied and an appraisal of the most cited experiments. This study explores these publications more critically. As explained

above there are differences of opinion about the purpose of the experiments and in addition there is the problem that periodontal disease is not a general feature of nonhuman primates so must be created artificially if it to be studied in these animals. The possibilities for error both conceptually and technically are great. It is not regular scientific practice to critique or find error in published work. Instead, peer approved publications are cited and experiments validated and findings published. Poor experimentation and concepts are left to wither on the vine remaining uncited. Alternatively, with systematic reviews, criteria for acceptance as valued papers are set; papers that do not reach these standards are discarded. This contrasts with subjects in the humanities where the major focus is on critiquing and finding conceptual errors which are (usually) welcomed by the original authors and understanding of these as a means of furthering the subject. This paper attempts to bridge this cultural divide by bringing the humanities critique to the data set of publications to study "scientific error". The previous study described an extremely stable investigation process, which generally used conventional and a conservative range of techniques to produce results, which were reported in a standard fashion (see 3.2.1). The presuppositions surrounding this research genre were rarely discussed, despite the vast range of expensive physical resources required to hold and mount experiments on non-human primates, the physical and psychological harm to the animals themselves, and the high possibilities of error which could nullify the value of the whole conduct and reporting of the experimentation. In some ways the research conducted on macaques is a reaction to open criticism of dog experiments. Jendresen and McLean (1983) make light of this in their report.

> *In recent years several conferences on periodontal research recommended subjects for concentrated investigation, and it looks in the literature as if these recommendations have been taken seriously by the investigators, all of whom want to be in on the bonanza of research money and publication space assumedly available for such high priority subjects. This has led to a plethora of articles with*

minor or no variations of the same theme: strings are tied around premolars of beagle dogs; the strings are left in place for a specified number of days; the teeth are wiggled before or after the strings are removed; bacteria are counted; treatment includes mechanical means and/or drugs; pocket depth is measured before and after the animals are sacrificed; and then statements are made with regard to aetiology, pathology, and therapy of periodontal disease - in humans - with a modest modifier that it is hoped will not be taken too seriously. (p417)

So Bergenholtz and Caffesse et al (1984) report on the increasing pressure to use a monkey model closer to humans because of the unease at the interpretation of dog experimental work and the inability to extrapolate findings. And yet there are inherent difficulties with the primate experimental model. The experimental animals may have some of the same characteristics as man (Caton and Mota, et al., 1994), but major differences still remain: 1) Young non-human primates have a much greater propensity for healing regeneration than the older human populations that suffer from periodontal disease. 2) "Disease" produced rapidly in experimental animals may differ significantly from a microflora ecology and host response that have developed over many years in humans. 3) Preventive care before or following treatment, especially mechanical oral hygiene is difficult to maintain in humans but is far more difficult in non-human primates in experimental conditions. The important effects on outcomes is emphasised by Lindhe's clinical studies (Lindhe and Westfelt, 1982) and Caton's (1979) experimental work. 4) Communications between the periodontium and the dental pulp via accessory canals may be minimal in non-human primates but humans may have more accessory root canals 5) Size differences may influence the range of cellular healing. The contortions of experimental method produce a demonstration that may deceptively mimic the human clinical situation. It is likely that as the demonstration is seen to fail to mimic accurately the human situation, increasingly complex protocols will be introduced to plug these deficiencies Also it is difficult to eliminate error because essentially experimentation a learning process and must involve novice researchers gaining

experience. Much research includes a cross fertilisation of ideas extending and adapting research protocols say from one size of animal to another which may not readily fit. Things can go wrong and still there is something useful to come from it. Honest reporting on the unexpected impact of the procedures on the animals could be of great import for future researchers thinking of carrying on this work.

One author who stands out in the dental field is Brunette who after an established research record largely in vitro studies such as Brunette and Kanoza (1977), Bellows, Melcher and Brunette (1980) and Uitto, Larjava and Brunette (1992), wrote a major text on critical evaluation of dental research Brunette (1996). Rather than taking a positivistic view that science involves objective experimental procedures, which eliminate as far as possible subjectivity or opinion, he sees academic science as the social institution, devoted to the construction of a rational, consensual opinion over the widest possible field. (p198). This is in keeping with a recent philosophical monograph on error that states, "The history of science is the history of changes of mind about the truth of things. The science of the present is an agglomeration of corrections of the science of the past" (Rescher, 2007 pp25). Indeed, Brunette (1996) goes on to say that much of the research literature of science is rhetorical, intended to persuade other scientists of the validity of received opinions and that there is "a huge amount of literature, it is growing fast, and much of it is useless." So it is important for scientists to be aware of the possibility that publications contain errors and that the most common cause of error is a mistake in technique (p187). However, defects in one aspect can sometimes be compensated by strengths in another. LaFollette and Shanks (1996) also emphasise that: "We must not demand too much by expecting every individual experiment or even every individual line of inquiry to be fecund. Every successful research program includes failed experiments and failed lines of inquiry ...that is the nature of science. Rather we must assess the benefits flowing from the institutional practice of basic research using animals". (p202)

This could be achieved by studying published papers even though outright failures are not usually published! Oxman and Guyatt (1988) also make the point that published reviews and primary studies have major flaws. Given all these excuses and acceptance of some errors there must come a point where one particular error in some cases or combination of errors in others could derail the experiment to such an extent that little could be gleaned from it. It is therefore proposed here that it would be a valuable exercise to analyse experiments that have been completed and published and characterise the errors entailed. Attention can be drawn to common types of error reported or derived from the published data. Protocols of future experimentation may then be more critically reviewed in order to identify where error might be avoided. Further, Rescher characterises two forms of error. Either there can be a failure of omission where, in practical terms, something is not done which should be done or at an intellectual level where evidence is ignored. Or there is a failure of commission where something counterproductive is done or where a wrong idea is accepted. Most illuminating of all is Rescher's view that error can be looked at from the perspective of its extent which indicates "the volume and scope of what must be done to put matters right" and / or gravity which indicates "the magnitude of the consequences". These insights are used in the process of evaluating error in the group of experiments studied.

Method of Evaluation

First Stage - Distribution of Scientific Error

An illuminative approach was used to explore the texts. Each paper in the experimental data set was read and coded for possible errors using the outline of error types by Brunette (1996) as a starting point but to augment this list where necessary. Exemplars of error types were isolated and showed a frequency distribution as shown in described below.

Wrong experimental protocol

A common fault in experiments, which affected adversely the whole results and outcome, was failing to gain a baseline record of periodontal health at the start (Albers and Ellinger, 1988; Anneroth, Danielsson et al, 1985; Aukhil and Iglhaut, 1988; Blomlof, Lindskog et al., 1981; Wilhelmsen, Ramfjord et al., 1976). Some tooth replanting experiments failed to root fill teeth prior to replanting (Blomlof et al. (1988) and Lindskog et al., (1988) when the need had been well established by this time. In one experiment, it appeared that the experimental animals were out of control: At least three of the six implants were removed by the monkeys themselves even though they were placed under chair restraint. (May and Shapiro, 1981; p553) Other methodologies were so intensive in the anaesthetic and other procedures that recovery times were inadequate and the animals became debilitated and lost weight (Alvares and Siegel, 1981).

Operator sensitivity and calibration

Various comments are made in the papers referring to problems encountered in achieving the required result. It is often difficult to separate out what is a demanding method with what is simply operator error or clumsiness. Hence Bahn, Broxson et al, (1987) said that because of problems with histologic specimens preparation, the number of samples was inadequate to allow statistical analysis. Ellegaard, Karring et al (1974), in similar vein, reported 93 defects were produced but only 75 were processed for microscopy (p368-9) It appeared that the root surfaces had often been damaged during the production of the bony defects (p369). Magnusson et al (1985) reported that nine of the test teeth had to be excluded from the final examination due to failures of a technical nature occurring during the surgery, biopsy sampling or histological preparation. Some experiments such as Lindhe, Nyman et al (1982) which involved repeated scaling, could produce a range of attachment loss depending on operator sensitivity and are not easily amenable to calibration. The ligament injection studies by Albers and Ellinger (1988) and

Brannstrom, Nordenvall et al (1982) fail to mention the force used to penetrate the ligament and the rate at which the liquid is injected. Standardised operator criteria would have made the experiments more reliable and easier to interpret.

Controls missing: This can mean that controls are missing altogether. Rossmann, Gottlieb et al. (1987) used only one monkey to produce just two fields exposed to a CO2 surgical laser. Caffesse, Castelli et al. (1981) performed Widman flap surgery in all four quadrants without any control sites. Without controls it is difficult to interpret results. For instance, it is not possible to draw the conclusions Johansen and Karslen (1978) make about the induction of periapical lesions, because they have no controls with the same preparations of conventional bridgework, but without occlusal interferences.

Alternatively, controls have been used but they are not the appropriate ones. Caton and Nyman (1981) used controls that were not the relevant ones - there should have been a surgical no-bone group in their study. Whilst the results are entirely as anyone would predict, it is not possible to establish whether the attachment loss caused by the surgery was due to a surgical procedure or to the osseous therapy. Albers and Ellinger (1988) used saline as a control in their local analgesia experiment. Had they used local analgesic alone in one group they would have been able to determine the effect of the vasoconstrictor.

Improper time considerations: A number of experiments were not sufficiently long to achieve a meaningful result. 28 days is probably not long enough to assess connective tissue healing (Caffesse, Smith et al., 1987) or to test for pulpal changes (Bergenholtz and Lindhe, 1978). Lindskog, Blomlof et al. (1988) are likely to have misinterpreted their experimental findings at eight weeks of healing where they propose that an epithelium layer could maintain the width of the periodontal space and prevent fusion of bone with the tooth. Given further time they may have seen no epithelial remnants at this ectopic site. 9 weeks may not have been long enough to let bone fully mature (Levin, Getter et

al, 1974) and 16 weeks is a very short time to assess the success of an implant (Listgarten and Lai, 1975). 24 hours drug therapy is a very short period over which to assess the cell stimulatory activity of a placental ointment application (Lolli, 1982) and 6 weeks is a short time to assess the effect of a drug on a chronic disease such as periodontitis. One case of excessive time for an experiment may have been the Levy, Robertson et al. (1976) study in which the early sacrifice of the primates may have preceded development of gross necrotic lesions in the mouth induced by the tuberculosis inoculation.

Insufficient results

Slots and Hausmann (1979) show a case of only one tooth in one monkey and only one site on this one tooth was microbiologically sampled and analysed (an additional monkey acted as a control). The sufficiency of results largely depends on the original aims and final claims for the experiment.

Lack of randomisation of sites

Authors such as Boyne and Fremming (1982) have introduced controls into the experiment but have consistently performed the test or the control on one side of the moth, so that their experiment is unrandomised. This allows for the possibility of bias, as one side may be easier to work on than another for a left or right handed operator and the operator also knows which is the test and control site whilst working on it.

Systematic error - where an error ran through the body of the experiment.

Systematic errors ranged from a failure to record a baseline of oral health before experimentation (Slots and Hausmann, 1979), thus making intervention at a later date difficult to interpret, to ineffectual methodologies. Coverly, Toto et al., (1975) prepared a surgical defect to mimic a natural chronic lesion in the monkey but the procedure was too slight and for too little time and followed no established protocol. Not surprisingly,

later surgery conducted healed in the control and test groups as if no chronic lesion has been produced. Levin, Getter et al., (1974) presented a paper entitled "Healing of periodontal defects with ceramic implants". However, on further inspection they are referring to healing under flaps - a situation where practically anything non-toxic would be tolerated. This is a surrogate end point for the clinical situation alluded to in the title. Johansen and Karlsen (1978) arranged their experiment in a case study fashion so that it was impossible to compare one case with another.

Lack of precision (closeness of repeated measurements)

Lack of precision is usually closely related to a rather crude or uncontrolled methodology within an experiment. Picton and Wills (1981) describe a process of cutting through a tooth root filling it and fixing in a brass Dentatus screw and then stressing it and finally taking an impression of it. This quasi-clinical experiment is likely to produce inconsistent results. Gottlow, Nyman et al (1984) surgically treated teeth and cut the crowns down to use the remaining gingival and mucosa to form a complete covering over residual roots. They found the 3 test and 6 control roots penetrated the covering soft tissue during healing and were therefore excluded from further examination meaning that over one third of experimental roots were lost. Valderhaug (1974) drilled holes and extirpated the pulp form primary and deciduous teeth leaving them exposed in the mouth. He found that periapical lesions were not a repeatable or consistent finding. This is most likely due to local anatomical tooth differences and differences in degree of injury each tooth sustained.

Lack of accuracy (closeness to true value to be determined)

Two highly cited papers Karring, Nyman et al. (1984) and Nyman, Karring et al. (1980) both admit to a problem with accuracy. As a result of extensive root resorption, the notches prepared in the implanted roots in order to identify the level of the alveolar bone crest prior to extraction and transplantation could not be relocated in all specimens. In

these specimens, the borderline between the apical and coronal portion of the roots had to be determined by arbitrary assessments (Nyman, Karring et al., 1980: p366-7). This puts into question the whole process of the value of being able to carry out these experiments on monkeys, kill them and determine histometrically the various responses, if it is still necessary to arbitrarily determine reference points.

Statements not supported by the experimental evidence

These appeared to occur either as a statement without evidence or as a great exaggeration, or alternatively to misinterpret data and assume a cause and effect relationship when none may exist. Slots and Hausmann (1979) stated that their study greatly incriminates the bacterium they studied as an important pathogen in periodontal disease. This statement is a little of an exaggeration considering they studied only a single site on a single tooth in a single monkey. Exaggerated claims are also made by Albers and Ellinger (1988) who state that an intraligamental injection technique appears to be safe based on a few injections by one operator in monkeys of unknown baseline disease status. Lolli (1982) makes the assumption that used appropriately, an ointment containing placental extracts can favourably influence tissue formation after gingivectomy and when used before applying the compress, it can favour rapid epithelialisation of the wound. However, he bases this view on 24 hour mitotic figures only, which are greatly raised. This may be a misinterpretation. This increased cell division does not indicate directly better epithelial coverage that would take a few days. It may be showing a fairly non-specific epithelial cell proliferation stimulation caused by the placental extracts acting as an irritant.

Statements not supported by the literature

Cases included statements where the then current literature had not been consulted, where words in current use had been re-defined to augment the appearance of results and mention of the results of procedures that are not supported in the body of the

literature. Freeman (1981) alludes to the permeability barrier function of keratinised tissue and fails to acknowledge previously published papers by Squier (1973 and 1977) which clearly show that both keratinised and non-keratinised epithelia are able to act with a permeability barrier function mediated by the fusion of membrane coating granules with the cell membrane to form an intercellular permeability barrier independent of keratin production. Rutherford, Ryan et al. (1993) use the term periodontal regeneration, but for the purpose of analysing their results they accepted "regeneration" had occurred only if more than 20% of possible regeneration had occurred. They have redefined the term regeneration, that is, formation of tissues as they were before they were destroyed by disease, based on only reformation of one fifth. "Successful regeneration" appears to give a false meaning to the paper, which also shows a wide range of values.

Lack of Post-operative oral hygiene

In this particular set of experiments one of the most important criteria for good healing is good oral hygiene. One paper, which appeared to contain many errors, May, and Shapiro (1981) admit that weekly examination revealed gross amounts of plaque sand materia alba adhering to the implants of all monkeys (p553). Nearly half of the experiments showed a failure of the researchers to ensure adequate oral hygiene following the procedures. Lindskog, Lengheden et al (1993) admitted further that their animals did not undergo any hygiene period and consequently plaque induced periodontal inflammation influenced the healing result to a large extent (p18). Some authors attempted some form of plaque control that was not adequate. Wirthlin and Hancock (1982) complained that despite weekly polishing of crowns of teeth to remove debris and plaques, a marginal redness persisted (p304). This was not surprising since Caton (1979) had already published data, which showed that it was necessary to clean plaque from the teeth three times per week to maintain gingival health in monkeys.

Method of Evaluation

Second Stage - Determining an Error Index

Following this analysis it was then possible to construct an Error Index to establish a numerical score for each paper to identify and characterise those papers severely compromised by multiple errors. In appraising the experiments over the years for trends, it is surprising how many published research papers should have so many major scientific errors (see Figure 3.2.2-2). It is also difficult to evaluate how many errors impede interpretation of the experiment so much that it has to be placed into Brunette's category of "useless". Most important may be systematic error, controls missing, experimental protocol error and operator sensitivity or a calibration problem. The range of scientific errors appears fairly uniform over the twenty years, with slightly fewer systematic errors in the second decade. Because of the likely difficulties of managing the primates to institute regular oral hygiene, this important element has often been neglected, and has been highlighted by providing "lack of post operative oral hygiene" as a specific separate error coding. Other methodological faults are outlined in Figure 3.2.2-1 and show that by far the most common errors are methodological. To gain further insight into the overall volume and gravity of error in individual papers an Error Index was constructed. Some relatively small errors can sometimes unhinge a complete experiment but systematic error throughout the body of the experiment is almost certain to. However, it is difficult to generalise what could be considered a major or minor error and weight the scoring for particular errors.

Error Index

The Error Index (see Table 3.2.2-1) is determined from information given in any part of the scientific paper reviewed. However, scores are based on errors likely to occur in the rationale, methods, results and discussion parts of the paper, to give a maximum

theoretical total of 10. Systematic error, controls missing and wrong protocol are rationale errors and allocated a score of 1 each if present. Other critical methodological issues are operator sensitivity, lack of randomisation and improper time considerations that can attract a further score of 1 each if present. Insufficient results or lack of precision or accuracy were the results faults considered and given scores of 1 each if present. The key methodology of post-operative oral hygiene is considered very important for this group of experiments and if this is lacking a score of 1 is given. Finally, a score of 1 is allocated if at a discussion level statements are made which are not supported by evidence or by the literature.

Discussion

The Error Index for the total period of the sample shows that most experiments appear to have at least one scientific error (see Figure 3.2.2-2). It also shows that grant supported research commonly demonstrates one or two errors but that non-supported research is more error prone (Fisher exact test 2 tailed $P < 0.0001$). The most common error was the lack of postoperative oral hygiene, which could have directly affected the outcomes of healing in many of the surgical procedures carried out. Methodological errors accounted for nearly all the errors, although nearly 10% of the publications made statements that were not supported by the literature or by the evidence they proffered. The experiments with the most errors included an unrandomised, uncontrolled inoculation of a small number of different species of monkey with tubercle adjuvant until gross tissue defects were formed (Levy et al., 1976 [with seven errors]). Boyne and Fremming (1982) [with six errors] describe a gross surgical phase and a text explanation to justify the experimental method, both of which have no relationship to the title of the paper. No periodontal indices were used in a periodontal paper and measurements that were made were likely to have different reference points at two surgical phases. Neither of these surgical procedures incorporated post surgical oral hygiene. There is little

evidence in the literature to support the statement that "the importance of the results of the histological examination actually had greater validity, because the modifications of a cellular nature noted in animals must find a parallel man, whilst a pure and simple analysis of the clinical characteristics of an injury in an animal does not always correspond to a lesion in a human being" Lolli (1982) [with five errors]. The statement that an ointment containing placental extracts could favour the epithelialisation of a wound may be in error as there were insufficient results conducted over insufficient time, no randomisation, no post operative oral hygiene and no statistics. Skinner et al. (1976: p197)) [with five errors] were far more apologetic about their methods and results, admitting, "when mixed with blood the chondroitin sulphate became a gelatinous mass which presented some difficulty on placement" and suggesting that they should have used with material with collagen as well. In addition, they say that ...the complex and often unknown etiologic factors of "natural" periodontal disease are not present in the experimental animal: and therefore, the repair proceeded without the influence of these complicating factors, and could therefore alter the results. They go on to say "that the problem of osteogenesis in human periodontal disease is a very complex order of body function with many possible initiating factors. This multifaceted problem is not easily paralleled in an animal model. In the last analysis, therefore, only human studies will offer valid and sufficient insight into osteogenesis" (p201). A final suggestion is that further study would be of extreme value, if humans were used as the experimental model! Problems of extrapolation as error are discussed further below. Johansen and Karlsen (1978) [with five errors] described how six monkeys were purposely subjected to different experimental procedures and observation periods, obviously eliminating controls. They catalogue a series of incidents blaming individual differences in resistance in monkeys, since they are "caught wild and later used for experiments". They report an instance of a new dental bridge that becomes extremely mobile indicating fracture of a

root. The bridges were recemented when they fell out after 7 months and then after 2 months were lost. With another monkey the bridges were recemented twice. In yet another bridges on both sides of the mouth became very loose, but the authors do not mention and therefore fail to identify the obvious periapical lesions with bone loss visible in the radiographs provided, which could explain the phenomena they describe.

Errors or inspired guesswork?

Assumptions are continually made in the literature, such as those by Anneroth and Danielsson (1985) who state, "As the tissue anatomy and histology is similar in monkeys and humans, one might anticipate that tissue reactions after PDL injection would also be fairly similar". In contrast, when it suits, Wirthlin and Hussain (1992) make the point that "the differences in probing attachment level in this study between baseline and the ligated state were not great by standards of human periodontal disease, but were meaningful for the smaller monkey teeth". The above quote illustrates the underlying problems of scale in extrapolation, which may or may not be in error. Slotts and Hausmann (1979) in their study of one site around one tooth in one monkey come to some extremely bold conclusions.

> *The periodontal disease process of higher animals supposedly mimics relatively closely that of human periodontal disease. Unfortunately, these experimental animals, including M arctoides, often require months or even years to develop a significant loss of alveolar bone. Application of a ligature around the crown of a tooth adjacent to the alveolar bone, however, can induce alveolar bone loss in beagle dogs and monkeys within a period of a few weeks. The inflammatory infiltrate of the periodontal tissue of the ligated tooth seems dominated by polymorphonuclear leukocytes, whereas the "common" human periodontal disease is characterised by the predominance of lymphocytes and plasma cells. The ligature related pd ...appears...more acute than the typical pd. However, human pd may proceed by periods of rapid bone loss and by periods of remission. The*

> *microbiological results of the present study, therefore, may relate to human pd in its exacerbated phases. (p266) [pd = periodontal disease]*

It is also unlikely that this experiment gives sufficient evidence to support their claim that the bacterium they identify is "an important pathogen in periodontal disease". As Dolan (1999) relates "It is on the proper operation of this process of extrapolation that the validity of knowledge gleaned from animal experimentation depends" (p178). Clearly some of this extrapolation may produce error at the late stage of interpreting the experimental results even if the experimental method was sound in itself.

Conclusion

> *Error is not a mere blank in the canvas of knowledge but is filled in with what should not be there (Rescher, 2007; p92)*

The importance of experimental error can be related to its extent - how much it can affect the experiment's progress and its gravity, which is the severity of the consequences of accepting the error. From the publication of the experimental findings in this series, most errors appear to be related to poor methodology, although there can be misinterpretation of experimental evidence from other publications or from the experimental data itself. Funded research contains fewer errors, so that research-funding panels may be influential in reducing error especially in experimental protocols. The Error Index clearly identifies published papers in this series, which may lose any scientific value because of their multiple errors that put the interpretation of findings at risk. The Error Index offers experimenters and research review panels alike a checklist tool to identify and reduce error.

Table 3.2.2-1 Error Index

Item	Score
Systematic error	1
Controls missing	1
Wrong protocol	1
Operator Sensitivity	1
Lack of randomisation	1
Lack of post operative oral hygiene	1
Improper time considerations	1
Insufficient results	1
Lack of precision and/ or accuracy	1
Statements not supported by evidence or literature	1

Minimum score of 0 for no recorded errors.

Maximum score of 10.

Figure 3.2.2-1 Distribution of Scientific Error

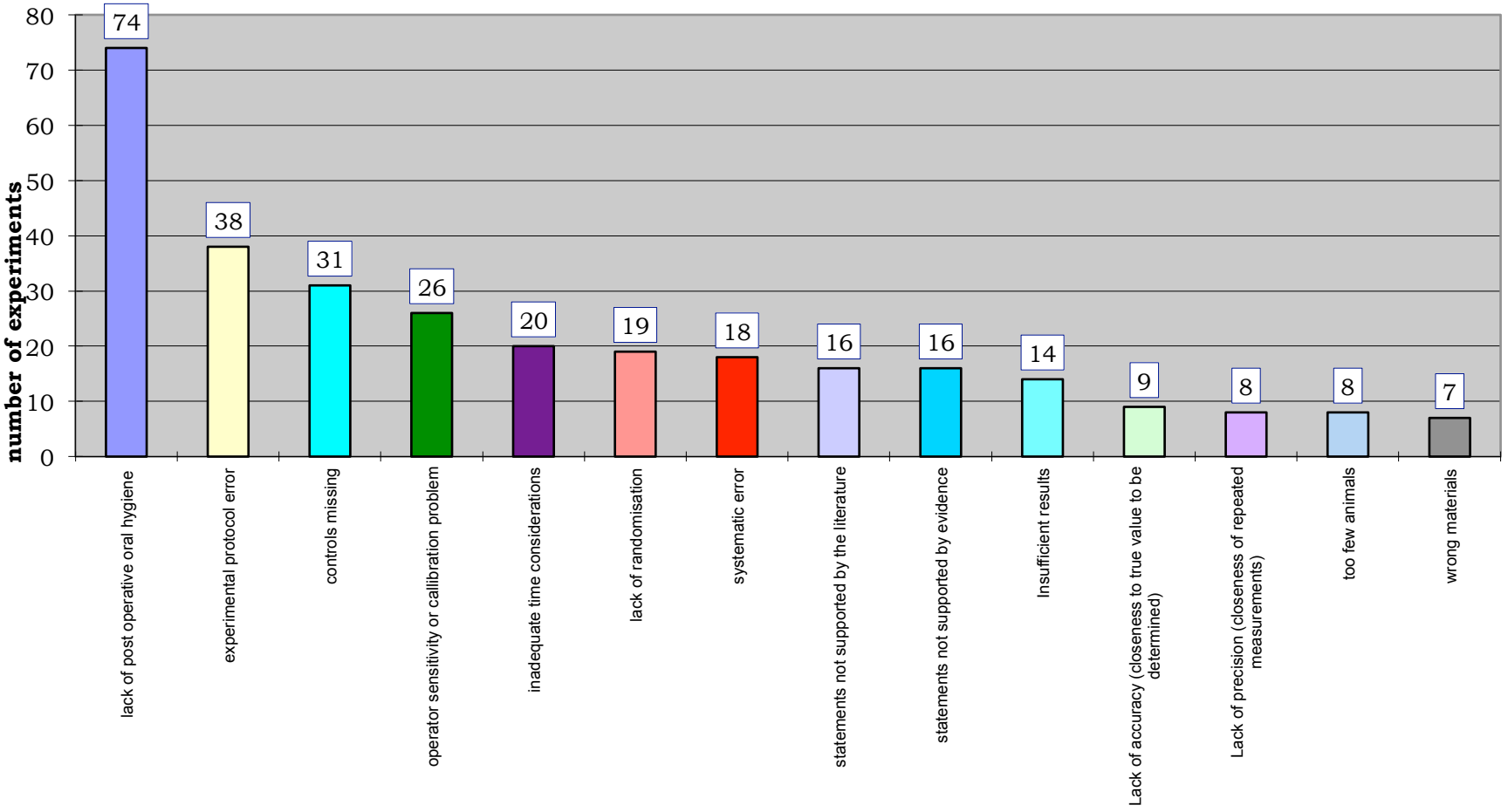
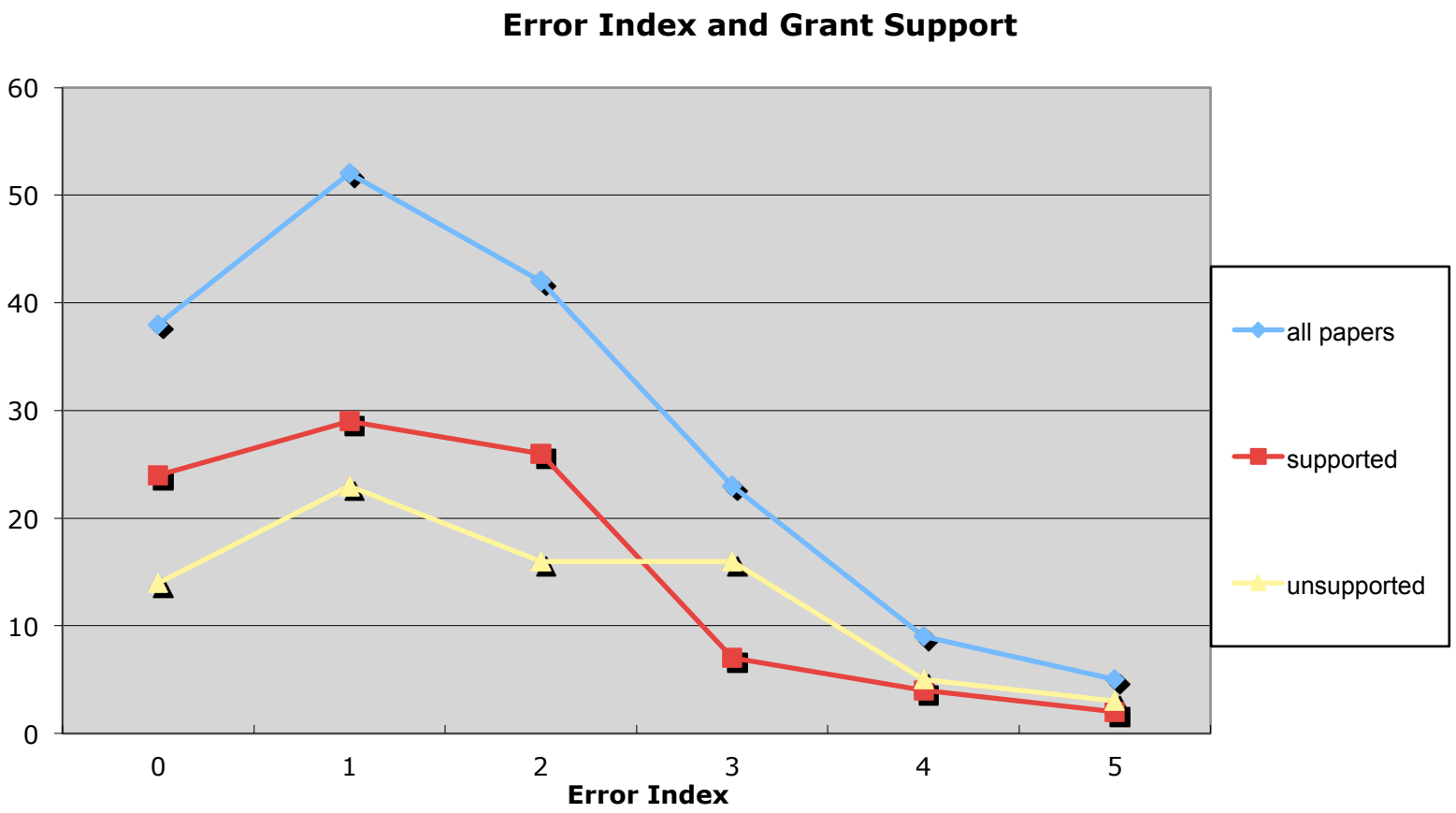


Figure 3.2.2-2 Error and grant support



3.2.3 Sweet J, Pugsley L, and Wilson, J. (2008) "Stakeholder perceptions of dental chairside teaching and learning". British Dental Journal 205: 499-503

As a hands-on clinical educational programme undergraduate dentistry is an anomaly in Higher Education. This study aimed to evaluate the perceptions of chairside teaching of dental team stakeholders, including dental nurses, dental students, and dental tutors at a single UK dental school. From this sample the penetration of current learning and teaching innovations within Higher Education into the specialist field of clinical dentistry could be evaluated. This article is the first of a series of three, which investigates the perceptions of stakeholders of chairside teaching at a single dental school. The second evaluates chairside teaching on a UK wide scale. The third provides educational tools to encourage collaboration and sharing good chairside teaching practice. A further accompanying article reviews some of the educational methodology and innovations in teaching and learning that may be applied to dentistry.

Introduction

There have been a remarkable number of innovations in teaching and understanding of student learning in recent years in Higher Education that may have contributed to a better learning experience for students. These have been discussed in the accompanying education innovation paper in this series. For the dental student the learning situation is far more complex than most. Acceptable practice in dentistry is a well-defined spectrum of activity delimited by the need for patient safety and to abide by current guidelines in using specialized techniques, equipment and materials. There is little literature on how students from diverse backgrounds adapt and conform to this specific culture of assumed and expected standards. A brief review is carried out in the second paper in this series. Dental chairside teaching is unique because the student

takes responsibility for the restoration and preservation of a patient's oral health under guidance from a tutor. Not only is communication with patients of vital importance to inform and encourage them to engage with disease prevention measures but also some treatment options involve making irreparable changes to structures in the mouth. Successful dental care should therefore include a sensitivity to the wishes of patients as well as technical ability and, most important, an understanding of risk, what to do, when to intervene, and to critically appraise treatment outcomes.

The purpose of this study was to widen the field of investigation to include the perceptions of multiple stakeholders in dental chairside teaching, which has not been reported in the literature so far. As a way forward, a detailed study of a sample of dental students, dental nurses, and dental tutors was carried out in one dental school. Different survey methods were selected using the most appropriate for any specific dental team group. These multiple methods had the advantage of providing 'triangulation' as multiple measures ensure that the variance reflected is that of the subject of the research and not that associated with the measures.

Methodology

A UK Dental School (Cardiff) was selected as a Case Study for the project and stakeholders sampled to give as wide a representation as possible for their group. 10 dental tutors (out of a possible 35 academic clinical staff) were invited to take part using maximum variety sampling to represent a range of age and experience, seniority, gender and full or part-time employment (Morse, 1998). One to one, semi structured qualitative interviews were utilised, to allow for in depth accounts to be obtained from the teachers (Cohen and Manion, 1994) (see Table 3.2.3-1 Dental School Study Sample). Focus groups were conducted with 24 fourth-year dental students out of a cohort of 54 and 8 qualified dental nurses out of cohort of 24, all of who volunteered in response to an e-mail request from the non-dental author. Fourth year dental students

were chosen because they had experienced a full year of clinical chairside teaching and were therefore experienced enough to critically appraise what they were experiencing. Fully trained dental nurses were chosen because they were conversant with the training of dental students. The focus group was chosen as the qualitative research tool since it has the advantage that multiple views could be elicited on the same interview occasion, allowing for the group dynamic to confirm or refute opinions (Krueger and Casey, 2000). Each group consisted of between six and eight participants with the moderator using a schedule designed to allow the participants to explore their attitudes and understanding of dental student learning in the clinic and their response to the teaching they receive. The questioning became progressively more focused in order to stimulate discussions about the topic. Since in chairside teaching the patient is the teaching model, providing the student with an opportunity to learn practical skills, the patient plays an integral part in the teaching and learning process. A questionnaire was developed and administered to patients following their dental treatment seeking their opinions on teaching and learning. 150 questionnaires were distributed to patients, however only 11 (<14%) were returned. With such a poor return no meaningful results or conclusions could be drawn. It is possible that patients felt unable to comment on the educational experience, or that they were not interested in it, merely attending to receive dental treatment.

Data analysis

The data were collected and, where necessary, transcribed into text and analysed using .ti software (2005). As an overview, perceptions were matched against a teaching model, which describes five major approaches (Pratt, 1998). Detailed analysis of perceptions was then made, point-by-point, assessing to what degree they appeared "teacher-centred" or "student-centred" (Prosser and Trigwell, 1998).

Case Study Results

Three of the stakeholder groups, the students, the dental nurses and the tutors, engaged enthusiastically with the study. Most dental tutors looked on their teaching very much from their own position as teacher. They appeared to consider themselves most clearly as subject specialists or experienced practitioners and think of teaching as a process of passing on knowledge and students learning by receiving it. Alternatively they see themselves as experts showing students how to do things, treating them like apprentices. In essence students need to know what to do and how to do it. In this there was recognition of the value of briefing and debriefing as good practice, for this laid out opportunity to do things well the first time, and how things could be done better still on a future occasion. There was recognition that some students were more adept practically at linking theory with practice, but differences in learning styles were not considered.

Perceptions as Teacher-centred or Student-centred

The perceptions of chairside teaching of all stakeholders appeared to centre around two major themes of "student learning" and "provision of teaching and clinical organisation". The origin of these perceptions could be subdivided into those taking a "student centred" or "teacher centred" approach. This is illustrated with examples in Table 3.2.3-2 and Table 3.2.3-3. The focus groups revealed that the students had a very clear idea of what good chairside teaching could be and whilst they had no academic education theoretical background their responses and views could be aligned to a variety of concepts of learning derived by educational theorists (see Table 3.2.3-2).

Learning through thinking

This is illustrated clearly by one example where one student talking about chairside teaching says:

> *"Each case is different, you may be thinking at first, well it's a filling. But each one is different; each patient is different. So it's really important to have a chance to think about what we have been taught and draw on it, learn from it. You need to think about what you know and how you are going to use that knowledge."*

This is clearly a "student centred" view. Prior thinking and placing experience into concept maps indicates having a thinking approach where organisation and structure of knowledge is critical for understanding. Dental tutors also did not refer to learning theorists, but were clearly interested in what they see is the "thinking" role for chairside teaching: "you develop a way of talking to a patient and describing to a patient what you are trying to achieve so logically you can use that skill to talk to the students and describe to them what they need to achieve, what the patient requires and so on" which shows that this teacher believes in passing on knowledge from a "teacher centred" perspective encouraging students to think about what they are doing.

Learning by doing

Other students' perceptions of chairside teaching showed a different emphasis saying:

> *"It's really a way for allowing us to learn by doing. You know, all the stuff that we are told about in lectures and we read about and the phantom head practices, they all come together in these sessions."*
>
> *"I learn best when I make mistakes. That way I'm able to see what's what."*

These comments are aligned to experiential learning concepts of "learning by doing" (Kolb, 1984). This was one of the strongest perceptions of chairside teaching. But it was also conceived as something haphazard and perhaps its success relied on mistakes. As one tutor noted:

"I think they have no idea of what they're doing; pretty inadequate. I think it happens by accident that they learn. Generally I think they learn by making mistakes".

It was generally considered that they need "lots of practice", but how much was difficult to decipher. However one tutor made the point that:

"experience does not make one competent; competence must always be linked with the capability of explaining why".

Learning by students working together

Another student perception was to do with working with peer groups:

"It's really good when we have the House Officers in clinic. They are just above us and so know what we need to know. They are more of an equal".

"I like learning from other students, you can listen and learn in pairs and that's really good, really helpful, you feel comfortable with them."

These views follow those of educationalists who encourage peer tutoring as an aid to learning (Vygotsky et al, 1978). In contrast a number of the dental tutors opposed the idea of different years working together and the one-year teaching another.

Learning by working with other dental care professionals

The students reported that:

"The senior dental nurses can give very useful little tips, these are really helpful, we can learn a lot from them and hopefully they learn too in these sessions."

"I wish the nurses did more of the teaching, the experienced ones are brilliant and a lot of them do supervise us in the one clinic at Bayside and that's invaluable."

This follows concepts of the value of interprofessional education and the effectiveness of learning and working together (Barr, 2000). However, many tutors held negative views about integrated learning with Dental Care Professionals (DCP), thinking that teaching should be by dentally qualified tutors.

Learning by returning to thoughts or actions

A concept alluded to by dental tutors but, not students, was that students start as novices and work their way up through beginner, competent and proficient practitioners - finally to expert (Dreyfus and Dreyfus, 1986). One tutor working at an intuitive level of expert said:

> *"...inherently my own organised mind is the crucial thing in trying to identify how to structure a course... some people have got a natural talent for organising, quantifying and structuring and communicating and you can't teach it."*

Some tutors were disparaging of reflective practice, clearly perceiving this as neither required for themselves as intuitive experts, nor for students who as beginners:

> *"have nothing to reflect upon".*

Learning by doing practical tasks

Psychomotor skill theory was hinted at by a dental tutor with:

> *"It's quite important to show them the finished product so they know what a cavity should really look like and this has to be in a variety of situations."*

However, despite the mention of the view of the finished product no mention was made of visualisation of sequential steps or a knowledge of the expected range of common errors related to a skill as important for learning (Mayberry et al., 1993)

Teaching and Clinic Organisation

Both dental tutors and students were most articulate about issues concerning the provision of teaching and clinical organization. The main issues are shown in Table 3.2.3-3 indicating how a focus on the teacher or the student can alter the learning outcomes. Some problems could be clearly related to individual teacher differences:

> *"The problem is, it depends who is supervising the clinic. There is so much variation in the teaching."*

Educational training in teaching for dental tutors

Students were extremely vocal about how they thought clinical tutors should be prepared to teach and how teacher training may be of value:

> *"The GDP tutors and academics chose to teach and so they should have training. It's very obvious that many of them are not trained to teach and then the sessions are often a waste of time."*
>
> *"You can tell Mrs. Best has been on a teaching course, she is brill. [sic] She explains things, asks what you think and lets you ask questions."*
>
> *"Sometimes the feedback is good, they'll ask what you're doing and why, but some tutors they jump in and tell you what to do and that's no help."*

One tutor thought that:

> *"There can be something to be said for the teacher that they are terrified of!"*

Continuity of dental tutor allocation

Some problems were perceived by students as defects in clinic organisation:

> *"The treatment plans vary week by week depending on who is in charge. Often there is a mismatch of specialty with the teaching and the teacher".*

Dental tutors were also concerned that clinical chairside teaching needs:

> *"Organisation - doing the right thing at the right time".*

Debriefing

Some students noted:

> *"These can be really useful, when they happen - which is not that often. You have the opportunity to get a breakdown on the clinic and information on the cases. You can consolidate your knowledge if you can prepare for stuff coming up."*
>
> *"Having an opportunity to debrief after a clinic is really useful, you can talk through what you have learned, what went well or what was rubbish."*

"I loved the debriefs, but the tutors are often in a rush to leave at the end of clinic."

Dental tutors were generally in favour of debriefs, but they have been a fairly recent introduction and have not been fully embedded yet. One said:

"At the end of the session it is important to go over what they've done wrong, to debrief things and that should go on throughout the session and on all the time. Important thing is to realise that you've messed up and what you are going to do about it in future, what are you going to do to remedy the situation."

Student Centred Practice

Some students reported some dental tutor behaviour that obstructed their learning:

"Mr Hyde spends all his time avoiding us, he's in the office drinking coffee."

"Some tutors disappear before they sign off our lists and we need the signatures for the records. When this happens I either hide the list and pretend it's been misfiled or keep it in my locker and try and catch them the next week, once I did forge the handwriting, I know I shouldn't have done, but I'm the one who'll be in trouble for not signing off. They should stay 'til the end of the session and do the teaching properly."

But that is not to say there were no good examples of a student centred approach:

"Everyone is different and if you're doing a practical procedure you get good at it if you do lots of it - you'll find some that don't find it too difficult to do and I can recognise those straight away - and then there's those that need more nurturing and finally those who find it difficult to relate to a practical situation -and it is those who need more teaching, the others just need guidance".

"I like to encourage more self-created learning and find the evidence base for clinical methods and use of materials -- and importance of writing something down at the time about the clinical work for later reflection".

Discussion

Despite various curricula modifications and changes, chairside teaching itself appears to have changed very little over the years, relying on dental tutor/dental student

relationship with dental nurses having an assumed supportive but rarely formalised role. Dental tutors appeared to be enthusiastic subject specialists or practitioners who were keen to transfer their skills to the students. However, generally they were not particularly student-centred, nor was the need for educational training in how to teach widely expressed. Dental tutors reported that there was scope for improving the chairside learning experience through organising one-to-one relationship master-classes and attention to the use of technology to improve demonstration visibility, so that students "can see what you're doing". Part-time dental practitioner lecturers perceived that they helped the students see an all important general practice side to things but despite that they were happy to follow "a party line" on detail of clinical procedures that are taught. Without educational training, eight of the tutors had very wide ranging views on the degree of "supervision" that students required and how much they should let the student do and when to "take over" to demonstrate how it should be done. The idea that intimidation would have a positive learning outcome does not seem to fit with any current educational theory. Media (other than standard radiographs and photographs) were not widely used to illustrate clinical issues or provide resources for debriefing. Students and dental nurses recognised the value of peer and interprofessional education, a view not shared by the majority of tutors. Only the two tutors with formal training in education favoured peer learning and collaborative teaching. This appeared to be based on how they valued the time spent on their postgraduate education courses, where they reported that networking with other colleagues on the course and across disciplines, was as equally important for their development as the taught elements. Obviously there is some confusion in making use of the "novice to expert" skills sequence model in the far more complex world of clinical practice. A counter intuitive position is arrived at where novices and experts alike appear to gain little from reflection. The problem lies with taking the original driving

skills development sequence (Dreyfus and Dreyfus, 1986) and enlarging it inappropriately into a model for competence and professional development (Chambers and Gerrow, 1994). Some creative ideas were found for gaining continuity from pre-clinical training: bringing students through from the phantom head into the clinic with the same dental tutors -- but this was seen as a problem for some teachers not willing to "risk getting away from the safety of phantom head into the clinic". Good patient selection for improving the resource of types of patients suitable for teaching is seen as a massive organisational problem of critical importance. Also the importance of debriefing eluded to positively by students and tutors follows a pattern in the education literature (Ments, 1990). Resources may be drawn together more fruitfully by reorganising dental curricula so that interdisciplinary students such as undergraduate dental, hygienist and therapist from a number of years work together in collaborative practices, a process which can be summed up as "vertical podding". This may be of particular value in overcoming some of the drawbacks of traditional clinic organisation as suggested by Lawton (1976). By providing a team of student clinicians with differing skills and learning needs, the treatment requirements of patients can be matched more easily. "Vertical podding" also provides a favourable collaborative learning situation for peer support where a reliance on other members of a group for learning underpins successful learning (Johnson and Johnson, 1999).

Conclusions

Only a few of the innovations sweeping through Higher Education have reached dental chairside teaching investigated here. In part, it is the complexity of the clinical teaching situation that has kept teaching traditionally as a dental tutor/dental student one-to-one relationship. However, in keeping with understandings of social and technological change there are many possibilities for chairside teaching to change too. Some of these were reported as early as 1976 by Lawton, and some exemplar schools such as

Adelaide (Mullins et al., 2001) have implemented programmes that include comprehensive educational teacher training in a problem-based curriculum. What was evident from this study was the enthusiasm for chairside teaching of most dental tutors but also the complexity of carrying it out. This paper provides a starting point (much as Frank Lawton's in 1976) to draw attention to the current status of chairside teaching. The next stage will be to investigate chairside teaching more widely across the UK in the third article in this series and to develop educational materials to encourage and to share good chairside teaching practice in the fourth article.

Table 3.2.3-1 Dental School Study Sample

	Total Sample Size	*Sub-groups*
Dental Tutors	10	Interviewed individually
Year 4 Dental Undergraduates	24	4 Focus groups each with 6 students
Trained Dental Nurses	8	1 Focus group with 8 students

Table 3.2.3-2 Learning issues seen as teacher or student centred

Learning	Teacher Centred	Student Centred
Thorough Thinking	Talking lecturing at students	Teacher listens and structures student learning
By doing	By demonstration	By doing it themselves
By students working together	Teaching by tutor – no learning together	Learning with peers
By working with Dental Care	Teaching by tutor – no learning with DCPs	Interaction and learning with DCPs
By returning to thoughts and actions	Teacher/ expert intuits knowledge Student/ novice knows very little So neither needs to reflect	Reflection essential for an understanding of skills development
By going about practical tasks	Show vision of best outcome Tell the student when wrong	Locate example of best outcome make and celebrate a range of errors in simulation

Table 3.2.3-3 Clinic organisation seen as teacher or student centred

Teaching and Clinic Organisation

	Teacher Centred	Student Centred
Many different staff	To provide a good staff student ratio	Opportunity to gain a range of experience learning
Educationally trained staff	Tend to take over and demonstrate	Understand learning 'explain, let think, ask'
Regular allocation of staff	Get to know students less adjustment to new cases	Continuity of treatment planning more patient centred
Debriefing following clinical work	Talk through issues as the teacher sees it	Allows student to talk and express feelings and thoughts about the session

3.2.4 Sweet J, Wilson J, and Pugsley L. (2008) Chairside teaching and the perceptions of dental teachers in the UK. British Dental Journal, 205: 565-569

Abstract

This study outlines how dental tutors at the chairside view their teaching and describes what are considered important current issues, requirements and recommendations for good chairside teaching practice. A qualitative analysis was undertaken of stakeholder perceptions of chairside teaching from both a single dental school study and a UK wide evaluation workshop. The evaluation of good chairside teaching showed that training requirements might be quite different for different stakeholders in chairside teaching. Further, this evaluation process may serve as a process model for institutional change for improvements in chairside teaching. This article is the second of a series of three and evaluates chairside teaching on a UK wide scale. The first, investigated the perceptions of stakeholders of chairside teaching at a single dental school. The third provides educational tools to encourage collaboration and sharing good chairside teaching practice. A further accompanying article reviews some of the educational methodology and innovations in teaching and learning that may be applied to dentistry.

Chairside teaching and the perceptions of dental teachers in the UK

The aim of the study was to provide an overview of perceptions of chairside teachers in the UK. Sweet, Pugsley and Wilson1 reported on the perceptions of stakeholders of chairside teaching at a single dental school. These were evaluated by dental colleagues invited from each UK dental school, via the medical and dental subject centre of the Higher Education Academy, to a workshop conference held over two

days. This paper describes the outcomes of a qualitative analysis (described in the accompanying education innovation paper this series).

Review of Chairside Literature

Surprisingly little information is available on how early clinical experience and the presence of relatively inexperienced students in a dental clinic impacts on clinical teaching or how clinical teaching has had to adapt to various cohorts of students with different education experiences and expectations. Unlike research, where often a problem can be exploited as a useful starting point for a range of investigations that can later be published, problems in teaching can be interpreted as failure and generally avoided, or at best, solved quickly so that trouble free teaching may resume as quickly as possible. Issues are therefore rarely published. Lawton (1976) was one of the first authors to admit that undergraduate chairside teaching might not be what it could be and made suggestions for improvements:

1) providing qualified dental nurse assistance to provide better learning and a more efficient use of time. (Nixon and Rowbotham in 1970 had already reported successful early attempts at teaching chairside assistance for fourhanded dentistry to dental students, who were otherwise taught to work alone).

2) introducing "vertical podding" - student group practices consisting of students from each level of the course with the necessary nursing and dental tutor support, following the suggestions of Gilmore (1973) and Bellanti (1973) to aid better student / patient allocation matching. Patients with more complex treatment needs could be allocated to senior students and those with simple needs to junior students. However, thirty years later, dental students were still working without nursing support at a London dental school, so Bartlett and Woolford (2003) were able to show students' similar praise for working in a dental team with full nursing support in an outreach clinic. Mullins and Wetherall et al (2001) describe how they ask dental students to be explicit about their

expectations of their clinical educators and how a trusting learning environment can be optimised in the dental teaching clinic. Also they have applied modern educational theory to dental practice at Adelaide Dental School (Mullins and Wetherall, 2001). Powell and Barrett (1981) emphasise the fact that part-timers outnumber full time faculty teaching clinical dentistry and describe the benefit of in-service training. The case for training dental tutors in dental schools has been made by Carrotte (1994) but detailed evidence has not been forthcoming either in terms of deficiencies in provision, or in the range of excellent practices that could be shared. Either or both of these could justify an educational enhancement training programme. The beginnings of such evidence may be forthcoming as Behar-Horenstein et al. (2000) were disappointed in finding that critical thinking skills were infrequently taught at the chairside and this underscored the need they perceived for periodic appraisal of clinical instruction.

Materials and Methods

Two complementary methods of qualitative analysis were used. The first was an analysis of the findings of a representative group made up largely of chairside teachers who were able to use their own experiences, and the reported findings of the perceptions of chairside teachers at a single dental school, as a baseline for their own evaluation of chairside teaching. The second was an in-depth analysis undertaken by the authors, which attempts, at an impersonal level, to place people's conceptions of the world into different categories to gain a general understanding. The first approach collects individual conceptions to gain consensus whilst the other seeks to find major differences in approach that would separate out conceptions of one group from another. In this way, the overall picture of the challenging issues involved in chairside teaching is identified. But, in addition, the possible differing roles of different dental tutors to support, change and improve chairside teaching can be made.

Evaluation methodology

Overview

Representative chairside teachers from dental schools throughout the UK attended a two day conference / workshop (Sweet, Wilson and Pugsley, 2005) where the authors led a dedicated strand on evaluating chairside teaching and presented their research findings based on semi-structured interviews conducted with clinical teachers at one UK Dental School (reported in part 2 of this series). The response of the participants was recorded, transcribed and an interpretive analysis made.

Details

The participants of the evaluation workshop were introduced to a number of complementary approaches used in a sequence to help them produce a rounded critical evaluation (Preskill and Torres, 1999). Participants were first given the opportunity to independently identify issues of importance in nurturing good chairside teaching in practical terms from their own personal experience and that within their organisation (Scriven, 1991). They were also able to discuss ideals to aim for and also what they thought were severe barriers to successful chairside teaching (Patton, 1997). At this point the dental school findings (Sweet, Puglsey and Wilson, 2008) were presented, and from this colleagues were able to calibrate this single school's chairside teaching situation against their views on chairside teaching at their own institutions, thereby determining whether the findings from the single school are common throughout the UK.

Results: Evaluation results initial reflections

The participants at the workshop were first given the opportunity to identify what they thought were vital issues for successful chairside teaching. Despite the wide-ranging

backgrounds and roles of the participants they reached a consensus that the following were the most important issues:

1) quality control of chairside teaching.
2) educational training in teaching for all chairside teachers, especially part-time general dental practitioners.
3) encourage interactive skills of dental tutors facilitating student learning in the clinic
4) ensure optimised student / staff ratios
5) ensure the continuity of teaching - avoiding changing treatment plans
6) provision of standardised protocols, where all teaching follows these closely.
7) ensure good feedback to students - which ideally should be immediate, and to be sensitive to different student learning styles.

Overall, there was a sense that chairside teaching could improve if it was given better recognition and that a high profile research agenda for clinical academics was generally a negative influence.

Transferability of the single site findings

Following the presentation of dental school findings (see 3.2.3) the workshop participants were able to discuss in detail the themes of importance that arose with the issues that they had independently generated themselves. The dental school data appeared in general terms to be representative. Similarities were seen between all six other UK dental schools represented in the workshop. They could confirm that their chairside teaching was similar to the study dental school in that:

1) chairside teaching is traditionally carried out on a one-to-one basis between dental tutor and dental student
2) most teaching is carried out by staff who are untrained and teaching standards are variable
3) perceptions of chairside teaching of dental tutors, and dental students and dental nurses is likely to be different
4) use of peer and interprofessional education options are generally neglected
5) staff student ratios are not ideal
6) there is scope for greater use of media and technology
7) there is scope for the empowerment of patients
8) a number of useful innovations are taking place at all schools

The evaluation confirmed three main requirements for good chairside teaching.

1) Good educational practice -- understanding how students learn in the dental clinic and help to support their learning.
2) Good teacher logistics and training -- understanding the individual educational development needs of dental tutors and offering suitable training programmes.
3) Good clinical organisation -- understanding of innovative modes of practice, clinic organisation and sharing good practise.

In addition, improvements in technology, innovation in teaching and assessment and practice of an appreciative quality evaluation could have positive impacts on all three of these requirements. Opportunities should be taken to develop all these approaches. The evaluation consistently rejected ideas of quotas and the need for mechanical repetition, and also "teaching by humiliation" which was considered bad practice by all. Based on a discussion of reflections and presentation findings the major recommendations were that:

1) Dental tutors should all have educational training in teaching
2) Dental schools should encourage peer review of teaching
3) Dental schools should encourage reflective practice
4) Chairside teaching should be subject to quality control and enhancement
5) Collaborative networks to develop good teaching practice should be encouraged across institutions.

In-Depth Methodology

All the collected data from the single Dental School study (3.2.3) and the Subject Centre workshop outlined above was subject to a form of reflective in-depth analysis (see the accompanying education innovation paper, 2.2.2).

Results from the In-Depth Analysis

Perceptions

From the analysis of interviews and transcriptions it was clear that there were distinct variations in the contributions that different staff could make to chairside teaching, understanding teaching development needs and acting on them. From the analysis it became clear from the data that five categories of chairside teacher could be differentiated and these are outlined in Table 3.2.4-1. Table 3.2.4-1 summarises the

characteristics of the different teacher types and what they specifically bring to the clinical situation. From the Table it can be seen that there is a gradual increase in complexity towards the dental educational developer. However, all categories in the list bring something very special to the chairside, which may or may not be possessed by the educational developer. But, without the educational development approach there is not the educational vision or impetus for change and improvement that can lead to improvement in chairside teaching.

Dental practitioners

Clearly, many part-time practitioners have a major focus elsewhere but many bring much in the way of experience and knowledge into the dental clinic teaching. In fact some think of their job as "at the coalface" and see their position as one who helps students by example and as role models. They tend to see their role as one to supervise rather than to teach. However, when asked about student learning they often equated this with what the students were taught in the school.

> *"You develop a way of talking to a patient and describing to a patient what you are trying to achieve so logically you can use that skill to talk to the students and describe to them what they need to achieve – what the patient requires and so on."*
>
> *"I think there is some special cases where it is particularly useful to know how to do something like a lower left molar crown preparation. You're not going to learn that on a bridge course. I've learned the hard way so I have some interesting techniques to offer. Things I picked up from messing it up myself and repeating it so many times."*

Senior Academics

Senior Academics show an emphasis on covering the syllabus and getting the students organised. Their own perceived inherent intuitive greatness could be something of a block to communication with junior staff or students. They tend to be resistant to

change especially that which involves modern teaching methodologies or threatens authority of the discipline.

“I try to instil organization – professionalism – doing the right thing at the right time”

“I think it would be very unfair to expect the undergraduates to teach or assess themselves- why should a fourth–year student have to explain to a second-year student when it could be explained by members of staff.”

“If we had a DCPs attached to each dental student group that would be marvellous but unrealistic.”

Intuitive teacher practitioners

Intuitive teacher practitioners show an emphasis on practical learning and common sense thought and have a clear idea of seeing students through from one learning experience to another. They are aware of many issues beyond their control and ask for clear guidance on what should be taught.

> *“Enlightening - that people have got similar views is great - I would like to see a more seamless margin between the in-hospital teaching and the outreach teaching - not to change us all into academics but have some teaching or training course which will make it more uniform teaching across the board.”*

Teacher trained academics

Teacher trained academics are keen to stimulate critical thinking and want to apply a range of education theory which they experienced in their courses. They want standardised guidelines for procedures and quality control measures and are keen to promote reflective practice

> *“Teaching people to evaluate and to give feedback is of great importance and should be basic training”*

> *“Students - once they start to think for themselves they start learning rather than tell show do - develop critical thinking.”*

Educational developers

Educational developers are dental teachers with a mission to change chairside teaching and have clear views on problems of chairside teaching. They want to apply a range of educational theory to bear on chairside teaching and are full of ideas to improve teaching such as inter year activity to promote learning. They are interested in promoting team working and interprofessional education. They are keen to promote university-based action to encourage educational training programmes for clinical teachers and to encourage universities to develop career pathways.

> *"Two things -my resolution is to get myself on a change management course - you end up with all these ideas but to go back and get the staff to accept it - I think that is a real skill and I don't think I have that at the moment.'*
>
> *'The other thing is the old gripe that you cannot do everything to an extremely high standard - such a need for the universities to recognise that there needs to be expertise in the teaching arena - they need to recognise that and facilitate the appropriate career pathways -it is so sad that things are so slow to happen. Things are beginning to change."*

Discussion

It is clear that different clinicians have different approaches to chairside teaching based on their background and current teaching and practicing position in dentistry. The evaluation workshop participants brought a whole range of perspectives to bear on the dental school findings presented to them with their own shared experiences. They contributed approaches from reviewing practical issues in dental practice and their impact on teaching to educational theory and a focus on contextualised situated learning. Despite these differing points of departure, it was possible to reach a consensus on all issues that were considered important. This may serve as a model for further educational training and development where a dialogue between the dental tutor stakeholders in chairside teaching around focusing issues or themes may be of

great value to the individual clinicians and to their institution's improvement of chairside teaching for its students. In the workshop described here, non-clinicians including a social linguist and educationalists from other fields in Higher Education, and a veterinary surgeon visited the group, joined and helped widen the context of the discussion. Clearly there would be opportunity to invite other stakeholders such as dental students and nurses, DCPs patients and administrators to this kind of discussion where the agenda was improve chairside teaching in a particular institution. The five perceptions derived from the in-depth analysis indicate that dental teaching clinicians who tend to fall into any one of those categories may also benefit from specific educational training and professional development. General practitioners without sufficient training may unwittingly be straying from taught procedures, which may confuse students especially in the early years. They may be so submerged in their subject that they fail to recognise student-learning issues. Natural teachers without sufficient training have been called "diamonds in the rough" (Frase and Hetzel, 1990). Without an education in teaching and sufficient self-reflection and peer feedback, some severe blind spots in teaching methodology may mar what is generally good teaching practice. The diamonds need polishing to become star teachers (Frase and Hetzel, 1990). Very often senior academics need to be more open and supportive of change and stop pulling back younger, educationally trained staff, with innovative ideas. Academics who are educationally trained need to ensure that they do not become brittle and inflexible in their educational approach and that they are continually maintaining a dialogue to improve their practice. Educational developers need to continue their professional development to ensure that their vision and approach is appropriate when acting as agents of change.

The value of categorising perceptions is that education and training may be aligned more closely to need and possible take-up. Recognising the categories also lead to the

conclusion that optimal chairside teaching is dependent upon all dental tutor stakeholders continuing a vigorous continued programme of professional development. The value of the workshop findings is that they articulate important issues that are important for successful chairside teaching. The five categories derived from the data from a single school study and a UK workshop, and the evaluation findings appraising chairside teaching, provide a staring point for further investigation and cross institutional collaboration.

Table 3.2.4-1 Perceptions of chairside teachers and what they bring to the clinical situation

Dental Practitioners	Knowledge of dentistry Wide clinical experience
Senior Academics	Knowledge of dentistry Wide clinical experience Additional subject specificity
Intuitive Teacher Practitioners	Knowledge of dentistry Critically appraised clinical experience Intuitive good teaching ability
Teacher Trained Academic	Knowledge of dentistry Wide clinical experience Knowledge of processes of education Critical appraisal of teaching and systems
Dental educational developers	knowledge of dentistry wide clinical experience knowledge of processes of education critical appraisal of teaching and systems

3.2.5 Sweet J. (2007) Research-led: pedagogy lost or found. Proceedings of the 2006 14th International Symposium: Improving Student Learning. The Oxford Centre for Staff and Learning Development pp111-123.

I would like to talk about research led... But let us make an abrupt stop at this point and ask you to take part in a thought experiment. Can you place a subject of your choice after "research led" - but this subject must not begin with L or T. Once you have the subject in place as "research led your subject" consider carefully what you think the phrase can mean. I would suggest that it is likely to imply that Research led (say) accountancy, or results or evidence it brings, can provide a lead for accountancy practice. Likewise Research led astrophysics, or results or evidence it brings, can provide a lead for astrophysics practice. To end the thought experiment I should now like you to consider the phrases "research led teaching" and "research led learning". Do we likewise mean that research led teaching, or results or evidence it brings, can provide a lead for teaching in practice? Does research led learning, or results or evidence it brings, provide a lead for learning in practice? We can end the thought experiment there and return to the implications for research led teaching and learning later. For this is not how the terms are being used in debates on research and teaching currently in Higher Education. This is largely because the word "research" resonates throughout the universities as their major "reason d'être" and the privileged political and financial structures supporting research, which determine how they are strung. So the term research immediately implies the research body and its relation to teaching - the other perceived function of the University - perhaps appropriately termed the "second discipline" by Beyerlein (2003) (see Table 3.2.5-1 Principles of Process Education). There is a large literature, which attempts to make sense of the perceived

divide between the two sectors in Higher Education. Papers by Boyer (1990) and later by Glassick (2000) attempted to reach out to researchers and teachers with new concepts of scholarship to diversify the interrelationship. However, a predominately reductive approach is taken by most authors, some of whom have been searching for an overriding principle of understanding of Higher Education such as (Barnett, 1997; Barnett, 2000; Barnett, 2005; Barnett and Coate, 2005) with concepts of critical thinking, to move on to supercomplexity and currently critical being. Brew (2001) writing predominantly about research saw a commonality between research and teaching, even stating that "in the broadest sense the aim of research is to teach" and understanding the relationship between research and teaching therefore is vitally important but it means we have to conceptualise research as teaching (Brew, 2001; p13). However, when it comes to understanding and reaching 'beyond the divide' as she calls it in a later book (Brew, 2006), she is aiming for the development of a research-based theoretical model designed to provide a greater depth of understanding about the relationship between teaching and research (p16) and interprets Bereiter (2002) and Wenger (1998) as supporting a single knowledge building community concept. However, like most mergers, it seems more like a take-over to me. Inclusive scholarly knowledge building means -- all pervading research. For Brew (2006) going beyond the research and teaching divide would also mean a balance of high-quality researchers in the subject discipline together with high-quality researchers concerned with subject-specific and generic pedagogical research and scholarship; each academic being active in researching and publishing... (p158) effectively making teaching more like research (p172). A recent classification of research types of teaching set out by Griffiths (2004) and augmented by Healey (2005) places the types along axes of content or process and student or teacher centred. Here "research led teaching" is defined as a curriculum, structured around teaching subject

content; the space drawn by "teacher centred" with emphasis on "content". Warwick, on the other hand use the term "research-based learning" to refer to all the dimensions of linking research and teaching (Castley, 2006). Students learning by finding or being allocated moments when they can become involved in the research being carried out by their research supervisors is certainly "subject research led learning", but without the "subject" qualifier, I would advocate that there is a need for a term that indicates the lead that research into learning can bring - "research led learning". Perhaps the best term for university education that includes elements of research in it is the general term used by Brew (2006) of "research enhanced education". Certainly this approach is encouraged by Jenkins, Breen and Lindsay (2003), and clearly there may be some disciplines where it is possible for undergraduates to be close to the cutting edge and others where it would take years of specialisation to get close. Commonly there is a call to summon up a nexus; an illusive link or bond between research and teaching that will smooth access from one to the other. There are also issues of scale and methods that may provide a commonality between research and teaching. Some kinds of technological research and some modes of education as it has become massified, have become geared to produce near standardised "products" designed to be pleasing to employers in manufacturing or service. Competent production in research may then be seen as a model for teaching. The perceptions held of research and of teaching may be critical in understanding possible relationships that may provide a nexus.

Perceptions of Research

Cooperrider and Srivastva (1987) point out the vital issue that by adopting one mode over another the researcher duly influences what he or she will finally discover and accomplish. Brew (2001) studied 24 researchers from representative universities in Australia and using phenomenographic methods determined four perceptions of research: a domino variation where the research was geared towards answering

separate questions or issues; a trading variation where research was perceived to involve production of publications, and obtain grants; a layering variation where the prime purpose of research was to eliminate darkness and finally the research journey variation that was primarily personally transformative. However, she did note that research was generally not characterised by reflexivity - researchers tended to leave out discussion about research itself - research led research! Also, except for the journey variation, knowing themselves was not considered part of the agenda. Clearly, these points raise questions about the suitability of this kind of research to lead in education where the development of the individual is critical. The research body is also not a classic "profession" as it has no individual clients for which it is working, so its expression of ethics and values is quite different: whereas teaching largely focuses on the journey to facilitate the student's learning, and a set of values for teaching has been established for a number of years by educational developers (SEDA, 2010). Despite the popularity of learning outcomes - like research -generalised outcomes present a problem to education of individuals if too tightly defined (Brew, 2006). Also from literature on examples of "good teaching" it is hard to see where research fits in (see Table 3.2.5-1 for an example of Process Education) except as the process of improvement of teaching through action research (Beyerlein, 2003). For instance De Grave, Dolmans and van der Vleuten (1999) showed that notably, a tutor stressing the learning process in the tutorial group was perceived as more effective than a tutor stressing content as an expert tutor.

Perceptions of Teaching

Pratt (1998) describes teachers' perceptions of teaching in Higher Education. These are described in terms of three major components; the teacher, the students and the discipline content. Depending upon the context and orientation of the components a possible five perceptions are produced. A prevalent concept is that of transmission

mode where the teacher is closely involved with discipline knowledge and concentrates on conveying content to the students (see Figure 3.2.5-1). Pratt also shows a close relationship between content and teachers when they hold an apprenticeship perception of teaching where they act out and model the discipline practitioner for the student to copy (see Figure 3.2.5-2). However, Bruffee (1993) explains more clearly that it is the practitioner teacher within a discipline that is placed at the centre of it. It is postulated here that the perception of the subject expert in apprenticeship mode feels himself to be at the centre as guardian of the subject (Figure 3.2.5-3). Developmental mode relies on "the system" to deliver and the teacher focus is on preparing detailed materials, such as problem-based, to motivate students to determine their own learning objectives and engage with the content themselves (see Figure 3.2.5-4). Social reform mode entices the student to learn content but to see into the social consequences of what they have learnt and how they can engage in the community to change it for the better (see Figure 3.2.5-5). In nurture mode the teacher works very closely with a group of students, encouraging and challenging them to take responsibility for their own learning and engage and share in the available content (Figure 3.2.5-6). Pratt (1998) does not consider a research perspective but using his model and applying further concepts from Bruffee (1993) it is possible to extend Pratt's conceptual model to include a researcher and teacher practitioner (Figure 3.2.5-7). If the teacher practitioner remains at the centre of the discipline, the researcher is seen as working at a boundary expanding the borders of the discipline (Figure 3.2.5-8). With discipline boundaries in place, the position of students, certainly when they start, will be seen at the very borders (Figure 3.2.5-9). The teacher provides materials and an environment to draw the learners into the discipline "as if" they are within it, and with the provision of group work, intermediary cultures can flourish; some way between that of the discipline, and the culture from which each student has originated (Figure 3.2.5-9). As

the students confirm their knowledge and skills their placement in the discipline is assured and they are drawn into it (Figure 3.2.5-10). Depending largely on the nature of the discipline there may be opportunities for students to mimic the research methodologies of the subject researcher marked out on the right, contributing to widening knowledge and change within the discipline. The processes engaged in Figure 3.2.5-10 describe conventional teaching and learning that could be described in one of the five appropriate Pratt perspectives. The option 2 outlined in Figure 3.2.5-11, describes a process of research led by the teacher so could be called "teacher led research". A fascinating commonality of position is afforded: the researcher pushing out at the boundary and students pushing in at the boundary, taking the same spatial sites within the discipline (Figure 3.2.5-12). If the students were to spend some time working for a researcher as an assistant at some time prior to developing their own research this could be termed "subject research led learning" (Figure 3.2.5-13). None of this is "research led teaching" as defined at the start of this paper. Clearly there are differences between research and teaching and even in the structure and use of the words themselves. Research usually refers to one subject and that is largely a description of content although of course processes of research and methodology are of importance. Teaching refers to teaching of a discipline and in addition teaching to a student (Elton, 2005). So that teaching involves a duality of processes of dealing with an object and a subject at the same time and to a lesser extent can be seen as having content. In the extended teaching mode from Pratt's model it seemed appropriate to use the term "teacher led research" rather than teaching led. Teaching in current use is in the doing and does not have a large implied content or substance. On the other hand "researcher led teaching" has quite another connotation in research dominated universities where it could describe the practice of filling key senior staff positions with researchers in preference to established and experienced teaching practitioners,

especially in vocational subject schools. I would like to reclaim the term "research led teaching" and to use it very much as at the start of this article research led teaching implies Research into teaching, or results or evidence it brings, can provide a lead for teaching in practice This is the other aspect of teacher perception that is missing in Pratt's analysis -that of research into teaching taken widely to include educational research into components that affect teaching directly and more practical action research into teaching practice. How can research led teaching be carried out? It is suggested here that it is possible to map a preferred mode or variation of research against a prevalent teaching perspective. For example, using Brew's (2001) "variation" models of research, "domino variation" used by a teacher with a transmission teaching perspective, action research could include selecting research questions about assessing student learning against some national standard, or to use a peer to observe and give feedback on the impact of a didactic lecture. An example of the "trading model" would be to investigate the possibilities of producing scalable distance modules from the materials usually used on the course including programme descriptors, lectures, seminars, practicals and student handouts. The "layering variation" of research inquiry may suggest to the teacher to extend their range or depth of content knowledge. A completely different approach – "to lighten the darkness" - may be a research initiative to attempt to increase student diversity and widening participation and so make the subject more widely available than before. However, research in this form may be a greater challenge to the teacher with a transmission perception and lead that teacher to other possibly more enlightened perceptions. The "journey variation" lends itself to reflection on various approaches to teaching that have taken place over time. This could involve the interface with the subject, and involve research writing that places the subject in context better and perhaps allows the teacher to become closer to the subject and understand it better. The apprenticeship perception

represents the status quo. Without assistance from collaborators from a different field it is likely that the research into teaching as perceived may just produce self-inflation and self-gratification. Perhaps not if someone is asking the right questions. The developmental perspective relies so heavily on the teaching materials themselves - usually centred on a set of problems. The teacher will, no doubt, if he or she favours this approach, want to carry out a research protocol which also starts with a problem seen with the teaching using a domino or layer variation mode of research thinking. However, Gergen and Gergen (1997) point out that whilst a critical posture is the most appropriate place to start the reflexive process, there are distinct dangers in an unrelenting posture of critique. Some of these are outlined by Cooperrider and Srivastva (1987) and the negative consequences of seeing the world as a problem and never moving on creatively. Evidence that teachers' work can change the world through their students, the ideal in the social reform perspective, may be very difficult to research and could very easily be disguised by other events. However, Cooperrider and Srivastva (1987) have illustrated from the literature "the Vauxhall effect". This is the story of a social science survey which showed Vauxhall shop floor workers to be generally apathetic, well integrated into the system of working and unlikely to give the management any problems. But these results were leaked to the workers at the same time as management had decided to keep large profits to themselves. Two days of riots broke out. This piece of academic writing gave the workers a means to articulate a reaction to the management. The research had delivered an "enlightenment effect" to the workers that resulted in outcomes that would not have been determined from the research findings alone. In a nutshell, this episode illustrates that where there are humans involved, there are a wide range of outcomes that could never be predicted from a simple cause and effect analysis, where materials alone are objects of research. Teaching at the research perspective gives a wide range of research possibilities.

There is a wide range of classroom research and research into Collaborative learning in Higher Education (Bruffee, 1993; Heron, 1996; Angelo and Cross, 1993) and post-compulsory education such as Johnson and Johnson (1999) from which to investigate further the enculturation of students into a discipline or profession, and the importance of group work in picking up cues for understanding behaviour and knowledge in intermediary cultures. The teacher led research opens itself up to many forms of research including a form of self-evaluation conducted by the students themselves on their own or peer work, which could be monitored or supervised by the teacher. There are currently official projects at universities such as Warwick where students are employed to assist researchers in their work for a few weeks so there are opportunities to carry comparative studies on the efficacy of such programmes as subject research led learning. There has been a call for a nexus - a link or bond between research and teaching. Some have searched for a single nexus as they conceive some single knowledge building community where all is content with academic life. However, from the numerous variations of research and perceptions of teaching an alternative multidimensional view can be advocated. The domino variations and transmission and apprenticeship perceptions appear the most self-contained and appear to have the least to offer each other. As students become freer inquirers into their studies, they can engage with "research like teaching" and will be able to engage with the outcomes of research and in some cases contribute to research themselves.

Approaches to the Nexus

Perhaps the simplest approach is to treat research and teaching like two different professions and then use concepts of inter-professional education to link the two. Inter-professional education has been defined as Occasions when two or more professions learn from and about each other to improve collaboration and quality of care (CAIPE, 1997) and later refined to Members (or students) of two or more professions

associated with health or social care, to be engaged with, from and about each other (Freeth, Hammick and Koppel et al., 2002) These expressions could be translated to state that the nexus occurs on occasions when teaching and research learn from and about each other to improve collaboration and quality of academic understanding. But the negotiated revision translates as something of a tangle, to say the nexus occurs as well, when researchers, students and teachers are engaged with, from and about each other. Another approach would be to consider similarities and differences present in research and teaching. That would automatically pronounce commonalities, which would give a good indication of suitable links between the two. However, this may not be as straightforward or as rewarding as it seems at first sight. Gergen and Gergen (1997) warn that there are dangers interpreting only two possible stories that tell us either that we differ from other people, or that underneath the apparent differences we are all the same. There are both enriching and impoverishing outcomes attendant on both stories. The story of differences can act as a deterrent against dangerous tendencies to universalize the presumptions of one's home culture; yet, simultaneously it functions as an alienating device (exoticizing the other). The story of sameness functions in just the reverse: it overcomes tendencies toward alienation ("after all we are one"), but simultaneously arrogates the parochial to the level of the universal. A dramatic instance of the illegitimate use of perceived sameness is illustrated in the prose epic of Prometheus and Epimetheus (Spitteler, 1931). Sameness convincingly produced at a parochial and superficial level allowed Behemoth (personified as the devil) to persuade Epimetheus to be fooled into giving up the Children of God to be murdered, when the Angel of the Lord had specifically placed them in his safekeeping. The safety and future of the world were at stake. Gergen and Gergen (1997) suggest that we abandon neither story of sameness nor of difference, but seek for alternatives of potentially greater promise. A further approach to the nexus would be to attempt a

form of integration, but this assumes that we believe that research and teaching are from different paradigms, and that the one cannot be expressed in the other, for if we follow Kolb's thinking: The transcendent quality of integrative consciousness is precisely that, a "climbing out of" the specialised adaptive orientations of our worldly social roles. With that escape comes the flood of contradictions and paradoxes that interpretative consciousness serves to stifle... and he goes on to say that this process is a necessary ingredient for creativity in any field. (Kolb, 1984; p158) Kolb takes things further: Appreciative apprehension and critical comprehension are thus fundamentally different processes of knowing. Appreciation of immediate experience is an act of attention, valuing and affirmation, whereas critical comprehension of symbols based on objectivity, dispassionate analysis, and scepticism.... knowledge and truth result not from the pre-eminence of one of these knowing modes over the other but from the intense coequal confrontation of both modes. (Kolb, 1984; p105) One approach that infuses theory into practice in an affirmative way is the process known as appreciative inquiry, which Cooperrider and Srivastva (1987) say is a perspective that is uniquely intended for discovering, understanding, and fostering innovation in social-organisational arrangements and processes. Briefly, the approach is to discover the best of "what is", to develop ideals of "what might be", gain consent on "what should be" to deliver the experience of "what can be". The first stage may involve an analysis along the same lines as before looking at the perceived worlds of research and teaching but seeing where they excel. The second stage of "what might be" will extend beyond the current perceptions. Peterson (2003) explains a little more about the process: Appreciative Inquiry principles are intentionally naïve and psychologically sound. Whenever you surprise a subject and interrupt an anticipated script with new language and unexpected questions, they are forced to pause, struggle to find new language, new ideas with which to respond (p1). The process encourages an infusion

of thinking beyond current perceptions to ask what is outside both current concepts of teaching and research, which could contribute to a greater understanding? What is within teaching and research, which is currently not expressed? How can research and teaching together make cultural impact by their presence? What new conceptual resources need to drawn upon to widen the options? What evidence is there to challenge current perceptions? Can we agree then with Brew (2006) when she says change in the nature of knowledge means that research processes have become as important as the production of research and that there is a need to open up to a broad range of understanding of the nature of research (p136). Will this swathe of appreciative investigation avoid a return to research dominance, or can the follow up question of "what should be" continue to reflect a representative integration that can lead us to "what can be"? Certainly, the appreciative inquiry approach, firmly embedded within social constructionist practices (Gergen and Gergen, 1997) would ostensibly take no privileged accounts of what is, and through working with relationships help produce the language we need to discover the nexus for ourselves.

Conclusion

Domination of Higher Education by primary discipline based research has intruded on and displaced teaching (as a second discipline) from phrases used in the Higher Education literature including "research led teaching". This paper reclaims this term of "research led teaching" as one of the major components of a pedagogy that would continue to link theory and practice by mapping educational and action research into its structure and perceptions. The link and bond between teaching and research as a nexus can be seen as a generative multiplicity of forms, depending largely on the depth and degree of complexity of the initial perceptions of both research and teaching. The success of this will be determined by the attitude and amplitude of creative effort and finding the language to convey the meaning.

Table 3.2.5-1 Principles of Process Education

The principles of Process Education outlined in the Table offer a vision of quality teaching/learning. The underlying principles support the ideal that while individuals may in the practice of their discipline and routinely use multiple resources for information, guidance, challenge, and feedback.

1. Every learner can improve his or her ability to learn how to learn better regardless of current level; one's potential is not constrained by current ability.

2. An empowered learner uses learning processes and self-assessment to improve future performance.

3. Everyone requires help with learning at times, but the goal is to become a capable, self-sufficient life-long learner.

4. Methodologies model processes and are extremely helpful in learning to perform and use processes more effectively.

5. Producing discipline expertise from an educational program requires both the development of a specified professional knowledge base and significantly strengthened lifelong learning skills.

6. Educators should assess students regularly by measuring accomplishments, modelling assessment processes, providing timely feedback and helping students improve their self-assessment skills.

7. In a quality learning environment, facilitators of learning (teachers) focus on improving specific learning skills through timely, appropriate, and constructive interventions.

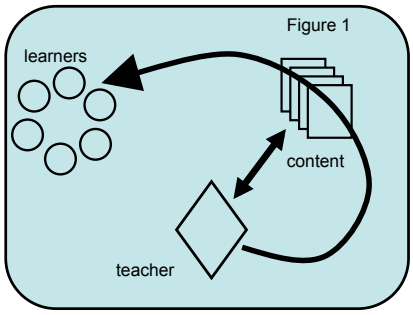
8. Faculty must accept fully the responsibility for facilitating student success.

9. An educational system can continually improve its effectiveness in producing stronger learning outcomes have different developmental paths, that developmental path does not limit their ultimate potential. The educator and the learner assume new roles that differ from traditional practice. Creative use of learning environments, facilitation, mentoring, curricula design, assessment, and constructive interventions replace didactic communication of information from experts to novices (Huba & Freed, 2000). As a result, learners are more involved by aligning institutional, program, and course objectives and by investing in faculty development, curricular innovation, design of performance measures, and embracing an assessment culture.

10. Concepts, processes, and tools employed by the Process Educator can be continuously improved through action research in the classroom.

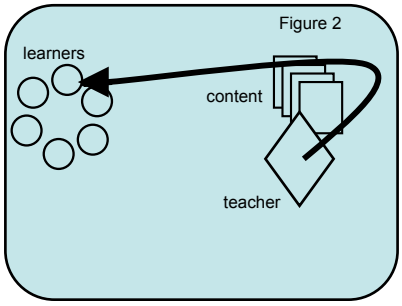
(from Beyerlein, 2003)

Figure 3.2.5-1 Transmission perspective



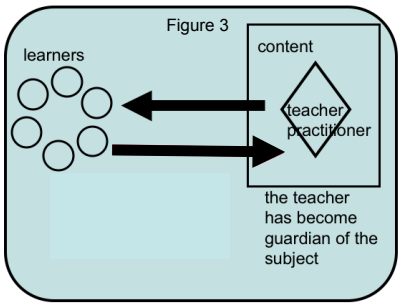
Transmission perspective (after Pratt)

Figure 3.2.5-2 Apprenticeship perspective



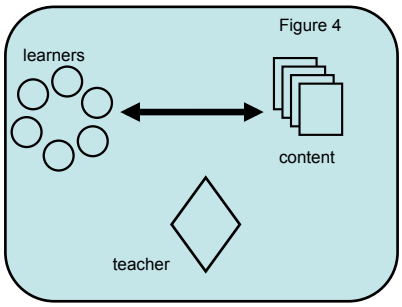
Apprenticeship perspective (after Pratt)

Figure 3.2.5-3 Apprenticeship perspective modified from Pratt



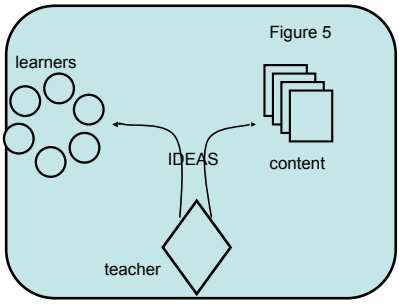
Apprenticeship perspective (after Pratt and Bruffee)

Figure 3.2.5-4 Developmental perspective



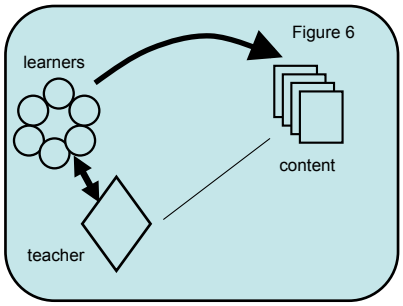
Developmental perspective (after Pratt)

Figure 3.2.5-5 Social reform perspective



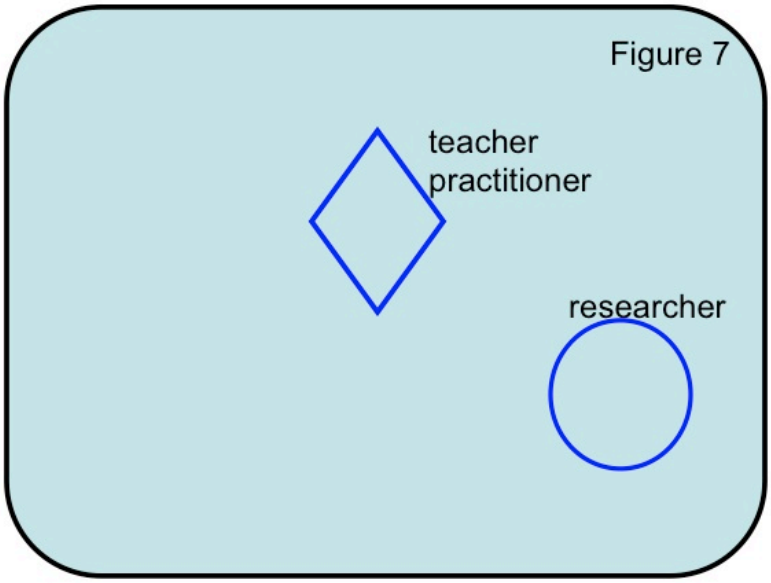
Social reform perspective (after Pratt)

Figure 3.2.5-6 Nurturing perspective



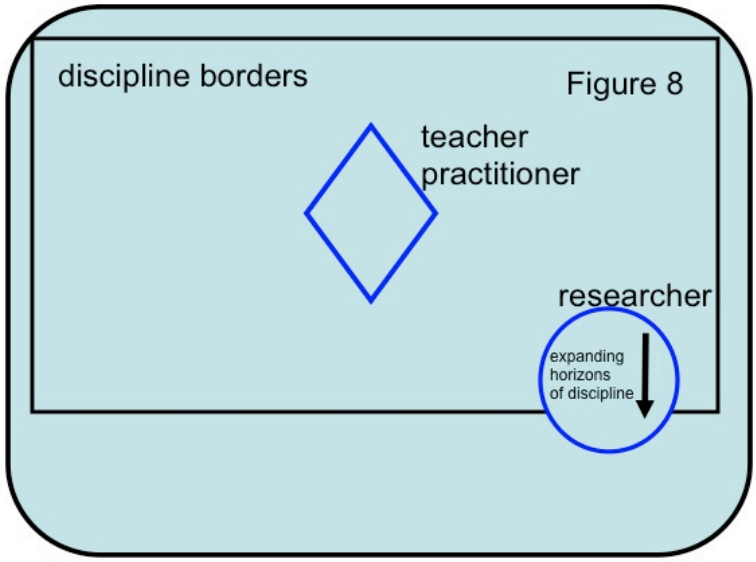
Nurturing perspective (after Pratt)

Figure 3.2.5-7 Research Perspective



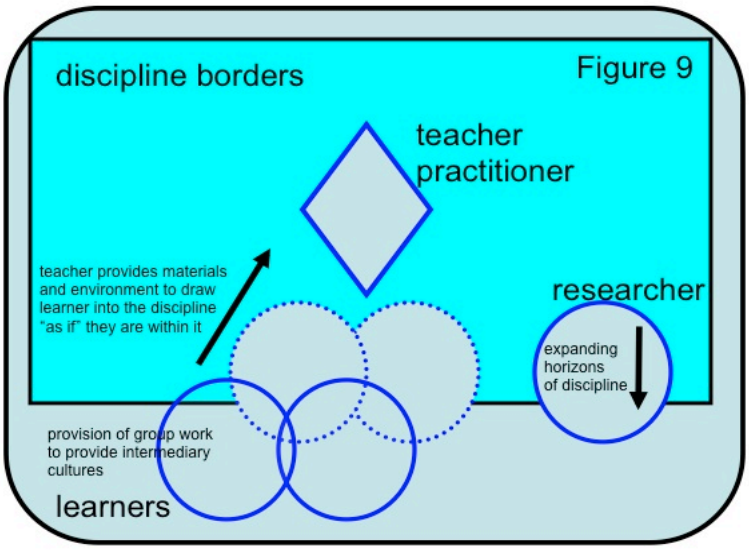
Research perspective
after social constructivist concepts from Bruffee (1993)

Figure 3.2.5-8 Research perspective with discipline borders



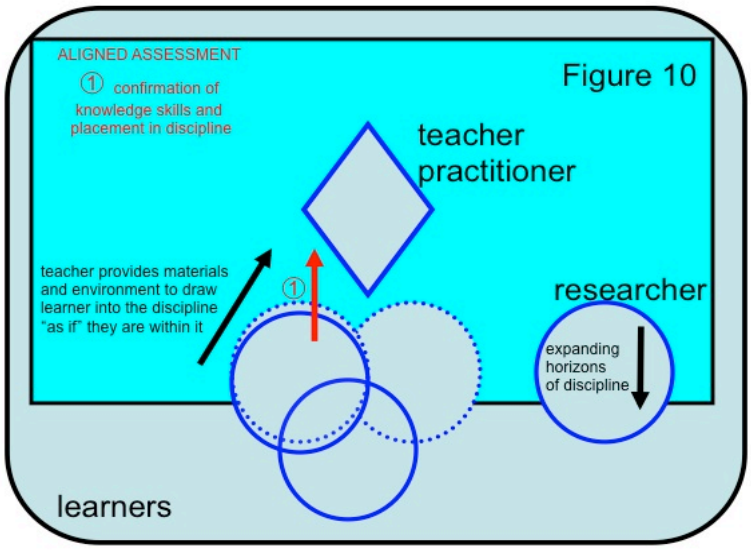
Research perspective
after social constructivist concepts from Bruffee (1993)

Figure 3.2.5-9 Research Perspective



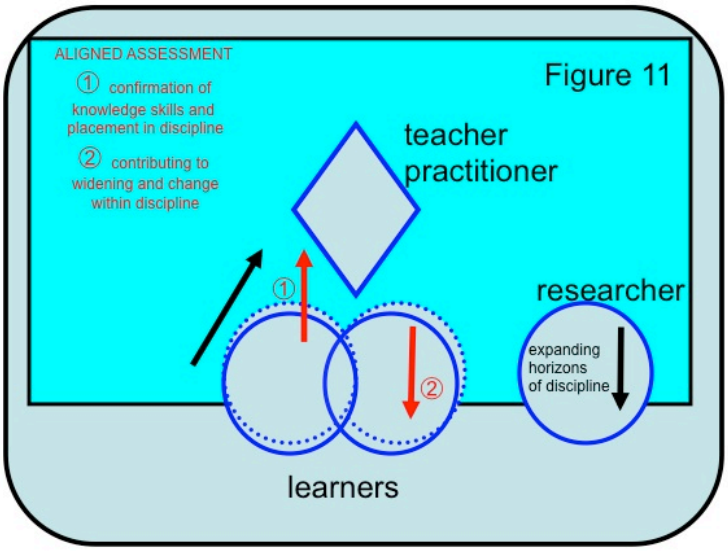
Research perspective
after social constructivist concepts from Bruffee (1993)

Figure 3.2.5-10 Research perspective with discipline borders



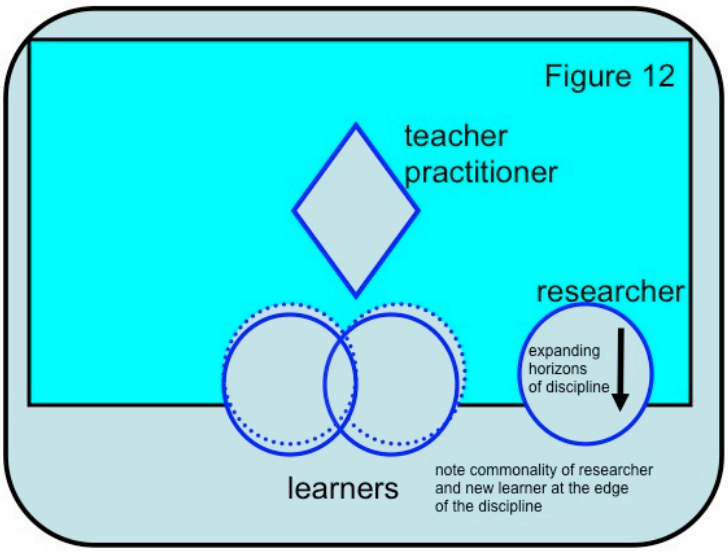
Research perspective
after social constructivist concepts from Bruffee (1993)

Figure 3.2.5-11 Research Perspective



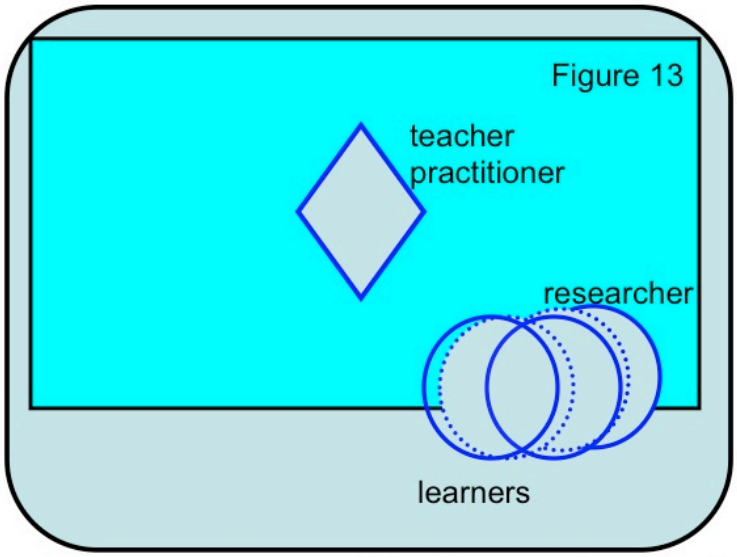
Research perspective Teacher led research
after social constructivist concepts from Bruffee (1993)

Figure 3.2.5-12 Research perspective with discipline borders



Research perspective
after social constructivist concepts from Bruffee (1993)

Figure 3.2.5-13 Research Perspective



Research perspective Subject research led learning
after social constructivist concepts from Bruffee (1993)

4 Academic and Professional Development

4.1 Introduction to Academic and Professional Development

Academic and Personal development is the third writing theme. Introductory comments and summaries are outlined in section 4.1 and the exemplar articles prepared for publication follow in section 4.2.

4.2.1 Sweet J. (2003) Opportunities in medical, dental and veterinary (MDV) educational development. In: J, Huttly S, et al., editors. Effective Learning and Teaching in Medical, Dental and Veterinary Education. London: Kogan Page pp 5-17.

This chapter explains the hypothetical opportunities that arise if a centre for educational development were to be created in a healthcare university. It reviews the types of encounter between those working in the disciplines and a central resource that could be generated, and outlines the diverse range of roles of those who could contribute to its success.

4.2.2. Sweet J. (2003) Loci of Educational Development. Educational Developments 4: 10-11.

This article presents the results of a study conducted in a healthcare university, which reveals the loci of where educational innovation and development takes place. In addition, initiatives to raise the profile of learning and teaching were investigated.

4.2.3. Sweet J, Wilson J, Pugsley L and Schofield M. (2008) “Tools to share good chairside teaching practice: a clinical scenario and appreciative questionnaire.” British Dental Journal 205: 603-606

This article is based on the research carried out on the perceptions of multiple stakeholders in a dental outpatient clinic in a Welsh dental school and a UK wide workshop held to convey and compare findings with other dental educators. From this

it was possible to produce a dental chairside scenario which represents good clinical teaching practice and in addition to produce a questionnaire that could be used in other dental schools, for them to evaluate their clinical chairside teaching more closely and disseminate good practice. With two other colleagues, I have received funding from the subject centre to use this article as a resource to help other colleagues in dental schools to implement an evaluation and to hold a further workshop to collate and compare findings, to stimulate further dissemination of good practice.

4.2.4 Sweet J. (2010) “Arousing interest and reflection on National Standards with a bricolage of images and text” prepared for Reflective Practice

This paper discusses a collective modelling of standards derived from individual and group imagery and thoughts and in addition a wide variety of physical construction of artefacts developed in a workshop devised to explore the widest possible range of approaches to "national standards".

4.2.5 Sweet J. (2010) “Harm and experimentation - an ethical evaluation of Periodontal Research publications describing the use of macaques as experimental animals” prepared for Science, Technology, and Human Values

This paper discusses the harm that can be caused to animals in a specific area of experiments gained from an analysis of the published literature. The ethical implications to the individual researchers are explored.

4.2.6 Sweet J. (2006) "Research led: identity lost or found?" presented at the First International iPED Conference 2006: Pedagogic Research and Academic Identities. Coventry September 2006

This paper dives straight into what is meant by the terms identity and identification and some of the issues that can make this topic so confusing. One solution is to identify with what we do. This can be a powerful and definite position with which to engage with others until we encounter change either in the educational environment or within

ourselves. We will then feel alienated to this brittle identification and need to break with it to move on. A more positive identity is suggested possible through reflective practice and educational research.

4.2.7 Sweet J. (2010) “Aligning Progress Files and Personal Development Planning to times of Transition” prepared for the International Journal for Academic Development

Personal development planning has arrived on the scene in Higher education but has been hijacked by considerations of employment, and considerations of what others might think, rather than the development of an inner knowledge of self. In this article I follow the progress of the progress file and how it could develop, based, in part, on a consideration of the proposed borders of reflection and ethics in the model presented here.

4.2.8 Sweet, J. (2009) "Beyond Reflection Dogma." In *Beyond Reflective Practice: New approaches to professional lifelong learning*, edited by H. Bradbury, N. Frost, S. Kilminster, and M. Zukas, 182-190. London: Routledge.

Models of reflection have often been more like checklists for letting the person stew on how well they are conforming to pre-prescribed learning activity. In this paper, on beyond reflection dogma, I advocate a broader border of engagement between personal development and learning and teaching, especially on what engages with the inner life. I argue that engagement for employment has a place but without incorporating the self the reflection processes are hollow and have limited utility.

4.2 Exemplar Development Articles

4.2.1 Sweet J. (2003) Opportunities in medical, dental and veterinary (MDV) educational development. In: J, Huttly S, et al., editors. Effective Learning and Teaching in Medical, Dental and Veterinary Education. London: Kogan Page pp 5-17

The opportunities for learning and teaching in MDV education are immense. For a start, it is not enough for strategies to be just student-centred; they must be patient-centred as well. They must also be robust enough to enable teachers and learners to handle the various third party, individual and corporate forces that can either enhance or impinge upon the care of patients. Effective strategies often entail situated learning, which ranges from tertiary level to working within the community. The long length of the course and potentially invasive nature of treatment often dictate a favourable ratio of staff to students, which can be exploited. However, some foci in MDVE are very short of staff. The team health care approach at work can also be simulated in MDVE through interprofessional education and vertical integration of student years and extended into concepts of life long learning in postgraduate courses. Effective communication is an essential skill in MDV practice that can be taught and assessed. The practitioner needs to master a range of IT skills and writing genres, within a multidisciplinary environment. Few fields outside the MDV world offer the possibilities of depth and range of activity, which teachers can use to nurture new reflective practitioners who, using best evidence, can attempt to treat patients optimally. The approach in this chapter is to concentrate on how a MDV school within the university setting could utilise a centre for educational development. I set out a personal view which, firstly, tries to articulate a range of activity the centre should take, its main function as a community of staff and students. Secondly, the reader is prompted to

think about his or her own organisation, identify how learning and teaching is currently supported and to envisage what further developments might be appropriate. Fortunately, forward thinking vice-chancellors are putting forward their own vision for the future of their universities but also offering to be receptive to ideas especially if they provide solutions. This chapter is therefore designed to stimulate management either directly or indirectly to fund and organise educational development appropriately within their institution. Another aim is to encourage lecturers to envisage the contribution they might make towards the organisation's success. A similar but wider ranging Centre for Higher Education Development for a predominantly non-healthcare university is well documented on the World Wide Web (Coventry, 2002). My concept of educational development for a MDV university includes a learning and teaching centre that can lead and nurture teaching but primarily provides a home base for a community of educators. This is a creative unit that allows the lecturer to work with the centre and so achieve more than he or she would working alone. This, in essence, is what teaching enhancement and educational development is about - evolving participatory collaboration, critically testing learning activities and creating credible evidence of their impact.

Functions of the Centre - Communication

One of the major functions of the centre must be to improve communication and the impact of educational developments on improving the learning of students. In an inspiring chapter Boyer (1989) states that 'In the end, the quality of a College can be measured by the quality of communication on the campus'. This includes the relationship between MDV professional and patient. As Boyer says 'the doctor who knows only disease is at a disadvantage alongside the doctor who knows as much about people as he or she does about pathological organisms.' But communication must also provide a healthy link between teachers and between teachers and students.

Within the process of life-long learning the teachers become life long students. Boyer (1989) would also reciprocate and say that 'we need to create a climate.... in which students are teachers, too.'

Teacher development

A major thrust of the centre is to encourage educational self-development. It is clear that there cannot be curricular development without staff development, for it is through staff interactions with students, the materials they prepare and systems they put in place that delivers an environment that the students will apprehend as the educational climate (Genn, 2001).

Practical tips and useful literature

Many who teach in MDV are busy doing something else; either research or a practical clinical service commitment to patients. This can be most helpful in the teaching program because the teacher is in a position to converse about the topic content or patient management with authority. When it comes to enhancing the learning experience of students, the busy teachers will be looking for useful teaching tips. The centre should encourage these lecturers to attend forums to share good practice and attend both presentations and workshops geared to enhance teaching skills. The centre should also direct these lecturers to some of the very good generic books on this topic such as Fry, Ketteridge and Marshall, 1999; Gibbs, Habeshaw and Habeshaw, 1988 and Race, 1999. Influences of the organisation The degree to which lecturers can take the initiative in enhancing their teaching may depend as much on the nature of the organisation they are working for, as their own interest and motivation. Teachers fairly new in post may find it particularly useful to assess their current teaching situation and to realise the importance of gaining the support of heads of departments in order for teaching initiatives to prove successful.

The overall plan

The centre should be a focused facilitator of positive action to help formulate and implement a learning and teaching strategy for university wide impact. It should be sensitive to the expectations and opportunities afforded by external agencies such as the Quality Assurance Authority (QAA). The centre should concentrate on forming functional links through secondment and collaboration to bring about actions with outcomes that make a difference. It should assure all parties that it is not attempting to duplicate or compete with existing activities or initiatives. It should not be a central authority to pronounce on educational matters giving out advice or just giving out information, but provide resources to nurture self-development of staff so that they may become teaching authorities themselves. It should hold a learning inventory of case studies where changes in teaching, and ways of working with students and the uptake of new ideas are recorded. It should take responsibility for induction of new lecturers with teaching duties. The centre should organise meetings, conferences and forums that are largely participatory and publish a newsletter/Journal and Web site. This can be achieved through leadership, organisation and dedication of its staff and adequate funding.

Personnel positions, recognition and funding

Full-time members of staff would take a lead facilitatory role. Vital to the overall impact of the centre is the principle of collaboration. Two major ways in which this could be achieved would be through joint projects with other close functioning departments such as information services, and yearly secondment of staff from other academic departments. Staff throughout the university who make a longer-term commitment to the development of learning and teaching should be recognised, and a Teaching Fellowship scheme critically evaluated over a period of five years would help achieve this. Teachers who have shown outstanding educational development should be

designated Teaching Champions and be funded to read a paper at an international educational conference. Whilst the main impact of the centre should be on teachers who can cascade this influence to the learners, there is a good case for involving students at some stage to close the loop; to be assured that the educational developments facilitated by the centre are indeed enhancing students' learning. A promising initiative to produce this result would be to employ student liaison officers. These are experienced students who are willing to take a year out some way through their course (Bratley, Francis and Wilson, 2001). They could prove to be an invaluable resource. They will be in a position to help individual students find the support they need and thus may help student retention levels by keeping them on track. Student liaison officers will also be able to give important feedback to the centre that educational enhancements are having an appropriate impact. A further evaluation of centre activities can be achieved through the appointment of dedicated Research Fellows, who can analyse the success of specific activities and overall functioning of the centre as a community. Central funding for full time staff and students and Teaching and Research Fellowships and Teaching Champions would be necessary as these are completely new initiatives. However, some of the joint projects will promote shared responsibility between departments and the secondments should expand the educational teaching and research capacity of individuals within those departments. Some form of top-sliced funding to the centre may ensure that educational development occurs in departments appropriate to their needs, and joint projects with the centre would have a focus on functional outcomes.

Leadership of teaching

The institution can make statements of visions and values and institute manuals of policies and procedures, but unless deans and heads of departments support these, they will have limited impact (Candy, 1996). From questionnaires and semi-structured

interviews with heads of academic departments, Martin et al (1997), were able to describe six categories of conceptions of leadership. The most inspired leadership to further progressive teaching in the widest educational context was described as having an emphasis on students' experience and initiating discussion with teachers and students on how to enable further improvement of this experience: a continuous curriculum change model. The leader of the centre would clearly have to support this approach and be in a position to encourage other heads of departments. Martin et al (1997) categorised a further three types of fairly enlightened leadership which was willing to discuss with other teachers; the student's experience; or their roles, responsibilities, and practice of teaching; or the subjects and the discipline. Least enlightened concepts of leadership were where roles, responsibilities and teaching practices were imposed, or where structure and organisation was imposed. Good academic leadership enables people to achieve and focuses on change whilst understanding the internal and external pressures on the educational process to achieve appropriate outcomes (Ramsden, 1998). The role of staff in the department must be to encourage and support their leader in accepting change and taking the necessary risks to develop more successful and satisfying learning and teaching.
Who should be a member of the centre? Monthly forum meetings should be open to all. A faculty wide inter-professional education day for first year students, in their first week, requires large numbers of staff to act as tutors for break-out groups – and this is an opportunity for staff to contribute and gain experience of interprofessional education in action.

Projects and collaborations.

The centre will provide the public face of educational development for the institution. The centre can respond to specific issues and collaborate with other departments as task and finish exercises. An example could be a perceived difficulty of downloading

and uploading materials to the MDV web site. A collaborative exercise with the IT department could help clarify the primary educational issues on the one hand and the advantages and limitations of the software and hardware on the other. In these collaborative projects the primary aim is action to produce an achievable outcome. Action learning sets could be particularly helpful for participants to balancing reflection with action. Other collaborations could be considered long-term, such as the establishment of a course and Postgraduate Certificate in Educational Development (PGCED) examination jointly with an existing awarding postgraduate section or department. The focused inventory of educational development case studies could be catalogued and supported in a joint library services venture. Some important issues cross all disciplines and sections of society, such as, communication, promotion of a healthy life-style, smoking cessation and coping with change. The centre should play an active role in brokering partnerships to further community.

What would be the programme for the secondees? There should be dedicated time for individual teachers to reflect on their current teaching position, to upgrade and update andragogy by following a set of core learning objective and values and the option of gaining a post graduate certificate in educational development (PGCED). They should help to determine the Learning and Teaching needs in their own department. They should select an aspect of learning and teaching in their own department and institute educational change. They should write this up as a short case study. Paired with a cross professional/disciplinary colleague they should contribute to a range of chosen and allocated activities within the centre. They should help with the peer assessment of teaching within their department. At the end of their appointments they should mentor the following secondees from their department.

Teaching Fellows and Champions

Two underlying threads of activity can be served by the creation of Teaching Fellows and Teaching Champions. Firstly, staff can be given recognition for educational development efforts that they are making and maintain a high profile public face for the centre. Secondly, they serve as levers to encourage excellence in teaching and provide encouragement for academics to choose a teaching career. Teaching Champions could be nominated sequentially during each year for recognition of work done in educational development. These could be awarded to secondees or others who have developed a presentation to be given at an international conference. A number of teachers who are willing to take on a project over a period of five years and are developing a track record in educational development could be awarded Teaching Fellowships. These could be established educators and those who have been secondees for one year and who would like to continue with their work.

Teaching Fellows should: Present an outline proposal for an educational project of five years duration. Make yearly interim reports on the progress made with their continuing professional development and contribution to the centre. With a cross professional/disciplinary peer, act as advisor to the centre on an agreed topic. Conduct a mentor role to secondees. Contribute to the induction of lecturers with teaching duties. Contribute to the functioning of the centre as negotiated.

Student liaison officers

Student liaison officers bridge the gap between students and the support and teaching they are offered. They do not offer advice themselves, but help students choose from the help options available. In some cases this could be for student support services. In others, it may be possible to help with academic problems. The approach in this role must be one of enthusiasm and impartiality. They should work in teams under the direction of a full-time member of staff at the centre.

Student liaison officers should: Attend an induction-training course on the structures of the university, educational development and roles of liaison officers. Take a presentation role at the induction of the first year students. Direct students to sources of help. Draw on the resources of the team of student liaison officers and leader full-time member of staff. Attend secondary schools taking part in a widening access scheme. Provide help for international and Erasmus exchange students. Provide a student perspective at the Learning and Teaching forums. Provide a student perspective at staff inductions.

Research Fellows

The proposal for a centre for educational development primarily involves lecturers who have a strong commitment to teaching. By their collaborative efforts the centre should help them realise their teaching potential and keep them teaching well and better. There is provision for programmes to enhance progressive development over a period of some years and a substantive feedback loop from students is proposed in the form of student liaison officers. The most powerful indicator for the success of the centre for educational development in an MDV setting is that interventions it facilitates should produce an appropriate health care outcome change (Kirkpatrick, 1967). Objective evidence from studies of the centre's early achievements and possible failures will be essential to plan ahead. There is, therefore, a fundamental need for at least a small body of researchers dedicated to the study of the centre and its community. A comparative study of exemplar teaching by Teaching Fellows using powerful health care indicators for success would be particularly demanding but may provide a base of evidence upon which to make further funding decisions. In addition a qualitative study of the structure and function of the centre as a community may give important indicators for appropriate adjustment of sizing and remit of the centre at a review after a period of four or five years.

Alternative solutions

There is, sometimes, a temptation to muddle these learning and teaching enhancement approaches with management quality control, which attempts to show that teaching standards are being monitored and improved. In some ways, this is a paper chase exercise, which ensures that procedures are in place. It can be especially useful to get colleges to look again at what they are doing, expand provision when deficient, and attempt to equilibrate standards across disciplines. Management control systems, however enlightened, rarely blend well with concepts of teaching enhancement, which concentrate on the development of the individual teachers to respond to the learning needs of their students.

Learning in MDVE must be object or context specific so cannot but have a vested professional interest, but what seems important is the realisation of interdependence in the health professions. Many different professions are needed for the overall care of the health needs of the population and of patients. Further, we should respect the qualities of these other professionals and understand the limitations of our own competence. Also, we have common ground in our links with ethical issues of diversity, inclusiveness and connectedness. In essence, this means that we need to promote community, in which we appreciate and recognise our differences and similarities.

Should the centre have professional advisers who can take on some of the teaching role of academics? One feature of the new universities is the development of those in the registry or the faculty administration who have an academic advisory function (Guest, 2001). Ensuring students present modules in on time, organise course changes and pastoral care, are taken on by these advisers. Does this enhance the learning experience of students? A one-stop shop for students generic needs, such as finance, housing, writing and basic IT skill development and student counselling is appealing, as students are likely to find the help they need when they need it.

However, this system may distance the students more from their teachers, who will spend less time with them. The academic will be released to spend more time on their research! In most circumstances this is hardly a means to teaching enhancement. Advisory function officers may have a useful registry role especially in the running of complex MDV courses.

Services and support.

The basic human needs must be satisfied before learning can take place, and those who provide counselling provide a service to help students with their domestic situations or generic learning difficulties so that they have a mind to deal with their specific subject learning and professional development. Counselling must be and must be seen to be confidential and a low-key peripheral activity. It would not gain from being brought into a central place except to advertise the fact that it is available and so permit ready uptake.

Should the centre be a virtual? Virtual learning environments (VLE) are available as resources both for students and teachers to learn specific skills or knowledge. Distance virtual learning obviously has the advantage of availability at any time with a simple computer connection, does not eat into dedicated time, is available to all and can be accompanied by an assessment and even a certificate to warrant that learning has taken place (e.g. Tripdatabase, 2002). However, VLE programmes cannot encompass a great deal of variation, do not open up networks of communication and do not directly further community activity across professions. The centre could be linked to virtual learning environments or become linked to a managed learning environment (MLE). A computer network system that works consistently and provides means of access to quality information quickly and permits communication between teachers and students must be an essential resource for a centre to enhance learning and teaching, but the

physical structure and facility does not in itself provide insight into what actions to take nor what motivates a community towards teaching enhancement.

Is a learning and teaching centre an educational research establishment? Teachers who are trying to enhance their practice will be constantly asking themselves, "How can we do better?" They will be planning and taking action to achieve that. This kind of educational action research occurs when teachers aim to improve their teaching at the grass roots level by incorporating the views and expressions of the stakeholders of the process, be it students or patients. Thinking behind the research takes them through the Kolb learning cycle of reflecting on their teaching, planning changes and improvements, acting on these and observing the outcomes with both researcher and researched contributing to the overall findings. This kind of research must be part and parcel of enhancing learning and teaching. Educational research using psychometric tests or phenomenography is often carried out by researchers on other teachers and their students. The irony is that the complexity of formulating the research questions, filling grant applications, the data collection and interpretation of results and preparation for publication pull the researcher away from teaching itself, so that generally researchers do not directly enhance their own teaching. A constructive way forward may be collaboration between researchers and teachers. The major function of the personnel at the learning and teaching centre may be to act as intermediary or broker between the teacher who would like to improve their teaching but does not have research experience, and the researcher who would like to work with valid teaching materials. The centre should also create other opportunities for teachers to step outside of their teaching duties for a year or so and facilitate research for a time. The community approach may also permit cross professional research. A self-development approach will realise the potential of individuals at different times in their professional lives.

Should the centre take on the whole of professional development? Academics carry out many management roles and need training. Much of this is not directly related to teaching although there may be some spill over. There seems little point in competing with the Personnel or Human Resources Department to provide management training. The centre could lose the focus of educational development. However, there may be scope for collaboration on joint issues such as, coping with change, communication and motivation.

Taking teaching seriously

Those lecturers who have volunteered to be secondees at the centre will be taking their teaching seriously, following the literature and seeing how they can develop their approach to facilitating the learning of their students. Saroyan and Amundsen (2001) say that a change in practice occurs when teachers change their basic assumptions held about themselves as learners, their role and the goal of education and that reflection is the key to the process. They propose a new model of teaching for higher education that contains four elements: conceptions, knowledge, action and context. They suggest that conceptions, which are defined as one's beliefs about learning and teaching, determine the kind of knowledge one draws upon to complete the educational task. Knowledge includes the subject matter as well as knowledge of pedagogy / andragogy related to the subject, task and learners. Action is the enactment of the teaching task, which occurs in the overall educational context. The characteristics of good teaching are broadly that it is student centred so teaching is a form of facilitating learning but where clear objectives are stated. Good teaching, they claim, occurs when the teacher is able to act out his or her thoughts and bring reflection into the process; i.e. when there is convergence between conceptions and actions. They make the point that to gain feedback from the students is an enlightened approach as far as it goes, but far more is needed to evaluate teaching in this wider

context. Apart from questionnaires they suggest studies of free writing and journal keeping, records of critical incidents, needs assessment, a teacher behaviour inventory and the use of metaphor to build a greater picture of how the teacher helps generate a suitable educational climate for the student to facilitate learning. If the programme for secondees is based on this kind of approach, the individual will be able to carry out some of these reflective activities, but will be encouraged to work collaboratively with a cross professional / disciplinary peer to help enhance each other's teaching. The reflective practice based on action learning sets of a small group of, say six, secondees will help participants to focus on their individual actions, how they give peer support and how they can contribute to the activities of the centre.

The personal side of learning and teaching [We want] 'to make citizens and workers but also we ultimately want to make human beings who will live life to the fullest (Dewey, 1916). The influence of the teacher should not be underestimated. Candy, Crebert and O'Leary (1994) found that that the behaviour of academic staff was more influential in determining student attitudes towards learning throughout their lives than information given in official documents with institutional rhetoric. It is therefore appropriate for the secondee to analyse where they are placed in their career, and in their understanding and commitment to learning and teaching. The opportunities for the teacher to express him or herself may vary in a number of ways. Boyer (1989) brought in the concept that academic life may express itself in the form of seasons, wherein some teaching, research or administration may be the major focus of attention. Even within the field of teaching, there may be a specific focus of activity, say of developing curricular structures or content, using various teaching methods, involvement in the assessment methods and examinations or taking on an academic support role. The secondee is encouraged to follow a core curriculum of current educational concepts that may enable personal and institutional change and development. The first

fundamental concept is the central one of understanding how students learn. The current concepts of the importance of a deep approach to learning and constructive alignment of teacher with the student and the use of learning contracts are covered (Biggs, 1999; Anderson et al, 1996). A second concept is the value of evidence-based practice in the clinic and the classroom (Sackett et al, 2000; Belfield et al, 2001). A third concept is the aspiration to ensure that MDVE is patient centred and that, in the early stages of training in particular, there is provision of appropriate clinical simulation (Hasle, 1994). A fourth concept is that of individual ethical behaviour within the professional and interprofessional context (Crawford, 2001).

The opportunities for educational development in MDV have never been greater for the individual lecturer. However, with a centre that can focus collaborative activities between enthusiastic educators from these professions and beyond, the scope of activities increases many fold. The temptation to make the centre an all-inclusive part of registry is resisted, although it is argued that it should be highly collaborative with other departments and service sections of the university. The focus should be clearly on the enhancement of learning and teaching. Demarcated roles for various members of staff and students are suggested. A leader with vision but one who is willing to adopt a continuous change model for the curriculum is advocated. The major organisational method to ensure the centre has direct relevance to everyday teaching in the departments is through secondment of lecturers into the centre and their continuing work and return to the departments. Creation of teaching fellowships helps provide an optional longer-term strand of further progression and development for some of these staff. Employment of student liaison officers show a commitment to and a functional means of ensuring feedback on the student experience. Research fellows dedicated to studying the centre as a working community, and as a means to enhance teaching and

healthcare outcomes will provide objective data that can be used to plan the centre's future development.

4.2.2 Sweet J. (2003) Loci of Educational Development. Educational Developments 4: 10-11.

"One idea I came away with from the November 2002 SEDA Conference was that educational development can follow a progression of typical stages. The novice teacher is intent on his or her subject matter ensuring that he or she “knows enough”. Once this stage is mastered the teacher develops an overriding interest in the students and their learning and with this comes an interest in different teaching methods to improve student learning. In addition there develops a greater interest in theory; in the pedagogy. Once all these planks of educational development have been walked there is a natural willingness to want to “grow others” into this multifaceted world through organising various workshops for other staff. And it is only then that the developer realises how much more some experienced staff are engaging in the talk and culture of the HEI in which they work. What then takes hold is an overwhelming curiosity to know what others are up to with their staff and students, how what they are doing fits into the educational thrust of the organisation, and with what angle of pedagogy they could be using or say they are using. That is why, two years ago I was determined to run a study at my own institution, in an attempt to bring to light the loci of educational development within it. A small grant from SEDA and matched grant from UWCM was obtained to support this work. The findings were discussed in a seminar at the Annual SEDA Conference in Birmingham November 2002, and an informal briefing outline is presented in this article.

This study was conducted in three parts to obtain some triangulation and included interviews with prominent staff, an analysis of the progress of a monthly Learning and Teaching Forum, which had just been set up, and changes to the College Website over a period of 16 months.

Interviews

Semi-structured interviews were carried out with nine key authorities in the College including the Vice Chancellor, Pro Vice Chancellor for Learning and Teaching, deans, staff and educational developers. They were first invited to outline their own unprompted views on the "educational development" they saw occurring within their own remit and that of the College in general. Following this they were prompted with open ended questions on the issues identified by D'Andrea and Gosling (2001) as being important constituents of educational development work: institutional management of teaching and learning; curriculum development and planning; innovation of teaching and learning strategies; support for student learning; support for research on teaching and learning; and development of academic staff. The duration of the interviews was between 30 and 50 minutes, they were recorded digitally, elements transcribed into a text file and analysed using the Atlas.ti qualitative analysis software. This software allows significant words or phrases to be coded so that common occurrences of words or meaning can be readily identified.

Forums

Forums were introduced in 2000 as a monthly meeting place for College staff interested in educational matters. First year data were taken from a summary document produced by the Acting Director of Learning and Teaching. This was not available for the second year so data was taken from PowerPoint presentations posted on the College Website. This data was converted to text files and analysed using Atlas.ti software. Forums in the first year started as a series of monthly experiential workshops on themes such as: story telling, Socratic dialogue, problem-based learning, matching pedagogy and assessment and balance between parity and diversity. The overall topic for the first year was Assessment. There was also a one-day conference on Interprofessional Education (IPE). Communication was the major

theme for Forums in the second year and included an awareness day conference on Managed Learning Environments (MLE) and a presentation on an e-IPE project where 12 students completed an educational task using laptop computers with which to communicate. A further day course on Action Learning followed by six action learning sets for facilitators were held. Other events included workshops on learning outcomes and teaching governance to enable participants to self-assess the degree of congruence of their individual activity and philosophy with those of their departments.

Website

From an off-site connection, the whole University of Wales College of Medicine Website (uwcm.ac.uk), made available to this connection, was downloaded into an Acrobat file in February 2001 and again in June 2002. The Website contains general items for the College and includes presentation materials such as a prospectus for new undergraduates and postgraduates, details of Departments including staff, course materials for students, events and meetings and a host of administrative issues including personnel. Some parts of the site are therefore secure and not available for anonymous connections. Acrobat attempts the collection of such pages and where failure occurs records an error and moves on to the next page. Acrobat will also allow the whole downloaded site to be searched for words but this must be done singly and manually. A preferred method for word counting is where the Acrobat file is saved as a text file and downloaded into Atlas.ti, which through autocoding, can determine the number of occurrences of words in thousands of pages in just a few seconds. Word counts were taken for 'research', 'teaching' and 'learning' at the two time lines to produce Table 4.2.2-1.

A word density was calculated by dividing the number of counts by the total number of pages. The word density for 'research' was the densest followed by 'teaching'. There were no differences between the two downloads. However, the word density for

'learning', although the lowest, showed a significant increase over time (0.13 and 0.2 with a significance p=0.01 chi squared test (Siegel, 1956).

Discussion

I have yet to feed back the details to those I interviewed for their response but in general terms interviewees were generally upbeat about own department and School. The overall perception is that students are receiving excellent training at the College and that there are few absolute requirements for change!

Most educational development activities occur at Departmental level based on the level of interest of individuals who have the intrinsic motivation. Generally School-wide initiatives such as an evolving curriculum, assessment review or employment of an educational development officer appear to be motivated mainly by perceived external pressures for change.

Although it was seen that most Schools work as 'silos' fairly autonomously, there was both enthusiasm for a Centre for Enhancement of Learning and Teaching and Interprofessional Collaboration (CELTIC), planned for the College, and some reservations that staffing and function of its Director may not turn out to be fairly represented within the Schools.

Quite contrasting views on issues such as problem-based learning (PBL) illustrated a differing underlying pedagogy. A constructivist view considered that PBL was one of the ways of getting people to work for themselves and others, to understand group dynamics and that it releases enthusiasm. A more cognitive view was that PBL was oversold on issues of transmitting a core body of knowledge. This also was shown in the differences of opinion between fractions on emphasis in interprofessional education (IPE). The constructivist view was that the interprofessional learning of different professionals being, learning and practicing together is of greatest benefit in a process. Whereas a more foundationalist approach is that based on learning outcomes - that

where there is congruity there are possibilities for professionals to learn from and about each other on occasions.

Similar differences presented themselves at the monthly Forum meetings where the Acting Director was continually attempting to juggle the needs of some academics who preferred an experiential approach, investigating their own ideas and those of colleagues, and others who prefer "shopping" – who want to listen and take away something to add to an outcomes list. However, in a positive way the College LTSN initiative has encouraged lecturers from different Schools to share experiences and ideas within the forum, which was not possible before its creation. Large numbers of staff have been made more aware of issues of IPE and MLE through day conferences.

The Website part of the study gave some objective evidence that there was a recent proportionate increase in the use of the word 'learning' and possibly for a greater interest in 'learning'. A further qualitative search in the Website revealed an apparent increase of pages on 'learning and teaching' and 'learning disability'.

Whilst this may show a genuine interest in learning and its facilitation some College initiatives in particular were a reaction to QAA assessments. Also the institution has to continually adapt to external forces with the continued pressure from the RAE exercises to get funding and clinical delivery pressures.

Conclusion

I am particularly pleased to have received the funding support of both SEDA and UWCM and freedom within my institution to carry out such a pilot study on educational development. I am also grateful to those who attended the seminar in November 2002 for their attention and advice. I would like to investigate and bear witness to the birth of CELTIC at UWCM based on the data and techniques used here.

Table 4.2.2-1 Wales College of Medicine Website – years compared

6877 pages downloaded February 2001

	Word Count	Density
Research	4723	0.69
Teaching	1717	0.25
Learning	928	0.13

11261 pages downloaded June 2002

	Word Count	Density
Research	7923	0.70
Teaching	2964	0.26
Learning	2298	0.20

4.2.3 Sweet J, Wilson J, Pugsley L and Schofield M. (2008) "Tools to share good chairside teaching practice: a clinical scenario and appreciative questionnaire." British Dental Journal 205: 603-606

Abstract

This article provides a scenario for analysis of good chairside teaching practice to serve as a starting point for continued discussion in this complex field. Documented issues of good chairside teaching practice are cross-referenced to a clinical scenario with explanations in the form of a commentary. This provided the context for generating a set of questions that are provided as tools to support good chairside practice. These tools are designed to be used with 'Appreciative Inquiry', which claims that there is much to be gained by discovering where excellence is possible and elaborating upon this. Although this process can be carried out in single units or departments, it is proposed that collaboration between institutions would allow sharing of valuable innovations and greater understanding of educational training, production of good practice guidance and professional development of staff. This article is the third in a series of three and provides a scaffold for a scenario and questions to encourage collaboration in evolving and sharing good chairside teaching practice. The first article investigated the perceptions of stakeholders in chairside teaching at a single dental school and the second evaluated chairside teaching on a UK wide scale. A further accompanying article reviews some of the educational methodology and innovations in teaching and learning that may be applied to dentistry.

Sharing good practice

The aims of this article are to explore examples of what good chairside teaching could be from the viewpoint of dental students, dental tutors, dental care professionals and

patients (the "stakeholders") by means of analysis of a clinical scenario. In addition, the intention is to enable readers to elicit instances of good chairside teaching practice in their own dental teaching institutions by using the questionnaire provided. The article is designed as a resource for future collaborative workshop activity where chairside teaching innovations can be developed and implemented in and across institutions.

Background

A study of dental chairside teaching including all stakeholders at a single Dental School in the UK (3.2.3) showed unevenness in the student experience and variation in dental tutors teaching that, upon subsequent evaluation appeared to be common across the UK (3.2.4). Dental chairside teaching colleagues who made up the evaluation team indicated that it was possible to work towards a consensus view on what characterises good chairside teaching practice from the many examples of good practice that were identified. This involved attending to issues of optimising the student learning experience, tutor performance and training and working with other Dental Care Professionals involved with clinic organisation. The second step in the sharing process was to identify specific instances of good practice that can be disseminated. Appreciative inquiry (Cooperrider and Whitney, 1999; Cooperrider and Srivastva, 2003) is chosen as a suitable methodology as it can present a focus on what is most valued -- integrated practice that "just works". Apart from identifying good practice that is already in place, appreciative inquiry encourages collaborative activity that can take innovation through from design to implementation. Since its inception it has been used primarily in organisational development but has recently been described as a tool for evaluation (Preskill and Catsambas, 2006) and as a research methodology (Reed, 2007). Appreciative inquiry is not the same as positive reinforcement, which is about continually saying things that are positive, because appreciative talk is rather considering things that are valued. It quite simply avoids deficit language. There are

major problems with deficit thinking because thinking and talking negatively will continually hark back to what is wrong, with the temptation for the teacher to teach by humiliation, placing blame on students, which does not help learning. Appreciative inquiry is based on the maxim that there is more to be gained by discovering where excellence is possible and to elaborate on this (Cooperrider, Whitney and Stavros, 2005). Appreciative inquiry has been described to include four stages: to visualise where there is current excellence; to imagine what might be; to innovate; and finally to implement change.

The approach deployed here is in essence an extension of appreciative inquiry into clinical teaching behaviours, both those of the tutors and of students. The suggested tenet is the proposed efficacy of developmental dialogue, which is always learning focused and prospective. This is based upon clear commitment to a positive climate and conditions that facilitate teaching and learning around the chair and briefing and debriefing sessions before and after the clinical encounter. A useful, aspirational maxim we have adopted is one of dialogue in clinical teaching, which is characterised by "… 'real talk', which includes discourse and exploration, talking and listening, questions, argument, speculation, and sharing, but in which domination is replaced by reciprocity and cooperation." (Jarvis et al., 1998)

Scenario, commentary and questions

The approach in the article is to provide materials, which would allow those with an interest in dental chairside teaching to conduct a variety of development activities, from large-scale workshops to individual interviews with key innovators in chairside teaching or institutional questionnaires for all stakeholders. The appreciative inquiry sets the tone of the clinical narrative and the different perspectives are explained in a commentary that follows. The questionnaire purposefully contains open-ended questions, which are key to gaining the local knowledge that may express excellence in

practice and also where excellent practice might be possible. Essentially it is a process of assisted self-evaluation and review that aligns well with the Quality Assurance Agency's current position on systematic enhancement of university practices (QAA, 2008)

Chairside clinical scenario

The dental chairside teaching scenario (see Figure 4.2.3-1) is derived from a compilation of favourable clinical events that have been determined as good clinical practice (see 3.2.3 and 3.2.4). The lines of text in the scenario are numbered so that the behaviours which show where the teacher has attended to individual and collective student learning and patient empowerment can be pin-pointed as shown in Table 4.2.3-1.

Commentaries

The scenario is designed to be a document to promote discussion, not as some clinical ideal. However, just as the approach to students should be non-threatening, also the form of peer observation going on should be too. The peer observation method suggested by Cosh (1998) is modelled here where the main focus is on the observers and what they can learn from the teachers they are observing, using the teacher and experience of teaching as a resource for their learning. It places the onus on the observers to relate what they see and what they discover from the dialogue they have with the teacher following the teaching session to their own teaching experience. This is quite different from the stereotype of teacher observation where the observer looks on and makes a judgement on the teacher and the teaching. Clearly it is important to have the patient as the main focus of attention at the briefing to ensure that the most appropriate treatment is carried out - urgent care in the case of patient A and related to oral hygiene compliance in the second. The tutor was helpful in giving a level of

support to allow student A work out and complete treatment in a way she had never achieved before. Prevention is the keystone of good practice and here a patient empowerment option is in operation. The tutor is aware of the limitations of the students' experience and prepares for this. Despite coming in some distress to the tutor the response to the student was one of reassurance and further carefully placed questions rather than simply telling what to do. The sequence of the tutor's questions and help showed an underlying organisation and a calm role model. The interjection of a dental nurse indicated the great deal of direct help and behind the scenes help that support staff should be encouraged to give. The interests of the patient were continually taken into account and continuity of support was achieved in these cases. Some collaboration between students at different levels in their course should be organised if they are not working together in practice teams (i.e. for one particular patient junior students carrying out patient education and motivation, intermediate students carrying out relatively simple treatments and senior students more complex treatments). The key feature of good modern teaching is not to humiliate students. The teacher does not need to gain points - students need help to progress and learn even when they do not perform well at all times. Did gentle handling of Student B produce the best learning outcomes? The main focus following the practical clinical session is debriefing possibly for a time with the whole dental team, including feedback from patients and dental nurses. Here the focus was on the student talking to the dental tutor and other students of their experiences and what they have learnt from them. The fundamental aim is for the students to start the process of life long learning, to realise their strengths and weaknesses, and to act to strengthen their overall working practice. It is suggested that this can only be inculcated in an environment that offers a positive climate and conditions commensurate with such dialogue. The intention is that this scenario will serve as a starting point for discussion on chairside teaching. The work of

drawing out more concrete examples of good practice lies in questioning specific instances of practice on issues that this scenario approach has raised.

Questions

A major focus is on what it is you value in chairside teaching and why you do so. This produces a resource for asking appreciative questions4 in order to work on what is the best of current practice; then to work with what might be the best of possible practice; to then ask provocative questions to develop innovations and finally to help navigate change and implement it. What good practice is already in place and innovation about to be implemented as a future opportunity at an institution? Is this good practice useful? Could it be transferable and provide a valuable innovation at another institution now? Finally, the questions elicit details about the people involved in chairside teaching. An analysis of these findings may help provide the right emphasis in projecting training provision to improve teaching. 3.2.4, produced five categories of chairside teacher suggesting that each has an important and sometimes unique role in chairside teaching. They suggest that gearing training and professional development towards type may improve allocation of resources. However, they also illustrated that a stakeholder mix at a workshop could produce valuable learning for the group members and consensus views as outcomes. This is a further reflection of our position that appreciative, developmental dialogue is an essential component of maximally functioning educational environments produce valuable learning for the group members and consensus views as outcomes. This is a further reflection of our position that appreciative, developmental dialogue is an essential component of maximally functioning educational environments.

Conclusion

This article is a working document based on a case study of chairside teaching at a Dental School in the UK and follow up dialogues with colleagues as a UK workshop. It is designed to provoke interest and discussion in chairside teaching by means of a scenario and complementary commentary. The questions that follow provide a resource for an appreciative inquiry into best practice in chairside teaching which could result in the sharing of hard won initiatives and innovation.

Table 4.2.3-1 Features of good chairside teaching as they appear in the scenario

Feature	line
Encourage questions and be supportive non-threatening	throughout
Put yourself in the student shoes	throughout
Consistent assessment -- equal treatment for all students	throughout
Enthusiasm for teaching -- willing to teach	throughout
Keeping tutor behaviours positive	throughout
Avoid being patronising	throughout
Peer review of teaching	05-07 59-86
Relevance for the patient in briefing	10-25 46-47
Helpful and advising	12-15 48-50
Embedded preventive care for students	19-20
Recognise that they are learners	25, 63-65
approachable	29-31
Do not tell them what to do!	30-31
Organised -- be a role model	30-37
Involved peers, nurses and PCDs	32
Patient centred	32, 51-54
Be there to sign the paperwork	35
Continuity of supervision and teaching	36-37
What questions have they	48
Friendship pairs for cross year patient management	52-53
Don't humiliate in front of patients!	57-58
Cheerful	81

Relevance to the student in debriefing	87-106
Recognise that experience is needed	88-91
What students need to know more of	90-91 102-105
Tutor to know the course and what they are doing	92
honest feedback	92-96 102-105
Debriefing -- constructively critical -- explain -- praise	92-96 102-105
Opportunity for students to revisit procedures	95-96

Figure 4.2.3-1 Chairside clinical scenario

15 minutes yet before patients arrive for the afternoon clinic session.

All dental students making a group of 6, dental nurses and allocated dental tutor have arrived in the clinic together with a colleague who is doing peer observation.

"I have come to do peer review of teaching. I think that I need to improve the way I give feedback to students. So if I may, I should like to observe your clinical teaching with a focus on how you give feedback," says the observer. "That's fine of course," the tutor agrees.

They all take a look at the patients' notes

Tutor asks the students what they have scheduled for today?

Dental student A has a patient who has a small restoration on a lower premolar treatment planned. Caries is detectable on a radiograph but not visible in the mouth.

Tutor - "Why do you need to restore this tooth?"

Student A - "The radiograph shows that the enamel has been breached and floss catches interproximally."

Tutor - "So that means?"

Student A - "There is a cavity - the lesion will no longer respond to preventive measures alone."

Tutor - "Good - is there anything else you would like to tell me about this patient and anything else you are looking out for?"

Student A - "Not really - she does have remarkably good plaque control. In fact, we are part of a new teaching module that only started this year - this patient volunteer taught me how to clean my teeth because she consistently has plaque scores below 10% All the same, she does have two very large restorations that we are currently watching.

Student B volunteers the information that his patient has chronic periodontitis – "I'm carrying on with sub-gingival debridement. I carried out the first session two weeks ago under local with no problem, although the patient is diabetic." He adds, "With sub-gingival debridement I needed a little help with the instruments last time but I feel confident today."

Tutor - "Fine - just let me know the plaque scores first before you go ahead – Thanks."

The tutor carries out the rest of the briefing with the group and the patients arrive. Student A's patient has lost a large filling and fractured an additional cusp above the gingival margin from a molar tooth, leaving a large cavity.

Student A looks somewhat distraught – she goes straight to the tutor for help.

"I'm sure that if you collect enough information together you will be able to work out what it is you can do to help your patient today." the tutor says reassuringly.

"I know she is very keen to keep this tooth - she told me on the way in," adds the Dental Nurse

"Let me know when you are ready to discuss things," the tutor adds.

Student A - "Thanks; I think I will need a radiograph at the start to confirm there are no fractures or pathology." Tutor - "That's good - I'll sign the radiographic form for you."

Tutor – "Make sure I'm available to see you with this patient again to keep the continuity with what we are doing here."

…Some time later…

"You have the radiograph back?" asks the tutor.

"There is no sign of fracture or apical area. The patient is keen to keep the tooth despite its fairly poor prognosis and she is not getting any pain from it. So I have checked that the tooth is vital," says Student A

Tutor –"So what do you intend to do now?"

Student A – "I have checked the cavity where the old filling came out; there is no sign of secondary caries. Where the additional cusp that has come off it leaves insufficient retention for etching composite alone, so I think it will need pinned retention."

The tutor takes a look at the cavity. "Yes that's right" *and then turning to the patient*, "I think you will need a crown on this at some point if the tooth continues to be symptom free."

"What do you think I should use as a liner?" asks Student A

Tutor - "Something that will give a bonding surface."

Student A - "OK I will use glass ionomer." "Fine," says tutor.

Student A, talking to the patient says, "Today we can try to mend your tooth with a specially pinned filling. If the tooth remains trouble free over the next few months I shall get my colleague Student C to construct a crown for you, as that is not currently part of my course."

"That should give a longer lasting result," she adds.

The tutor looks over and sees that Student B has just finished giving local to his patient, but he did not report to him first about plaque levels.

Tutor - "I would like you to let the dental nurse look after the patient for a moment so that I can have a word with you over here" - *indicating a place in the clinic out of earshot of patients.*

The peer-teaching observer comes over.

"Now why do you think I need to talk with you?" the dental tutor questions Student B.

Student B – "Oh, I forgot to check for plaque levels! I was so intent on getting on with the procedure! - I think its OK."

Tutor – "There was another reason for me seeing you with the patient - you have not had that much experience treating patients and I wanted to check out your patient as he is diabetic and assess the suitability of the procedure you are about to carry out."

Student B immediately explained "As it is later in the day I did check that he has had sensible food and drink and has taken his insulin and feels fit and well."

Tutor – "So nothing is lost as long as he keeps the area sufficiently clean afterwards - You should check out the area you did before - just for plaque and that should tell you how he is doing with oral hygiene."

Student B – "So I'll give the necessary plaque control instruction now whilst the local is taking." *And saying this, student B goes back to his patient.*

Peer observer – "I would have given him a good dressing down in front of the patient just to make a point that he wasn't behaving - doing what you asked."

And then after a moment of reflection carried on to say "But I do see that action would not have helped matters for the student or the patient!"

The tutor turns to the observer and says "Yes, I think you have to work decisively to protect the patient as you act as the safety net for patients and the students generally appreciate that, but the way you do this must support the student to help them progress, not pull them back. If I thought Student B was acting unprofessionally, mindfully ignoring advice, that would be a different matter."

Peer Observer – "Also I can see there is no bad feeling in the clinic - all the students are working calmly and fairly cheerfully - like the tutor!

…Some time later…. dental tutor talking to peer observer "Its nearly time for the debriefing session - this is where the focus is on the student's performance whilst the briefing session earlier is centred on the patient's requirements - the student should of course be as prepared as they can for this. I try to give individual feedback during the clinic time immediately following clinical events, at the debriefing or see them afterwards."

Tutor – "How did it go today?"

Student A – " I had quite a shock today having to do something completely different than what I had expected for my patient. I did start to panic. But when I had seen the radiograph and could start to link findings with the patient's tooth, I began to settle and I could work out what to do. And with only a little prompting, I completed an enormous pinned restoration. I still find placing rubber dam difficult."

Tutor – "I nearly suggested you book a crown prep appointment, but realised that this is not part of your course yet. Yes you managed that patient well and from that will be more prepared for the next clinical surprise. Would you like to lead a short discussion with your colleagues on liner materials that you would use for different restorations? Try to get some practice with rubber dam on manikins before your next clinic – perhaps with some more senior students – or if you would like some help please let me know."

Student B - "I didn't follow your instructions about the need for checking adequate plaque control before going on with treatment. I see what you were trying to do now. As it was, the patient was doing well with his oral hygiene. But this has made me think - Should I expect the healing following sub-gingival debridement to be as good in a well-controlled diabetic? I have quite a few things to write about in my clinical record book and things to look up."

Tutor – "Yes you handled nearly everything well but were just too eager to get on with things. I'm pleased that you are thinking about the outcome of what you are doing and that if you document the events of the day and what you have learned that would be most useful. Otherwise it is lost and opportunity for furthering good practice missed"

The debriefing continues and comes to a close… the students leave.

Peer teaching observer - "I'm surprised you have not said more in the debriefing."

Tutor – "No, this is the time for the student to express what they have learned from the session so that they can gain from each other's experiences."

The peer observer then explains to the observed dental tutor what had been learned from the observation session. The dental tutor then has an opportunity to add to this and they can then draw their conclusions about what they have both learned.

Table 4.2.3-2 Questions to ask about Good Chairside Teaching Practice

A) In our Institution what are the best ways in which we

1) enhance student learning?

2) improve teaching or knowledge about it?

3) use ancillaries in chairside teaching?

4) organise the clinics?

5) utilise clinical or media equipment?

B) What might we put in place in the future to

1) enhance student learning?

2) improve teaching or knowledge about it?

3) use DCPs in chairside teaching?

4) organise the clinics?

5) utilise clinical or media equipment?

C) How can we share Best Practice within the Community of Chairside Teachers?

In our institution what good practices do we have to offer the wider chairside teaching community?

In our institution what good practice could we gain most from the wider chairside teaching community?

D) What can I best contribute to good chairside teaching practice?

1) hands on supervision of students in the clinic?

2) playing a major role in the support and furtherance of my discipline in dentistry?

3) using my natural understanding of patients and students?

4) using my training in education to help students learn?

5) developing an overall understanding of chairside teaching and work on changes to improve it

E) I have experience and knowledge that would enable me to tell others about

1) good teaching practice?

2) specific clinical subjects?

3) how to use educational theory to improve student learning?

4) how to help other staff improve their teaching?

F) Further training and professional development most useful to me would be

1) protocols and methods that should be used in chairside teaching

2) teaching methods

3) education theories

3) dentistry specific knowledge

4) how I can help my colleagues teach.

How do you think you would seek these opportunities?

4.2.4 Sweet J. (2010) "Arousing interest and reflection on National Standards with a bricolage of images and text" prepared for Reflective Practice

Introduction

National Standards in Higher Education have become a topic of great interest in the early years of the millennium in the UK (Higher Education Academy, 2006). Much of the literature has attempted to align standards to academic progression, but is there more to discuss with reference to parallel trends of interest in quality, excellence within HE and standards sought in industry, government and the professions (Tam, 2001; Winter, 1992). Also can academics align themselves with pronouncements or stands which are pronounced in their name? This paper describes how a debate on standards was aroused at a conference on National Standards in higher education teaching (6.2.16). Two sets of materials were used to arouse debate:

1) a bricolage of visual images and text from an experiential workshop on standards [see Appendix 1, at the end of this article]

2) selections from a rare epic prose, to the point when "National Standards" become an important issue, published in 1881 [see Appendix 2 for précis of this section at the end of this article]

Highlights of the conference dialogue on National Standards are presented and how views of standards became polarised in the form of a debate. In conclusion, the advantages and risks of using disparate texts images and older references as resource materials for discussion are considered.

Highlights of the dialogue and debate on National Standards

The facilitator grounded the session from a scholarship viewpoint of the need to question presuppositions, especially about things that appear to be "a given" such as

the notion of National Standards. It was suggested that the outcome to the session should be that of having a clearer notion of National Standards by using two disparate resources that could permit existing presuppositions to be undermined. Participants were challenged by asking what they could see of value about National Standards in the images and clips of text they were given from a previous SEDA Conference workshop [see Appendix 1]. This was followed by a jigsaw exercise (Johnson and Johnson, 1999) in which small sections of text from the English translation of Prometheus and Epimetheus, by Carl Spittler were given to pairs of participants. Later they would be given five minutes each to relate to the whole group that part of the story they were given, and in addition, outline what significance this had to them about the notion of National Standards. This was a powerful way to inculcate "positive interdependence" where small groups rely on each other to gain the overall picture and permits a relatively large amount of text to be "group read" in the short space of time available at a Conference.

In response to the images at the workshop

Participants firstly had time to reflect on the images taken from the modelling workshop, which were passed around and were able to start putting their thoughts and feelings into words. What seemed to be of most significance to them started as one or two words then developed into streams of associations as follows:

As many present were educational developers, a particularly strong image to many was that of the great big magnet of the discipline and the other small magnetic pull of the educational developer. The images were also seen to represent a range of possible responses to the notion of standards - on the one extreme you have standards as being symbolised as "washing everything away" as "dramatic destruction" and on the other extreme you have the magnet with the huge pull of the discipline and the tiny pull of the educational developers and their standards

And somewhere in the middle you have the navigational model, which could be interpreted as standards helping us on the way; helping us to navigate the way through professional practice. One participant at the workshop was much taken by the navigation image and was able to take this still image and see how it conveyed impending change. He goes on to say

> *It made me think about how we navigate around the planet which people have been doing for thousands of years but we still take an earth centric model for navigation; we forget the reality that the sun is the centre of the universe. But people do manage to navigate round the earth using the earth centric model*
>
> *so does it matter about the reality?*

And the ideas started to flow

> *similar to the idea that Newtonian physics is good enough even though quantum mechanics gives a better explanation*
>
> *how do we end up acting accidentally fixing up things in this way*
>
> *so back to your theme of scholarship and revolution*
>
> *where's the next turn of the wheel coming from?*
>
> *that's okay if you want the consensus of the time where we are; the earth being the centre as you like but now there is a better reality with the sun*
>
> *so where's that momentum going to come from?*

To others the most telling imagery was that which placed standards at the very top of the image or even above it

The link that I saw was with the bird up there. Isn't it beautiful and something to see? - Like a bird-watcher you get something from watching it.

The coat-hanger had to be something up there and with the money there seemed to be a way above the money that forms a network of values. There is a need for something that comes up above.

This was interpreted as

things always have to be contextualised

is that what standards are?

they help to contextualise things -- you want to contextualise it against something that is better and always up there somehow

And this sparked off a little theoretical underpinning and some debate

Isn't the standard the thing that is up there?

that's a platonic idea

the standard is the ideal the thing you look for

it is the external reflection of the mirror

if you say that you assume that there is an external standard rather than you create your own standard

not really you don't have to usually take it to that philosophical extreme

what you say is that something exists

divorcing it from the particular standards

you can imagine a conception that says here exists a professional consensus that is good practice

and it is defined in this set of standards

so a new person coming to the field then can see that that is something outside of their own perception and experience which represents some kind of consensus

without having to be attributed to the absolute platonic ideal

you could argue that the only reason it has real existence is because somewhere there is truly an ideal and although this isn't

it is a better closer approximation than I am likely to come to

just walking to the situation at the start finding out what is good and was bad

I agree that that is a possibility but personally I don't believe it is right!

I give you a counterexample

in Zen and the Art of motorcycle maintenance Presig searches for what is quality

eventually he finds it

he says that quality is what

people have in their own conscience

that they create quality so you cannot define it by saying what it is

how it is placed

who created it and what was the outcome of it

we come out of the discussion

that so long as you have an idea you can lay down what quality is

that book is dated

in that the argument seemed to make common-sense in those days that you couldn't define quality

if you didn't define quality you could understand the world better -- how quality acts on things

but now there is a whole industry that defines quality

But what matters is how these standards have arisen

So what you're saying is if any true standards

or any true quality that we might come to an understanding of

is a collective process of discussion debate and is formed that way

now that's true

that's how they came about there was a professional discussion

None of that I dispute that is we agree that there are some ultimate ideal standards what I'm saying is that we tend to concretise things to say these are the standards my question is how does one engage with a new generation to say that now we need to re-examine?

but there is the completely opposing view that there is no way of defining standards

it just comes out of the work that people do when they create things

but you say there's no way of reaching the standards

but there is through professional dialogue

what emerges is a set of standards that are not perfect

but they are operational

and they are always tentative

and that is what is denied by the likes of the Academy -- they are setting up standards which we must obey

what they are saying is that at this moment in time they represent a professional consensus

no more that -- not that they are eternal

But they aren't even a professional consensus -- getting all the institutions to have a thought about to quality!

only a tiny minority in academia are interested in quality

at least they were asked to contribute

And then the debate takes a downward turn from the nebulous

you were thinking of the standards as something you needed to look up to as aspirational

in such a way that you never knew quite what it was

one could reverse that and say that the standards are the foundation upon which we should all operate

and that you would take it for granted that these would be the standards

that they are part of a professional training

that's where you start from not what you are working towards

I like it is a process but not as a product

I see any framework as a scaffold to assist the articulation of the self

where the self is and where the self may be

and where the self may be, maybe the function of dialogue with others around the notion of a framework

but with the fact that it's fixed and seen as fixed they tend to be abusive

well I think to say it is fixed is simply mistaken

The discussion quelled for a little as the participants moved on to share their feelings and thoughts about the section of the book they had read.

In response to sections from Prometheus and Epimetheus

Participants in pairs, who read a section, first tell the story and then their interpretation of it. The sections they were asked to read were the sections when National Standards were used and abused. How normal people can be duped (see Appendix 2)

*We joined the story of the book at **Chair One***

all is appearance

chair one is based on the notion that if you keep saying it then in turn must be true

we have examples in the twentieth century -- terrible examples although they don't have to be terrible

lack of received wisdom -- are they?

could be the standards?

are standards a trap or an illusion?

external truths like this or an illusion?

they need to be internalised

Chair Two

the way to persuade people

if you tell people things they already know surely they will check them out

but quite the reverse happens in practice -- people love to have their own ideas reflected back at them

So things will be accepted because they are familiar

Chair Three

we can seduce these people into a trap

and the trap will be coupled with a song in a wood

and the response will be

that we did this thirty years ago

familiar with the song and familiar with the wood

so they can see the standards coming

So having had the experience of something similar in the past such as professionalisation and then see the standards as they had been presented now and mistrust them

but the thing is that that might be the case but their position at the start

to discuss a trap and as they are discussing around a trap

and then they become hooked as their ideas become entrenched

So the idea is that they are seduced into a trap which is familiar that they mistrust

so the very act of getting them to the trap puts them in a vulnerable position if you can get them

So you get the focus of the standards and they start to discuss around them that they are vulnerable because you can get them

the trap is to start talking about them you think the trap is the standards themselves but it is really the engagement with them

The Stool

Here is an upstanding man but he likes rascals

and he will love you so don't worry about it

I will sing a song to make sure it goes all right

I read the story in isolation from everything else I didn't actually know a lot of what was coming

So they are talking about a man with a great reputation that I wouldn't dare to tackle

I wondered if this man who had a great reputation

if the standards were for him and for everyone else

It is just that this man said he has a fear of the standards

There seems to be nothing more incongruous than seeing the words "National Standards" in a book written in the eighteen eighties

and yet they were talking about the national flag the National Standards and that is what some people interested in standards are looking up for

looking up to

something

yet it seems to be the commonality

the thing I thought about was that the chairs were rational things to do to trap the enemy that you could ensnare people with in their thinking whereas the stool was getting the person emotionally through the back door -- you could argue what you like but in the end you catch this person out because of his fancy

You are setting up the standard against an existing standard and instead of the invisible bird it's going to be the invisible whale

what is interesting as they go on talking about it

even, they start talking about it as if this bird and whale are real

in practice they are concerned if the bird and the whale will talk to one another -- even though they've admitted that from the start both creatures are invisible!

perhaps there is another analogy here that set these things up and somehow they become concrete and become real although they are totally imaginary

So you get people having the notion that they are ticking off the standards which gives the idea that they are clear and palpable and fixed instead of standards being a vehicle for exploration

A final amusing comment

part of the trickery was that the enemy's dogs had ideas on their collars that were " the same as those that hung by the bushel on the National Standards"

as a luscious network of vines and creepers all over the National Standards

Debriefing

Participants were then asked to feedback on the process of using these two disparate resources for discussion

There has been quite a rich debate here with metaphor being used in connection with the text

which may, or arguably, may not be with the notion of "National Standards"

but I see it as a kind of arousal mechanism

you actually got us aroused and as a consequence we probably engaged more with the debate around the notion of standards than we might have done if we were not in this aroused state

extrapolating metaphor and pictures enable us to articulate that we might not do without those

the bricolage approach where there was a good story and metaphor and image juxtaposition allowed re-framing of previous experience

power of myth and imagery is so important

to the vibrancy

to be willing

to contest

to be scholarly

I like the power of myth and power of the archetype to enable you to think in a very off centre way

what we have discussed is something far richer than just the standards

we don't engage in the imagination as much as we should in learning

this approach is the complete antithesis of what I normally do

I would normally draw people on people's pre-existing experience

and the stories that they produce as a means of looking at a particular area

whereas what you've done is the opposite and it's taken me some time to come to terms with it

maybe we need to think of the cultural point of entry of such activity

I think are all wondering what was going on here but we all went with the flow

the fact is that we don't normally bring that much imagination into teaching

we need to pay attention to the journey and to arrival

because of the learning histories of people bring

people don't tend to arrive into new challenges comfortably

we need to consider the trajectory into these things.

Conclusion

A fruitful debate on National Standards in Higher Education documented here was stimulated by two unusual resources that were shared by the participants. The first resource was of recent imagery and accompanying commentaries, which were the outcomes of a previous experiential workshop. The second resource was selected text from an English translation (1931) of an epic prose by Carl Spitteler (1881). A section of this book continually refers to and describes National Standards with reference to how relatively easily conscience and good moral standards could be circumvented and did not provide the assumed protections afforded by these cultural codes of practice. Overall reflections were that practical day-to-day solutions are not guided sufficiently in sound theory which then may not serve humanity well to determine the right responses to change. There was a fundamental difference of opinion over whether standards and measures of quality could be predetermined or whether it comes out of the work people do when they create things. Standards were also seen by some as something to reach up for whereas others saw them as the foundation upon which to build and operate. Whilst as one participant said seeing and discussing the phrase "National Standards" from a book written in 1881 appears incongruous at the start, but the way in which Spittler uniquely crafts all parts of the story into subjectivity is stunning. For many participants it was the way in which he demonstrates the fundamental fallacy of seeing National Standards as concrete forms rather than useful constructs that is most useful. How easy it is for us to slip into prescriptive ways of working with "facts". The debriefing clearly showed participants being taken unawares by the oblique nature of the resource materials and sensing a subversive scholarship at work as a form of public

examination of presuppositions. Essentially, this was Schön's "displacement of concepts" at work. The old assured realities were brushed aside temporarily. In the floundering in the new environment created by the unusual resources old concepts has to be displaced to reengage. The participants were seeing things in a new light (Marton and Booth, 1997). They were learning!

Appendix 1

This contains an explanation on the experiential workshop and a set of outcomes derived as annonymised still images and quotations taken from the video recorded at the time.

Experiential workshop

This workshop was underpinned by theoretical concepts from Kolb (1984) of apprehending new concrete experiences, within a group dynamic to gain greater range of experience extending the zone of proximal development (Vygotsky, 1978). But fundamental to its success was the application of Schön's (1963) displacement of concepts. Here, the participants are immersed in a new situation completely and activity which is not part of their usual routine. They can then use their familiar concepts in new and active ways. The participants were therefore invited to explore what they understood by the term standards.

After discussing and thinking about standards for twenty minutes, workshop participants broke up into six small groups with the purpose of expressing what they meant by standards through the juxtaposition and use of the various materials available to them. The outcomes are shown below in terms of image and narrative taken from the video footage recorded at the time. [See Appendix] The sand, plastic sea creatures and water gave vent to images of destruction as part of the sand island gave way. The magnets inspired the critical role of individuals seconded from a large

and powerful department of a university who comfortable in both educational and subject camps could re-code standards and infiltrate or negotiate relevant local criteria. The remaining four experiential stations of flip chart drawings of ships in the sea, the bird and boat toys, the money and the coat-hangers all made reference to an invisible web of influence from above when talking about standards.

Outcomes of Experiential Workshop on Standards (see Figures below)

Standards as Destructive

Standards in the Balance

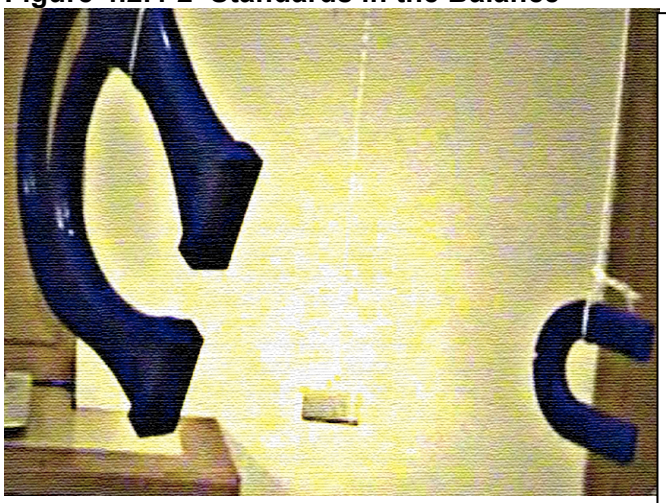
Standards and an invisible web of influence from above

Outcomes of Experiential Workshop on Standards

Figure 4.2.4-1 Standards as Destructive

First of all the animals are not representative at all - they are representative of different academic disciplines of different people at different stages in their academic career and they are on a island that has different levels and they are relatively happy on their level .. apply the tidal wave of professional standards - And look what happens! Oh no! everything's washing away except for a little life raft except for a little life raft that you can go and jump into - which represents the unknown future

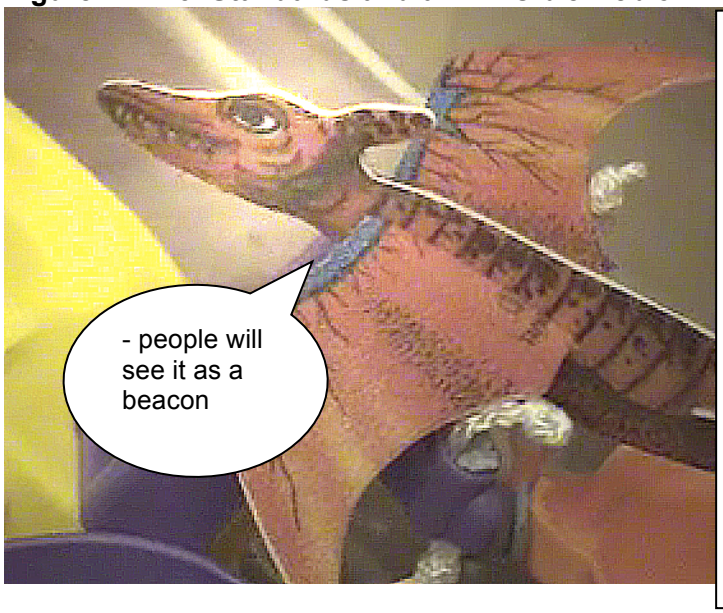
Figure 4.2.4-2 Standards in the Balance



Now this is the powerful department of Egyptology and this is an Egyptologist here and they have a lot more influence over this person than we have

This is my little institute influenced by national and professional standards over here - now somehow we have to help this person to be close enough to us to understand what national professional standards are about and then work with the department to define local criteria that Egyptologists can make sense of
They don't need to know about professional standards - just local criteria

Figure 4.2.4-3 Standards and an invisible web of influence from above

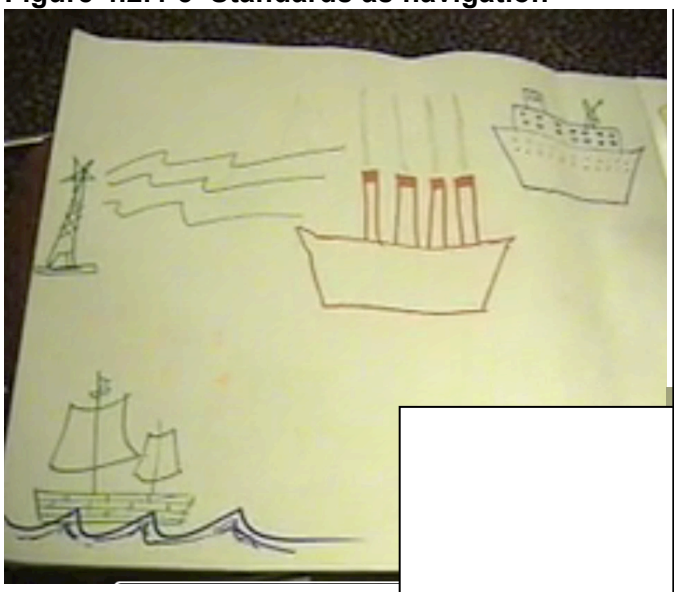


We are looking at an autonomous kind of framework impacted on by outside bodies
So we have our professional body building their own standards with our customers stakeholders and other aspects that keeps us balanced that makes us feel we are not going off the rails - building our framework
This is a beautiful bird - the plumage is quite remarkable - and we can see from a distance that is a skill that some bird watchers have.
It is a particular skill - people will see it as a beacon

Figure 4.2.4-4 More standards from above

This basically starts as a vertical model and then we realised that actually with the standard people may be moving sideways so we needed other options for them - there are hurdles to cross wherever you go the standards are the hurdles you cross
if you go up down or sideways you have got to get over things
There needs to be something here - we are talking about new horizons there should be something like the kind of here - I'm not sure what that is

Figure 4.2.4-5 Standards as navigation



The image that came to me about standards was the idea of a mediaeval ship which begins sailing by the stars - with very little notion of where it was going or why Through to modern situations where you can get ships now which are virtually automatic where they navigate themselves by satellite some notion of standards saying where you are and how you are located and so on.

Figure 4.2.4-6 Standards as values

We are identifying all the ones where there is lots of it - a kind of mass the stuff that is not unusual and picking out things that are unusual or unique or distinctive - we are separating the two and then I don't know what we are going to do after that
What is distinctive provides the basis for a set of values which we are going to arrange into some web in some connective fashion that provides meaning for the mass of possibilities that shape around these values

Appendix 2

Prometheus and Epimetheus (Epic prose by Spitteler, 1881)

Prometheus and Epimetheus are brothers who grow up in a pleasant valley but don't go around like ordinary folk obsessed as they are with their own souls. The angel of God noticed this and came up to Prometheus unawares, he says

"Separate thyself from her and I shall give thee a conscience in her stead

but Prometheus is not impressed and he says

"...My soul, for, lo, She is my lady and mistress, and She is my god in joy and sorrow, and all that I am, I owe to her alone

and so I will share my honour with her, and, if needs must, I am ready to forego it altogether"

However, Epimetheus overheard this conversation and says

"My desire is for truth and my soul lies in thy hand, and, if it please thee, pray give me a conscience

and as he spake he handed to the angel a casket richly adorned with gold and precious stones

we are told that, to this the angel gave him a conscience in gracious compliance with his request

Despite Epimetheus not being the angel of God's first choice he does make him king on earth

after the coronation he takes him up a steep and dark stairway to the top of a lofty tower

and he says

Here, in this chamber, sleep my [three] children, the consolation of my heart and the future hope of our kingdom

and then he says

"This key I herewith entrust to thee, that thou mayest preserve it safely to thy latest breath"

Like everything in the book all people animals and things are subjective so the conscience within Epimetheus develops its own animal-like personality and says

“Simply do what is right from day to day”

In the meantime, Prometheus feels insulted and cast out and walks away and into the North country where it is cold and he catches a chill

and he sees an apparition

we are told that the blood of Prometheus rushed through his veins in mortal terror, and then

"...The Goddess approached him, and looked at him, glance for glance and eye to eye.

And at her gaze his life died and rose again, his blood first seized and then froze, and all his feelings became enslaved to her in boundless and self-forgetting love"

he remains willingly in her power

later in the book the angel of God becomes ill and wants to convey a secret message to Epimetheus so that he may handover Mythos his son to rule heaven

but he goes on to say that they must appear cheerful and jubilant despite his illness and likely death and he says

“Above all, be sure that thee carefully conceal my bodily weakness, so that Behemoth, my old adversary and enemy of my kingdom may not hear of it”

But Behemoth does get the message and decides that this is the time to find some way to kill the children of God

he has no idea on how to do this himself so promises his daughter in marriage to whomsoever "places these children in my power"

a very smart servant comes out of the woodwork with a cunning plan playing on the presuppositions and assumptions that ordinary folk had about their National Standards to help Behemoth understand what he is up to more clearly, he places the king Behemoth on three chairs each one indicating an important ploy in the whole plan

and finally he places him on a stool where he relates a lesser backup strategy

poor Epimetheus and his conscience are no match for this cunning

the common folk are easily fooled and even the Athenians who are the local intelligentsia are so worried about being fooled that they cannot make definite decisions one way or the other. It is a sad day when the children of God are taken away to Behemoth. Such is the strength of the plan and twisting of the standards that most folk are even in favour of letting them go. Needless to say it remains with Prometheus who will be swayed by no one other than his soul, who is finally called in to save the day.

4.2.5 Sweet J. (2010) "Harm and experimentation - an ethical evaluation of Periodontal Research publications describing the use of macaques as experimental animals" prepared for Science, Technology, and Human Values

> *The science of life is a superb and dazzlingly lighted hall which may be reached only by passing through a long and ghastly kitchen. The physiologist is a savant, seized and possessed by a scientific idea. He does not hear the cries of animals, nor see the blood which flows. He has nothing before his eyes but his idea, and the organisms, which are hiding the secrets he means to discover.' (Bernard, 1949; p15)*

Introduction to an evaluation of periodontal research

The case for the use of non-human primates has been continually made in the periodontal literature by advocates who use these animals in their own experimental work (Schou S, Holmstrup P, et al., 1993; Caton J, Mota L, et al., 1994) emphasising the ways in which non-human primates (with various exceptions) mimic the human anatomy and physiology or the oral tissues including the periodontal tissues in health and disease. Other researchers such as Page and Schroeder (1982) and Selvig (1994) take a broader overview and suggest that the similarities between humans and non-human primates are far fewer than the other authors would suggest. Rather than advocate the direct extrapolation of test results to humans they propose that the interest in the non-human primates and other animal experimental models should be in the diversity which the various models demonstrate, giving a great range of features to investigate both health and disease. This view is supported by other workers outside dentistry such as Newell-Morris and Fahrenbruch (1985). It is also instructive to note

as Bosshardt and Schroeder (1988) emphasise the underlying problem of using non-human primates in periodontal research that "periodontitis in non-human primates, either wild-caught or maintained in captivity, is rare in young or mature and still variably infrequent in old animals". A previous study (3.2.1) identified features of periodontal research using macaques over a period of 20 years and cited over thirty years in an independently derived data set of publications. Included in this were the usual scientific parameters of country of origin and laboratory, an overview of this experimentation, the range of problems to which this research has been applied and an appraisal of the most cited experiments. A further study (3.2.2) explored these publications more critically for scientific errors. However, as explained in that paper it is not regular scientific practice to critique or find error in published work. Instead, peer approved publications are cited and experiments validated findings published and poor experimentation and concepts are left to "wither on the vine" remaining uncited. This contrasts with subjects in the humanities where the major focus is on critiquing and finding conceptual errors, which are (usually) welcomed by the original authors, as understanding of these can be a means of furthering the discipline or righting its direction. This paper goes one step further from current scientific practice to critique each paper point by point in order to consider ethical issues at source. Although many texts bring out ethical issues in detail sometimes strongly advocating animal experimentation and others strongly against, too often the arguments are too distant from the facts of individual cases and too generalised. Possibly the greatest problem in evaluating the ethics of the use of animals in research is the relative secrecy with which it is carried out. Smith and Boyd (1991) is particularly valuable as their investigations were based on privileged access to a small number of experimental laboratories which were visited in addition to the experimental documentation. The wide range of questions they asked were as valuable as the in-depth narrowly focused

results they obtained. However, the underlying bias of the book comes to light by page 25 when they say that "benefits of using animals in so far as fallible knowledge can determine therefore, the moral community's commitment to the common and individual good appears to have been more adequately expressed by the use of animals than it would have been by not using them". The underlying teleological utilitarian approach is clearly in place. Where members of the public would be convicted for "cruelty" if they inflicted the harm and suffering that experimenters inflict, they resort to arguments of necessity: that an act which is normally unlawful may be lawful if it done as the only way of achieving a greater and lawful benefit. This approach leads to the uncomfortable position that they reach at the end of the book where they say, "In undertaking biomedical research on animals we ought to do what we ought not to do" (p325). However, they do outline in detail special recommendations on the rationale and strategies for the use of non-human primates in scientific experimentation. Consideration for animal use is clearly divided into issues about animal housing and husbandry and the possible procedures conducted on what might adversely affect the animals. However, many of these appear to be based on assumptions rather than evidence. Generally it is thought better to breed the animals for experimental work rather than capture and bring them in from the wild. Capture often involves shooting of parent animals and privation and stress during transport to the research facility. However, breeding in captivity gives the animal no experience of natural conditions at all. Different age, sex and life experience of the animals will obviously affect the impact of the experimental procedure. Also the impact of surgical or non-surgical techniques and manipulations, and whether they are carried out under anaesthesia or analgesia will produce a different experience for the animals. However, Smith and Boyd (1991) fail to look specifically at harms experienced by the animals. Like man, macaques are highly placed on the phylogenetic tree so the arguments for experimental authenticity

can also be matched by arguments for similar ethical considerations, if not rights for these animals. There are differences of opinion about purpose and value of the experimentation within the scientific community as mentioned above and many different philosophical approaches to the ethical consideration of the experimentation so there is much scope for fruitful discussion.

Aim of Study

The aim of this study of periodontal research is to identify and evaluate the features that may inflict harm on macaques used as experimental animals. These studies were chosen on these animals because they are controversial. The study uses appropriate questions described by Smith et al. but relies entirely on information published in the public domain. However, it does includes a large data set of 170 papers. Within the journal articles it is possible to build up a partial but wide picture of the rationale behind the experimental procedures and their impact on the non-human primates used as experimental animals.

Method of Evaluation

First Stage - Range of Harms inflicted on the animals

An illuminative approach was used to explore the texts. Each paper in the experimental data set was read and coded for possible harms using the outline of recommendations on the rationale and strategies for the use of non-human primates in scientific experimentation (Smith and Boyd, 1991) as a starting point but to augment or eliminate from this list where necessary. However, the published papers followed a particular genre which tended to include some data but exclude others. The techniques used including anaesthetics and analgesics and species of animal were invariable readily available from the papers, and sometimes some information on the wild or captive origin of the animals. However, information such as age or sex of the animals, the

quality of the facilities in which the animals were kept, after care and previous experience of operators was rarely given. In the ethical consideration of experimental animal work the position of Obrink (1983) is taken where he states that consideration must be taken from the animals point of view - but this was difficult to assess with the choices available to the animals experimented upon.

Killing, pain and morbidity

It is difficult to predict the animals' possible preferences when facing the experimental options were they given the choice. Living conditions apart, from the animals' 'point of view' the least invasive experiments to the animals' consciousness would be when the animals are anaesthetised either experimented upon and killed or the tissues are used subsequently in an experiment [2.5% of animals]. Of course there is the underlying harm to the animals of reducing the duration of their lives. Two other options are where animals have to endure experimentation whilst conscious or endure anaesthetics, manipulations and recovery, and are subsequently killed [60% of animals], or, alternatively experimented upon whilst alive but are not killed [37.5% of animals]. In fact, procedures that are likely to cause pain were recorded in 136 experiments (80%) and show a consistent pattern over the 21-year review period. Reports by authors of morbidity, unintentional experimental mortality, gross injury and restraint, which may indicate a greater harm, are reported in a small number of experiments frequently in the first decade, but less frequently in the recent literature.

Reporting on Harms inflicted on animals

The underlying problem of using non-human primates as an experimental model for human periodontal disease is that it does not generally occur naturally. The periodontal ligament does not become dissolved away by disease. However, the situation is also complicated by the fact that most monkeys have a mild gingivitis, an inflammatory

disease that does not involve the loss of periodontal ligament. There are therefore effectively no animals ready to be used with periodontal disease and also efforts have to be made to continually clean the monkeys teeth at least three times per week (Caton, 1979), to ensure a healthy base line start to experiments. Unfortunately, nearly all procedures on non-human primates involve sedating the animals, which can have an overall deleterious effect on the animal's health. So even experiments that involve collecting plaque samples or performing oral hygiene, and the administering of drugs, usually involve multiple anaesthetics. Only one paper indicates that animals could be trained to co-operate to take drugs without either restraint or anaesthetics (Staple, Reed et al., 1977). It is possible that a procedure, which is simple and relatively innocuous in humans, may turn into a major negative experience for the monkey. However, I shall outline the range of harms inflicted on the animals starting with the apparently least invasive.

Injections and crevicular washings

Two experiments tested the relativity innocuous use of the intraligmental syringe; a method of injecting local analgesic directly into the periodontal ligament (Anneroth, Danielsson et al., 1985; Brannstrom, Nordenvall et al., 1982) and another two involved taking washings from the crevicular fluid which exudes from around teeth where the gingivae are inflamed with additional purposeful puncturing of the base of the periodontal crevice (Challacombe, Russell et al., 1978; Lehner, Harty et al., 1987).

Inoculations

A series of eight experiments involved inoculation of the tissues in an attempt to stimulate immunity. The site of inoculation may react with an inflammatory reaction or even frank infection. Levy, Robertson et al. (1976) stimulated an exceptionally destructive reaction in some animals which caused gross necrosis of the jaw. This

could have caused both pain and loss of function. [see Appendix for Case Study detail at the end of this article]

Scaling and Root Planing

A number of studies included scaling and root planing in their experimental protocol as part of the process of removing plaque and any calculus deposits which may retain and trap plaque near the soft tissues and allow gingivitis to continue in the animal's mouth. Lindhe, Nyman et al. (1982) was a study of scaling and root planing every two weeks for six months. The net attachment loss would be operator sensitive.

Ligatures tied around teeth to trap plaque

Twenty-five experiments included a variant of the "ligature method". If plaque is purposely retained in the monkey's mouth by tying a piece of ligature or floss around a tooth, the local environment is changed and a false "periodontitis" starts up. The previously resilient surrounding bone and periodontal ligament now rapidly falls victim to "ligament induced periodontal disease". Despite the apparent clinical similarity, at histological level, it shows an acute inflammatory lesion that is quite different from chronic lesion found in human periodontal disease, which is usually symptomless. The acute lesion in the monkey could be more uncomfortable and possibly painful to the animal; none of the authors of these papers mention the possibility. Various other foreign bodies have been used to trap plaque and cause disease equally effectively including the use of cotton pellets (Berg, Blomlof et al., 1990), pieces of wood and wire. Some authors have also combined this procedure with other actions to ameliorate the action of the ligatures with drugs (Brunsvold, Chaves et al., 1992; Kornman, Manti et al., 1982; Offenbacher, Braswell et al., 1987; Weinreb, Quartuccio et al., 1994) or inoculations (Manti, Kornman et al., 1984 and Nisengard, Blann et al., 1989). Other more recent experiments combine additional more complex protocols of ligatures,

surgery and scaling and root planing (Berg, Blomlof et al., 1990) or ligatures, extractions, surgery and implant placement (Schou, Holmstrup et al., 1993).

Biopsies

Non-human primates are expensive animals to maintain for experimentation, and biopsy taking (used in 12 experiments) is a useful method to allow a follow-on experiment with the same animal, or to provide histological material for a minor experiment conducted secondarily to a major experimental protocol (for example see Johnson & Hopps, 1974; Wood, Binowitz et al., 1980). The method was used by Asaro, Nisengard et al. (1978, 1983) where a bacterial sample was first taken and analysed, and then a biopsy of that site. This allowed a timed analysis of bacterial challenge and histological host response.

Periodontal Surgery

Nearly 80 experiments used periodontal surgery in the protocol. All these cases would involve the cutting of the gingivae around the teeth with a scalpel, the releasing of this tissue away from the tooth or teeth. A variety of further interventions were then used to cause further injury, such as the removal of bone from around the teeth (Caton & Nyman, 1981; Lindskog, Lengheden et al., 1993; Matherson, 1988) and purposeful complete removal of the gingival tissue (Karring, Cumming et al., 1975). A range of procedures were used to test augmented healing as a result of the placement of membranes into the wound site (Gottlow, Laurell et al., 1994; Iglhaut, Aukhil et al., 1988), implanted graft materials (Ettel, Schaffer et al., 1989), substances rubbed onto the root surface (Nasjleti, Caffesse et al., 1987), and systemic drug therapy (Shamash & Bissada, 1977). Other experiments tested the use of cyanoacrylate glue instead of conventional sutures (McGraw, Caffesse et al., 1979), and Picton (1988) kept animals

under anaesthetic for many hours testing for the increased movement of teeth following periodontal surgery and bone removal.

Tooth modifications

A most common action to teeth in the experiments was to extract selected teeth prior to and during an experiment. Experiments to use implants to replace teeth required that a suitable place be made in the dental arch, and for healing to take place prior to implant placement Johns (1975). Some teeth were removed for convenience to permit access to experimentally determined areas of the mouth. Some fillings were carried out, mainly to provide a reference point in the teeth to be viewed on radiographs. Some teeth were prepared for crowns and bridges, mostly for experiments in which teeth were built up in height to create an artificially premature contact with the opposite tooth well before any other teeth could meet (Budtz-Jorgensen, 1980; Johansen & Karlsen, 1978). However, Stark, Nicholson et al. (1977) go to incredible lengths to test the solution sometimes used to impregnate cords pushed down between the tooth and gingiva in order to take impressions. They prepared the teeth; either placed the cord or conducted electrosurgery whilst catheters placed into the left ventricle were able to record blood pressure changes. Another experiment records the careful root canal treatment of the monkeys' teeth (Castelli, Caffesse et al., 1991). This contrasts with Valderhaug (1974) where 16 adult or deciduous teeth in very young child monkeys were drilled into, the pulps of the teeth removed and the teeth left without any further treatment for up to nearly a year. Some teeth showed infections following this "treatment". The author does not state the problems the monkeys may have experienced with partially alive and dead teeth. One experiment involved conventional orthodontic treatment (Murakami, Yokota et al., 1989) but another proved much more invasive with extractions and surgery, mainly to place a number of markers in the bone for

radiographic purposes, as well as orthodontic treatment (Wennstrom, Lindhe et al., 1987).

Replanting

This term has been coined to mean the extraction of a tooth and its replacement into the socket following a delay or modification to tooth or socket and was used as early as 1972 by Hurst (1972). Seventeen experiments were of this type. Augmented healing was attempted with biological preparations (Nasjleti, Caffesse et al., 1986), and the effects of amalgam fillings (Nasjleti, Castelli et al., 1977). The replanted teeth were usually splinted to adjacent unaffected teeth and few teeth appear to be lost and following a short period of soft foodstuffs, recovery appears to be usually within days.

Implants

Within the search parameters, 9 experiments concerning implants were targeted. These usually included an extraction phase and some form of periodontal surgery (Hashimoto, Akagawa et al., 1988; Johns 1975; Yanagisawa, Sairenji et al., 1977). In some cases the experimenters indicate that the use of monkeys in this kind of study is fraught with difficulties. Restraint or chairing was sometimes necessary to prevent the monkeys reaching the implants and pulling them out. May & Shapiro (1981) report that 4 out of 6 implants may have suffered this fate in their experiment despite these precautions. Johansen & Karlsen (1978) had similar problems with the bridges they constructed on teeth that were high on the bite. Presumably these were also an irritant to the monkeys who were continually managing to pull them off. Lang, Braegger et al. (1993) and Akagawa, Matsumoto et al. (1992) used ligature stimulation to produce an experimental peri-implantitis. These experiments would have entailed extractions to make room, at least one periodontal surgical and placement of the implants in addition to many anaesthetics for at least weekly attention to the ligatures.

Block Sections and Gross Surgery

Biopsies are usually given to mean pieces of tissue just a few millimetres across. Some experiments involved block sections of tissue containing teeth and were considerably bigger than this and others involved sectioning or removal of portions of the jaws of the animals. Allen, Sadowsky et al. (1994) cut through the vital roots of most of the upper teeth and left this to heal. In another experiment Boyne & Fremming (1982) stated: ..premaxilla was removed in its entirety from the floor of the nose, antrum, and the remaining horizontal palatal shelf. p19. This was an extraordinary extra debilitating surgery one-month's prior to sacrifice. From a reading of the paper this tissue could have been delivered after killing and fixation and to inflict surgical recovery in this way appeared unnecessary.

Deficiency states and special diets

Alvares, Altman et al. (1981) and Alvares & Siegel (1981) studied the induction of scorbutic gingivitis in the Macaque monkey. Apart from the mouth gingivae and mucous membranes which may become sore following Vitamin C deficiency, they reported that the animals showed joint mobility limitation and petechial haemorrhaging of the skin and mucous membranes. Worse still, areas that they biopsied showed delayed healing. Johnson & Squier (1985) studied monkeys restricted to an atherogenic diet. The 54 months of the enforced diet may not have been long enough for the monkeys to develop the full range of signs and symptoms of atheromatous diseases, prior to killing.

Drug therapy

Various drugs were tested for their effects on periodontal disease. Bye, Caffesse et al. (1980) tested the effect of antibiotics and anti-bacterial mouthwashes on the progress of periodontal disease. Using the ligature method Offenbacher, Braswell et al. (1987)

tested possible beneficial effects of a non-steroid anti-inflammatory agent and Staple, Reed et al. (1977, 1978) produced a model of gingival hyperplasia to an anti-epileptic drug.

Radiation heat and cold

Jardine, Hussey et al. (1975) describe an experiment testing dosages of radiation many times the recommended human therapeutic dose, and included up to 33 radiotherapy sessions in 6.5 weeks. Milder injury included gingival retraction of the soft tissues. Greater reactions included frank necrosis of the jawbone which led to death. They were sacrificed when death secondary to oral cavity necrosis seemed imminent. Jardine, Hussey et al. 1975 p187. Robertson, Luescher et al. (1978) tested the use of electrosurgery against amalgam fillings: The results suggest that electrosurgical procedures involving cervical metallic restorations contiguous with dentin effect major damage to pulpal and periodontal tissues. Neither coagulation necrosis in the pulp and subsequent formation of a periapical granuloma nor initiation of a similar process in furcation areas with resultant interradicular bone resorption would necessarily lead to postoperative discomfort. Interpretation of minor pain reported might well be masked by prosthetic or periodontal instrumentation of the tooth accomplished at the same time as electrosurgical procedures. (p709). No indication is given of the pain that could have been experienced by the monkeys. Rossmann, Gottlieb et al. 1987 use a CO2 laser to test two dosages of laser radiation on gingival tissues. The animal was irradiated and following this a biopsy taken. The shorter time of 0.2 seconds resulted in damage but with some epithelial coverage. Damage at 0.5 seconds was deeper at the centre of the radiation and epithelium was missing indicating ulceration.

Experimental procedures, surgical and non-surgical

Non-surgical procedures varied in numbers between nil and 250 per experiment, with an average of 24.5 procedures per experiment and include any technique for examination or anaesthetic. However, most experiments in the set of 170 involved at least one surgical procedure (72%). The surgical procedures numbered mostly one, two or three, with an average of 1.9 surgicals per experiment. A smaller number of experiments were far more invasive and the number of surgicals numbered up to 13 in one case. The experiments with very large numbers of surgicals (i.e. over 6) were all conducted prior to 1989. With this exception, the distribution of both non-surgical and surgical procedures in terms of numbers of experimental procedures appears to follow a consistent pattern over time. Working on non-human primates generally entails using an anaesthetic whether a procedure is surgical or not. Reviewing the number of anaesthetics administered per week (average = 1.5) indicates the manipulative intensity experienced by the animals.

Vivisection

> *'Experimental torture is as appropriately the study of the half-enlightened man as sport is the amusement of the half-witted. It is idle to spend a single moment in advocating the rights of the lower animals, if such rights do not include a total and unqualified exception from the awful tortures of vivisection - from the doom of being slowly and mercilessly dismembered, or flayed, or baked alive, or infected with some deadly virus, or subjected to any of the numerous modes of torture inflicted by the Scientific Inquisition.' (Salt, 1892)*

> *'the term 'vivisection' will be consistently used in its original sense, i.e. (partial) dissection of, or surgical intervention on, living animals for the purpose of research. This is distinct from the meaning which the term has widely acquired since the second half of the nineteenth century (partly as a result of its indistinct*

use by medical laymen opposing animal experiments), i.e. all kinds of animal experimentation including the application of chemical agents and physical and the inoculation of micro-organisms, not necessarily implying surgical procedures (Rupke, 1990, p14).

There is clearly a difference of opinion about what "vivisection" is in the two quotations above. For Salt's (1892) purpose it was a suitable term to use to identify all animal experimentation that harmed the animals so used, and from this to campaign against animal experiments. For the purpose of this study I have reverted to Rupke's more restricted definition as it more closely identifies a particularly invasive harm. Here, the term vivisection is defined as "the harm caused by at least one surgical procedure followed by at least one period of recovery". When the results are recast in terms of the volume of animals suffering vivisection, in these series of experiments it was 61%.

Statements About Welfare and Grant Provision

Only three reports of Ethical Committees were made in the 170 papers, and only mention of the welfare of the animals was made in 37 papers. Mention of animal welfare is not directly related to obtaining a national grant. Clearly, most grant recipients do not mention animal welfare, at least in their published reports.

Method of Evaluation

Second Stage - Determining a Harm Index

Following this analysis of harms it was then possible to construct a Harm Index to establish a numerical score for each paper to identify and characterise those papers which describe where the experimental animals are harmed most. The Harm Index (see Table 4.2.5-1) is determined from information given in any part of the scientific paper reviewed. However, scores are based on harms likely to be described in the

methods, results or discussion parts of the paper. An increasing level of experimental impact on the animal is simulated by an increased Harm Index score, which has a maximum of 10. If the animal has to suffer up to two surgical procedures a score of 1 is accumulated; if more than two surgical procedures a score of 2 is given. Additionally if a living animal makes a conscious recovery after the surgery, a further score of 1 is given. Multiple anaesthetics are documented within the series of publications as potential harms - with excessive numbers causing animals to lose weight and die prematurely. The intensity of manipulations is therefore scored. If up to two anaesthetics are given on average per week, a score of 1 is given; if more than two anaesthetics per week a score of 2 is given. If the experiment extends for more than 12 weeks a score of 1 is given. If restraint is used, like chairing, a score of 1 is added. If the animals' life is shortened by killing, a score of 1 is added. If pain is likely to be experienced a score of 1 is added. It is particularly difficult to differentiate degrees of possible pain experience from the literature, whereas a dichotomous score of likelihood of pain experience or not, could be applied fairly easily. If there is a report or evidence of gross injury or morbidity a score of 1 is added. The scoring scheme is entirely arbitrary in content and weighting. It does, however, give expression to practically all the kinds of negative impact on the animals recorded in the published literature study sample. If the index were to be used in a different experimental context, it is likely that additional items should be added or omitted and the weighting altered. For the use by an Ethics Committee, the index could be used retrospectively for both rejected and accepted research protocols to give a calibration cut-off point for acceptability. This follows the suggestions of Obrink (1983) that limits of harm should be legislated. If this is not possible, the index may still prove useful in refining the range or extent of harms recommended by a committee. Most experiments, even with the higher Harm Index, did not include a report indicating the welfare status of the animals. The distribution of

National grant and local grant support appears to follow the same pattern. A small number of studies mention that the animals tolerated the experiments, and follow a similar distribution. Mention of experiments maintaining particular standards of animal care or accreditation from animal husbandry advisory bodies were intermittent and widely distributed in the Harm Index range. Commercial funding supported experiments were also few in numbers and showed a wide distribution in the Harm Index range. In appraising the experiments over the years for trends, it is surprising how many published research papers should be so invasive and harmful to the animals. It is also difficult to evaluate how much harm may impede the health of the animals so that the harm itself describes experimental errors.

Discussion

The average Harm Index score for the sample of 170 published papers was 5.2. This indicates that most experiments involved a great deal of harm inflicted on the animals used in the experiments. Most animals in this research are killed, suffer pain and experience preoperative anaesthetics and surgical recovery and a high intensity of various additional non-surgical interventions. Publications with a high Harm Index reveal cases where: six surgical invasions were made in 42 days which involved wounds created into the PDL below the level of the epithelial attachment (Beavers et al., 1986; Harm Index of 7). May and Shapiro (1981; p553) [Harm Index of 8] reported that "to prevent manipulation of the protruding implants, the monkeys were placed in restraining chairs and fed a soft diet"… but "it was apparent that the animals had removed the three other implants, despite chair restraint". Alvares and Siegel (1981) [Harm Index of 7] showed that in the development of scorbutic gingivitis the experimental animals became unwell and progressively ate less despite the fact that they were fed a nutritionally adequate, synthetically prepared, pelleted control diet. Bergenholtz and Lindhe (1978) [Harm Index of 7] indicated that the method of cross

species preparation of artificial periodontitis caused excessive gross injury with the placement of rubber bands, enough to cause exfoliation of five upper incisors. Lahiffe et al. (1978) [Harm Index of 8] describe how they restrained the monkeys with a plastic collar to stop tearing of sutures and how one monkey died in the night following surgery - possibly connected with the use of sodium pentobarbital.

Combining Harm and Error Indices

Those publications which show high scores for Harm and Error generally represent the most poorly conducted and invasive experiments, where even some authors are quasi apologetic about what they had done. May and Shapiro (1981; p553) reviewing their own experiment, which is a veritable mix of harm and error:

> *"more frequent prophylaxis of the implant and surrounding tissues would also assist in reducing or eliminating inflammation. While it is necessary to anaesthetise the monkeys for prophylaxis for overall health reasons, it was not possible to anaesthetise the monkeys more frequently than once weekly. A better animal model would tolerate more frequent anaesthesia or would allow prophylaxis without anaesthesia. Also it would be desirable to utilise an animal model that can be more effectively restrained. At least three of the six implants were removed by the monkeys themselves even though they were placed under chair restraint. Additional factors may have contributed to implant failure, and this should be considered in future experimentation: root wafer damage during sectioning, biocompatibility of the post cementing medium, and a lack of initial stabilization". (see details of this experiment as a Case Study in the Appendix at the end of this article).*

Other authors appear to demonstrate bravado towards method and animals that defies logic (Boyne and Fremming, 1982; Combined Harm and Error score of 12) inflicting gross resections of tissue from the animals for little apparent reason and failing to use adequate controls (see Case Study 2 in Appendix). Wilhelmsen et al. (1976 Combined Harm and Error Index of 11) described clinical gross injury to the animals where an

area of sequestration of the alveolar process was observed. In addition, a catalogue of errors including inadequate depth of drilling of reference points, failure to gain reproducible measurements and several specimens lost in histology preparation were reported. Levy et al. (1976; Combined Harm and Error Index of 11) reported massive destruction and harm to the animals in a poorly designed uncontrolled experiment where animals were killed late when very debilitated from the induced tissue destruction (see Case Study 3 in Appendix). Ellegaard et al. (1974; Combined Harm and Error Index of 10) showed root surfaces had often been damaged during the production of the bony defects, which could be interpreted as both gross tissue injury (Harm) and error resulting from inaccuracy. Iglhaut et al. (1988; Combined Harm and Error Index of 10) submitted the experimental animals to multiple wounds which were made on a total of 81 teeth in just 4 monkeys. Following this, 24 of the teeth had to be excluded from the histometric analysis due to technical problems.

Discussion

Madden and Caton (1994) advocate the use of laboratory animals to study the aetiology and pathogenesis of periodontitis. They argue that because most periodontal disease results in irreversible destruction of connective tissue and alveolar bone, it is unethical to induce experimental periodontal disease other than gingivitis in humans, whereas this can be recommended in laboratory animals They go on to define specific animal models stating that primates, dogs, and rats provide great versatility for assessing periodontal tissue invasion and damage by suspected pathogens, genetic and immunological factors. They say that when large numbers of animals are required and/or when sacrifice is necessary for histologic purposes, the rat and possibly the dog are models of choice. In these terms the animals are merely material objects. These authors are quite prepared to use any of the animals for any test of damage, but pull back on including primates when mass killing or sectioning is required. Ethical issues

are not alluded to. Their reasoning is more a practical issue of cost and difficulty of primate handling. The approach is similar to the response given by Hunter, one of the earliest dental researchers, who, when asked for an opinion said "I think your solution is just: but why think? Why not try the experiment?" (Festing, 1989; p53). Current pressures are more on researchers to unthinkingly publish rather than to unthinkingly experiment, but one could lead to the other. There is certainly a case for careful evaluation of research by others than the researchers themselves who may be working too close to their narrow field of activity. They may be unable to place their work in context unless they take on board wider issues and then become evaluators themselves. Once the decision has been made to experiment on animals it is certain that there is no simple way to ensure optimal care of the animals and reach optimal experimental finding without error. Husbandry may affect the process greatly. Journals reporting the experimentation rarely give details but most animals appear to be kept in isolation in nothing much more than the individual travelling cage in which they first appeared at the research centre. However, as Segal (1989) mentions animals housed in groups have the benefit of dynamic social partners, but they also face the hazards and stresses of dominance hierarchies. Sometimes journal articles appear to contain conflicting statements. For instance, in one part of a paper by Guyman et al. (1980) they state that in their experiment "All three animals were in general good health throughout the experimental period, with consistent increases in weight. The appliances were well tolerated, with no apparent discomfort (p490). Yet, three pages away they state that "The animals were kept in restraining chairs during the experimental phase to prevent removal or manipulation of appliances and were maintained on a diet of enriched milk, fresh fruit and water (p487). It is difficult to reconcile these statements. It would appear that the animals could not, in fact, tolerate the appliances so were kept in restraining chairs, where it would be difficult to express

any discomfort they might have. It is therefore likely that they would gain weight because they were unable to take any exercise. Weight gain, in this instance, would be no indicator of health. Sometimes it is difficult to differentiate what might be more harmful. For instance, Clark et al. (1988) say that animals in groups I and II were restrained by hand, and their mouths were held open with a wooden stick. In groups III and IV animals were sedated with Ketamine (30 mg/kg body weight). Madden and Caton (1994) whilst advocating the use of non-human primates in periodontal research admit that restraints and sedation are usually required to perform procedures safely, and present a limitation in the primate model. However, they relate that a pole and collar system for training non-human primates was being tested in a dental centre in the United States that could prove to be a useful alternative to sedation for oral hygiene and other non-painful procedures. The element of circus comes into play here. It appears that the experiments and what is required of the animals to conform and perform is increasing in a similar way to increasing human pressures in the workplace to be a more efficient employee. The interest is to be more materially accountable - certainly it has little to do with ethical accountability. It appears that Madden and Caton (1994) are hoping for optimum animal behavioural performance or compliance, looking on the animal as only an object. This is instead of the holistic ethical view, which sees some obligation to an other. They are not interested in Welfare of the animal, which appears to attempt to see the situation from the animal's point of view, and to react to this. If these experimenters were really interested in the animals they would not be experimenting on them in the way that they are.

Cruelty, Suffering or Harm?

When considering the ethics of the use of animals in these experiments is cruelty, acting humanely or animal suffering or harm the primary issue? Early reformers of animal experiments Russell and Birch (1959) realised at the start that many animal

experiments caused suffering that exceeded that a normal lay person would be allowed to perform morally and legally. They understood that the experiments were generally not what they considered humane, so that they advocated a formula which has become known as the three Rs. Wherever possible experiments should be refined and the animals chosen should be reduced in number or replaced with a more humane alternative. This has been gladly accepted by the experimental fraternity who see this as a way of retaining their rights to experiment. The recommended incremental moves towards a more humane approach are unfortunately generally unquantifiable as experimentation is usually conducted in separate short-term projects that are not necessarily closely related and comparable. Essentially, animal experimentation is inhumane and the incremental shavings off of inhumanity does nothing to alter the status quo and continued establishment of animal research facilities which can polish their reputations through advocating the 3Rs. From the philosophy literature there are many authors who, without analysing animal experiments in the kind of detail here find them unacceptable from a variety of points of view including libertarian utilitarian, rights and virtue (Singer, 1976; Regan, 1984; Clark, 1997). However, Carruthers (1992) and Leahy (1991) are notable authors for their anti-animal liberation position. They make generalisations about experimental animals such as the vast majority of these creatures will enjoy a well fed, decently housed, and sometimes even pampered existence, prior to a painless death. (Leahy, 1991; p225) This does not describe the series of experiments studied here, which are invasive and too often fraught with errors that can also impact adversely on the animals. As misguided, Leahy (1991, p190) also goes on to say that "And it has yet to be established that the painless killing of animals in medical experiments or for food involves suffering." So if the inner feelings of animals and even other humans are ever in question it may be better in ethical discussions to consider harm, which can be a objective event such as death, or

manipulations, rather than trying to interpret suffering experienced by the animal. Equally, it may be better to avoid considerations of cruelty, which would concentrate on the motivations of the experimenters. As Carruthers (1992) states it would be difficult to criticise the qualities of character of experimenters and animal suppliers who may have a prime motive to retain the profitability and competitiveness of their business, which is certainly not trivial. As an alternative, harm inflicted on animals, despite some difficulties of interpretations, can be elicited from various sources including the write-ups of the experimenters in journal articles. Dresser (1988, p138) brings out the point that if the experiments are to continue "The most controversial question for the moderate reformers is the extent to which an alleged scientific need will be permitted to override an experimental animal's interests in avoiding negative and obtaining positive experiences. An undoubtedly fertile source of future conflict will concern the placement of absolute limits on the harm that can be inflicted on laboratory animals." The Harm Index combined with the Error Index (3.2.2.and 4.2.5) are offered as a means to engage with this very topic of implementing absolute limits of harm that can be allowed to be inflicted. This approach encourages experimenters to develop protocols that have a reduced accumulation of harm to their animal charges and as a tool for research committees to evaluate and reject excessively invasive experiments. However, the case for non-human primates to be used in experiments presents a fundamental paradox, as Girling (1989) explains the case for qualification and disqualification are exactly the same. He says that "it is the primate's physiological closeness to Homo sapiens that makes it the most scientifically suitable stand-in for man in the laboratory; and it is the very same human resemblance that makes the sight of it so appalling." The RSPCA view is that "It is virtually impossible to create an environment that would satisfy both the needs of the research project and the needs of the primate so that as a result, the needs of the primate are those that are compromised." Do those who still

advocate primate experiments represent a modern mainstream view or are they hanging on to the tail end of an aristocratic world-view that has been largely eroded elsewhere. Madden et al. (1994) quoted at the start of this article puts humans clearly as the 'better class' in a hierarchy. They appear to assume that they are entitled to treat those of inferior status as resources for the preservation and enhancement of our "superior way of life". Sapontzis (1988) goes on to explain this position of privilege eruditely in the context of contemporary ethics: "Of course, we ought to be humane in our use of inferiors - noblesse oblige - but this humane obligation remains secondary to and circumscribed by the presumption and exercise of aristocratic privilege. For example, our traditional, humane ethic prohibits randomly tormenting animals but is overruled when it comes to performing painful and lethal experiments on animals ....if those experiments could benefit us. Such aristocratic world-views have been the target of what we commonly consider moral progress. Our rejection of slavery, feudalism, aristocracies of birth, sexual and racial exploitation, etc., all have in common the discrediting of supposed "natural hierarchies" in favour of a presumption of equal consideration for all. Consequently, it is not inappropriate to see contemporary animal research practices as vestiges of feudal mentality on the contemporary scene and as prime candidates for rejection as the next step forward in our moral progress". Jamieson (1985, p8) proffers his "moderate view" where it is thought wrong to experiment on animals generally without thinking that it is always wrong. He is not always willing to split the difference but to stipulate stringent conditions to allow the exceptions. In some ways this is the position taken earlier in the discussion where the use of the Harm Index is advocated to monitor and prevent the worst invasive experiments. However, the problem with a moderate view is that the degree of moderation is always open to interpretation continually as to how moderate the position is. Whilst there is a cultural knowledge prerogative which still always tends to value

intelligence as more humanly significant than virtue (Roberts, 1974; p115) it is particularly pertinent to further the dialogue between disciplines and cultures. There appears to be a need for expertise in the disciplines that can also be held accountable in society. Medawar (1972, p86), also an advocate of science, was comfortable with the essential nature of experimentation. But, at the time, stated that "We must grapple with the paradox that nothing but research on animals will provide us with the knowledge that will make it possible for us one day, to dispense with the use of them altogether". Can we now dare ask "Has that time come now?" What if experiments are restricted? Jamieson (1985, p7) considering this says that restricting the use of animals in science would not necessarily result in less freedom of inquiry. In fact, it would stimulate new and alternative activities redirecting resources away from entrenched institutions which would otherwise continue repetitive research that was found acceptable and can be easily funded. It is not is if there are no other restrictions on researcher freedoms over gaining knowledge. Research on unconsenting prisoners, unwanted children, or unloved old people is not allowed. In addition, much research in the contrived conditions of an animal experiment has been criticised. Reines (1991 p203) notes that ....the dramatic impact of laboratory experiments derives not only from the visually arresting character of animal and in vitro studies but also the faith in their results. The notorious variability of the results of such studies ensures that virtually any clinical hypothesis can be dramatised with an appropriate choice of species, strain, and experimental protocol. In addition, Sharpe (1985, p8) makes the point that society's control of the infectious diseases rests primarily on efficient public health services and a reasonable standard of living. Since medical measures clearly played only a relatively minor role in increasing life expectancy, it follows that animal experiments must also have played a very small part, even on the unlikely assumption that animals were involved in developing all such medical measures. As for periodontal diseases,

these are largely preventable being caused almost entirely by poor cleaning and oral hygiene practices in susceptible individuals, and when it has not progressed too far, is largely treatable with current simple therapeutic measures. It is interesting that practically none of the 170 experimental papers produce an outcome which could supply a convincing justification that would constitute a "necessity" for research. Most of the papers, especially those with multiple errors seem to be rights of passage, to produce a research career profile. The most cited involve theoretical underpinning of tissue types in periodontal healing, but when it comes to evidence based decisions and manufacturer demonstration of their products, human studies are used with the full range of ethical issues of confidentiality and consent.

Conclusion

This study brings to light a large variety of harms inflicted on non-human primates as experimental animals used in Periodontal research including injections, inoculations, scaling, ligatures, surgery and biopsy, tooth modification, replanting and implanting, deficiency diets, drug therapy, radiation, heat and cold. The use of a Harm Index to identify the intensity of harm that was inflicted, reveals that is surprisingly high in this sample set of experiments. Most animals were killed, suffered pain before death, preoperative anaesthetics, recovery following surgery and a high level of various additional non-surgical manipulations. Claims for the "necessity" of such experiments are not available from the published journals themselves, so that justification for the continuation of these experiments remains in question. This study questions the view that periodontal research necessitates harming non-human primates.

Table 4.2.5-1 Harm Index Item

Item	If value is	Score
Surgicals	>2	2
	<2	1
Intensity of Manipulations	>2 anaesthetics per week	2
	>2 anaesthetics per week	1
Duration of experiment	>12 weeks	1
Restraint		1
Gross injury or morbidity		1
Killing		1
Pain		1
Recovery from trauma		1

score of 0 given if no harm inflicted maximum score possible of 10

Appendix Case Studies of Harm and Error

Case Study 1

May,FB; Shapiro,PA (1981): A method of obtaining an epithelial attachment on an endosseous implant. J. Prosthetic Dentistry 45, 550-557.

Abstract

An attempt was made to obtain a soft-tissue seal around the neck of an endosseous implant using a section of root from another tooth in the oral cavity. Six implants were placed bilaterally in the mandibular first molar regions of three monkeys. Four of the six implants were lost during the experimental period. In at least three of the four situations, it was apparent that the animals had removed the implants despite chair restraint. On the basis of clinical evaluation of all implants and histologic examination of the two remaining implants, it was concluded that an epithelial attachment was not present. The absence of an attachment may have been caused by chronic inflammation around the implant wafer. While an epithelial attachment could not be demonstrated in this experiment, it is felt that the rationale for this research project remains valid. Several potential improvements in methodology are suggested.

Commentary

Three M. nemestrina monkeys were used. Extractions of first molars and second premolars were conducted six weeks prior to implant insertion, to create implant sites. Two stage implants were used. Firstly a Bioglass implant was embedded bilaterally in the mandible. At the second stage nine weeks later, the implant was exposed and a Vitallium post placed at second stage 9 weeks later. A wafer of tooth made from an extracted tooth was cemented with composite to the vitallium post and cemented to the bioglass implant orifice, to act as a trans-mucosal interface. A cast crown was then

cemented to the post and the monkeys were placed in restraining chairs and given a soft diet. Following a weekly examination and prophylaxis for 10 weeks the animals were "put to death" [p552], except for animal C, since both implants were found missing [p554]. The implants were in effect all rejected by the host tissues, showing a lack of even an epithelial attachment.

Animal Appraisal

Three adult M nemestrina monkeys were firstly subjected to extraction of lower first molars and second premolars six weeks before the implant surgery. The first part involved the raising of a flap and placement of the Bioglass coated implant, sutures and their removal after a week or so. The second part included the uncovering of the Bioglass implant face, and the insertion of the post with the root interface and the crown. All surgery was accompanied by an injection of Penicillin, and the monkeys were placed in restraining chairs and fed a soft diet, to prevent manipulation of the protruding implants. It was apparent that the animals had removed the three other implants, despite chair restraint. (p553). It seems that a number of the implants became mobile and were sufficiently irritating for the monkeys to find some way of removing them even though they were kept restrained in a chair. Oral prophylaxis was only carried out once weekly, the limit of the frequency of anaesthetics they say they were willing to give the monkeys to keep them healthy. The histology of the implant sockets reveals areas of gross inflammation. It is likely that the animals found the inflamed areas uncomfortable or painful. Animal C had found some way of removing both implants, which saved its life at this time, since no histology could be prepared. The need for the use of primates is still open to debate. Elements of biocompatibility could be reached through in-vitro studies as a baseline. Despite the large number of errors identified in this experiment it received some peer examination through a Public Health Service grant through the University of Washington Orthodontic Memorial Fund.

Conclusion

This is one of the most outrageous experiments to be published. The experimental work only entailed six implants in just three monkeys. Four out of six implants were lost in a short time from the experiment, leaving two that were on the way to being rejected. The fragments of dead tooth to be used as the transmucosal segment were not attached to epithelium but were resorbed as in delayed replanting of teeth described in the literature. This experiment is placed in the five experiments with the most errors and in the five with the most harm.

Case Study 2

Boyne,PJ; Fremming,BD (1982): Periodontal pocket elimination using durapatite ceramic implant. Alpha. Omegan. 75(3), 17-22.

Abstract

A hydroxylapite material [Durapatite "periograf"] having well defined properties and characteristics has been studied in both dog femur intramedullary cavity sites and in a dog femoral subperiosteal Millipore chamber model. While it is recognized that the periodontal lesion is difficult to produce in an experimental animal model it was felt necessary nevertheless, to evaluate the use of the hydroxylapatite ceramic material in a finely divided particulate form in simulated surgically produced infrabony defects of fully matured adult Rhesus monkeys. The purpose of this study therefore was to evaluate the histopathologic host response to the ceramic implantation of infrabony surgically created periodontal defects, and to characterize the interface between the soft and calcified tissue of the host and the ceramic implant particles. It was not the intent of this work to attempt an extrapolation of the results to the treatment of the infrabony periodontal lesion resulting from either periodontitis or periodontosis, but rather to study the response of the recipient periodontal tissues in a surgically created

defect to the subject implant material. The control defects described in this study therefore are not to be taken as representing baseline levels of osseous repair of pathologic periodontal lesions from which either acceleration or deceleration of bony regeneration could be measured in respect to the experimental ceramic implantation.

Commentary

A periodontal flap was raised in the upper anterior region and a defect created in the bone between the lateral and canine teeth. A small amalgam filling was placed at the level of the crown / root interface as a reference and the right side was used for the implanted experimental material and the left for the unimplanted control. Two different particle sizes were used in the experiment. After 18 weeks the animals were given tetracycline to act as an osseous label, and two weeks later an excision biopsy was carried out, which included the whole premaxilla that was removed in its entirety. Measurements taken again on the biopsy showed that the vertical defect had filled on experimental and control sites to about half of the defect, and histology showed that the implanted material had been tolerated well by the surrounding tissues.

Animal Appraisal

Twelve rhesus monkeys were subject to periodontal surgery with bone removal and on the right side implantation with a hard tissue graft material. Flaps were sutured and removed ten days later. Penicillin was prescribed over this healing period and on the eighteenth week the animals were given Tetracycline, but this antibiotic was used in this case as a bone marker. Antibiotic cover is common practice for periodontal surgery involving placement of graft materials. No mention was made of the health of the tissues prior to experimentation, but it is reported that all mucoperiosteal flaps healed without incident. The antibiotic therapies may have helped. Instead of a re-entry procedure to measure the bony defect following treatment using the same measuring

methods as used at the creation of the bony defects and implant placement, an extraordinary surgical procedure was carried out at 20 weeks to deliver a very large biopsy specimen resulting in gross injury. In this unnecessary surgical phase the front teeth, underlying bone and surrounding tissues were removed. This extraordinary debilitating surgery was carried out one month prior to killing the animals. This tissue could have been delivered after killing and fixation, and seems a pointless exercise.

Measurements

Measurement in the first surgery is clearly from amalgam marker to base of surgically created bony defect, clinically determined. However, for the second measurement, from the above statement it is unclear to what level or degree of hard tissue the measurement was made to. Measurement was after the removal of the premaxilla and after fixation, so that the measurements were not directly comparable with those previously conducted.

Conclusion

An unnecessarily invasive experiment to test a periodontal graft material for tissue compatibility. The need for the use of primates is not established. Periodontal disease was not fully simulated in this case and both test and control areas showed similar healing responses

Case Study 3

Levy BM, Robertson PB, et al. Adjuvant induced destructive periodontitis in non-human primates: A comparative study. Journal of Periodontal Research 1976; 11: 54-60.

This experiment is very much like Dowden, Emmings et al. (1983) that represents a genre of experiments in which animals are injured in a slightly different way from that carried out before, to see what happens. It is doubtful if the method has any utility

Commentary

Pairs of monkeys were sensitised with Complete Freund's adjuvant (CFA) and following a positive skin test were injected in upper and lower jaws again with CFA on the right hand side and control incomplete adjuvant (IFA) on the left to act as controls. After one month the animals were killed. Destructive lesions were found in all animals in response to CFA, however, more structured tubercles and evidence of bone deposition as well as destruction occurred in the rhesus monkey. The IFA induced lesions without bone loss. None of the lesions mimic human periodontal disease.

Animal Appraisal

The animals were subjected to multiple initial sensitising inoculations in nuchal axillary and groin regions, and the rhesus monkeys additionally at five abdominal sites. The intragingival injections caused gross lesions in the marmoset which included destruction of jaws and teeth, showing histologically occasional spicules of dead bone and granulomas containing microabscesses, the capuchins showed an acute vasculitis as well as areas of microabscesses. The rhesus monkeys showed well-formed tubercles especially forming around venules, areas of acute vasculitis and new bone formation around these lesions. Such dramatic destruction in just thirty days could have caused pain, as tissues were invaded, and loss of some function of the teeth as the jaws and teeth were replaced with inflammatory tissue. Ectopic new bone formation could also cause pain and discomfort if mineralised tissue were to create pressure spots. No mention of these possibilities is raised in the paper or any issues of animal welfare. There was a questionable need for primate use in this experiment. The

anatomy of structures was not relevant in this experiment. The comparisons between the various primate species may not be relevant either. It may have been that response by each primate was different in the small numbers of animals used, a factor of animal body weight to material injected, and the time given to produce lesions.

Figure 4.2.5-1 Experimentation on the living and the dead

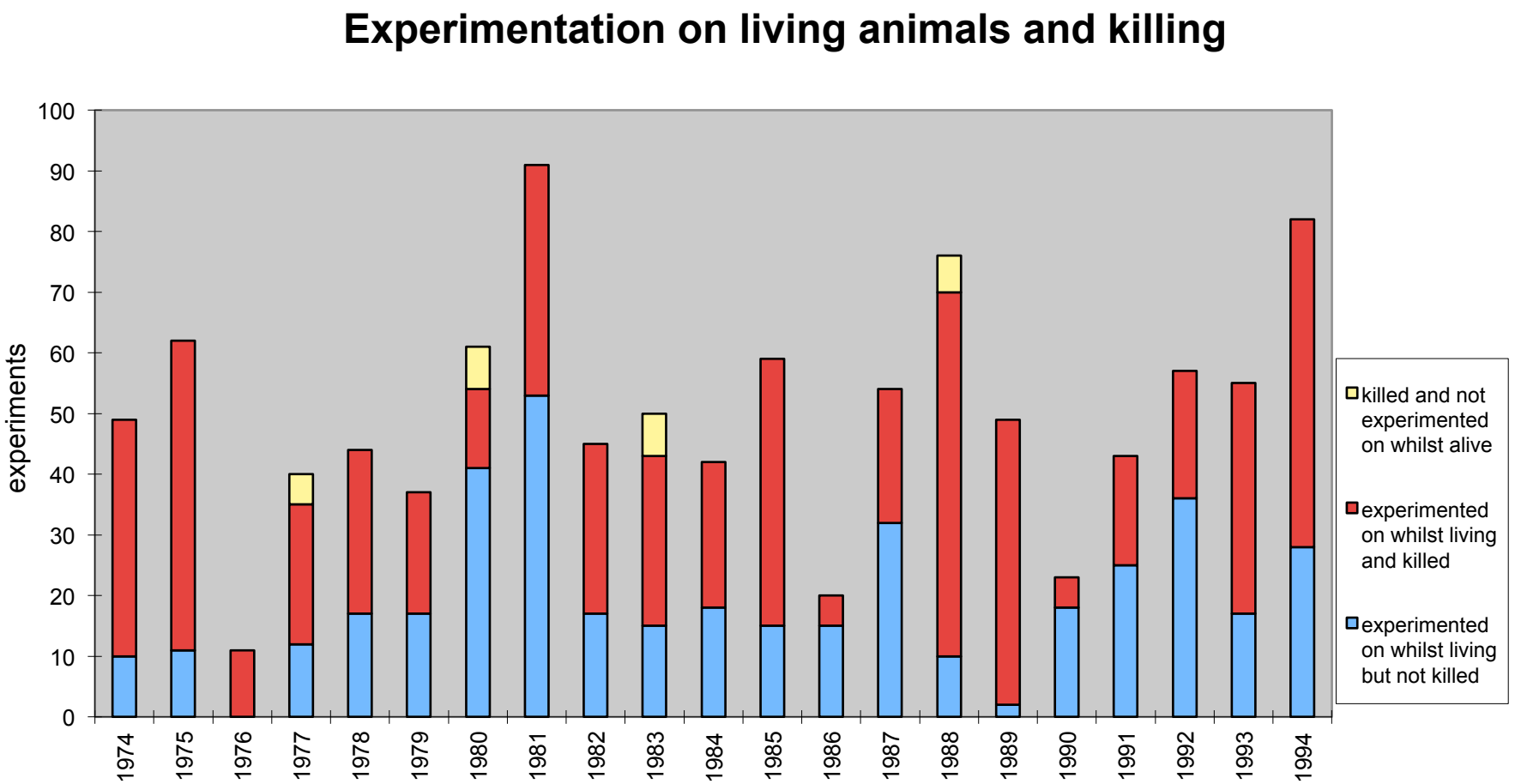
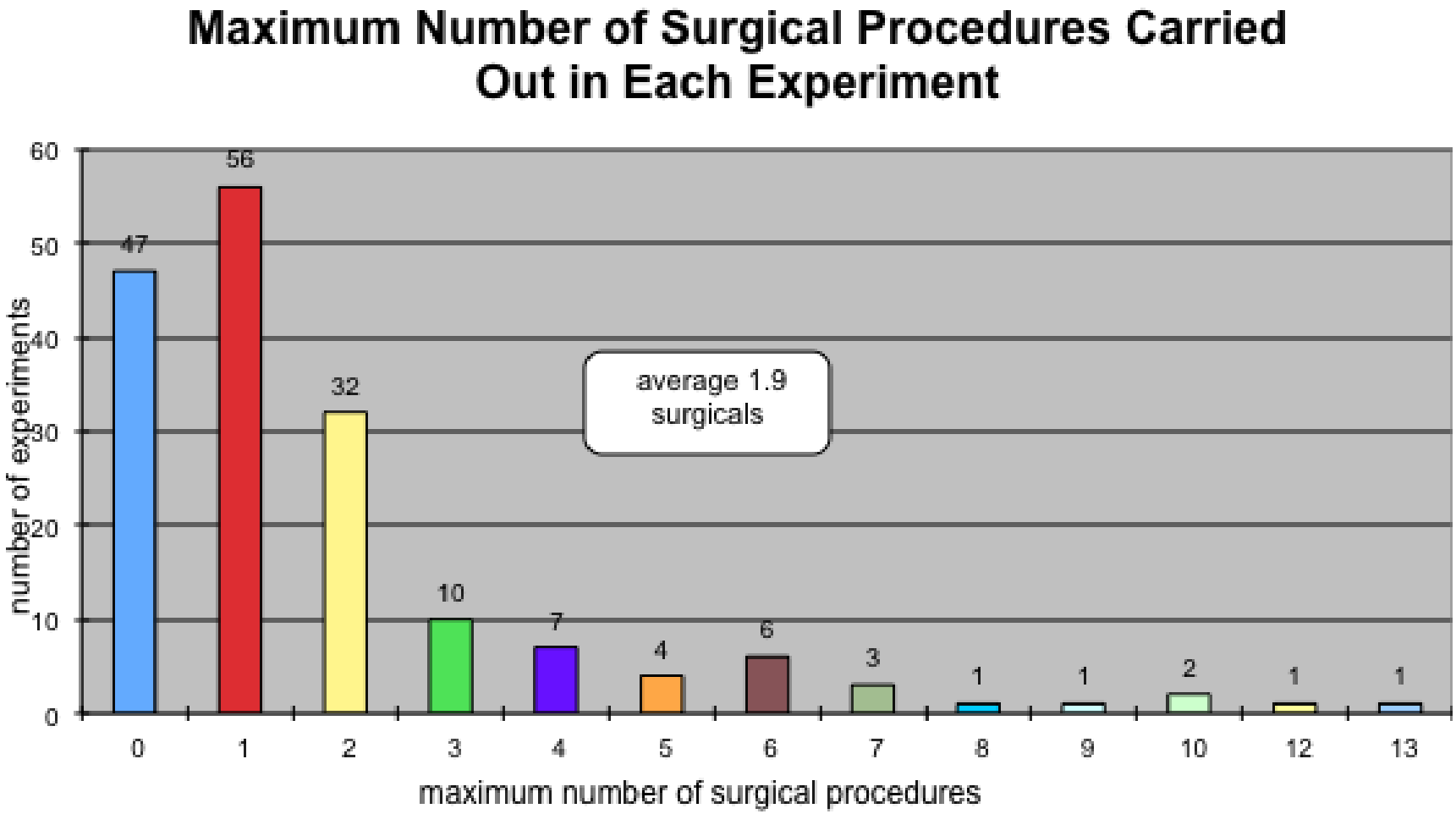


Figure 4.2.5-2 Numbers of surgicals



4.2.6 Sweet J. (2006) "Research-led: identity lost or found". Presentation given at First International iPED Conference, Coventry University.

I would like to start by asking two naive questions and returning two naive answers.

What do we mean by pedagogic research?

Pedagogic research is research into the study of the theory and practice of teaching, so that pedagogic research or the results or evidence it brings can provide a lead for teaching practice. This could also be called research led teaching.

But this is not how the term "research led teaching" is currently being used in Higher Education.

What do we mean by academic identities?

Academic is "that relating to education and scholarship" and identity is "the fact of being who or what a person or thing is" (Mac OSX dictionary). So a person's academic identity is in effect who he or she is in the educational or research setting.

If we go back to Jung (1971) he denotes identity as an unconscious conformity. He goes on to say that "it is always an unconscious phenomenon since a conscious conformity would necessarily involve a consciousness of two dissimilar things, and, consequently, a separation of subject and object, in which case the identity would already have been abolished"... "Identity is responsible for the naive assumption that the psychology of one man is like that of another, that the same motives occur everywhere, that what is agreeable to me must obviously be pleasurable for others, that what I find immoral must also be immoral for them, and so on, It is also

responsible for the almost universal desire to correct in others what most needs correcting in oneself".

Jung denotes identification more harshly as "an alienation of the subject from himself for the sake of the object, in which he is, so to speak, disguised". But he goes on to say that it is a normal situation that can fit a person well for a time: "so long as the individual cannot go his own way". Then of course it presents problems, as the individual does not know how to act for himself - to continue Jung's male example of an individual. Interesting, Jung continues that:

"Identification always has a purpose, namely, to obtain an advantage, to push aside an obstacle, or to solve a task"

But this is not quite how the term "academic identity" or "academic identities" is currently being used in Higher Education literature.

Merriam and Cafferella (1999) in a chapter on sociocultural and integrative perspectives on development use the term socially constructed notions of race and ethnicity gender and sexual orientation as they relate to adult development, which are issues that have been used to discriminate and marginalise members of society. Largely to counter this, series of "identity" development theories have been put forward, which have resulted in the term identity or identities being framed by a particular section of society, and at the same time to add the opportunity to value "the other"; to learn from anyone who is seen to be different from ourselves. Merriam and Cafferella (1999) quote Chávez and Guido-DiBrito et al. (1996) as providing a model of development for gaining greater access to "the other". They point out a developmental process of learning to value from a sense of unawareness, to awareness, to questioning/self-exploration, to risk-taking/other exploration and finally, integration, when the individual has become multicultural.

However, academic identity is still used in a more traditional sense by Brennan and Jary (2004) to mean an intimate link to professional identities and even the disciplinary tribes described by Becher (1989). Kolb (1984) also showed that as professions become more established they become more specialised, rigid, and bureaucratic, so that the academic identity of those within them become more narrow and this presents difficulties to staff in developing their career, as they find it hard to adapt to new requirements of acting and thinking. However, Barnett (2000), determined to see Higher Education as an overview, sees the university "a site of rival warring parties" and "only attachment to temporary projects within it" (p105 and p115). Academics, he declares, show a "collective blindness about the university as such" (p106). Also Barnett says that "the ability to recognise individuals as of a certain kind is passing rapidly: individuals themselves present multiple identities. Boundaries, rules and community: all are fuzzy and on the move".

An alternative position to this uncomfortable one of multiple identities is described by Brew where she says that central to her understanding of personal identity, as an academic is a capacity to critique the academic habitus. Bourdieu's neologism seems to settle matters a little by keeping a single personal identity whilst dealing with multiple events and different genres of thinking and feeling, and has been summed up by Engeström and Miettinen R, et al., (1999) as "the system of durable dispositions through which people organise their practices and representations" (p121).

However there has been a call for more critical practices such as autonomy rather than identity (Usher, Bryant, et al., 1997), where they suggest that it is through changing contexts, rather than adapting to them, that autonomy is ultimately to be found. And also Elton (2001) states that the critical aim should be at changing the system, rather than fitting people into it. Usher, Bryant, et al., (1997) also warn about a possible antagonism between individual identity and group critique and the uses and abuses of

critical pedagogy. Whilst ostensibly opposing 'regimes of truth' it can itself become one itself, the difference being between "pedagogy which is argued" and hence liberatory and transformative, as opposed to a "pedagogy of argument" which can prove totalising and regulative.

And what of the issues of identity and scholarship?

Kreber (2005) proposes that scholarship can take account of the marginalised, espouse various forms of knowledge and choice of content. Aligned to the widely perceived need for lifelong learning, she has suggested that scholarship of teaching promotes three significant educational goals, which are: self-management (the capacity to engage in continuous adaptive learning), personal autonomy (critical thinking capacity and intellectual development) and social responsibility (moral development). Although she talks of the altruistic role of scholarship, the educational goals she mentions are primarily individually based and not entirely linked with community. There seems to be a greater emphasis on personal autonomy -- and with this there is an underlying worry, that with the high-stakes required, scholarship of learning and teaching is elitist -- who has the identity membership card? However, the advantage of this lifelong learning approach appears to me to be that, with these recommendations, teacher researchers themselves have to engage in lifelong learning, and in that sense, are students of lifelong learning: modelling the process for their own students. Wenger and McDermott R, et al. (2002) are willing to provide a home for identity within a community of practice: "Projects come and go. Teams are assembled and dispersed. Given such flux in the formal organisation, communities of practice offer an underlying layer of stability. They provide a welcome "home for identity" where practitioners can connect across organisational and geographic boundaries and focus on professional development rather than merely the application of expertise to meet a specific goal (p21)." However, the "identity" of the person they are inviting may have to be changed

to conform to their perception! Wenger (1998) defines "identity" as "an experience that involves participation and reification" (p163) and that "learning is an experience of identity" (p215). This entails both a process and a place, and is quite different from the Jungian classification as an "unconscious" entity. Although, Wenger (1998) says that our identities form trajectories, he backs away from "straightforward experience" by suggesting "the term trajectory suggests not a path that can be foreseen or charted but a continuous motion -- one that has a momentum of its own in addition to a field of influences" (p 154). Wenger's identity within the group and that of belonging becomes quite complex, described in terms of engagement, imagination and alignment. This increases further in complexity as he goes on to say that: "Our membership of any community of practice is only a part of our identity... some are parents; some are churchgoers; some are bar-goers; some have engrossing hobbies" [although unfortunately these are not detailed]. An identity is thus more than just a single trajectory; instead, it should be viewed as the nexus of multi memberships (p158-9). Just as Wenger (1998) is beginning to 'identify' what identity is, it appears to slip away into something or nothing: "...in the nexus, multiple trajectories become part of each other, whether they clash or reinforce each other. They are, at the same time, one and multiple" (p 159). There is an admission that there is a need for integration -- Wenger calls it reconciliation. It requires the construction of an identity that can include these different meanings and forms of participation into one nexus. A further approach to the nexus would be to attempt a form of integration, but this assumes that we believe that the different trajectories are from different paradigms, and that the one cannot be expressed in the other, for if we follow Kolb's thinking: "The transcendent quality of integrative consciousness is precisely that, a "climbing out of" the specialised adaptive orientations of our worldly social roles. With that escape comes the flood of contradictions and paradoxes that interpretative consciousness serves to stifle..." and

he goes on to say that this process is "...a necessary ingredient for creativity in any field" (Kolb, 1984; p158).

Kolb takes things further: "Appreciative apprehension and critical comprehension are thus fundamentally different processes of knowing. Appreciation of immediate experience is an act of attention, valuing and affirmation, whereas critical comprehension of symbols based on objectivity, dispassionate analysis, and scepticism.... knowledge and truth result not from the pre-eminence of one of these knowing modes over the other but from the intense coequal confrontation of both modes" (Kolb, 1984; p105). Perhaps Kennedy (1990) gets closer to an understanding and overall appreciation of the negotiation between individual and social ideologies as an enculturating process. He uses the metaphor of the cocoon - and sees the situation from the perspectives of breakthrough, forces and status-quo, when he resorts to and works with imagery very much like that of Kolb.

The concept of communities of practice may not, on their own, provide a sufficiently robust conceptual environment for the multiple contexts in Higher Education. As Engeström and Engeström et al. (1995) quoted by Leander (2002) explains: "Within complex work practices, experts are not only engaged in simultaneous tasks, they also "operate in and move between parallel activity contexts, contexts which "demand and afford different, complementary but also conflicting cognitive tools, rules, and patterns of social interaction" (Engeström et al., 1995, p. 320).

One way to gain a greater understanding of processes and contents within these complex situations has been the use of the idea of spaces. Spaces can be used to trace how people act, engage symbolically and think and co-ordinate all their activities. Spaces can be used to understand how activities embedded within social practice could enable productions of identity (Leander, 2002). However, one of the most sensitive and illuminating papers to use this metaphor was a study of migrant teachers

entering Australian schools. Instead of a traditional consideration of schools as containers shaping the identities of teachers by practices and relationships held within, a consideration of multiple shapes of identity as they become transformed was modelled. The essential attributes of identity in such a professional community become self-awareness, critical reflection, personal development, effective communication, co-operation and willingness to enrich the community (Kostogriz and Peeler, 2005). They used an ecological model of a professional community that makes diversity a resource of different professional practices; to enrich all teachers in the community, rather pinpoint diversity as a problem. The major characteristics displayed were the open shapes ready to assimilate "otherness" and acceptance of both recognition and inclusion of differences and examination of similarities, which could appropriately engage different teachers. Most important of all was the sense that professional identities remained "incomplete" and open to development - perhaps the identities that work best are the ones that remain unconscious.

However, it is with the problems that the migrant teachers experienced entering new schools, perceived as closed systems that are also instructive. The authors perceived three devices, used by traditionally aligned schools, to deal with the migrant teachers. The first was what they named the ‘filter’ model based on a selective process in which “the community attracts those prospective members who fit with its philosophy of practice and repels those who do not”. The second, the ‘funnel’ model of professional community maintenance “involves an initial diversity of community members”. But later, those newcomers who do not fit into the communal philosophy of workplace become marginalised (silenced) or forced to leave. And finally the ‘linear’ model of community maintenance is based on a process of homogenisation and involves progressive assimilatory strategies in dealing with difference. Within such a community of teachers, there is a strong sense of professional developmental trajectory – the proper way of

doing things. Still the direction has been chosen and the power base of those in charge maintained.

It is interesting that these methods fall by the inappropriate use of difference and sameness. The logic of comparison to gain resolution of a new issue or difficulty may not be as straightforward or as rewarding as it seems at first sight. Gergen and Gergen (1997) warn that there are dangers interpreting only two possible stories that tell us: "either that we differ from other people, or that underneath the apparent differences we are all the same. There are both enriching and impoverishing outcomes attendant on both stories. The story of differences can act as a deterrent against dangerous tendencies to universalise the presumptions of one's home culture; yet, simultaneously it functions as an alienating device (exoticizing the other). The story of sameness functions in just the reverse: it overcomes tendencies toward alienation ("after all we are one"), but simultaneously arrogates the parochial to the level of the universal."

In the filter model, where there was a strong expression of difference, anyone seen as not following predetermined codes of practice could be summarily excluded. But excessive emphasis on difference could exclude on the basis of differences that are not relevant and can exoticise - or blow out of all proportion a particular irrelevant difference. The funnel model is most likely that of the opposite. A judgement of sameness of practices and behaviour is falsely made at the start. The basis of the inclusion is minor, "arrogating the parochial" leaving other differences to come to the fore which were ignored and not faced at the start. The linear case is similar in that the predetermined progression of change is designed to suit those incumbents so that there are no provisions to cope and adapt to "real" differences.

What identities are perceptible in Higher Education in the two major camps of research and teaching?

Brew (2000) studied 24 researchers from representative universities in Australia and using phenomenographic methods determined four perceptions of research: a domino variation where the research was geared towards answering separate questions or issues; a trading variation where research was perceived to involve production of publications, and obtain grants; a layering variation where the prime purpose of research was to eliminate darkness and finally the research journey variation that was primarily personally transformative. Identity with the journey variation is perhaps the most straightforward. Alignment will be with concepts of the life-course development (Bee, 1996 and Progoff, 1992). The person will identify and encourage an open approach to identity, which will change over time with different emphases during the person's lifetime and career. The other research variations are more difficult to decipher until you read more from Brew (2000). Here she explains that research was generally not characterised by reflexivity - researchers tended to leave out discussion about research itself - research led research! Also, except for the journey variation, knowing themselves was not considered part of the agenda. Also, the research side is quite willing to be dominant over teaching and rob the term "research led teaching" defined as a curriculum, structured around teaching subject content (Griffiths, 2004; Healey, 2005). I would propose that there is no issue of identity here at all. What is present is identification with the object of research, "with the alienation of the subject from himself for the sake of the object, in which he is, so to speak, disguised" (Jung, 1971). This, as Jung says, is perfectly normal and fine until the individual wants to go his own way. Research is a particularly brittle and rigid identification as it does not entail an emulation of another person but that of a worldly activity that does not sit easily with aspects of the inner issues which requires individual personal attention. The obsession with outcomes is identified with an objective view of research success. Research is, after all, not a classic profession in that it does not serve individual clients

and in these circumstances, ethical issues and teaching issues are practically impossible to deal with, unless they can be seen within a rational dominated world and identification is maintained with research.

Identity for teachers may be quite different.

Teachers in higher education would have an identity commensurate with their perceptions of teaching. Rather than a bipolar classification of teacher and student centeredness, I have taken Pratt's (1998) more substantial descriptions of teachers' perceptions of teaching in Higher Education. These are described in terms of three major components; the teacher, the students and the discipline content. Depending upon the context and orientation of the components a possible five perceptions are produced with their accompanying identities. A prevalent concept is that of transmission mode where the teacher is closely involved with discipline knowledge and concentrates on conveying content to the students and would be identified as a "fount of knowledge" filling empty vessels. Continuing a close relationship between themselves and subject content teachers can hold an apprenticeship perception of teaching where they model the discipline for the student to copy. The practitioner teacher identifies himself as expert, at the very centre of the discipline, (Bruffee; 1993) acting as "guardian of the subject", allowing the newly like-minded to enter the portals. A further developmental perception, followed in problem-based learning, sees the educational activity as that of students motivated by teaching materials, which enable them to determine their own learning objectives and engage with the content themselves. The teacher identity is that of "creator of teaching materials" which are ideally so self-contained, that they alone can stimulate and direct students to their learning objectives. A further social reform perception would see successful teaching as that which empowers students to engage in community activities to change it for the better. The identity is possibly that of "political agitator" In an alternative nurture

perception, the teacher works very closely with a group of students, encouraging and challenging them to take responsibility for their own learning and engage and share in the available content. The identity here is of "teacher as lifelong student".

Pratt (1998) does not consider a research perspective but using his model and applying further concepts from Bruffee (1993) it is possible to extend Pratt's conceptual model to include opportunities for students to mimic the research methodologies of the subject, contributing to widening knowledge and change within the discipline. Here, the teacher has used skills to lead students into working in research and the identity will be as "academic developer and teacher of research methods". None of this is "research led teaching" as defined at the start of this paper.

Research is the other aspect of teacher perception that is missing in Pratt's analysis - that of seeing research into teaching, taken widely to include educational research into components that affect teaching directly and more practical action research into teaching practice that is an integral part of teaching itself. The identity is that of a "teacher researcher" who conducts research led teaching.

How can research led teaching be carried out? It is possible to map a preferred mode or variation of research such as Brew's (2000) against a teaching perspective, such as those of Pratt (1998). However, research into teaching in practice is much more complicated with important fore-grounded values and nuances. Lomax (1998) has emphasised the professional nature of teaching: "Whilst respect for evidence is the corner stone of evidence-based professionalism, a wider epistemology to appreciate moral, spiritual, political, aesthetic, affective or practical criteria, may be appropriate. Most important is a statement of values, which should accompany each research report, and action research should model a theory of good educational practice" (p 12).

Identities of those reaching for the teaching / research nexus

What identities are modelled by the writers of research and teaching - especially those who would like to see a common knowledge-building pathway? A predominately reductive approach is taken by most authors, some of whom have been searching for an overriding principle of understanding of Higher Education such as (Barnett, 1997; Barnett, 2000; Barnett, 2005; Barnett and Coate, 2005) with concepts of critical thinking, to move on to supercomplexity and currently critical being. For Brew (2006) going beyond the research and teaching divide would also mean a balance of: "high-quality researchers in the subject discipline together with high-quality researchers concerned with subject-specific and generic pedagogical research and scholarship; each academic being active in researching and publishing..." (p158), effectively making "teaching more like research" (p172).

These authors see multiple activities going on in research and teaching and Barnett talks about multiple identities. Yet, despite very great differences between teaching and research, which make them look like different paradigms to others, these authors appear to want to see a single knowledge pathway and need to inflict some quite dramatic changes to the way things are in teaching and research to do so. How do you explain such a situation? Again I think this is not through identity but identification. Barnett (2006) is acutely sensitive to the anxiety and angst of students but the uncertainty in Barnett's world seems as bad out as in: "Uncertainty refers surely not just to the world out there but the inner world". The answers remain a knee jerk reaction to the overpowering identification: to put themselves forward to take on the world; lift out of your comfort zone; you have to be on the edge all the time. Again, I think these authors are identifying this time with the whole Higher Education itinerary. An unhappy task as to contain this gargantuan inside is impossible: hence the need to attempt to mend and fuse the whole process with a single solution.

Conclusions

Pedagogic research is defined in terms of "research led teaching" which is reclaimed from those authors who identify with research only as the body of subject research. Academic identities are traced through teaching and research and found to be wanting in some areas where a more appropriate description is one of identification.

A most promising concept in the education literature is that of educational spaces with which issues of individual development within local contexts and deal with wider global issues of complexity.

4.2.7 Sweet J. (2010) "Aligning Progress Files and Personal Development Planning to times of Transition" prepared for the International Journal for Academic Development

The early development of Progress files and opportunities for Personal Development Planning (PDP) in Higher Education are outlined with reference to the alignment of the pedagogical and reflective practice literature of the time. The turn towards discipline based PDP is critiqued and the case for offering a robust more generic in-depth Journal based methodology is advocated. The story of the progress files follows directly from the implementation of the Dearing (1997) report recommendations: Progress Files 'should consist of two elements: a transcript recording student achievement which should follow a common format devised by institutions collectively through their representative bodies; a means by which students can monitor, build and reflect upon their personal development'. This has evolved into a three-part system based on public, shared and private knowledge (see Figure 4.2.7-1 Original Progress File Concept; QAA, 2001). Early in 2001 an interesting set of intention statements were made without underpinning references. This may have been a post-modern moment of idea shopping (see Figure 4.2.7-1). However, true pedagogical colours were shown in a further set of PDP intention statements, convoluted and set in a repressive prescriptive tone, presented later in the year (see Table 4.2.7-2 (Jackson, 2001b). The statements could say simply that students should widen their horizons and become more independent and confident. And 'prove what they have leant?' Does this mean to prove it is correct, or to give evidence that something was learnt at all! The intentions are very rarely evidenced or referenced so where do the theoretical influences arrive from and how differently could they be placed? Using this model the PDP outlined

becomes subsumed within the sphere of pedagogy and employability and less to do with individual autonomy and development. An attempt to follow some of the texts on the topic placed as they appear more or less closely aligned to pronouncements about PDP and Progress Files are shown in Figure 4.2.7-2 Theoretical Basis for Progress Files (Sweet, 2001). The University of Hertfordshire (2001) advocated mapping and tracking. Mapping is showing the position of something, where and what form skills provision occurs in curricular and extra-curricula activities, and tracking follows the course of something in the case of skills development, over the entire length of a study programme relating student learning to employers' interests. This plausible approach has been criticised by Lester (1999) who says that to make a person into an initial map-reader and with extended development into a mapmaker, is not entirely helpful. Proficiency as map-reader, following other peoples' structures, does not transfer to exploration and experimentation required to map uncharted territories and redraw maps of known ones. Intention statements also have an overriding message that students should aim to be smarter and more strategic. This is closely aligned with concepts of benchmarking which is defined as "identifying smarter ways of doing things and new solutions to common problems, and identifying ways of reducing costs while optimising the quality of service offered to students and other clients" (Jackson and Lund, 2000). Motivation is largely advocated in terms of external or achievement motivation, which focuses on personal levels of achievement and depends on time-management and organised study and treats tasks as personal challenges to produce outcomes which are more sensitive to context than to the persons themselves. Whereas extrinsic motivation focuses on satisfactory completion of courses based on records and pressures of inflexible outcomes, less mention has been made in the PDP literature on intrinsic motivation, possibly because it is not easily located and possibly is less susceptible to influence. An important value of PDP maybe the new demands

for explicit outcomes, reversing a trend that Bordieu (1985) saw in education. He says "by doing away with giving explicitly to everyone what it implicitly demands of everyone the education system demands of everyone alike what it does not give". The master-patterns offered by benchmarks and Progress files make what is required of students more explicit returning cultural capital to regular students. What is noticeably missing in the PDP literature is the mention of organisational changes to adapt to student development. There appears to be a lost opportunity to develop more directives for the construction of learning organisations (Senge, 1994). Whilst there is possibly some step towards Senge's concept of personal mastery through personal development records, the group activities of forming mental models, shared vision, team learning and systems thinking are not considered. Whilst there is mention of self-directed learning (SDL), the statements are formulaic without the kinds of suggestions of Jarvis (1998) that SDL needs curriculum supplemented with informal ways. Real concepts of student autonomy surfaced in the set of original statements (see Table 4.2.7-1). These held the promise that the individual may be empowered within the given educational settings in a relatively risk free setting to open ideas to change cultures which could be aligned with Mezirow's (1990) concepts of transformative and emancipatory learning, where learning and struggle for collective action is set to change institutional structures or practices. These are not furthered by the current PDP initiatives. PDP is also demanding of at least a certain level of reflective practice particularly in "improving their awareness of the skills they are developing". This may fit with concepts of reflection in action. The requirement to "understand how they are learning" and the strange phrase "and how they prove what they have learnt" may be aligned to Kolb's learning cycle or a simplified version of it (Hull and Redfern, 1996). But there is no emphasis on affective activities and the approach of Boud (1995), where intellectual and affective activities allow individuals to explore feelings and experiences to lead to new understandings

and appreciations in isolation or in association with others. Although the intended statements refer to students in the plural, it is clear that all the students will achieve their objectives individually and that there is little emphasis on group activity - words used are effective, independent and confident not contributory, collaborative and supportive.

A major problem with the original and intentional statements is they do not acknowledge a space in HE for individual and academic development. The autonomy of the individual is insufficiently articulated and protected. This needs to be articulated through a wider epistemological base or understanding of what knowledge is and the illustration of what is meant by the individual development space within HE and its relation to the other components, and a methodology to open and expand an individual's response to opportunity. Sweet (6.1.1) has described the need for a space for individual development in HE closely linked to reflective practice and ethics, and learning and teaching with research. As the individual reaches towards aspects of research they immediately engage with ethical issues as the individual impacts on others and needs to engage with reflective practice as they are learning - seeing things anew. Progress with PDP for students has also been stymied by the lack of suitable staff cpd frameworks that could be used as a model for student development. However, recently, useful cpd frameworks have been suggested by Peters (2007) based on questions about life actions. This model provides a balance between the instrumental how-what-and-where and the more probing and demanding why questions which centre more on the individual's responsibility to develop there academic lives. This is in particular gives guidance on how students could structure a portfolio of development, which gives adequate attention to disciplinary and generic issues. More recently, incorporation of PDP within disciplines has been encouraged. This is particularly helpful in that a PDP process, which contains acceptable language

within a discipline, furthers the culturing of the student in that discipline. This seems to fit well with some of the more instrumental concepts in giving staff and student guidance on employability. However, embedding PDP totally within the curriculum of a discipline is not without its disadvantages. Separate disciplines can contain an idiosyncratic world-view and act as if in separate worlds! It would be a disservice to educate students within such narrow limits that they are trapped by their discipline? An alternative view is to suggest that many processes and skills in HE are generic and that students maybe starting to live a life within their trained discipline may need to move to other subjects and disciplines maybe more than once in their lives. The PDP initiatives could possibly do well to follow on with some of the work started with the generic concepts of graduateness (Brown et al., 1997). Discipline based PDP presents the risk that students become packaged as a product of the discipline or the educational process, or both and may themselves identify with the discipline rather than find and develop their own individuality. When preparing students and staff for transmission to other disciplines, what resources can the academic developer offer them? Journal keeping has taken on some interest in HE but the intention here is to review how a particular Journal keeping method may prove a way to strengthen PDP by producing a reflective practice that can support disciplinary activity but with broadened out reflection that fully respects the autonomy for individual development. The Intensive Journal (IJ) approach (Progoff, 1992), is to firstly log activities by keeping a record of the reactions of the person to life events. The journal keeper can then carry out specific exercises to process the material to give a sense of the movement of that life. Each unfinished section in the journal is left in a state of readiness as the user returns to it. Zeigarnik (see Goldberg, 1990) showed that particularly when there are strong feelings motivating interrupted tasks they are remembered better than completed ones. The net effect for the Journal keeper appears to be that of greater understanding of where life

is going, with each section supporting the other, producing a portfolio of the life. Progoff (1992) makes the point that logging activities in life is just the very first stage of providing the materials for reflection. Alternatively, diaries alone can provide a means of recording these reflections, but commonly, without a structure of sections comments and arguments, they can often encourage circular thought patterns and the person can get "stuck in a rut". The IJ approach attends to the quality of the journey rather than a concentration on outcomes. Attention is given to active reflection as much as life events and to feelings as much as rationality, for, as we know from experience, the next move in one's life is very unlikely to be entirely rational. One of the features of the IJ programme as advocated by Progoff (1992), has been the use of workshops to get individuals started and to maintain the process. Where this differs from the educational developers' norm, is that individuals from any background work independently in their own journals whilst being led through the various different sections by a group facilitator. The focus of the facilitator and the attention of the participants to their own journals create an atmosphere, like a retreat, that is very conducive for individual development. The Journal workshop therefore unusually allows; "individual work that cannot be done alone". In the IJ approach privacy is sacrosanct. Opportunities will arise in the workshop for individuals to read selections from their own journals if they wish to, but this is primarily a function which provides additional valuable feedback to the individual from what it feels like to "read out aloud" and secondarily where the facilitator can give the individual feedback on how they are working in the process. Other journal types have been used successfully within disciplines, but commonly the tutor has been party to and contributed to the content of the text (Miller and Siden, 1976: Mullins and Wetherell, et al., 2001). The process has been one of culturation into the discipline rather than developing autonomy, the individual life and living with others. The IJ approach is more aligned to interprofessional initiatives where individuals can

contribute and take advantage of a community of learning. It is perhaps best to not have the whole persona trapped by a discipline dominant, after all, it is anticipated in the future that most people will have to change jobs a number of times in their life course. The private IJ of life approach developed in the nineteen sixties appears more appropriate now for many than specific discipline content based approaches. In fact, there is a spiritual but secular element to the process. The Journal is conducted in an atmosphere of stillness to allow a progressive deepening at the edge of consciousness. Clearly, with very different lives there is no single correct way to draw the materials of a life together. This is facilitated with the use of the multiple sections, which go beyond the everyday rational perceptions, to include imagery, dreams and meditations. An entrance meditation is included as part of the IJ workshop as a method to enhance the atmosphere of stillness. Many other sections do not involve active construction or discovery but "letting things appear". Experiences of people places and things, situations and circumstances are taken for what they are -- the subjects of the life. The IJ then takes the novel approach of considering all these as persons who express relationships to one another. Some of the most powerful insight the Journal has to offer can come from setting up dialogues with these persons within the Journal. It is quite possible to articulate meaning from what was previously not in consciousness and to draw into relationship current experiences with historical sources. The net effect of IJ use can be a reflective life relating to its historical context and a person who is able to creatively adapt to change. The initial complexity of the IJ comes from the fine choice of activities or exercises that relate specifically to life history work and relationships, imagery dreams and meditation. This initial complexity allows the individual to draw on the materials of the life in a unique way. The Journal inflicts very little in the way of content on its practitioner. There seems little point in constructing an individual identifying solely in response to some external agenda such as a discipline

or employment only to find that the discipline or employment changes out of recognition or disappears, and the person is thrown back on themselves but without resources. It will be far better for the person to understand themselves and their inner quest and then adapt to the world, making the most of every opportunity.

Conclusion

It is hoped that this article will draw attention to 1) The possible realignment of PDP and Progress Files towards deeper approaches which may provide a more robust resource for individual and social change 2) Discipline based PDP may provide easily accessible options for both staff and students, but could be dangerously shallow for persons who are forced to change disciplines or professions and may stymie creative progression to new and different disciplines or professions 3) Opportunities for group activity, networking and reflection could be incorporated more frequently into PDP as a resource 4) Journals which give persons a robust process for working with the materials of their lives, in privacy and without inflicted content may prove a valuable resource especially during life's transitions.

Figure 4.2.7-1 Original Progress File Concept

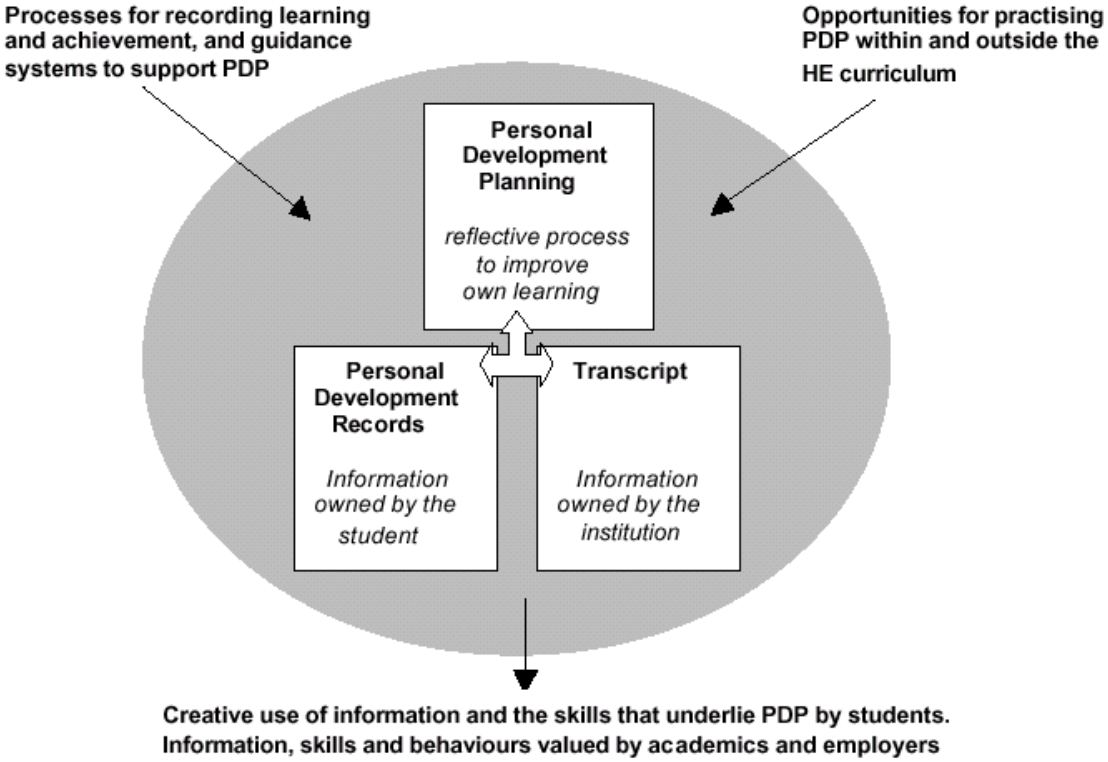


Table 4.2.7-1 (QAA, 2001) Original

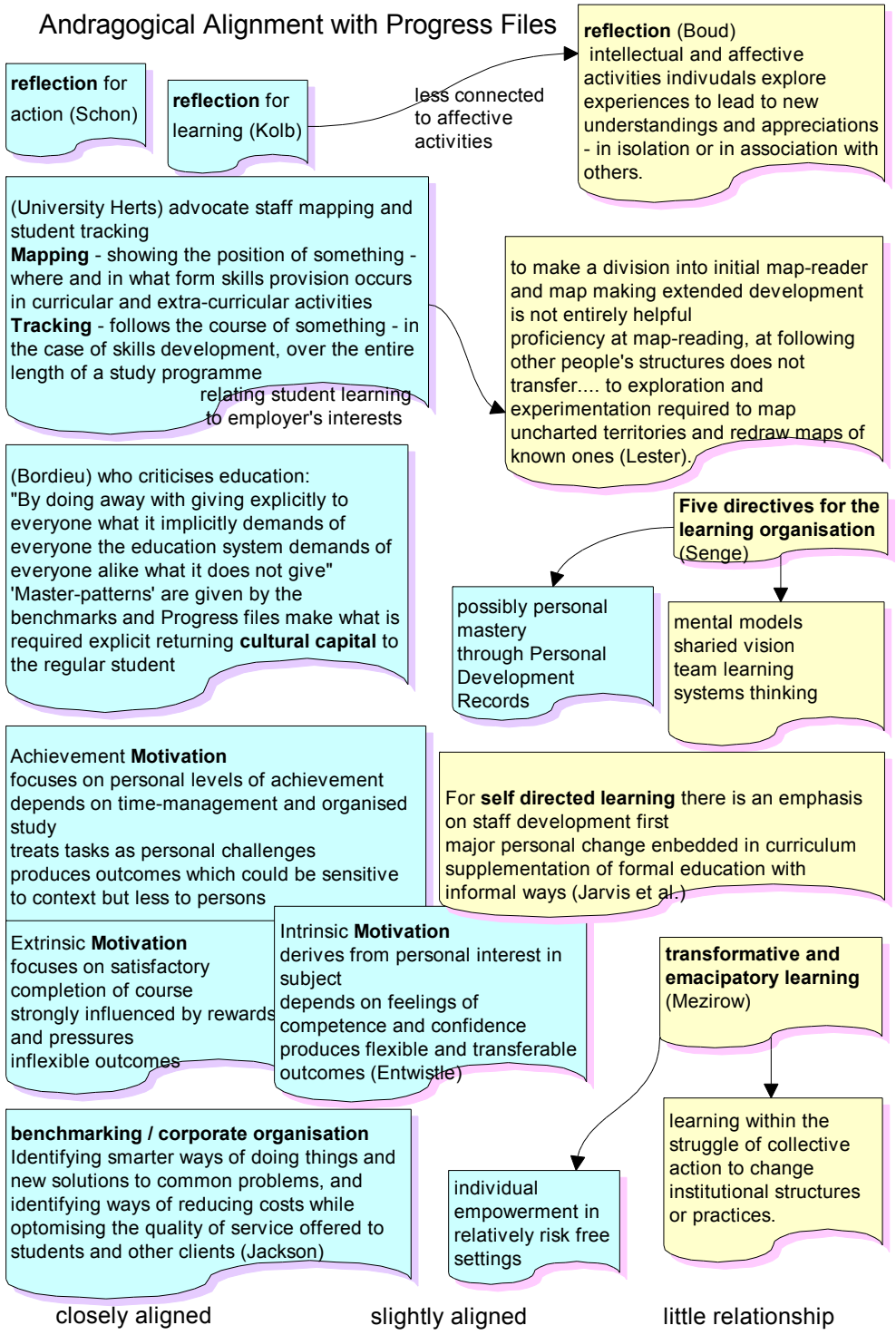
WHAT WE ARE TRYING TO DO STATEMENTS
• motivate people
• change cultures
• change the way people
• think and behave
• change systems
• share practice
• share resources
• create new resources

Table 4.2.7-2 (Jackson, 2001b)

FIRST FEW 'WHAT PDP IS INTENDED TO DO' STATEMENTS
It is intended to help students:

- become more effective, independent and confident self-directed learners
- understand the different contexts for learning;
- understand how they are learning and how they prove what they have learnt
- improve their general skills for study and career management
- improve their awareness of the skills they are developing through study of their subject(s)
- articulate their personal objectives and evaluate progress towards their achievement

Figure 4.2.7-2 Theoretical Basis for Progress Files



4.2.8 Sweet, J. (2009) "Beyond Reflection Dogma." In Beyond Reflective Practice: New approaches to professional lifelong learning, edited by H. Bradbury, N. Frost, S. Kilminster, and M. Zukas, 182-190. London: Routledge.

Abstract

This paper reports the empirical findings following the innovative group reflections method recommended by Cowan (1998), the surprisingly practical outcomes of the process and of the new realisations of many “forgotten” issues which come to light with this new reading of reflective practice. 114 clinical undergraduate dental students in groups of twelve to sixteen shared reflections with their colleagues on what impacted on their learning during their clinical practice and one clinical facilitator shared reflections with all the students on what impacted on his teaching during their clinical practice sessions. In particular, shared reflections brought to light the need for an additional member of support staff; the case was made to management, and in response to this, a further staff allocation has been made. The group activity contrasted greatly with individual paper based portfolios to encourage reflective practice with which the students were familiar. This is also true for some of the online managed environments for reflective learning that are being currently devised by subject specialists in the profession. There is a current dogma, especially in the health care professions, that reflective practice is an individual activity that largely comprises of incident analysis, carried out alone (RPIIA – reflective practice as individual incident analysis). A check box mentality appears self-perpetuating and cuts off reflection from its academic roots. I describe a whole range of topics that appear to have been conveniently “forgotten”. The rigid clockwise cycle of experience reflection planning and action are often attributed to Kolb (1984), without giving Kolb the credit for adapting the original Lewin cycle. The dynamic across the centre of the

circle is forgotten. In a journey around the periphery the focus is upon external events and if assessed, the students' attempts to please those in authority, rather than the students attempting to identify their own group identity and individual life quest. RPIIA does not fit well with feelings, especially where there has been little inner work to unpack emotions and feelings. There is a danger that the unremitting cycles provide a dogma of order where non-reflective encounters with and ethical response to others is undervalued because it does not fit process. In terms of the novice – beginner – competent creed popular in some literature in associated medical professions "reflection" in this narrow sense is stigmatized as a necessary process for the novice but quite unnecessary for the expert consultant who can intuit what to do. Some of biggest learning points from the Cowan approach, are that to be educational, much is to be gained from dialogue and that some of the most useful reflections are ones that we are willing to share. RPIIA is more likely to produce a compliant student but the Cowan approach may contribute to the well being of an organization fostering some disagreement and controversy no doubt but also cross-subjective confirmatory evidence. It is too easily forgotten that useful knowledge is not just packaged information and that learning needs creativity and passion.

Introduction

Reflective practice has generally been described as a psychological lonely affair thinking about what one has apprehended in the outside world. This paper describes a group reflective encounter and the practical unexpected outcomes. Alternative approaches to reaching beyond (RPIIA – Reflective Practice as Individual Incident Analysis) are suggested using group reflective activities whilst advocating also the concepts of personal growth and development of an inner quest.

Literature review

There is a current dogma, especially in the health care professions, that reflective practice is an individual activity that largely comprises of incident analysis (Atkins et al, 1994: Johns, 1994), carried out alone (RPIIA). For instance a current piloted reflective "e-portfolio" for Dentistry (e-portfolio, 2004) does not stand as a student self-selected offering of materials to occasion a claim to values and objectives but acts as a means of assessment and part self-assessment, and consists mainly as a closely monitored record of activity. A check box mentality appears self-perpetuating and cuts off reflection from its academic roots. Early exponents of reflective practice were attempting to encourage students and lecturers to move from prescriptive learning and ask students to take responsibility for their own learning. Elliot (1976) and Eisner (1979) saw reflection as the icing on the cake, as it were, to the educational process in producing a freethinking "connoisseur". A less prosaic idea about reflection is that it is simply "slowing down our thinking processes to become more aware of how we form our mental models" (Senge et al, 1994). But in RPIIA by tightening and restricting freedom of choice and action, I describe a whole range of topics that appear to have been conveniently “forgotten”. The rigid clockwise cycle of experience reflection planning and action are often attributed to Kolb (1984), without giving Kolb the credit for adapting the original Lewin cycle. The dynamic across the centre of the circle is forgotten, the vigorous contrast that can exist set between the opposites, and also the possible harmony and sense of balance that can be achieved. For instance in a situation of "research" learning inquiry there will be a continual grasping towards the concrete and the abstract, whereas clinical practice will make demands for reflection reaching across to active planning (2.2.4). In a journey marked out in RPIIA, just around the periphery of a cycle, the focus can be entirely based upon external events, and if assessed, it will record the students’ attempts to please those in authority, rather

than the students attempting to identify their own group identity and individual life quest. Whilst a number of professions would equate a high level of ability to reflect on their practice is an admirable aim for expert leaders, there is an interesting anomaly for the professions such as dentistry and dietetics, which in particular have been influenced by Chambers (2004) and Chambers et al (1996). They advocate the adoption of the skills based concepts of novice, beginner, proficient and expert (from Dreyfus and Dreyfus, 1986) and transfer them directly and apparently unthinkingly as a pathway for professional development as well. The outcome of using this protocol is an unintuitive situation where “reflection” is stigmatised as a necessary process for the novice and beginner but quite unnecessary for the expert consultant who can intuit what to do. Presumably a good number of consultants are content with not having to take the trouble to reflect and instead take a leap of faith! However, for the student that is put through a course of reflective practice that is not shared or valued by their superiors, there is a danger that unremitting reflective cycles can provide a dogma of order. Jarvis (1992) warns "all actions are subject to habitualisation and run the danger of degenerating in to presumption, ritualism and eventually alienation".

The current RPIIA genre of reflective practice does not advocate the strong case for situated learning, where the new environment or situation is the main driver for reflection and subsequent change. Schön's (1963) early work on "displacement of concepts", essentially a situational reflection hypothesis, is currently largely neglected. This early view of Schön's was a reaction to how difficult it is to get people to change their views directly. He discovered that it was easier to change people by moving them to a new situation where their old ideas could not work. They were then willing to modify or displace their old concepts and make changes to their actions and attitudes far more easily, without being directly challenged.

Schön's (1983) later concepts of reflection-in-action and reflection-on-action are well known. Reflection-on-action, is the most straightforward concept, that of thinking about an event or action after it has occurred. This is what the RPnIIA (Reflective Practitioner of Independent Incident Analysis) considers reflection to be and reflection-in-action is neglected. However, have we passed beyond the usefulness of reflection-in-action? Should it be removed or returned into use with greater vigour? Asking, "How can one reflect when one is working at something?" Court (1988) says that momentary "times out", which could perhaps be called "reflection-in-action", might better be seen as moments of quick deliberation leading to decision taking: deliberation not reflection-in-action. Heywood (2000) suggests that like a physician we can often be surprised when the evidence is contradictory and/or ambiguous. This is the stage of surprises that causes us to review what has gone before to see how it differs from previous cases. He equates this with Schön's stage of reflection-in-action. But is this a situation of being, for a moment, just conscious of the learning process? Marton and Booth (1997) propose that learning occurs when something is viewed differently. There are also three conceptual candidates in the educational arena that could be seen as instances of reflection-in-action, the first at a micro level and the others at a macro level. First, are the latest "threshold concepts" (Meyer and Land, 2005) with reference to "getting over difficulties in learning" referring to the "lucky ones" who can reflect and the raison d'être for the "threshold concepts" enterprise is then to get "the others" to become reflective practitioners skilled at reflection-in-action? Second, can the cry for "constructive alignment" (Biggs, 1999) be seen as a dynamic reflection upon the components of the teaching and learning process so that the whole concept draws itself together in a way that is larger than its constituent parts? The third concept is from the social constructivist school. The reflection-in-action could represent the individual's reaction to enculturation, a preliminary transitory realisation of knowledge

and identity. By engaging successfully with the discipline students can make progress through the outer skin of the discipline - or have found a pore or portal as a port of entry. They would meet with surprise as they see the world differently enough to see the outside of the discipline, to find a way in, and make the realisation that they have penetrated the discipline stockade. Bruffee (1993) talks about the importance of peer collaboration so that student groups may develop as intermediary cultures.

RPIIA does not fit well with feelings, especially where there has been little inner work to unpack emotions and feelings. This is where the poverty of a rigid concept of reflection merely as a rational introspection becomes apparent. Reflection can also be claimed to occur as a response to others in an interpersonal interaction. Heron (1992) values experiential knowledge, which he defines as participation in and resonance with one or more beings, for which Levinas (1991), from a different tradition, says we have an immediate ethical responsibility to act for other persons as we "see their face" on an individual basis. The indoctrinated RPnIIA novice will be trained to follow the cycle around and avoid "non-reflective" (non-reflection-on-action) encounters with this experience of the moment and instead will reflect on the experience and come up with reflected upon propositional knowledge which will result in an ethical response of justice, but without the risk of an intuitive immediate response to an other. This would be undervalued because it does not fit process.

Dialogue is vital to gain feedback from others and this is where debriefing is useful. A debriefing session is held to identify specific problems that occur and the learning needs to be pursued to overcome problems. Debriefing (Ments, 1990) can be used to close the loop and the best reflection takes place at the point of action. This could be in the workplace but commonly in an informal community of practice, and on the Web in particular, affinity spaces (Gee, 2005) have been described where high levels of interaction occur but without complications of membership or fixed status. Action

learning is probably the most established group practice method for enhancing the reflection by individuals on the spot in response to questioning (Weinstein, 1999). Forgotten possibilities of group reflection have been brought to the fore by Cowan (1998) as he openly experimented with his students in attempts to resolve difficulties in their learning. Heywood and Biggs agree that Cowan's addition of reflection-for-action is a useful adjunct to Schön's terms reflection-in-action and reflection-on-action. For it is that thrust across the centre of the Kolb cycle diagram from reflection directly for planning that is the primary action of practitioners. Cowan (1998) however, describes a social process, how the main focus of the reflection can be to make public reflections from both teacher and student on what has impacted on their lives at a pre-judgemental level. The immediate value of this is that the activity takes on group energy as the writing is not solely for individual student and vicarious tutor. The degree of “confidentiality” of reflections is made more explicit - they can be set for circulation just within the group or for wider use, especially if the student contributions are annonymised. Possible group reflection modification of the Kolb cycle is presented by Senge (1994) who translates the cycle of individual reflecting, connecting, deciding and doing into the collective cycle he describes of public reflection, shared meaning, joint planning and co-ordinated action, but this is difficult to envisage for anything other than a tightly defined project and further he does admit that in his experience groups often think they can skip stages in the cycle he describes.

One of the most unexploited resources for reflection looks at first sight as a contradiction - that of a group activity where the participants work alone. Ira Progoff researched a group of biographies of creative lives and found that practically each one of them used some sort of reflective journal record keeping. This led to further research on the use of reflective journals in the nineteen sixties with the publication of the Intensive Journal Method in 1975 (Progoff, 1992). Participants in this journal

method can initiate their journal by following the book and working alone. Alternatively they can attend a workshop where they also work alone on their journal but have the advantage of a facilitator introducing the various sections of the journal and the positive atmosphere created by non-interfering workshop participants, working in their own journals. The sections are of a log type for entering data or an exercise type where the logged data is creatively explored and reworked. One advantage of the Intensive Journal is that it does not come with content and is one of the least intrusive journal methodologies so that data is solely that of the individual. The outcome of using the journal can be a comprehensively researched documentation of the inner life of a person as they move through their life-course. It may help that person develop a more robust approach to life that Progoff calls having "inner muscles". Mezirow (1990) indicated that reflection in adults is an inner process and creates change within the person that could result in the transformation of the person. Whilst holding his or her identity the person moves on with a different outlook and a response to events. The Intensive Journal can hold a wide range of reflections, which can include spontaneous elements as reflection-in-action, reflection-on-action and Cowan's reflection-for-action; they can deal with feelings, work, people and life in general. Reflection in depth can invoke "aha" moments, including some like spiritual experiences that can stand with or without religious beliefs. There are three problems with the depth approach. First is the perceived rather unusual nature of pursuing the inner life quest, which has, in the West, not generally followed a secular reflective route. Second, moments of peace and stillness needed to gain access to inner experience are only too rare and third; it can be time consuming and at times hard work. However, there are few other ways in which reflections drawn from so many quarters can produce a self-balancing approach across time as a resource for living.

Conclusions drawn from the literature

The literature on reflective practice is very varied and derived from different philosophies. The opportunities for groups of individuals to contribute to an overall reflective issue is of great interest for future developments, which go beyond current reflective practice. The conceptual argument here is that clearly reflection can only be carried out by individuals, but the dogma that a RPnIIA should follow a mandatory cycle of fixed events involving that individual alone is restrictive. With additional suitably directional course materials RPIIA can provide a resource for authority and control that inflicts conformity, rather than the original concepts to which reflective practice espouses: to give the students the impetuous to take responsibility for their own learning, behaviours and attitude.

A further complication is that the original writings by Schön and Kolb have been selectively plundered in such a way that the original vibrancy and open possibilities have been changed to a stereotyped cycle of reflection; imposed - cast in stone as a truth (Moon, 1999: Hull et al, 1996). RPIIA is usually bolt-on because other educational models do not fit well with it. RPIIA ignores reflection-in-action and keeps firmly to reflection-on-action. Reflection-in-action is something of a tease, summed up by Heywood (2000) as a stage of surprises. But it may be a resource for a number of current educational models destined to improve the student learning experience. Trapped in reflection-on-practice the RPnIIA is unable to deal with acting in the uncertainly of reflection-in-action or take the risk of working with the moment - taking that ethical decision based on the immediate experience as a "Good Samaritan". The RPIIA position is to have to weigh up the pros and cons consider third parties and all that is a considered response instead, to deliver a plan of action at a further stage of the reflective cycle.

The Kolb cycle does not translate to group practice without some difficulty. Some of the most promising developments of moving reflective practice beyond an individual activity can be found where others can give support. Cowan's approach is particularly attractive and effective because it advocates a mutual shared reflections horizontally across faculty and student boundaries and appears to be most effective at resolving matters that involve the group collectively. Action learning provides support for each individual at a time in a small group being questioned by their peers. This appears to be most effective at unravelling personal work matters or projects, but with the additional caveat to act on the reflections. Affinity spaces, which are virtual sites where disparate characters are able to converse about an abiding passion, may again be a useful means of sharing reflections on a very narrow topic of mutual interest. The most demanding and possibly the most productive of ways to take reflective practice beyond its current horizons is journaling. I have described an established paper based system that works particularly well in workshop format. Once the decision has been made to take time out as a retreat, the participants have protected time and space for reflection and the temporary relocation may also contribute to a displacement of concepts.

The RPIIA genre of reflection works about a fixed cycle of processes that occur within a static individual carrying out his work with a focus on the exterior world, mainly the world of work. RPIIA like the skills development concepts of novice, beginner etc. may have a place at the starting block, but should be discarded before the first hurdle!

Perhaps rather than just working out from where we are now we should work backwards for what it is we want to achieve and from this select an appropriate model - maybe we want to resolve a specific work issue or be ready to help and respond with a group of colleagues or maybe sits a question of "Know Thyself". A final irony might be that the beyond in "beyond reflection dogma" may be centred within.

Research method

Student evaluation of teaching feedback forms were issued to all students, returned to the university registry by a student monitor and processed to give anonymous results as graphs to closed questions on a Lickert scale and unmodified text on additional open answers. To give a more holistic overview, an innovative group reflections method recommended by Cowan (1998) was utilised. 114 clinical undergraduate dental students in Years 3 and 4 (of a 5 year course) in groups of twelve to sixteen shared reflections with their colleagues on what impacted on their learning during their clinical practice. They wrote down their thoughts at the end of a clinical session towards the end of term and were asked to give their reflections on their clinical skills, what clinical work they had completed and who and what had impacted on their clinical work positively or negatively. Attempts were made here to elicit both analytical and evaluative reflections - what and how well? These groups of students had experienced the start of a new way of group working with a pair of students taking responsibility for running the everyday aspects of the clinic and taking occasional video of interesting clinical cases for debriefing and also experienced the advantages (when it worked) of a new computer appointment booking system for their patients. The hand written comments were typed up by a departmental secretary and circulated to the group. In addition, one clinical facilitator who attended most clinical sessions shared reflections with all the students on what impacted on his teaching during their clinical practice sessions so that reflections were shared. The results of the three reports were compared and contrasted.

Findings and Discussion

The first section explains what information was obtained from student evaluation of teaching alone. Second, the group reflection exercise entailed asking about issues

that had an overall impact on their clinical working. Reflections from a staff facilitator circulated to students leads to an overview of results and discussion.

The student evaluation of teaching

The student evaluation of teaching feedback form concentrated on issues around teaching and included closed questions, about the course content and how well it was organised, how useful the competency requirements in the documentation had proved to be. Questions were asked whether the clinical workload in the course was reasonable and how much clinical facilitation, including that of the students themselves, helped the working of students with patients. The students were then asked about their perceptions of their clinical abilities from helping patients achieve improved oral hygiene to carrying out various operating procedures and how useful debriefing sessions were a useful learning experience. Questions were also directed at obtaining feedback on the academic processes in the course, of the initial brainstorming of the course materials, group presentations as a way of learning, the value of self directed projects directed at helping to communicate with patients better and revision patient scenarios and questions.

Students were also invited to extend their views by responding to the open questions: What were the positive aspects of the teaching? and Do you have any suggestions for improvements? The response was generally positive and focused on issues to do with their perceptions of teaching and learning.

Student group reflections

In the group reflections the students highlighted the new clinical skills they had developed and included the kind of reflections:

I think the most useful thing I've learnt since being on the clinic is how to give oral hygiene instruction to patients. We had never been shown this before and now I can

use this on the other clinics as well. Also looking at radiographs has given me more experience in identifying bone levels.

As to facilitation of the clinic they reported some organisational satisfaction but just a few reverted to the usual request to be spoon-fed rather than take responsibility for their own learning:

Most people seem to have patients when they should have. The student presentations have been a very useful way of learning. Students running the clinical sessions seem to be successful. The presentations weren't that useful I thought, I would rather have had lectures, so that I knew that we covered all the information on all the topics we need to know to pass exams and be confident.

It was the impact of having very little nursing support that came up time and time again:

Non-existent, we assisted each other. It is very difficult to find a nurse available to help. At present, just seeing one patient in the morning, it works OK with us assisting each other. I am concerned the clinic organisation will become quite hectic when we see 2 patients each session with no additional nursing support. ...would be good to have one more specifically available to us

Reception work seems a thankless task and unlikely to please everyone:

Today receptionist was very helpful. Receptionist lost my patients file on the first session, otherwise I didn't have any troubles. Don't seem to produce accurate information about next appointments. Moody, everything is a bit of an effort. And the computer system used for appointments "Needs some work, some of the appointments are still mixed up."

The findings about group working seemed to indicate how well they worked together:

I like this group everyone seems to get on quite well. ... everyone shared their knowledge with each other. The group gets on well. We all help each other out, and

learn from each other. Certain people were more involved than others. Our group works very well together. I feel we are bonded.

Reflections of staff facilitator circulated to class of students

The style of teaching that I am trying to develop is based on the idea that it is what the student learns that is of prime importance rather than what is taught by the teacher. This is even truer in the clinical situation where simple answers to fuzzy clinical situations cannot be taught directly...

To be honest, I have found the devolving of the facilitator role testing at times. It is when students individually or in pairs take the initiative themselves; I find that things don't work out exactly as I anticipate, of course... I think that having student facilitators has freed me up with more contact time with individual students assisting their treatment of patients that was not possible before.

Nursing support

It was the early reports back from the student facilitators that alerted me to the fact that we do not have on a regular basis dedicated allocated dental nurses to the student clinic. This has been a feature of the periodontal clinic for many years... I do intend to see if this matter can be resolved to everyone's benefit.

Comparing feedback forms and reflections

Shared reflections brought to light the need for an additional member of support staff. The standard feedback form did not deliver this problem as it concentrated on "teaching" and not the overall impact on their clinical working. The value of the shared reflections was that it was able to ask big and more open questions and through the group response, to discover what is the collective view. It was something of a surprise to the staff because the situation had become the norm, in a 40-year-old institution and lived with for years. The case was made to management, and in response to this, a

further staff allocation has been made. Apart from positive personnel changes to the clinic the joint reflections also help to create an atmosphere of mutual trust and support between staff and students and an environment for positive change with ancillary support and a new understanding of their value, but with an element of disturbance as ancillary staff find their new extended roles working with students.

Conclusions

Some of the biggest learning points from the Cowan approach are that to be educational, much is to be gained from dialogue and that some of the most useful reflections are ones that are shared. RPIIA is more likely to produce a compliant student but the Cowan approach may contribute to resolving issues that are important to the whole group and can be resolved collectively and create positive institutional change. Many approaches reviewed are suitable for the short term, however some form of journaling may be a most productive way for an individual to reflect over their life-course and take reflective practice beyond its current horizons.

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6 Appendices

6.1 A model for Scholarship Activity in Higher Education

This first appendix contains the article I presented at the Higher Education Research and Development Society of Australasia (HERDSA) Conference in Adelaide in 2007 (see page 395). It was published in the Conference proceedings and is included here in its original formatting. In this, I outline a model for academic development based on an understanding of scholarship in Higher Education as a whole. It is used as a resource in the Outline section of this thesis.

6.1.1 Sweet, J (2007) A key place for Academic Development in Higher Education Scholarship. in Enhancing Higher Education, Theory and Scholarship, Proceedings of the 30th Higher Education Research and Development Society of Australasia Inc. (HERDSA) Annual Conference [CD-ROM], Adelaide, 8-11 July 2007

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Academics in Higher Education generally work in polarised sectors of research or teaching, frequently having to oscillate between the two. Relationships between these spaces of activity and the neglected area of personal development and the relatively new area of academic development are currently contested and require clarification. However, it is argued here that the three themes of research, learning and teaching, individual and academic development have such fundamental differences of background, aims and objectives that they do represent autonomous paradigms which result in different functioning spaces. Polar differences in culture and priorities produce a strained dialogue between research and teaching when considered alone. It is only when the activities of development are considered in combination with research and learning and teaching that a more global pattern appears with border relationships. Borders, referred to here, are subjects and processes that do not hold primary autonomy but appear situated, relying on adjacent operating spaces for their being. Understanding the nature of the borders that make up curriculum, reflection, ethics and evaluation, is seen here as fundamental, if the activity within different spaces, such as learning and teaching with research, can be reconciled. This paper considers "academic development" as an autonomous activity space in Higher Education, its relationship to the proposed border topics of curriculum and evaluation and its contribution towards a nexus placed at the centre of Higher Education. The scholarship model is developed and grounded with reference to the spaces or on borders defined above.

Keywords: scholarship, academic development, border topics

Introduction

Higher Education is going through rapid changes that make a position statement very difficult. Authors such as Barnett (1997, 2000, 2005) have experimented with one concept only to try another. His latest ideas on spaces within Higher Education begin to allow for complexity and understanding of local conditions. What is missing is the understanding of relationships and borders within the different components. This investigation intends to address these deficiencies by presenting a conceptual model that places the key functions of research and learning and teaching in relationship with the neglected fields of personal and academic development. A discussion draws these components together and points to the nexus as a central point of cohesion and integration for Higher Education Scholarship.

A Model for Higher Education Scholarship

Following the principle that there is a common process of movement inwards towards a sense of wholeness and outwards towards differentiation and fragmentation, both individual and collective (Jung, 1971), I am proposing a model for higher education based on a four space form shown in Figure 6.1.1-1

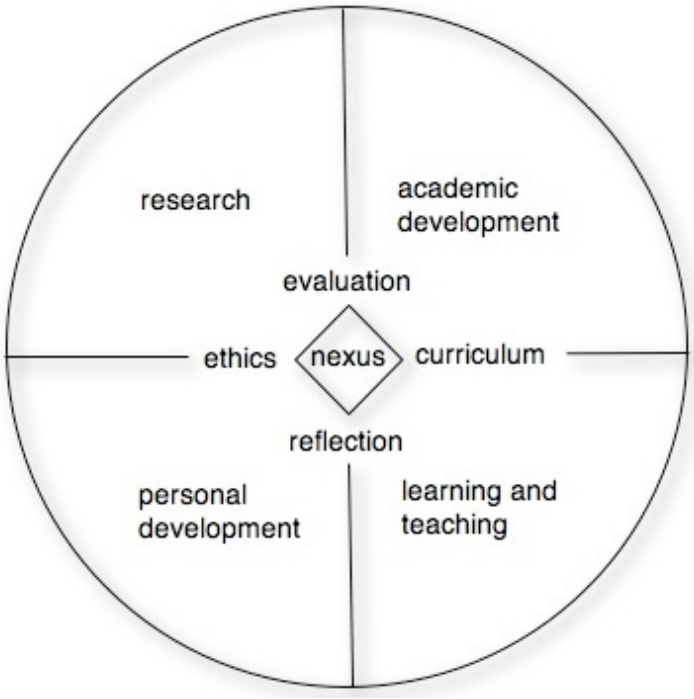

Figure 6.1.1-1 Spaces and Borders Model for Higher Education

This model sets out the traditional contesting spaces in Higher Education of research and learning and teaching in sections diagonally opposite each other: research above the horizontal indicating a general orientation towards the world and learning and teaching below the horizontal indicating an inner direction of activity towards the success of the individual student. However, it gives equal space to individual and academic development, which are seen to have a similar difference of polarisation either towards the individual life or towards the world. Setting the four spaces together in a particular configuration as shown in Figure 1 facilitates a

new layer of understanding of relationships by providing borders between these spaces of activity, which appear to have a particular life of their own. Rather than hardening and producing a rigid dogmatism, the out-flowing of relationship around a central nexus provides a location for reflection for further configurations.

By reaching towards the underlying purpose of Higher Education, I am suggesting that I can avoid the mistake of assuming a superficial commonality of process unifies research and teaching. Common processes are not to be confused with uncommon purpose. For example, both research and teaching entail inquiry, but that does not in itself fuse very different niched activities. The fact that they both use text does not make them the same either. The model is outlined in Table 1.

Table 6.1.1-1 Spaces and Borders

Spaces: Research, Learning and Teaching, Personal Development and Academic Development are outlined as distinct spaces in higher education.
Learning and Teaching The focus in learning and teaching is on the individual students and their learning and the provision of suitable teaching materials as a resource to facilitate learning. The emphasis, in essence, is on the growth of the individual and how the environment around the student can be a stimulus for learning on the inside as it were. The essential values must be towards the individual - a focus on creating a future.
Research This is the space related to the outer world to the extravert function. Research tends to entail searching towards discovery "out there" in the natural world or in a wider social construction (Arendt, 1958). It contrasts with learning and teaching where the focus is on the person rather than the world outside.
Personal development This is the section that seems to be missing largely from the current Higher Education agenda. Without personal development, the possibility of linking higher education with the inner quest is lost. Students can become alienated and lost if they do not find a means of relating their learning activities to how they feel about themselves. Personal development planning has arrived on the scene in Higher education but has been largely hijacked by considerations of employment, and considerations of what others might think, rather than the development of an inner knowledge of self.
Academic Development Academic development entails a collective journey that educators take in attempting to understand their role in improving and changing educational systems and role in helping others become good teachers and researchers. It differs from straight research because it entails working with individuals in their practice as well as organisations and an advocacy is assumed.

Borders: Curriculum, Reflection, Ethics and Evaluation are considered to be essential

border activities in Higher Education.
Curriculum This model places curriculum between academic development and teaching and learning. Curriculum as the students' experience is determined by their learning and the efforts of academic developers to provide learning resources and a learning environment for them.
Reflection Reflection is at the border of personal development and learning and teaching. This is where the possibilities of the individual's inner quest and inner life can become integrated with learning, taking ownership of their work. Close to the individual is personal reflection on the life course, whilst guided reflection in a teaching setting can often become more like an assessment.
Ethics In this model research borders personal development through ethics. The researcher can find a way to develop his inner quest in the outer work and this entails taking direct responsibility for these actions. On the one side of the border is the personal ethics and on the other hand, towards the research space are organisational and professional ethics.
Evaluation This model places evaluation between research and academic development. This is the collective assessment of collective activity as research or educational development. Research in this model can become either the source of tools utilising evaluation or a recipient of evaluation itself.

Defining Spaces and Borders

In this model the primary autonomous functional units, termed spaces are Research, Learning and Teaching, Personal Development and Academic Development. When set out with the relationships shown in Figure 1, border topics appear between the spaces. They appear to be driven by the adjacent spaces. In the case of Academic development this appears as **curriculum**, between it and Learning and Teaching and as **evaluation** between it and Research. The model emphasises the importance and nature of academic development as an identifiable and integral part of academe. The value of the model is that it may permit the construction of conceptual frameworks, linking concepts in ways that may not have seemed appropriate before. It may introduce missing integral parts into the equation that will permit a fuller rounding out, stabilising and harmonising into institutions; indeed the very aim of scholarship. Finding stronger links or bond between disparate aspects of academic life may help to ameliorate frantic and fragmented moments and produce a more integrating experience for students.

Academic Development and Scholarship

Andresen (1996) explicitly locates academic practice within its own space. He states that "Academic Development occupies a niche vocation... within academia. It both stands within, and operates alongside, regular academic work while often substantially overlapping with it." (p42). But he maintains a rather narrow definition of scholarship restricting it to "knowledge and learning" albeit carried out with "critical ability and thoroughness" (p41), as a theoretical

ideal or speculation. He appears to think that action is something which needs to be added to scholarship and this produces a synthesis which is achievable in practice. More recent literature on scholarship appears to bring elements of action and making public to the fore. Also the substantive view of scholarship as that of holding value was reported by Gunn and Prescott (1999) where scholarship appears to warrant the need to ensure that valuable knowledge and culture is not lost. In this the academic developer could have a role at the level of small groups, to facilitate transmission of knowledge, and at levels of managerial organisation to prioritise staffing levels. "Academic development" is taken here to include a support role for academic research, teaching, student support and university administration. It implies that all that is involved in "educational development" is subsumed into it.

D'Andrea and Gosling (2001) have suggested that this "educational development" component consists of aspects of

1) institutional management of teaching and learning taking an interest in the overall context creating a learning environment for students taking pedagogy into account.

2) innovation of teaching and learning strategies. Educational developers, with their background in pedagogy, generic understanding of learning and teaching methodologies across disciplinary and professional cultures, are able to understand the educational process within the whole institution and actively contribute to the learning and teaching strategy.

3) support of research into learning and teaching. Educational development can include support for "action research" activities where all stakeholders in the educational process are drawn into the conduct of the research (Zuber-Skerritt, 1996), to the more psychological and sociological investigations of learning and of learning cultures (Eraut, 1994; Bowden and Marton, 1998).

4) support of student learning and development of academic staff, to help teachers centre the educational process around the student who is doing the learning and to help members of staff with their own development as individuals, working in collaboration and in the context of the institution.

5) curriculum development planning.

Curriculum

The model presented in this paper, places curriculum as a border topic between academic development and teaching and learning. Curriculum as the students' experience is determined by their learning and the efforts of academic developers to provide learning resources and a learning environment for them. Conceptually curriculum has been defined by Kerr (1968) as including all the student experiences both inside and outside the educational institution, located close to the proposed learning and teaching space. Alternatively, Barnett and Coate (2005) emphasise the role of the academic organising it, locating curriculum closer to the academic developmental space. At the curriculum development planning stage it is often possible to bring in innovative teaching practices (Biggs, 1999). The educational developmental approach to curriculum development would be to facilitate wide consultation on change and integration. Consideration of curricula at a meta-level can also broaden the possibilities of curricula integration along the lines of Learning Communities (Shapiro and Levine, 1999) of cross disciplinary studies.

Evaluation

An additional item not mentioned by d'Andrea and Gosling (2001) is evaluation which is given a special place as a border topic in the model described here. This model places evaluation between research and academic development. Evaluation is defined here as is the overall assessment of collective activity as research or educational development. On the one side research provides the tools for evaluation of educational systems by the academic developer. But also because of the close proximity of borders, there appears also an obligation for the academic developer to engage with evaluation of research. The role of academic developers in the continuing development of research has a quite long standing history, especially with the literature on PhD supervision but taking responsibility to give feedback to the research community on the nature and outcomes of research is a function determined by the relationship this model provides.

As Preskill and Catsambas (2006) point out a distinguishing characteristic of evaluation is that unlike traditional forms of academic research, it is grounded in everyday realities of practitioners. It therefore needs to include stakeholders with some sensitivity. A particularly effective model is that of appreciative inquiry where by continuously crafting the unconditional positive question the whole organisation is able to discover, amplify and multiply its accumulated strengths. The method is certainly not one of simplistic positive reinforcement, but one of deep critical appraisal, for example, to determine the organisation's best practices - the core factor that 'gives life' to the organisation. It is proposed that the questions set the stage for how the future can be constructed.

Theoretical basis and review of the literature

Barnett's early models for Higher Education

One of the most prolific writers developing models for Higher Education and its development has been Barnett producing a series of books (Barnett, 1997; Barnett, 2000; Barnett, 2005; Barnett and Coate, 2005). He appears to be having some difficulty identifying what it is that could best describe higher education or provide some cohesive structure to enhance or even maintain its development. He starts in 1997 with a critique of "reflective practice" as a possible resource. He outlines very clearly the ways in which he feels the original aspirations of it as a means of encouraging self-development have been hijacked by forces that would indoctrinate the student as the topic becomes denatured into checklists to which the student vows conformity. This point is still topical. By the end of the book he still despairs, declaring "We have no general account of the purposes of higher education in the modern world. For the most part, we muddle along." (p171). However, the most promising commonality he identifies within the University is the process of critical thinking, which it attempts to embed in individuals. However, by 2000 he abandons any attempt to produce a common process within higher education like critical thinking as he states that the disciplines are so diverse, but at the same time, he finds the idea of independent discourse problematic. He invents a neologism of supercomplexity to cover the whole area of higher education and the environment that it finds itself in, but he falls into the kind of trap he criticised in the abuses of "reflective practice". He spells out a process again, but this time where he advocates that students should be challenged somewhat brutally, so that they adapt themselves, that they may sit with the "Time Lords" coping with supercomplexity.

Barnett's later models - being and spaces

Barnett's outward orientation towards the world and its needs had ameliorated somewhat in the 2005 books. There is little or no mention of supercomplexity, and instead of hunting for a new alternative process to explain away the peculiarities of higher education he is beginning to work

with relationships within higher education and with concepts of spaces and shapes. In the edited work, Elton (2005) brings a much-needed historical context to the development of both teaching and learning and research. And a most significant move in Barnett's thinking is toward the importance of "being", and how this could be incorporated into the construction of spaces within higher education. However, taking on being with enthusiasm is all well and good, but he does so at the level of extreme superficiality -- "being" as a black box with inner qualities "written on the lid" and defining its success on the ability to adapt well to the world. Also he fails to draw significantly on the concept of educational spaces he proposes and come to realise the added value of taking heed of relationships and borders which the shapes present. This is all a very extrovert view of the world and higher education which fails to deal with the underlying problems identified by Turner (2004) of impoverished educational modelling either attempting to view education from an individual or sociological angle but also failing to engage with both at the same time. I think that Barnett is right to emphasise the importance of being, but he does not delve into the subject enough and open up the literature on the topic. To engage with it requires a widening epistemology. Feelings and relationships may present themselves which are quite different from the analytical and fragmentation of concepts that are part of thinking about something or working out how to do something. Barnett needs to get to the point of admitting that reason alone is not enough. There is first a need for a wider appreciation of what is valued as knowledge on an individual basis, especially at levels of symbol and imagery, and what makes for a rounded out person, despite, as much as because of higher education. Hence the need to explore personal development

Engaging with personal and academic development

How is it possible then to obtain as wide a view of higher education as possible and see where one aspect may relate to another, such as research and learning and teaching to provide a nexus (defined here as a "link or bond")? The realm of symbol and imagery is an uncommon area for academic writing. However, for example, it is possible through the use of a Journal method set out by Progoff (1992) to correlate most aspects of a life by recording the experiences in text. He advocates in this that the whole range of items of life experience such as work, an institution, a creature or even a situation or circumstance can be apprehended in a relationship as a person, and the images of possible dialogue can come as if of themselves and be recorded in the Journal. 'Prometheus and Epimetheus' can be a resource here as Spitteler (1931) makes exclusive use of subjective relationships between all the components of his story which produce a fascinating world of dialogue and counter intuitive turns, if interpreted along conventional 'knowledge about" lines. The most important outcome of this approach is that through working in subliminal ranges of thought and imagery it is possible to begin to unpack some of the ideologies that, for example, befuddle the world of science (Rollin, 2006) and start to articulate felt positions that normally remain unvoiced.

Integrating spaces and borders - widening epistemology

It is proposed here that linking imagery and ideology with the disciplines and the development of persons in the world of academe it is possible to construct knowingly a nexus for Higher Education. It is possible to cross some of these divisions conceptually by using the insight afforded by Heron (1992) who provides a pathway for possible integration of epistemologies by providing a classification of knowledge. First, he proposes positional knowledge that can be gained from a consideration of oneself and one's inner life and from the special phenomenon of contact and interaction with other persons. Second, is knowledge of patterns; that is symbolic and iconic and artwork forms. Third, is propositional knowledge; that is knowledge about something and finally fourth is practical knowledge about how things work. In Higher Education, possibly the first positional knowledge is least explored because language tends to lead a dialogue towards the propositional, and those in the vocations and likewise in philosophy and psychology often deal with particular individuals in practical generalities ignoring their

feelings and the special nature of the encounter with another person. A particular exception to this in philosophy is the work of Levinas (1991) who voices the concept of the encounter and the obligation that the other person places on the individual, to drive a first philosophy of ethics, which comes prior to overall notions of justice, which would include all third parties. This work underpins the view of ethics seen in this model as an interactive border between personal development and research. Propositional knowledge is knowledge about things. This is the bread and butter of scientific knowledge and the humanities, of facts and values, ideas about people, animals, places and things. Very often the different schools in Higher Education have contrasting views and priorities based on a long history. A brave attempt to integrate the disciplines is made by Latour (2004) in his book "Politics of Nature: how to bring the sciences into democracy". His views are inspiring in that he attempts to find similarities of "what should be taken into account" in relation to facts and values and place those in juxtaposition with "how disciplines would rank or order them". (p 109) This provides a new axis and separation of powers. Whilst some of the concepts can be taken on board in Higher Education, the main value of the work to me lies in how re-arranging items in concept maps and consideration of their borders can provide new insight. It is with this wider insight into the range of knowledge functioning that it is possible to return to topics such as research and unpack the unvoiced ideology and metaphors that dominate its orientation.

Conclusion

Jung (1971; chapter V) recognised Spitteler's Prometheus and Epimetheus as a treasure trove of metaphor and imagery and promised to return to a further discussion of it, but there is no evidence for this in his collected works. Just as in the process he describes for personal individuation, I am suggesting that there needs to be understanding of the components of higher education in the form of a model suggested in Figure 1. It is then possible for the individual to construct his or her own nexus knowingly, freely and inclusively. The aim is to provide a new vista from which to view Higher Education and to encourage more rounded out approaches to its development. The border concepts of evaluation and curriculum taken with the space of academic development open up a neglected space in Higher Education and whilst putting forward a supportive role for it, the case for academic development expounded here gives it a role to directly challenge research in questioning its validity and appropriateness. And in learning and teaching it makes demands of subject teachers to engage with educational issues and question curricular development.

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This research paper was reviewed using a double blind peer review process that meets DEEWR requirements. Two reviewers were appointed on the basis of their independence, expertise and experience and received the full paper devoid of the authors' names and institutions in order to ensure objectivity and anonymity. Where substantial differences existed between the two reviewers, a third reviewer was appointed. Papers were evaluated on the basis of originality, quality of academic merit, relevance to the conference theme and the standard of writing/presentation. Following review, this full paper was presented at the international conference.

6.2 Conference proceedings

Conference Presentations

1) Intensive Journal Workshop Gladstone Library St Deiniol's, Hawarden planned for July 2011

2) Second UK Chairside Teaching Conference: Taking Inter-professional Collaboration Forward' organiser University of Bedfordshire planned for 22nd June 2011

3) Subject Centre for Medicine, Dentistry and Veterinary Medicine workshop: Celebrating 25 years of Kolb's Leaning Cycle: an appreciative workshop for 2009 Higher Education Academy York October 2009 devised workshop but did not facilitate.

4) International Congress in Periodontology (Europerio 6) Raman V, Sweet J, Ramlogan S, et al. "Association Of Body Mass Index With Recession In Patients With Periodontal Disease In Trinidad and Tobago". Stockholm June 2009

5) SEDA Conference "Using self-coding text analysis software to evaluate student coursework" Brighton May 2009

6) Vocational Trainers Study Day "From Teams to Knots" Eastern Deanery, Cambridge May 2009

7) First UK Chairside Teaching Conference: "Taking Chairside Teaching Research and Scholarship Forward" organiser University of Bedfordshire May 2009

8) Sweet J, Sweet D and Locke, C "Ergonomic Education of Dental Students in cooperation with Physio- and Occupational Therapists" Cracow May 2009 Annual Meeting of the European Society of Dental Ergonomics (ESDE)

9) James Hull Associates Spring Conference "Periodontal diagnosis and referral" Newport April 2009

10) SEDA Conference "Remodelling educational development from concepts of scholarship" Birmingham November 2008

11) AMEE Conference 2008 "Inter-professional learning and teaching in the dental workplace with physiotherapy, occupational therapy and dental undergraduates exchanging posture, ergonomic and oral health advice." Prague August – September 2008 Funded by an award from the subject centre for Medicine, Dentistry and Veterinary Medicine.

12) Subject Centre for Medicine, Dentistry and Veterinary Medicine workshop "Sharing good practice in chairside teaching". London May 2008

13) Sweet D, Sweet J, et al. Health Sciences and Practice Network "Inter-professional learning and teaching in the dental workplace setting with physiotherapy, occupational therapy and dental undergraduates exchanging posture, ergonomic and oral health advice." Cardiff April 2008

14) Subject Centre for Medicine, Dentistry and Veterinary Medicine workshop "An appreciative inquiry into Scholarship of Learning and Teaching: what we value in scholarship". London February 2008

15) Sweet D, Sweet J, et al. "Undergraduate healthcare students' perceptions of back pain, working posture and patient empowerment"; 6th Interdisciplinary World Congress on Low Back and Pelvic Pain: Diagnosis and Treatment; The balance between research and clinic; World Congress for Interdisciplinary Physiotherapy; Barcelona; November 2007.

16) 12th annual SEDA conference 2007: Professional standards and continuing professional development: ideals & realities "Kinetics and myths set against the Academy standards document" workshop Birmingham November 2007.

17) HERDSA 2007 Conference "A key place for Academic Development in Higher Education Scholarship" presentation Adelaide, Australia July 2007

18) ISSOTL 2007 Conference "A Scholarship model based on perceived "spaces" and "borders" in Higher Education" presentation Sydney, Australia July 2007

19) First International iPED Conference 2006: Pedagogic Research and Academic Identities "Research led: identity lost or found?" Coventry September 2006

20) Innovations in Student Learning through Teaching Symposium "Research led: pedagogy lost or found?" Bath September 2006

21) 6th Conference of the International Consortium for Educational Development - Enhancing Academic Development Practice: International Perspectives "Linking enhancement to a life story of academic development" facilitated workshop Sheffield June 2006

22) Staff and Educational Development Association (SEDA) Spring Conference 2006: Advancing Evidence-Informed Practice in HE Learning, Teaching and Educational Development "What does evidence-informed mean?" facilitated workshop Liverpool June 2006

23) British Dental Conference and Exhibition "Those who can, should teach" presentation with Ross Hobson and Damien Walmsley Birmingham May 2006

24) Higher Education Academy: Medicine, Dentistry and Veterinary Medicine - Breaking Boundaries Conference - ran a parallel two day strand of workshops on "Evaluating Chairside Teaching" Edinburgh November 2005

25) Assemble, Catalogue, Exemplify, Test and Share (ACETS) Symposium presentation "From Transmission to Nurture in Learning Activity Design" Edinburgh November 2005

26) 10th Annual SEDA Conference: Professional Standards and Continuing Professional Development: Constraining or Empowering? "Being and becoming: an appreciative inquiry into professionalism" workshop held with Tony Brand Birmingham November 2005

27) SEDA/AISHE Spring Conference: Inspiring Learning: Diversity and Excellence. "The uses and abuses of educational models" debate with Tony Brand Belfast May 2005

28) British Society for Teachers in Conservative Dentistry "Innovations in Chairside Teaching" - workshop Liverpool September 2004

6.3 Funded research

Research Grants

Ongoing research

1) Higher Education Academy: Medicine Dentistry and Veterinary Medicine mini-project: Investigating the educational and training needs of dental chairside tutors in the UK and producing Guidelines for their Initial and Continuing Education. (July 2010 £4,950)

2) Staff and Educational Development Association. “Collaboration between Subject Centre Health Education Developers’ Special Interest Group and SEDA” (March 2008 £500)

Completed research

3) Higher Education Academy: Medicine Dentistry and Veterinary Medicine mini-project: Breaking Boundaries dissemination: a collaborative evaluation and promotion of better chairside teaching (July 2006 £4,910)

4) Cardiff University Funding for Interdisciplinary/Inter professional Collaboration in Learning and Teaching. "An inter professional clinical exercise using a ‘patient centred’ approach to exchange prevention advice between physiotherapy and dental undergraduates". (June 2006 £8,700)

5) Higher Education Academy: Medicine Dentistry and Veterinary Medicine funding for two workshops on "Scholarship of Learning and Teaching" (May 2006 £1000)

6) ACETS project: "Student Resources for Patient Communication regarding Periodontal Diseases" (August 2004 £1000)

7) LTSN-01 workshop: Portfolios for Everyone (April 2004 £500) Workshop for dental teachers and staff involved in Higher Education.

8) LTSN-01 project: Perceptions of Chairside Teaching (August 2003 £4750) "Qualitative and phenomenographic study of stakeholders in undergraduate dental education"

9) Grant Award (UWCM) (June 2003 £1000) Loci of Educational Development in the Merged University (Cardiff and UWCM)

10) LTSN-01 workshop: Student Centred Teaching and Debriefing (August 2003 £500) Workshop for dental, medical and veterinary teachers.

11) LTSN-01 workshop: Scholarship of Learning and Teaching (February 2003 £1000) Workshop for dental, medical and veterinary teachers.

12) Institute of Learning and Teaching (ILT) Small Grant Scheme (December 2001 £1000) "Strategies to celebrate, share and reward excellence in teaching in Wales" Collaborative project across HE in Wales

13) LTSN Grant Award (UWCM) (October 2001 £1000) "Action learning for facilitators of e-based Interprofessional Education project"

14) Staff and Educational Development Association (January 2001 £500) Loci of Educational Development within the College. Matched by University of Wales College of Medicine (UWCM) (£500)

15) Clinical Effectiveness Support Unit (Wales) (February 2000 £3745.00) "Treatment Planning Handbook" web site development.