PETER GOODYEAR AND NIRA HATIVA

INTRODUCTION

Research on teacher thinking, beliefs and knowledge in higher education

Increasingly serious attention is being paid to the quality of learning and teaching in higher education. This is a global concern, associated with calls for greater accountability and efficiency, increases in the size and diversity of the student population and a relative decline in the real value of funds available for higher education. Teaching in higher education is having to become more professional. Agencies are being set up in a number of countries, charged with supporting and/or accrediting the development of teaching competences. (See, for example, the work of the Institute for Learning and Teaching in Higher Education in the United Kingdom.) Faculty are paying greater attention to their teaching and to finding ways of improving the effectiveness and efficiency of the support they provide to students. Universities are shifting budgets towards the improvement of learning and teaching and are strengthening the roles of faculty developers. There is a growing stream of practical books, aimed at guiding both new and experienced university teachers (e.g. Beard & Hartley, 1987; Biggs, 1999; Brown & Atkins, 1988; Brown, Bull & Pendlebury, 1997; Brown & Knight, 1994; Gibbs & Jenkins, 1992; Hativa, 2000; Laurillard, 1993; McKeachie, 1999; Prosser & Trigwell, 1999; Race & Brown, 1993; Ramsden, 1992). These shifts are creating a demand for a better research-based understanding of the nature of teaching in higher education. This research field is still immature, though it is now beginning to develop very rapidly, as a comparison between the early reviews of McKeachie (1963) or Dunkin & Barnes (1986) and the references cited within the chapters of this book will quickly reveal. Our book is intended to stimulate, and act as a central resource for, what we believe will prove to be one of the most exciting and rapidly growing areas of educational research in the next decade.

There is a strong tradition of research on teaching at the *pre-college* level, going back to the 1960s. An important strand in this research is work which concentrates on teachers' thinking, beliefs and knowledge (see for example Peterson & Clark (1978); Calderhead (1984; 1996); Leinhardt & Greeno (1986); Day, Pope & Denicolo (1990) or, in a somewhat different vein, Mitchell & Weber (1999). Our book will extend this research strand into the field of higher education. Research has shown strong, though not necessarily simple, links between these areas of (a) teacher thinking, beliefs and knowledge, (b) teachers' classroom practices and (c) student

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learning. The studies collected in this book explore these relationships at the higher education level. They constitute a unique resource for all those interested in research that can improve higher education practice. We have brought together an impressive team of authors from North America, Europe, Australia, and South East Asia. Together they provide a rich international perspective on teaching and learning in higher education.

It is perfectly legitimate to be interested in the ways in which 'knowledge workers' in general carry out their work, or think and talk about their work. Higher education teachers are an intriguing kind of knowledge worker (c.f. Shoenfeld, 1998), with some of the qualities that large corporations and international consultancies say they value highly in recruiting workers for the new millenium, and some qualities which seem to belong exclusively to the Victorian age. The authors in this book are committed to the improvement of education. Understanding and improving teaching is only part of the story. If improvement in student learning is the key goal, then research on teaching has to face a number of challenges. There can sometimes be rather uncertain connections in the paths which link learning outcomes to learning activities to teaching activities to teaching approaches to teachers' thinking, beliefs and knowledge. Improving educational opportunity demands a multi-directional attack. We can work directly with students to help them improve the way they tackle learning tasks (though we will have to do this every year). We can work on the learning environment, trying to ensure that library and ICT resources are adequate and that the physical infrastructure is well planned and well managed. We can work on the funding of study, so that students can focus on learning rather than subsistence. But we can also work on teachers and teaching. This can have two kinds of beneficial, enduring consequences: direct and indirect. We may be able to help teachers improve what they do in their direct interactions with students - giving better lectures, running more inclusive seminars, designing fairer assessment tasks, giving clearer feedback, and so on. But teachers also have a say in how universities are run, in developing strategies for learning and teaching, in course and curriculum design, and in a number of other important ways they give shape to the students' learning experience. Improving teaching can also happen directly and indirectly. Teachers can learn to do things differently by a variety of means, from observation and imitation to deep analysis and reflection on their working practices and pedagogical beliefs. A well-founded programme of support for the improvement of teaching will recognise this variety, and will also be sensitive to the interplay between self-motivated improvement and improvement as a response to external pressures. Within this complex web, attention must surely be given to both action and intention; to behaviour and belief. It would be naïve to say that belief and intention are the bedrock for behaviour or action: the relations are more reflexive than that (c.f. Suchman, 1987; Lave, 1988). Nevertheless, it is in the discourse of beliefs about teaching that we can find some of the opportunities for *radical* change. Similarly, as our understanding of the thought processes entailed in teaching clarifies, so we have a more *realistic* position from which to engage in discussions about how teaching occurs and can occur. We have a firmer grasp of what is possible. The more we know about the knowledge-bases of expert and experienced teachers, the better equipped we are to understand and *explain* their

teaching to novice teachers. Knowing more about how teachers do what they do is also a key to making educational research more relevant to their practice. Much of the current talk about 'evidence-based practice' overestimates the pedagogical sophistication and decision-making processes of practitioners (Yinger & Hendricks-Lee, 1993). It is our contention that a well-founded account of the relations between knowledge, beliefs, thinking, intention and action in teaching is necessary to an evidence-based programme of improvement in the practices of higher education. We hope that this book will play a useful role in outlining such an account, and we will attempt, in the final chapter, to assess how far we have come and where next researchers need to go.

1. OVERVIEW OF THE CONTENTS OF THE BOOK

In Chapter 1, Noel Entwistle and Paul Walker characterise the evolution of increasingly sophisticated conceptions of teachingand draw to our attention the ideas of 'expanded awareness' and 'strategic alertness'. The development of more sophisticated conceptions of teaching entails an expanded awareness of the nature of the discipline, the teaching of the discipline, and of students' learning – as well as a richer awareness of the relationships between these three. There are intriguing parallels between the development of students' beliefs about learning and the development of teachers' beliefs about teaching. Entwistle and Walker make the point that the more sophisticated conceptions of teaching evolve from, and include, the earlier and less sophisticated conceptions. Within a more sophisticated approach to teaching, in which the focus of attention shifts away from content *per se*, Entwistle and Walker detect the appearance of a kind of principled opportunism or 'strategic alertness' that enables the skilled teacher to capitalise on chance classroom events and exploit key 'teachable moments'.

Entwistle and Walker's chapter is unusual in its methodology, drawing on Paul Walker's own narrative account of his development as a university teacher. This account is data, first-order interpretation *and* illustration. It deserves to be taken seriously as data for others' research but it also paints a 'recognisable reality' – 'detailed, contextualised and personal' – for other practitioners. It illustrates the interplay between knowledge, experience and feelings which is missing from more abstracted or analytic accounts of teaching.

Mick Dunkin's chapter (Chapter 2) is also concerned with the development of concepts and beliefs about teaching in higher education. Rather than trace an individual's evolution through time, Dunkin contrasts evidence drawn from interviews with sets of novice and award-winning teachers. Dunkin's work has some roots in the cognitive science paradigm of expert:novice comparisons (see e.g. Chi et al, 1988; Ericsson & Smith, 1991) and more specifically in studies of teaching expertise by Gaea Leinhardt, Hilda Borko, David Berliner and their co-workers (see e.g. Leinhardt & Greeno, 1986; Berliner & Carter, 1989; Goodyear, 1991). Findings from this diverse literature display a remarkable convergence on the attributes of expertise. They can be taken to *suggest* that expert teachers in higher education will display a greater capacity to analyse teaching and learning situations (c.f.

grandmasters' 'reading' of a chess board), be more aware of the complexity of teaching and learning, and have an enriched conceptual repertoire for thinking and talking about teaching and learning, when compared with novice teachers.

Dunkin's methodology differs from that employed in classic expert:novice comparison studies. He used interviews to get teachers to articulate their beliefs about teaching, whereas the classic form of expert:novice comparison study involves the observation of task performance (and usually the elicitation of a concurrent or retrospective verbal account or 'think aloud' protocol). It can be argued that talking about teaching is an authentic teaching task. For example it may play an important role in self-evaluation, reflection and personal development as a teacher. It may also play an important role in collaborative teaching activities, such as course design. Nevertheless, important aspects of teaching are missed if we focus only on what can be derived through interviews.

Dunkin's comparisons of the espoused beliefs of his (relatively) novice and experienced, award-winning teachers tend to confirm these suppositions. His novice teachers tended to describe teaching in terms of one of four dimensions. All of the expert teachers mentioned at least two of these four dimensions, giving at least the appearance of greater cognitive complexity. A second area of novice:expert difference is concerned with explanations of self-efficacy. It would not be surprising if award-winning teachers revealed a higher self-efficacy than novice teachers. The interesting thing is that the award-winning teachers' accounts of their efficacy were complex and couched in qualified terms, and that the areas of expertise to which they most readily laid claim drew on pedagogical skills rather than up to the minute discipline knowledge. Finally, in relation to self-evaluation, the expert teachers typically drew on a wider range of information sources in coming to a judgment about whether they had given a good lecture or were teaching well. All this points to expert teachers having a richer conceptual repertoire with respect to teaching and learning. It is *suggestive* of ways in which staff development programmes might help novice teachers enrich their ways of thinking about teaching. What we still need, however, are good accounts of how the novice:expert transition is made, and can best be supported.

Lynn McAlpine and Cynthia Weston offer us one such account. Like Dunkin, they use the notion of expertise in teaching. Their empirical study focuses on six teachers in higher education for whom strong claims for expertise in teaching could be made. They videotaped a series of classes taught by the six teachers, interviewed them before each class and interviewed them again after the class using the playback of the videotape to stimulate recall. McAlpine and Weston focus on *reflection* as a mechanism – or metacognitive process – for turning experience into knowledge about teaching, arguing that reflection has the capacity to improve teaching insofar as it allows teachers to be more intentional and deliberate in their work. As a metacognitive process, reflection both creates and is sharpened by teaching knowledge.

How then does reflection act as a mechanism for the construction of teaching knowledge from experience of teaching? Classic accounts of the explicit knowledge upon which teaching draws, such as that of Lee Shulman (1986), refer to knowledge *domains*: content knowledge, general pedagogical knowledge, pedagogical content

knowledge, knowledge of learners, etc. McAlpine and Weston suggest adding a further domain: experiential knowledge. Whether to consider this a further *domain* of knowledge, or a *type* or *quality* of knowledge is a matter for debate. ('Domain' implies that what is important is the content. 'Type' or 'quality' might be used to distinguish the genesis of the knowledge or its representational form. See for example de Jong & Fergusson-Hessler, 1996.) But what is at stake for McAlpine and Weston is that experiential knowledge is used explicitly to provide rationales for monitoring and decision-making in teaching and that it is not *yet* principled knowledge. In addition to this explicit experiential knowledge, McAlpine and Weston's teachers also drew on forms of *tacit* knowledge. They suggest that intentional reflection is a way of turning patterned experiential and tacit knowledge into explicit principled knowledge. This may be a necessary, but cannot be a sufficient, condition for improvement in teaching. There are too many forces at work that can frustrate productive reflection and deflect teachers from using reflection in improving their teaching practices and the learning opportunities available to their students.

Peter Goodyear picks up the theme of experiential teaching knowledge in a study of the rapidly growing area of 'online' teaching. Goodyear's study is unusual in that it focuses on the work of one very experienced online teacher – a university lecturer who had ten years experience of online teaching, though no formal training in this methodology. The study is also unusual in that the teaching takes place within a postgraduate programme of continuing professional development, rather than in an undergraduate teaching programme. The fact that, at least in this study setting, students and teachers are separated in space and time means that online teaching can be examined using a mix of research techniques not normally available to researchers of teaching. For example, the teacher can be asked to engage in concurrent verbalisation ('thinking aloud') *while* they are teaching – something which is virtually impossible in the normal classroom situation. They can also be interviewed *during* a teaching session. For example, the work of the tutor studied for this chapter consisted of a sequence of reading and replying to electronic messages. It was possible to interview the tutor after they had worked on each such message. It was also possible to (re-) display messages on the computer screen and replay a recording of the teacher's utterances, as ways of stimulating recall and/or grounding their accounts of their thinking and action. Goodyear makes the point that research in this sub-field of university teaching is still in its infancy and so it is useful to identify some of the 'main contours' of the field and some important research challenges. Among these, he singles out shifts in the teacher's focus of attention; the extent and sources of the teacher's knowledge of their students; processes implicated in the articulation of tacit pedagogical knowledge and beliefs; the handling of conflicting or competing pedagogical goals; the relative importance of routine and deliberate courses of action and aspects of the 'presentation of self' in online educational spaces.

In Chapter Five, Elaine Martin and her colleagues argue that what teachers intend may be more important than 'how much they know' in determining what their students learn. From this perspective, improvement in teaching is not so much the repair of pedagogical skill deficiencies (or updating in subject matter

NOEL ENTWISTLE AND PAUL WALKER

STRATEGIC ALERTNESS AND EXPANDED AWARENESS WITHIN SOPHISTICATED CONCEPTIONS OF TEACHING

Abstract: Recent research into teaching in higher education has established what appears to be a nested hierarchy of conceptions of teaching moving from teacher-focused to student-focussed categories. This chapter draws parallels with the intellectual development of students to suggest a process of expanding awareness in academic staff of the relation between learning and teaching, which leads to the strategic alertness to 'teachable moments' as they occur in the classroom. A case study of one lecturer's changing conceptions of learning and teaching is presented in detail and related to the literature both of the nature of conceptions and schoolteachers' knowledge and beliefs about teaching. This analysis provides a fuller description of what may underlie sophisticated conceptions of teaching and leads to a discussion about how conceptual change may be encouraged in academic staff.

1. INTRODUCTION

This chapter examines recent research on how academic staff conceptualise teaching. In particular, it considers the ways in which an initially limited conception moves towards a more sophisticated appreciation of the complexities of learning and teaching in higher education. The starting point is a description of two studies which tracked developmental trends in student learning and epistemological beliefs. They indicate that higher level conceptions emerge out of the lower ones through reflection and integration, resulting in an expanded awareness of the nature of learning and academic study. These findings are used subsequently to draw parallels with changes in conceptions of teaching.

To understand how conceptions develop, their general nature is then examined before summarising recent research into contrasting conceptions of teaching at university. The chapter then extends the idea of a sophisticated conception of

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similar phenomena, neither study considered the underlying ways of thinking which create such conceptions. A general discussion of the nature of conceptions follows, with ideas about the way conceptions of teaching develop being considered later.

3. THE NATURE OF CONCEPTIONS

Until quite recently, the literature of cognitive psychology described concepts as part of a formal category system existing in the mind - the cognitive structure - which was searched when trying to answer a question (see, for example, Anderson, 1990). Concepts, of course, have distinct features through which their meanings are defined. The cognitive research tradition emphasised an orderly, rational process through which people acquire concepts, by extracting the common features of experiences in which the concepts are exemplified. Experientially, however, such descriptions seem much too tidy. They may help to indicate how young children build up everyday concepts - like table or dog - but they are less successful in explaining how complex abstract concepts are constructed. The defining features of such concepts are not so easily distinguished within the experiences, so what is stored in the memory to allow us to grasp a common meaning?

When students are asked in class to explain what they understand by even a somewhat abstract term, like 'antidote', very few of them can give a precise definition, at least initially. They are more likely to start with an example, such as a snake bite and the serum used to counteract its effects. Gradually, they manage to build up a more general and complete definition, testing its adequacy step by step against the comments of other students and by personal reflection. It is very unlikely that this phenomenon can be explained though the existence of formally defined concepts - except as special instances. Explanations are typically constructed from a series of recollections and fragmentary bits of knowledge, pieced together on a particular occasion to satisfy the demands of the question, the questioner, and the specific context (Entwistle, 1998a).

The distinction between formally defined 'concepts' and 'conceptions', which carry personal meaning, is at the heart of the extensive work using 'phenomenography' carried out by Marton and his collaborators (Marton, 1994; Marton & Booth, 1997; Bowden & Marton, 1998). This research typically explores the range of conceptualisations which people report and simplifies them into a set of inter-related categories, often in the form of a hierarchy such as that described by Säljö (1979).

The existence of a range of contrasting conceptions has been found in a wide range of contexts and content areas, and the existence of these webs of personal meaning can now be supported by emerging neurological theories about the ways in which memories are stored and knowledge acquired, based on complex linkages between neurones (Edelman, 1992). Such 'neural nets', within computer-simulations, have proved capable of recognising the key aspects of incoming information, based on previous inputs and analyses, and of reacting to them appropriately.

teaching, drawing on teaching in schools to identify more general aspects of 'good teaching'.

The central section of the chapter presents a detailed case study - a reflection on the personal experience of conceptual change over many years of teaching experience. This extended illustration suggests close parallels with the development of students' epistemological beliefs, and also introduces the idea of *strategic alertness* as an additional aspect of good teaching.

The chapter concludes with a discussion of the ways in which changes in conception occur in everyday teaching, compared with those 'seeded' by concepts derived from research. It appears that these conceptions may have importantly different characteristics which would affect how they might best be utilised within educational development activities.

2. NESTED HIERARCHIES DESCRIBING DEVELOPMENT IN LEARNING

Rather few studies have followed up students to explore how learning and thinking change during the college years, and yet longitudinal studies represent the only effective way of investigating developmental trends. Two early studies did, however, provide important indications of the changes taking place in student thinking. Heath (1964) interviewed students repeatedly throughout their four years in college. He focused on differences in personality, but also considered contrasting ways of thinking, concluding that there were three distinctive personality 'types' - 'non-committers', 'hustlers' and 'plungers'. The non-committers were cautious and anxious, both in establishing personal relationships and in the ways they tackled their academic work. The hustlers were self-confident but also insensitively competitive. The plungers were impulsive in their actions and followed idiosyncratic pathways in their thinking which others found difficult to follow. Over time, the students gradually began to integrate the other characteristics into those of their own initial type and moved towards an 'ideal type' - the *reasonable adventurer*. Students who had reached this stage of development behaved thoughtfully towards others and alternated their thinking between the free ranging thought processes of the 'plunger' and the cautious approach of the 'non-committer', while maintaining the drive towards success of the 'hustler'. Although this was a small-scale study, its importance derives from the intensive, long-term contact which was maintained with the students, and the idea that apparently disparate characteristics may become integrated in the process of development.

The second study also reported interviews over a four-year period and again focused on both academic and personal development. Perry (1970) found evidence of a trend in intellectual and ethical development, through a series of nine 'positions' or stages, which has since been described as a change in *epistemological level* from dualist thinking to relativism. *Dualism* implies a belief in the existence of right or wrong answers to every question and in the early stages of their course students often treat faculty as the ultimate authority from whom they expect the 'right' answers, first to be learned and then to be reproduced in tests and examinations.

They soon realise that they are actually being presented with a *multiplicity* of views, all of which are given some weight by their teachers. Having realised that there is, in fact, almost always more than one way of looking at a given situation, many students conclude that any one opinion (and particularly their own) is as good as any other.

These developments cover the first four stages in Perry's scheme, leading on to a fifth position which is seen as pivotal. This position involves a 'changed conception of reality', with relativism being glimpsed but not fully understood. The dawning awareness that knowledge is generally provisional may provoke unease as its broader implications are perceived, and lead to regression towards the perceived safety of dualism. This unsettling tension between progress and regression is an 'unstable equilibrium', which leads to the position being described as 'pivotal'. The term means more than that, however. In Perry's own words,

> (The fifth position) has taken us over a watershed, a critical traverse in our Pilgrim's Progress... In crossing the ridge of the divide,... (students) see before (them) a perspective in which the relation of learner to knowledge is radically transformed. In this new context, Authority, formerly a source and dispenser of all knowing, is suddenly authority, ideally a resource, a mentor, a model, and potentially a colleague in consensual estimation of interpretations of reality... (Students) are no longer receptacles but the primary agents responsible for their own learning... As students speak from this new perspective they speak more reflectively. And yet the underlying theme continues: the learner's evolution of what it means to know (Perry, 1988, p.156).

Only gradually do students fully embrace *relativism*, accepting that conclusions necessarily rest on subjective interpretations of objective evidence, with different conclusions justifiably being drawn from the same body of evidence. Only a minority of students in Perry's study were able to take the final step and demonstrate personal *commitment* to their own interpretation or perspective. This final stage may be seen in the attempts which some students made to construct their own coherent, individual perspectives of the discipline, and to identify with that view while retaining tolerance of alternative viewpoints.

In the longitudinal studies, several students who had reached the final stage reported what can be seen as an *expanding awareness* of the nature of knowledge and of inter-personal relationships. The recognition of alternative interpretations of evidence and of competing ideologies led these students to be cautious in their use of evidence and to become more tolerant of other viewpoints. They were also able to reflect on their own intellectual progress, recognising how they had gradually come to realise both the importance, and the limitations, of evidence. Not surprisingly, very few students reached this level of awareness of their own reasoning processes, but their comments did provide a powerful indication of the developmental trends involved.

Perry showed that students developed through his hierarchy of positions at different rates and to different extents during their time in higher education, influenced in part by their educational experiences. These conclusions have been

largely supported in subsequent studies (see the review by Hofer & Pintrich, 1997), leading to a recognition that higher epistemological levels emerge out of lower ones as a 'nested' hierarchy. These findings, taken in conjunction with Heath's, suggest that intellectual development in higher education involves the gradual integration of previously separate personal characteristics and ways of thinking, leading to an expanding awareness of the complexities of academic knowledge.

A subsequent developmental hierarchy was described by Säljö (1979) from interviews with a sample of adults with varying educational experience. His five distinct conceptions of learning ranged from learning as rote memorisation and the *reproduction* of knowledge conveyed by the teacher, to a recognition that learning rested ultimately on the personal *transformation* of the information presented, drawing on what was known or had been experienced already. In this way conceptual understanding could be achieved. Individuals who recognised the importance of understanding for themselves were still ready to use rote learning when necessary, but were conscious of the variety of forms of learning available, and how they could be used. In a subsequent study, the broadest conception was extended to represent learning as 'developing as a person' (Marton, Dall'Alba & Beaty, 1993; Marton & Säljö, 1997). Overall, these six categories again seem to form a nested hierarchy.
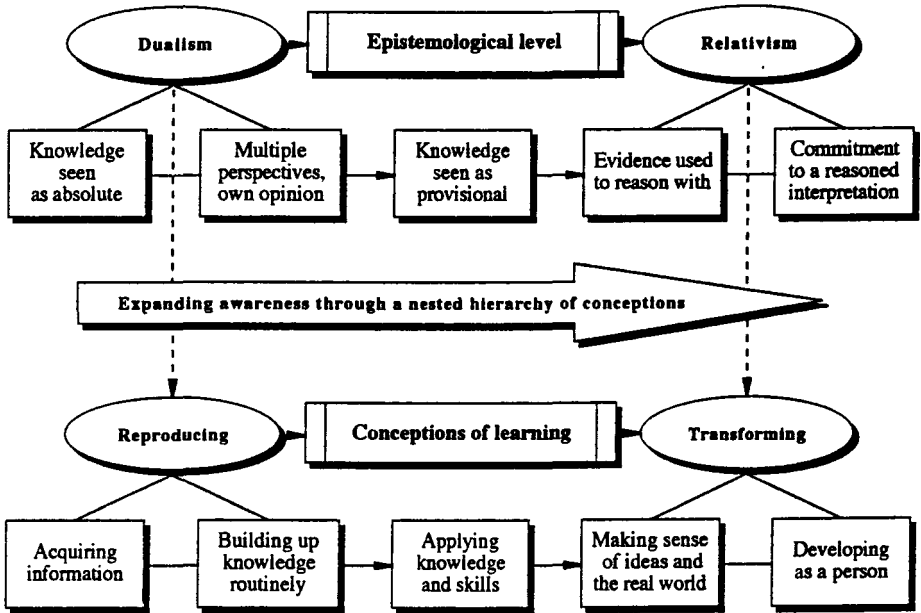

Figure 1. Intellectual development and conceptions of learning

Clear parallels can be seen between the hierarchies identified by Perry and by Säljö, with dualism being associated with a reproductive conception of learning (as illustrated in the published extracts from Perry's interviews) and the descriptive similarity continuing through the two series of categories, as suggested in Figure 1. Although Perry's epistemologies and Säljö's conceptions seem to describe very

MICHAEL J. DUNKIN

NOVICE AND AWARD-WINNING TEACHERS' CONCEPTS AND BELIEFS ABOUT TEACHING IN HIGHER EDUCATION

effectiveness, efficacy and evaluation

Abstract: After a discussion of the importance and the status of knowledge about
teaching in higher education, the author describes a research program at the
University of Sydney involving the study of concepts of teaching
effectiveness, self-efficacy regarding teaching, and the criteria for self-
evaluation as teachers of two groups of novice lecturers, and compares them
with a group of award-winning, expert lecturers. Differences were found in the
extent of the repertoire of concepts of teaching effectiveness, in self-efficacy
regarding teaching, and in the criteria used in self-evaluating teaching. The
findings are discussed as evidence of lessons to be learnt in achieving
excellence in teaching.

The study of teacher thinking in higher education contexts is much younger and
less voluminous than at lower levels of education. For example, in the third edition
of the *Handbook of Research on Teaching* (Wittrock, 1986) there was a whole
chapter on teachers' thought processes (Clark & Peterson, 1986) in which
approximately 50 studies were presented, all concerned with teaching at grade
school levels.   In the chapter concerned with research on teaching in higher
education (Dunkin with Barnes, 1986), however, not a single study of teacher
thinking was presented and the authors concluded by recommending that teacher
thinking become a focus for future research at that level.   In this chapter a series of
Australian studies conducted in response to that recommendation is presented and
discussed.

1. THE STATUS OF KNOWLEDGE ABOUT TEACHING IN HIGHER EDUCATION

Teachers' concepts and beliefs concerning teaching include, among other things, their judgments about the effectiveness of teaching as an intervention, their estimates of personal influence upon student learning, their beliefs about the extent to which they possess teaching competencies, as well as the criteria by which they evaluate their own teaching and themselves as teachers. It is important to note that these are all likely to be subjective assessments based upon personal observations rather than objective assessments based upon applications of scientific method. In Australia and elsewhere, university staff outside Schools of Education rarely have been trained as teachers, although it is not uncommon for them to have had some years of experience at the level of teaching assistants before they secure tenure track positions. This means that, in most cases, what they know about teaching has been learnt informally, by observing teaching from the reciprocal position of student, from observing and communicating with their colleagues, and experientially, that is, by doing it. One could hardly say that the knowledge of teaching these people acquire is scientific knowledge. Nor is it even professional knowledge, for there has rarely been a course or program of study in teaching leading to a qualification, such as a degree, in it. Usually there is no licensing or professional association to which they seek admission and which guards standards. At best, these people acquire what might be called "craft" knowledge.

Indeed, the very term "knowledge" is a difficult one to use when one is referring to complex human social activities such as teaching. There are few if any widely accepted, let alone demonstrated, tested or proven, truths about teaching in higher education, so that when one wonders what university teachers "know" about teaching, one is really wondering what *counts* as knowledge about teaching to them. One way to arrive at what counts as teachers' knowledge in higher education is to compare beliefs about the nature of teaching effectiveness held by novices with those held by "experts".

Differences between experts and novices in fields outside of teaching have been researched in several studies. For example, Chase and Simon (1973) studied chess players and found that after studying a chess board for five seconds an expert player can reconstruct the location of the pieces with an accuracy of between 80 and 90 percent. However, novice chess players were found to be capable of remembering the locations of only a few pieces. Furthermore, expert chess players were found to suffer only a moderate loss in playing strength when required to reduce the time for moves from 180 to 10 seconds.

Studies of differences between expert and novice schoolteachers have found comparable results. Berliner and Carter (1989) found that expert teachers were better able to identify important features of a task than were novices. Expert teachers engaged in "if-then" thinking more and were also more attuned to the subtleties of tasks. Similarly, the expert secondary school mathematics and science teachers in the study by Borko and Livingston (1990) were able to "plan more quickly and efficiently than novices because they are able to combine information from existing

schemata to fit the particulars of a given lesson" (p.490). Carter, Sabers, Cushing, Pinnegar and Berliner (1981) found that expert teachers were more likely to discuss teaching in a principled, analytic way than novices. Leinhardt and Greeno (1986) found striking differences in effectiveness, efficiency and smoothness between expert and novice mathematics teachers and attributed the differences to the experts' presumably more tightly structured schemata. Needels (1991) found that experienced elementary school teachers displayed greater understanding of the interconnectedness of classroom occurrences and discussed different topics from inexperienced teachers when asked to make written comments on a videotaped lesson. The topics used by the experienced teachers showed a greater understanding of the complexity of teaching and greater sensitivity "to how teachers might draw upon students' experiences and backgrounds" (p.278). Peterson and Comeaux (1987) found that "experienced teachers more often discussed problem events in terms of principles of effective teaching" (p.327) indicating that they were effective analysers and problem-solvers as teachers. When Strahan (1989) compared the views of instruction of experienced and novice middle school teachers, he found the experienced teachers to use more complex structures than the novices. Similarly, Swanson, O'Connor and Cooney (1990) found that, with respect to problems relating to classroom discipline, expert teachers were more analytical than novices.

Emerging from this body of research is considerable evidence that expert teachers differ from their less experienced colleagues in the complexity and sophistication of their thoughts about teaching. Experts seem to be more analytical, more aware of complexity and to have more enriched conceptual repertoires regarding teaching than novices. While none of the research cited above was conducted in higher education contexts, it is reasonable to expect that similar differences exist between expert and novice teachers in higher education and that the exploration of teachers' thinking in that context would be just as rewarding as elsewhere. Indeed, Berliner (1994), after reviewing research on novice-expert differences across many fields of endeavour concluded:

> Generalizing from studies in this domain should be difficult, but remarkably, that has not been the case...As has been made clear in this review ... propositions [from studies of expertise across disparate fields] are highly compatible with the ones we derived from studies of teaching. (p. 184)

Through such investigations the nature of excellence in teaching in higher education might become better understood and, therefore, more available for use in programs of professional development. In the research reported in the rest of this chapter, particular attention is paid to comparisons between novice and expert teachers.

2. THE RESEARCH PROGRAM

The series of studies reported here addressed three main substantive issues concerning teachers' concepts and beliefs in higher education:
1. Teachers' beliefs about the nature of effective teaching, defined as their beliefs about approaches they thought were most important in enhancing their students' learning.
2. Teachers' beliefs about their self-efficacy within the context of teaching in higher education; that is, their perceptions of the power of teaching to influence student learning and of their possession of the competencies required to actualise that power.
3. The criteria teachers said they applied in reaching judgments about the effectiveness of their teaching and of themselves as teachers.

The research program began with interviews with a group of 55 recently appointed tenure-track lecturers and an exploration of their experiences while being inducted into the university (Dunkin, 1990). The 55 were representative of all new lecturers joining the staff of the university in tenured and tenurable positions during the years 1981-1984, inclusive, and had had an average of 5.15 years of teaching experience in more junior positions. Part of the interview in which each new lecturer participated involved questions concerning his or her thoughts about the three issues specified above. It should be made clear at this point that the purpose of this research was not to evaluate teaching effectiveness but to map thoughts about teaching.

Corresponding data were also used from a second group, this time of 32 novice lecturers who had arrived at the university after 1984 and who were recruited according to a sampling design requiring matching of males and females within cognate fields of study, and who were, therefore, not representative (Dunkin, 1991a). On average, these lecturers had had 7.30 years teaching experience, again, in more junior positions..

Subsequently, the interviews were repeated with 12 experienced teachers at the same university, all of whom had won awards for excellence in teaching (Dunkin & Precians, 1992) and who had had an average of 23.3 years experience. These interview data were compared with the data from the two groups of novice lecturers in the expectation that there would be differences and that they might indicate lessons to be learned in advancing from the status of relatively inexperienced university teachers to the status of experienced and even award-winning ones.

2.1 Teachers' beliefs about the nature of effective teaching

Of course, in the final analysis, it is likely that teaching effectiveness is more a matter of what teachers do than what they believe. However, these two - knowing and doing - are certainly related to each other. The "knowing" part of teaching extends well beyond the classroom into such areas as teachers' knowledge of their subject, of their students, of the institutional, social and cultural contexts in which they work, of teaching methods, of resources to support their teaching, of techniques

for assessing student achievement, and so on. These are all matters of what teachers possess cognitively: of what they know, understand, believe and think about teaching and learning. The depth and breadth of this cognitive repertoire empowers teachers to make good decisions and judgments at the planning, implementation, evaluation, and follow-up stages of the teaching-learning process. As teaching is clearly an extremely complex process, there can be no disagreement that the size and quality of the repertoire of knowledge and thought that teachers possess and have at their disposal is crucial in determining the quality of their actions and, therefore, their effectiveness. There seems little or no need to argue that the study of teachers' cognitions regarding teaching effectiveness is an important thing to be doing. Research by Prosser and Trigwell (Trigwell & Prosser, 1993; Prosser & Trigwell, 1992), employing their Approaches to Teaching Inventory, and by Ramsden and Moses (1992) provides ample testimony of the value of the study of university teachers' strategies and intentions.

The responses made by the first group of novices (Dunkin, 1990) to the question, "What are the most important ways in which you can enhance your students' learning?" were recorded and subsequently analysed into categories arrived at intuitively on the basis of the author's long experience in the field of research on teaching. At the end of this process four categories were found capable of accommodating the variety of responses made. First, there were responses in which the lecturers argued that to enhance student learning they would have to *structure* their teaching very carefully. They would have to be very well organised, and thoroughly prepared, with student work carefully laid out and assessed. To some, the structuring had to be so thorough as to make it almost impossible for students to fail. Next, they considered that success in teaching depended on *motivating* students. The chief task for some was to arouse interest, enthusiasm and love for the subject so that students would be almost seduced into learning, even against their wills. Then there were those who saw effective teaching to consist of making the students *active and independent* learners. They seemed to be particularly concerned to give their students hands on experiences, to have them solve problems and to become self-sufficient scholars. Finally, there were those who saw effective teaching primarily as a *social relationship* in which students were made to feel secure, to see their teachers as approachable, nurturant people on whom they could rely for help.

Thus, these new staff together tended to see effective teaching to have four main dimensions:
1. Teaching as structuring learning;
2. Teaching as motivating learning;
3. Teaching as encouraging activity and independence in learning; and
4. Teaching as establishing interpersonal relationships conducive to learning.[1]

These same four categories were found also to accommodate the responses of the other two samples (Dunkin,1991a; Dunkin & Precians, 1992).

Table 1 contains the quantitative data that permit comparisons among the three samples. It shows that structuring and motivating were the most frequently

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[1] Dunkin et al. (1994) reported the following coefficients of inter-observer agreement for these categories: structuring .88; activity .74; motivating .73; relationships .86; total .82.

LYNN MCALPINE AND CYNTHIA WESTON

REFLECTION: ISSUES RELATED TO IMPROVING PROFESSORS' TEACHING AND STUDENTS' LEARNING

Abstract: In this chapter we describe the outcomes of our research on the reflection of six professors considered exemplary in their teaching. For instance, we found that they all held and used considerable knowledge about learners, as groups and as individuals, and used this knowledge in reflecting on the impact of their teaching. We use this information to elaborate on the role of reflection in the construction of teaching knowledge. Lastly, we address how the model of reflection we developed helps us understand the factors influencing one's ability to reflect effectively on teaching.

1. INTRODUCTION

There are different traditions in reflective practice that influence how one conceptualizes the role or emphasis of reflection in the life of the teacher (Zeichner, 1994). An academic orientation focuses on the organization of subject matter, a social efficiency orientation on how well practice matches what research says, a developmental orientation places priority on understanding students' thinking, a social reconstructionist orientation sees reflection as a political act, and finally the generic orientation is one in which any reflection is good because teachers can then be more intentional and deliberate in their thinking about teaching.

Our orientation currently could be characterized as the last. We would agree with Neufeld and Grimmett (1994) that growth can result from reflection on "the ordinary day-to-day experience of instructing students in classrooms ... (which) ... elevates the activity of instruction from the level of mundane drudgery to one that has the potential to educate practitioners, thereby changing and improving their practice".

What we want to do first in this chapter is describe the outcomes of our research on reflection. We have documented and analyzed in detail the reflective processes

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of six successful university professors[1] in their day-to-day planning, instructing and evaluating of learners.   The result is an empirical model which represents how reflection operates as a metacognitive process for evaluating and improving teaching. We have also developed a coding scheme that operationalizes the process of reflection. Both provide a language for describing reflection and therefore a way to think about how to improve teaching. Carrying out this research has not only provided some answers, but has also raised a number of issues. We also explore some of these in the chapter. Specifically, we elaborate on the role of reflection in the construction of knowledge about teaching: how we see these two inextricably linked.   Then, we go on to explore the relationship of reflection to teaching development, which we conceive of as a conceptual change process.   Last, we address the relevance of linking reflective teaching to student experience of learning and describe our goal in researching this little explored area.

2. THE PROCESS OF REFLECTION

Although reflection was a term used by Dewey, the recent interest in reflection was stimulated by Schön (1983) who highlighted the value of reflection in helping professionals learn about and improve their practices. Although reflection can be useful in learning from any experience, our interest is on how reflection serves as a mechanism for turning experience into knowledge about teaching. Ongoing use of the process of reflection is essential for building knowledge, and increasing knowledge increases one's ability to use reflection effectively and to develop as a teacher.

The process of reflection can operate in different spheres or arenas. We use the term sphere to designate these different arenas of reflection since the word does not suggest levels that must be achieved or transcended in a particular order. Diverse schema have been suggested to differentiate this varying nature of reflection (e.g., Carr & Kemmis, 1986; van Manen, 1977).   From our perspective, practical reflection focuses on improving actions in a particular course or class.   Strategic reflection involves an attention to generalized knowledge or approaches to teaching that are applicable across contexts.   Epistemic reflection represents a cognitive awareness of one's reflective processes, as well as how they may impede reflection and enactment of plans.   Although in our research we documented instances of strategic and epistemic reflection, the focus of our inquiry and the bulk of the reflection we documented was in the practical sphere, in which the focus is improving actions in a particular course or class.

Reflection can also occur prior to, concurrent with, and retrospective to instruction. That is, reflection may occur asynchronously when considering future actions (reflection-for-action) in light of past experience (McAlpine, Frew & Lucas, 1991); this is distinct from planning, although related, since planning need not draw on previous experience. Reflection can also be continuous and synchronous with

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[1] 'Professors' in the sense of 'university teaching staff'; not necessarily 'full professors' or professors in the British sense.

teaching, in which case it is concurrent or reflection-in-action (Schön, 1983; 1987). Reflection may also occur asynchronously at some point after class, and thus be disconnected from teaching actions. We think that retrospective reflection-on-action (Schön, 1983; 1987) represents the most common conception of reflection. We also believe reflection-on-action provides the opportunity for dramatic, extensive structural changes, and is more likely to take place in the strategic or epistemic sphere. Concurrent reflection-in-action and retrospective reflection-on-action were about equally represented in the reflection we documented. We have not yet completed the analysis of the data that will enable us to understand reflection-for-action done prior to instruction.

Despite the extensive discussion of reflection in the literature, there is, in fact, little research that has been theory-based, or has attempted to operationalize the term (Kompf & Bond, 1995; Kremer-Hayon, 1988). We believe our work does both; it draws from theory, and then operationalizes these concepts. We began with constructs from the literature (i.e., reflection, metacognition, domains of knowledge) and developed an initial model of the cognitive processes that are linked to improvements in teaching, a process in which one evaluates the relation between one's intentions and the impact of actual teaching actions, and makes adjustments to teaching as appropriate (e.g., Alexander, Schallert and Hare, 1991; Chi, Glaser and Farr, 1988; Kagan, 1992; Nelson & Narens, 1990; Shulman, 1986). Based on these theoretical constructs, we used the actual reflections of successful university teachers to verify, refine and elaborate the major constructs of our representation of the metacognitive process of reflection.

3. METHOD AND DATA SOURCES

Six professors recognized for their teaching excellence participated in the inquiry: three at McGill University in Montreal, Canada and three at Queen's University in Kingston, Canada. Three, trained as teachers, were in Faculties of Education; we call them math educators. Three, not trained as teachers, were in Faculties of Science; we call them mathematicians. There were two women and four men, all at least 45 years of age. All were experienced professors having taught in universities a minimum of ten years.

They were chosen based on the following criteria: recognized for teaching excellence (awards, positive student course evaluations, peer recommendations), and teaching a course they had taught before. The fact they were acknowledged for their achievements in teaching over a period of time by a variety of different sources can be interpreted as a mark of expertise (Ericsson & Smith, 1991). Exemplary teachers were chosen because research suggests that experts tend to exhibit more metacognitive activities than nonexperts and are better able to articulate them (e.g., Chi, Glaser, & Farr, 1988; Scardamalia & Bereiter, 1986). In this way, we could hope to document 'best practices'. Teaching a class they had taught before meant they would be familiar with the instruction related to the course and the nature of the students, and would thus be better able to display their expertise. The classes varied in size. Three were around 25 students and three were between 80 and 100.

During the delivery of the course, each professor was videotaped in one third of each of the 39-hour courses. The professors were interviewed pre and post class for each of these videotapings. The postclass interviews included a viewing of the videotaped class sessions which stimulated recall about their reflections during teaching. The verbal data were transcribed and then verified by the professors.

The analysis of the data consisted of coding the transcripts, drawing on constructs from the literature and constructs that emerged from the data (code book available from the authors). This analysis expanded and refined our understanding of how the professors reflected. When we had finished the analysis we held a symposium with the six in order to present to them the results and the model representing our understanding of the metacognitive process of reflection. Their overall reaction supported our interpretations. Although none of the professors had previously attempted to articulate what it was they were doing, by the end of the symposium, they were using the language of the model to discuss how they went about evaluating their teaching. (See McAlpine, Weston, Beauchamp, Wiseman and Beauchamp (1999a), for a full description of this research.)

4. THE MODEL OF THE METACOGNITIVE PROCESSES OF REFLECTION

Reflection as we define it is anchored in experience, in teaching *action*. Teaching actions are *monitored* in terms of external cues in order to track the achievement of *goals*, prior to, concurrent with and retrospective to instruction. Monitoring may lead to *decision-making*, decisions to modify teaching actions, dependent on where cues fall in relationship to the *corridor of tolerance*, a mechanism for explaining why only some cues lead to decisions to change. Ongoing use of the processes of monitoring and decision making are essential for building *knowledge*. Each of these components of the model (see Figure 1) will now be described in detail.
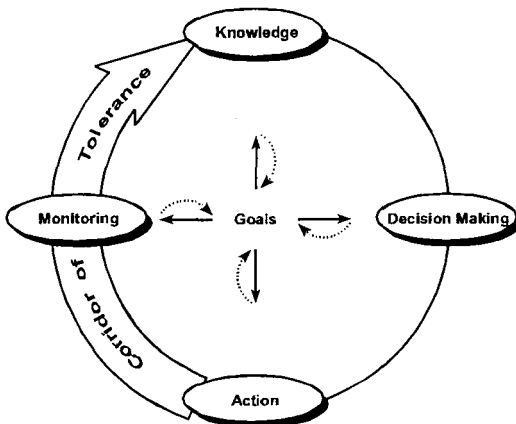

Figure 1.

4.1 Teacher actions - experience

What is apparent but not often made explicit in discussions about reflection is the critical importance of having actual experience upon which to reflect. Reflection is the vehicle for turning experience into learning (Boud, Keogh and Walker, 1985; Sternberg and Horvath, 1995). Webster's dictionary (1961, p. 800) defines experience as "direct observation of or participation in events: an encountering, undergoing, or living through things, in general, as they take place in the course of time". For instance, going to a baseball game is an experience of baseball since it involves external engagement in events whereas reading about a baseball game is an experience of reading.

Experience enables us to become skilful, e.g., in driving, teaching, cooking, managing. However, experience alone may not be sufficient to become skilful. As noted by Chi, Glaser and Farr (1988) and Ericsson and Smith (1991), one must distinguish practice from mere exposure to experience; specific long continued practice is important to develop skill. We concur and believe that multiple, repeated observations and interactions with the phenomenon in particular contexts may be necessary. Further, we believe that it is the analysis of these multiple experiences through reflection which enables one to detect patterns that then lead to knowledge. "Practice is about increasing your repertoire of ways to recover from mistakes" (Gutin, 1999, p.108) since "learning [in our case about teaching] requires feedback in order to be effective" (Ericsson & Smith, 1991, p.27). In other words, turning experience into knowledge may be dependent on the ability to use reflection to recognize patterns in the multiplicity of variables in experiences.

In terms of the model, experience is the base upon which the process of reflection is grounded. It represents the external actions of the teacher, the arena in which teaching is enacted, as cognitions are transformed into behaviours. Reflection is visualized as the continuous interaction between actions related to teaching and knowledge. In our research, we did not analyze teacher actions, but rather the professors' cognitions about their actions.

4.2 Goals

Goals are the component around which the process of reflection takes place since goals represent the teacher's expectations or intentions about what is to be accomplished in terms of instruction and form the basis for actions to be taken in order to achieve these. It is for this reason that they are placed centrally; they both direct and constrain the other features of the model. Although goals remain relatively constant (based on our research), feedback from the other components may lead to a change in the goals. Thus, the interaction between knowledge and action occurs related to specific goals. In our study, we found that the professors attended most to goals related to instructional methods (33%), next to student understanding (26%), and then to content (24%). The attention addressed to teaching goals (i.e., method and content) by these professors was expected and natural. What was of particular interest to us was the extent to which goals related

PETER GOODYEAR

TEACHING ONLINE

Abstract: This chapter reports initial findings from a study of the thinking, beliefs and tutorial action of higher education teachers who are working in a 'virtual classroom'. The teachers work on an 'online learning' course at the Masters level. An important means of communication on this course is computer conferencing. The work of the teachers is centred upon reading and constructing electronic texts – contributions to an ongoing 'electronic seminar'. The research setting allows an unusual degree of access to the thinking of teachers during the process of teaching. It also allows access to the thinking of teachers during the whole of the (relatively short) cycle of planning, teaching and reflection that surrounds each moment for intervention in the electronic seminar. The chapter offers two contributions to our understanding of online teaching. First, it begins to locate online teaching in relation to other forms of teaching by providing an analysis of how some common kinds of online teaching are undertaken. Second, through illustrations of the work of one experienced online teacher – supplemented by data taken from their 'think aloud' protocols and from interview transcripts – it highlights some key areas of knowledge and belief that seem to be a critical part of online teaching. The chapter discusses both substantive findings about relationships between teachers' thinking, beliefs and practices, and methodological issues raised by this relatively novel research site. It concludes with some suggestions for further research.

1. INTRODUCTION

Anyone who took at face value the predictions that are being made about growth in educational uses of the Internet might be forgiven for concluding that the days of 'conventional' university teaching are numbered. What use will a campus be in the age of the global student and the virtual university? Who will be bothered with, or

will be able to afford, face-to-face tutorials or seminars when email is quick, timely and cheap? Is the lecture dead, or deserving euthanasia[1]?

Actually, I suspect that many of our current learning and teaching practices will survive well into this new century. Those who foresee an easy substitution of teaching methods too frequently misunderstand the function or underestimate the complexity of that which they would see replaced. Yet new forms of interaction, and new ways of improving access to educational opportunities, *are* emerging as clear benefits of the growth of the Internet and of its main technologies - email and the World Wide Web. Email is already embedded in the working practices of most academics in the developed world. It is used extensively for research, administration and social purposes. It is becoming unusual to find an academic who does not also make some use of email in his or her teaching, though such usage is more likely to have developed *ad-hoc* rather than as a deliberate, systematic modification to teaching methods.

This chapter describes some research into teaching in an 'online learning' environment. This kind of teaching has been described in the literature with increasing frequency since about the middle of the 1980s. Some of this literature might be described as evangelistic (urging teachers to consider the value of online learning, presenting guidelines for pedagogy, etc). *Some* of the literature describes empirical research, not uncommonly in the form of a case study carried out by the teacher(s) who were involved in a pilot application of online learning. The papers that report more rigorous or more detached empirical research into students' experiences of online learning, or of learning outcomes, are still quite rare. I have found no such studies of the activities, thinking or beliefs of teachers in an online learning environment.

Since this is such an under-explored area, the chapter begins with an attempt to provide some conceptual clarification of the nature of teaching in an online learning environment. It attempts to identify a number of questions that seem to me to be central to progress in the area. It thereby provides some useful background to the research study that makes up the main part of the chapter.

2. BACKGROUND

2.1 Motivation for the study

This section explains the motivation for the study. There are a number of distinct reasons why researchers study teaching. It is possible, though rare, to find what might be called 'disinterested enquiries' into teaching, that is, studies which simply

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[1] Consider for example the views of international management consultant Peter Drucker: "Thirty years from now the big university campuses will be relics. Universities won't survive. It's as large a change as when we first got the printed book. Do you realize that the cost of higher education has risen as fast as the cost of health care? ... Such totally uncontrollable expenditures, without any visible improvement in either the content or the quality of education, means that the system is rapidly becoming untenable. Higher education is in deep crisis... Already we are beginning to deliver more lectures and classes off campus via satellite or two-way video at a fraction of the cost. The college won't survive as a residential institution. " (Interview in Forbes 10 Mar 1997)

see teaching as a fascinating activity to study, without there being any intention to derive practical benefits from the outcomes of the research. In the majority of cases, there *is* an intention to apply the outcomes of the research and the kind of application that the researchers have in mind carries implications for the kinds of data that are collected, the methods used to collect them, and (sometimes) the theoretical framework within which data are gathered and interpreted. Table 1 provides a schema for five distinct kinds of motivation for carrying out research on teaching.

Table 1. Five kinds of practical motivation for research on teaching

1	Improvement of teaching (one's own or that of others; via reflection and 'local' improvement, rather than via better theoretical accounts of good teaching)
2	Improvement of teaching (that of others, through better theoretical accounts of good teaching)
3	Better divisions of labour (re-engineering 'business' processes; e.g. using teaching assistants vs. expensive professors; see for example Ford et al, 1996)
4	Improvement of the tools/technology available to teachers (user-centered systems design methods depend on a good understanding of the working practices of the intended users of the technology; customised environments for online learning are becoming available; little evidence that these are properly informed by information about what teachers want to achieve)
5	The replacement or automatisation of aspects of teaching (there has been significant interest in the study of teachers' pedagogic knowledge and decision making among those who are seeking to build intelligent tutoring systems, e.g. Wood, 1991; Goodyear, 1991; Kamsteeg & Bierman, 1991; Cumming et al, 1994; Derry & Potts, 1998; Wasson, 1998. Less ambitious projects are trying to replace parts of the tutor's work through the provision of self-organising databases of 'frequently asked questions', etc)

Moving from the first towards the fifth of these categories involves, *inter alia*, increasing formality and precision in the descriptions created. The construction of an intelligent agent capable of carrying out some of the work of a tutor requires very detailed and precise descriptions of pedagogical knowledge and action, ideally in a programming language. Formal methods of knowledge elicitation are required and the outcomes may be unintelligible to the teachers involved in the study (Goodyear, 1989, 1991; Wood, 1991; Wasson, 1998). In contrast, working with individual teachers to help them come to a better understanding of their practice, and to improve upon it, often obliges the researcher to use language and concepts which are rooted in the teacher-subject's experience, even if this means that the researcher has to live, perhaps temporarily, with a degree of conceptual inexactness and incoherence (e.g. Larsson, 1984; Elbaz, 1990). The study reported in this chapter is probably best aligned with the second of the categories in Table 1. It is intended as a contribution to the improvement of online teaching, taking as a reasonable goal the clarification of some key aspects of what is involved in a common kind of online work.

2.2   The diversity of teaching in higher education

Teaching is not an undifferentiated activity. What is involved in giving a lecture to 500 students is different from what is involved in a one-to-one, face-to-face, tutorial. Also, interactive, face-to-face, or what might be called 'live' teaching is different from (say) planning a course, giving feedback on an essay, designing some learning materials, or reflecting on end-of-course student evaluation reports. (James Calderhead structures his 1996 review of teachers' cognitions in terms of 'pre-active', 'interactive' and 'post-active reflection' phases, to help distinguish the cognitive demands of 'live' teaching from its prior preparation and from reflection after the event.) The pattern and quality of teaching work varies between individual teachers and, most notably, between teachers in different academic departments or disciplines. This patterning also varies between universities in the same country and between different national systems. For example, one-to-one tutorials are now very rare in the UK higher education system, except for the supervision of dissertation work and for counselling students who are experiencing academic or personal difficulties. Small group tutorials and small group seminars are very rare in the teaching of the physical sciences in UK undergraduate programmes (ASTER, 1999). Supervision of lab classes is still a common activity for science teachers, of all ranks, in UK undergraduate teaching – though it tends to be delegated to teaching assistants in US universities. Teaching *other than* through very large lectures is an uncommon experience for academics in humanities disciplines in some countries of continental Europe. The point that needs to be made here, is that we cannot safely characterise teaching in higher education by reference to just one or two kinds of task. Any serious analysis of how teachers do what they do, of what their competence consists of, needs to be sensitised to the variety of that work. Online tutoring is just one kind of task area, though many suspect that it will increase in importance for most university teachers. (A 1998 study by the US Public Broadcasting Service (PBS) reported that 25% of North American higher education institutions were then offering courses on the Internet and that 1 million students were taking higher education courses online, compared with 13 million attending 'bricks and mortar' higher education institutions.)[2]

2.3   What is online learning?

The terms 'online learning', 'networked learning', and 'e-learning', are used almost interchangeably in much of the current discussion about innovation in education. For the purposes of the research reported in this chapter, the term 'online learning' is used to mean learning which involves interaction between people using Internet communication technologies, such as email or computer conferencing software. The interaction is between learners and learners and between learners and their teachers. Online learning may also involve use of web-based learning materials, but our current focus is on human interaction over the Internet.

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[2] The PBS survey results can be accessed at http://www.pbs.org/netlearning/stats.html (accessed 18 July 2000)

In the course which provided the context for the study, this interaction was typically text-based and asynchronous and used group-oriented communications tools (c.f. Mason & Kaye, 1989; Rapaport; 1991; Harasim et al, 1994; Collis, 1996; McConnell, 2000). Asynchronous interaction is interaction which allows participants to take part in the interaction at different times. Electronic mail, fax, voicemail and post are examples of asynchronous communications technologies. They stand in contrast with face-to-face discussions, videoconferencing and the telephone, all of which are essentially synchronous. A distinguishing feature of asynchronous communication is that it does not allow *interruption* - individual contributions to an asynchronous electronic discussion are relatively self-contained and well-formed and cannot depend on linguistic supports such as rapid turn-taking (Goodyear, 1995; Boden & Molotch, 1994). The use of text as a medium of interaction also has some important qualities. Unlike speech, it has persistence. It encourages closer adherence to commonly accepted rules of grammar, and more 'formal' modes of expression, than is usually the case with speech. Its persistence may promote reflection. It may not be the best medium for sharing experiential or tacit knowledge, or describing working practices (Goodyear & Steeples, 1999b). Finally, the interaction in the study context was essentially group-oriented. Although the technology in use did permit private emails to be sent, almost all of the interaction visible to any one learner (or tutor) was in a shared quasi-public online space. Everyone's contributions were meant to be read by all of the learners and tutors in the course group. (They were kept private from the rest of the world, and even from learners and tutors on other courses, by the use of password protection.)

The set of arrangements for online learning described here and prevailing within the study setting is not an unusual example of online learning. It will be recognisable to many practitioners and to those familiar with some of the best-known literature from online learning (e.g. Mason & Kaye, 1989; Harasim et al, 1994; Collis, 1996; Bonk & King, 1998; McConnell, 2000). However, it is important to note that it does not represent the whole space of online learning practices. It may be near the 'centre' of current practices, but there are other forms of online learning that would produce other views of how online teachers do what they do (see e.g. Mason, 1994).

2.4 Teaching in an asynchronous online learning environment

Most of the studies of teaching in the educational research literature are set in familiar contexts: teaching face-to-face in a classroom, managing a seminar, planning a lecture, giving feedback on an essay, etc. Our shared familiarity with these contexts allows researchers to get by with just a brief description of the study context. Since online teaching is relatively novel and takes a variety of forms, it is important that we take the time to get a clearer view of what was involved in the teaching studied for this chapter.

The online teaching took place within an MSc course run by the University of Lancaster in the United Kingdom. The topic of the MSc was itself to do with technology-assisted learning. It was a part-time programme of continuing professional development, aimed at people working in industry or in post-

ELAINE MARTIN, MICHAEL PROSSER, KEITH TRIGWELL,
PAUL RAMSDEN AND JOAN BENJAMIN

WHAT UNIVERSITY TEACHERS TEACH AND HOW THEY TEACH IT

Abstract: In this chapter we make three related arguments. The first, is that different teachers have different intentions concerning what students will learn and consequently in their teaching they constitute the topic or subject to be taught quite differently. The second is that a teacher's intentions concerning what it is that students should learn is closely aligned with a teacher's expectation of how students learn and how they can be helped to learn through teaching. The third is that when teachers focus specifically on the teaching of a particular topic within a specific context, there is a close relationship between their intentions and their teaching practice. In this chapter we explore these arguments through an empirical study which considers the different ways in which 26 university teachers intended to constitute a subject or topic for their students to study, how they then taught the subject and subsequently how consistent were their intentions and their practice. The analysis shows that when the context of teaching and learning is tightly defined there is a clear relationship between a teacher's intention and their practice. In particular, university teachers who adopt more conceptual change and student-focussed approaches to teaching constitute objects of study which are more relational and focus on the student's knowledge. Approaches which are more information transmission and teacher-focussed constitute objects of study which are more multi-structural and have a focus on knowledge which is constituted as being external to the student

1. INTRODUCTION

It is often taken for granted that university students will learn differently when taught by different teachers and the reason for this is commonly assumed to be quite obvious: some teachers know more than others; either they know more subject knowledge and/or they know more teaching skills. This is the implicit argument in

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books which offer advice and hints on developing teaching skills (see, for example Gibbs, Habeshaw and Habeshaw, 1986).

In this chapter we offer a different perspective on why it is that students learn differently when taught by different teachers. Simply put, we argue that the critical issue is not how much teachers know or what their level of teaching skill is, but what it is they intend their students to know and how they see teaching helping them to know. We want to make three related arguments.

— First that different teachers have different intentions concerning what students will learn and consequently in the teaching they constitute the topic or subject to be taught quite differently. This is the case even when teachers teach the same curriculum towards the same examination.

— Second we argue that teachers' intentions concerning what it is that students should learn, in a particular context, is closely aligned with teachers' expectations of how students learn and how they can be helped to learn through teaching.

— Third, we argue that when teachers focus specifically on the teaching of a particular topic within a specific context, there is a close association between their intentions and their teaching practice.

In other words, we suggest that when teachers make decisions about what is to be taught and how it will be learned they do so in line with an explicit or implicit theory of what teaching and learning the subject matter involves.

In this chapter we describe the results of an empirical study which explored the qualitative variation in the way 26 university teachers intended to constitute a subject or topic for their students to learn; how they then taught the subject and subsequently what, if any, inconsistencies emerged between intentions and practice. In doing so, we provide evidence to support the three related arguments referred to above, and discuss some of the implications for the theory and practice of teaching and learning in higher education.

2. THEORETICAL BACKGROUND

This study operates from the broad theoretical tradition of non-dualism in educational research (Marton and Booth, 1996). From this perspective it is asserted that meaning is created or constituted in the relationship between the individual and the context. This is in opposition to the dualist view that knowledge exists independently of the knower and can be learned and applied separately from its context, or exists within the knower independently of the context he or she is in.

Within this broad tradition of non-dualism there are a number of different research perspectives. The one focussed on in this chapter is phenomenography. From a phenomenographic perspective it is argued that knowledge cannot exist in a context independently of the knower, rather knowledge is constituted in the relationship between the knower and the context. So, from this perspective, teachers constitute knowledge within the teaching and learning context, and attempt to bring their students into relationship with that knowledge through their teaching in that context.

Previous research from a phenomenographic perspective has shown that there is substantial variation in the way that students conceive of and learn a topic and the way teachers in higher education conceive of and approach their teaching. Perhaps most importantly, from an educational perspective, there is also a relation between how teachers conceive of and approach their teaching in a particular context and the quality of student learning outcomes.

The idea of variation is an important one in phenomenography. It is argued that it is through attention to the variation in ways of seeing or experiencing a phenomenon that understanding develops (Marton and Booth, 1996).

A series of investigations have explored the relations between how teachers think about and conceive of their teaching (Martin and Balla, 1991; Prosser, Trigwell & Taylor, 1994), how they approach teaching (Trigwell, Prosser and Taylor, 1994) and how approaches to, and conceptions of, teaching affect the learning of students (Trigwell, Prosser and Waterhouse, 1999). In brief, it has been argued that where teachers see teaching as having a focus on the teacher, and where they see the task as either transmitting information or getting students to adopt the concepts and ideas of the discipline, then students will learn less well. In contrast, where teachers see the focus being on student learning (as opposed to being on teaching) and where teachers work to help students develop or change their own understanding of relevant ideas and conceptions, then students will learn more effectively.

It is important to emphasise that in these investigations teachers have been asked to focus on a particular teaching/learning situation with a specific group of students. Consequently, what is being described by these studies are specific responses, not general orientations to teaching. The focus of this chapter is not on how teachers conceive of and approach their teaching but rather on what it is that teachers within their classrooms intend to constitute for their students to learn and the relation between what it is intended be constituted for students to learn and how teachers intend to approach their teaching. We then examine the practice of teachers to see if there are inconsistencies between their intentions and their practice.

What it is that teachers constitute for their students to learn has been explored and called 'the object of study' by Patrick (1992). Patrick explored the teaching of Year 12 examination curricula in history and physics and found considerable variation in each of the disciplines, both in terms of what was constructed for students to learn and what was attended to and learned by students.

The idea of object of study has also had some exploration at university level. Martin and Ramsden (1998), working with teachers of creative writing, found considerable variation in the way teachers of the same, or very similar, curriculum constructed an object of study for students. They also found a relation between the object of study constructed by the teacher and the learning outcome of students. At one extreme teachers represented creative writing to students as the acquisition of writing skills. At the other extreme they represented it in a more complex way: creative writing involved an exploration of the thing the student had to say, and an engagement with language, as well as the history and tradition of language, to craft words which best carried a message. The comments and resulting work of students in the Martin and Ramsden study suggested that they had very often learned what it was their teacher presented for them to learn, so students whose teachers presented

creative writing as a series of skills were likely to develop relevant skills but see the subject as involving little more than skills acquisition. Those who learned with teachers who represented the subject in a more complex way were likewise more likely to develop a more sophisticated understanding. The range of learning outcomes identified in the study was subsequently fitted in to four of the five categories of Biggs's SOLO taxonomy of structured learning outcomes, with the lowest level of response (which has been described above) being classified as 'multistructural' and the highest level of response (again indicated above), being categorised as 'extended abstract' (Biggs & Collis, 1982).

The variation in the way teachers approach their teaching in higher education has been explored recently by Trigwell, Prosser and Taylor (1994). In their study of 24 university science teachers, Trigwell, Prosser and Taylor found a variation in the way the teachers approached their teaching in first year science classes. The variation was analysed in terms of teachers' intentions and strategies. Broadly speaking, the majority of the 24 teachers adopted approaches with an intention to transfer information and/or concepts to students by teacher focused strategies. A minority of teachers adopted approaches with an intention to help students develop and/or change their understanding of key ideas by student focused strategies. As has been mentioned previously, this variation in approach to teaching has been found to be associated with a variation in the way students approach learning.

3. CONDUCT OF STUDY

For the present study we interviewed 26 university teachers prior to their teaching of a topic, within a large first-year subject, in four discipline areas: social science and humanities, business and law, science and technology and health sciences. The focus of those interviews was two fold. First, we focused on the object of study the teachers intended to constitute for their students, and second on how the teachers intended to approach their teaching. On the basis of these interviews a hypothesis was formed as to how the teacher would teach in the classroom. For each of the teachers, the teaching of two major classes, usually lectures, was observed. The aim of the observation was to determine if the hypothesis formed after the interview held or whether what was observed challenged the original hypothesis. In all cases the hypothesis which was developed before the observation was not disproved by the observation and observed teachers agreed that, by and large, their expectations of the classes were met.

3.1 Conduct of the interviews and analysis of the interview data

An essentially phenomenographic perspective has been adopted for the collection and analysis of the interview data (Marton, 1988).

The data was collected by in-depth, semi-structured interviews with 26 teachers across the four fields of study. The interviews aimed at probing the teacher's conception of their object of study and their approach to teaching in relation to that object. The interviews were based around the following questions:

- What is it you teach these students?
- What must students know and understand?
- How will students be brought into relation with this knowledge?

The analysis was conducted in two stages. The aim of the first stage was to identify the qualitative variation in conceptions of the object of study and approaches to teaching, and to describe this variation in terms of categories of description. The identification of the conceptions and approaches involved several sub-stages - an initial identification of a set of categories of description based upon reading a subset of the full set of transcripts, on analysis of the structural relationship between the categories, independently of the transcripts, and iteration between the transcripts and the structural relationships until a stable set of categories was constituted. In the second stage, these categories were used to classify all the transcripts, with some subsequent adjustment to the categories and their structure, to ensure that they captured the full variation represented in the full set of transcripts.

3.2 Conduct of the observations

A *Planning for the Observation* pro-forma was developed, summarising the key aspects of the interview and identifying the sorts of things we would expect to see in the observation consistent with the summary. The *Planning for the Observation* pro forma was structured around the following headings:

SUMMARY OF INTERVIEW
   Object of Study:
   How students are brought into relation with the object of study
      Approach to teaching:
      Approach to learning:
   Desired learning outcomes:

STRATEGY FOR OBSERVATION SESSION
   Lecturer's intentions:
   Hypothesis:
      Teacher/student interaction:
      Things to watch for in the observation:

The lectures were observed, and detailed notes were taken during the observation, with the observer maintaining a focus on observing aspects consistent with and inconsistent with the completed *Planning for Observation* pro-forma. Based upon these detailed notes and the completed *Planning for Observation* pro-forma, a judgement was made about the rejection or acceptance of the hypothesis.

In the next section we describe the variation in the objects of study and approaches to teaching we found in this study and the relationship between the two.