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AUTHOR Atkins, M. J.; And Others
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ABSTRACT

This report reviews assessment issues from a British perspective with particular regard to the implications that the National Vocational Qualification (NVQ) Framework will have for assessment in higher education. It considers assessment in relation to the various purposes of higher education and puts forward a number of practical suggestions for improving the quality of assessment--suggestions aimed at individual lecturers, at departments, and at institutional managers. Four purposes of higher education are addressed: (1) the provision of a general educational experience of intrinsic value to the student in its own right; (2) preparation for knowledge creation, dissemination, or application in a specific discipline or field; (3) vocational preparation for specific occupations; and (4) preparation for more general employment. The problem is shown to be the separation of assessment of theory from assessment of competence, capability, and performance. The report includes a discussion of the inter-relationship of knowledge, understanding, and competence. An examination is also provided of the impact that assessment has on student learning, in particular, the way that some assessment practices lead to superficial, rote learning that is personally meaningless to the student and quickly forgotten once testing is complete. Appendices include a list of the abilities and attitudes desirable in students. Contains 98 references. (GLR)

ASSESSMENT ISSUES IN higher education

FOREWORD

This is a time of great change throughout higher education as well as within the wider context in which it operates. It raises a number of questions about student and employer expectations of higher education, about the nature of student learning and about how that learning is assessed. The recent expansion and diversification of the student body has added an urgency to those questions as academics seek to maintain and enhance the quality of the courses they provide.

Furthermore, the extension of the work of the National Council for Vocational Qualifications (NCVQ) into higher level qualifications is stimulating a good deal of debate within higher education. That debate has centred on the issues surrounding the meaning of "academic" and "vocational" provision; the relationship between academic courses and the professions; and alternative approaches to assessment.

In 1992 the Employment Department commissioned the University of Newcastle-upon-Tyne, through its School of Education, to undertake a review of assessment issues with particular regard to the implications that National Vocational Qualifications (NVQs) will have for assessment in higher education. This report, "Assessment Issues in Higher Education", is the result of that review. It considers assessment in relation to the various purposes of higher education and puts forward a number of practical suggestions for improving the quality of assessment - suggestions aimed at individual lecturers, at departments and at institutional managers.

Our intention in commissioning this work was not only to stimulate debate but also to encourage staff development in universities and colleges. We hope this report will do that by providing information about some of the new approaches to learning and its assessment, by exposing the issues to be addressed and by suggesting practical ways forward.

The Employment Department is responsible for encouraging higher education to give its students a better preparation for the demands of working life. The assessment of students' knowledge and abilities is a critical aspect of that preparation. I commend this report to you as a helpful and timely contribution to the debate about how the quality of assessment can be enhanced for the benefit both of students and of the employers who recruit them.

Valerie Bayliss

VALERIE BAYLISS
Director

Youth and Education Policy
Department of Employment

REPORT SUMMARY

The Report aims to do three things: to synthesise current thinking on the several purposes of higher education and identify the implications for assessment; to raise awareness of assessment issues among academic staff in institutions of higher education; and to make recommendations for a review and development of assessment methods as a necessary first step to their improvement and diversification.

The Report is written in the context of the many changes in higher education which are having a profound effect on the number, diversity and modes of study of its students. The Report also examines the interface between higher education and the National Vocational Qualification (NVQ) Framework and considers the relationship between the two rather different approaches to assessment.

Four purposes of higher education are distinguished. The first is the provision of a general educational experience of intrinsic value to the student in its own right. This includes the development of the trained mind, the development of an educated person possessed of the personal qualities needed in adult life, and the provision of lifelong learning opportunities. Whether general cognitive abilities develop, and can be assessed, independent of domain is an issue here, as is the tension between modularisation and a longitudinal perspective on personal development. The second purpose identified is preparation for knowledge creation, dissemination or application in a specific discipline or field. The appropriateness for all students of this historically central purpose of higher education is now being questioned and with it many of the traditional methods of assessment such as the three hour examination paper. The Report therefore looks in some detail at the criticisms of conventional assessment practice and argues, among other things, that a norm-referenced approach is now hard to defend. Vocational preparation for specific occupations (usually the professions) and more generally for employment form, respectively, the third and fourth purposes of higher education. Here the problem is shown to be the separation of assessment of theory from assessment of competence, capability and performance. However, it is in these more vocational areas that the possibility of linking up the NVQ Framework and traditional assessment is greatest.

The analysis of purposes with their attendant issues for assessment leads to a deeper examination in Section 3 of the inter-relationship of knowledge, understanding and competence. It is argued that too little attention has been given to 'understanding' but that there are real differences in the way that traditional higher education and NCVQ conceive of the three concepts. This means that there is likely to be disagreement about whether and to what extent assessment of knowledge and understanding should be a feature of the higher level NVQs. One possible meeting ground would be the more widespread adoption of a 'learning outcomes' approach by higher education in place of outline syllabuses. However, while having many attractive features, especially in modularised curricula, the specification of learning outcomes also has its drawbacks. Not the least of these is the danger of prespecifying what is to be

achieved in such detail that it is difficult for students to take responsibility as autonomous learners themselves. It is also suggested that it might be easier to reconcile traditional approaches to assessment with the methods currently being adopted for the General NVQs (GNVQs) than with the full assessment of work-based performance which is the hallmark of NVQs.

Since both higher education and the NVQ Framework are concerned with the effectiveness of learning, Section 4 looks at the impact that assessment has on student learning and in particular the way that some assessment practices lead to superficial, route learning that is personally meaningless to the student and quickly forgotten once the 'test' is over. Again, criticisms are made of many traditional assessment practices in higher education. This section ends with an examination of some studies of how students develop from novice to expert performers since this also offers one way of reconciling the traditional and NVQ approaches. It is argued that neither the traditional assessment of formal knowledge, nor the assessment of performance is adequate by itself, since expert performers appear to rely on both theoretical understanding and the experience of practice events. This again will suggest to many in higher education that the higher level NVQs will need to evolve further if they are to interface sensibly with higher education's contribution to initial postgraduate training and to continuing professional development.

The Report ends with recommendations at national, institutional, departmental and individual level. The recommendations focus on the need for debate, review, and training in the context of the new features of higher education and the need for coherence between higher education and the national NVQ Framework.

M J Atkins
J Beattie
W B Dockrell

School of Education
University of Newcastle upon Tyne

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CONTENTS

Introduction

section 1

THE AIM OF THE REPORT

This report is written for academic colleagues who, faced with the many current changes in higher education (HE), are being asked to reconsider the conventional ways of teaching and assessing students.

The authors believe that the present focus on the organisational aspects of learning, such as the introduction of modularisation, is obscuring a deeper debate on the appropriate purposes of higher education in the next decade. It is the authors' contention that the purposes of higher education, and the particular way that learning is organised in an institution, can be seen as orthogonal in their relationship. In other words, it may be helpful to see the organisational structures as, in themselves, neutral tools; the question is then whether the use of these tools is helping or hindering the achievement of the underlying purposes. It is therefore important that any debate about the assessment of students is conducted primarily with reference to the purposes of higher education rather than in relation to particular organisational features.

When we do look at assessment in the light of underlying purposes there is much that requires attention. Many current assessment practices can be criticised for not adequately reflecting the stated purposes of a course or unit, or for being unreliable, or for hampering effective student learning.

Accordingly, the aim of this report is threefold:

1 To bring together recent thinking on the purposes of learning, teaching and assessment in higher education

2 To raise awareness of the complex issues surrounding assessment policies and practices in higher education

3 To make recommendations for a review of assessment methods as a first step to their improvement.

ASSESSING STUDENTS

There are many reasons for assessing students. They include:

- to establish the level of achievement reached at the end of a course or unit
- to establish progress during a course or unit and give feedback on it
- to diagnose strengths and weaknesses leading to remedial action or to extension learning if needed
- to consolidate work done so far - a learning experience in itself
- to motivate students

- to predict a student's likely performance level in the future
- to determine whether a student is 'safe to practice'
- to select for entry to further training, employment etc.
- to conform to the requirements of external regulatory bodies

- to give individual staff feedback on the effectiveness of their teaching
- to determine the extent to which course aims have been achieved
- to obtain information on the effectiveness of the learning environment
- to monitor standards over time

Given the rationale for this report, it is the second and third groups of reasons which will form its main focus, i.e. the use of assessment to establish whether or not the intended purposes of a unit, a course or the whole experience of higher education have been achieved. However, since assessment systems have a powerful impact on how well or badly students learn we shall also be concerned with the first group of reasons, particularly in Section 4.

As far as possible the use of technical terms has been avoided in the report. However, debate is assisted by use of a few key terms and these are defined below.

Norm - referenced.
Assessment system in which students are compared to each other and placed in rank order or on a normal distribution curve. Typicaliy, students are then given grades or degree classifications according to where they fall on the mark distribution curve or where they are placed in the list. Only a proportion of students will therefore obtain a particular grade or class of degree.

Criterion - referenced.
Assessment system in which students' performance is marked and graded according to (prespecified) criteria and standards. The criteria need not be restricted to minimum thresholds of competent, acceptable or safe performance; they can also include elements of mastery and excellence. In theory all students could fail to meet the standards set or all could achieve the highest possible grade.

Formative :
Assessment methods designed to establish what progress a student is making during learning and give feedback on it.

Summative :
Assessment methods designed to establish what a student has achieved at the end of a unit or course. A final mark or grade is awarded.

Competence - based assessment :
There is no standard definition of this term. In this report we use it to mean the assessment of the acceptability of the performance of a defined activity against predetermined standards or criteria. The activity can require intellectual, personal or practical achievements.

THE CONTEXT OF THE REPORT

There are three sets of contextual factors behind this report.

First, the higher education sector is having to respond to a large number of externally driven changes. Institutions of higher education have never been uniform in purpose or structure or in the sources of their funding. But their diversity is likely to increase as a consequence of the recent expansion in student numbers encouraged by the government, its desire to establish a 'market' for higher education's 'services', and the new funding structures it has introduced including the separation of funding for research and teaching. (Certainly, higher education is getting more business like in its emphasis on measurable performance outcomes, quality assurance and development planning even if few lecturers see themselves, formally, as part of a business.) Although the profile of students in some institutions will continue to be much as it is now, in other institutions there is likely to be an increase in non-traditional and mature students, some with experience of employment, who wish to study on a part-time, non-residential basis and have their prior learning accredited. There is also likely to be growth in new forms of continuing professional development, and in vocational courses tailored for the local employment market. All of this means that higher education will be one part of a spectrum of opportunities for education and training that individuals will be able to access at many points in their lives and not just between the ages of eighteen and twenty-one. It also means that we are likely to see a rise in non-completion rates, and the introduction of new, recognised, 'exit' levels below that of the traditional honours degree.

Moreover the ending of one binary divide has highlighted the artificiality of another: that between further and higher education. The emergence of franchising and federating agreements is likely to lead to a blurring of the line between the two and even to mergers into institutions of much greater size. It may also lead to more regional planning of HE. So if at least one third of each successive age cohort is going to be entering 'higher' education by the year 2000 (HMSO 1991b) it is worth asking whether the taken for granted assumptions about the purposes of higher education are still appropriate and whether the balance between them needs to change in what many see as a new mass system. To what extent, for example, is higher education to become a general education for all and to what extent training for employment? Understandably there is considerable external pressure on higher education institutions to justify what it is their students can do, or have become, as a result of three or four years of (costly) study at the public expense that they could not have achieved by reason of chronological maturation and experience in the 'real' world.

The second set of contextual factors are internal. They are the curricular and organisational changes which affect what and how students are taught and have consequences for the methods by which evidence on student attainment is collected and verified.

One can argue that the selection of subject matter for the HE curriculum is getting more difficult as disciplines fragment into sub-specialisms under the twin impact of reductionist thinking and the knowledge explosion. That truth is relative and culturally specific is one of the major tenets of current intellectual life. But in the absence of any other unifying 'grand ideas' it may have the long term effect of weakening the authority of teaching in higher education. Historically, that authority has been based on HE's role as the main creator and definer of new knowledge. But this role is also being challenged by the rate of knowledge obsolescence and by the fact that other institutions in our society are as likely as universities to be the 'cutting edge' of new thinking. We may therefore be entering a period of considerable confusion in terms of the knowledge creation and transmission function of HE (Scott 1993).

At a more specific level, there have been a number of curricular initiatives in the last few years which could have quite major implications for traditional assessment practices if they are adopted on a wider scale. Work-based learning schemes, 'active learning' projects, the greater prominence of supported self study including use of computer-based tools and courseware, records of achievement, student contracts, and the projects supported under the Enterprise in Higher Education programme are all examples (See Appendix 2). These initiatives are raising doubts about over-reliance on the essay assignment and the unseen examination. In the context of these and other developments it is argued that students should take more responsibility for their own learning and for its assessment. They have also focused demand for assessment of personal competences such as working effectively in groups or teams, communicating orally, and for using information technology applications appropriately. But they have also left lecturers with a set of particularly difficult issues: should general cognitive skills and personal competences be taught and assessed as part of traditional subject study? If so, will the outcomes differ from discipline to discipline? If not, what does context-free, or subject-free, learning look like and does it really belong in 'higher' education?

Turning to organisational changes that are beginning to have an impact on the way that teaching and assessment are 'delivered', modularisation is probably the most potent example. The introduction of modular structures has created positive expectations of more flexible course design, more interdisciplinarity, and the possibility of credit accumulation over several years or through study at more than one institution or place of work. Indeed, under the ERASMUS programme it is now possible for a student to collect credit from study in European and American institutions. However, running through this report are echoes of a fear expressed by many we spoke to that uncontrolled modularisation will weaken the quality of learning achieved in higher education. For example, although some subjects can be studied on a 'cafeteria' basis, others require a linear progression through a hierarchy of concepts of increasing cognitive complexity and difficulty. The growth of general cognitive skills and personal competences may also be better served through a developmental rather than an accumulative framework. Further, in modular schemes, summative assessments are likely to occur more frequently while the opportunities to remediate learning deficiencies may become less. The extra

pressure that such an assessment regime may place on students could, as shown in Section 4 of this report, lead to quite superficial learning. It may be, of course, that the HE of the future cannot maintain the standard of learning found on the old honours degree courses and should not be trying to do so for all its students: there may be a limit to the value that any programme of study can add to a student's performance on entry. However, so far this has not been a popular argument. Rather, it is assumed that standards should be the same for all and maintained at the present levels if not improved (Scott 1993).

The third contextual factor is the development of a new, national system for the assessment of occupational competence and the need to manage the interface between it and higher education. Since 1986 the National Council for Vocational Qualifications (NCVQ) has overseen the introduction of National Vocational Qualifications (NVQs) in many occupational areas up to Level 3 (broadly equivalent to G.C.E. A Level standard). The first NVQs for Levels 4 and 5 are also now available. As a consequence, the regulatory bodies for many professions are reviewing their accreditation systems for graduate entrants and some employers are reconceptualising their approach to staff development. These moves are likely to have a backwash effect on higher education and raise the question of whether some parts of an HE course should count towards an NVQ award. The government has also signalled its intention to bridge the academic: vocational divide by use of general NVQs (GNVQs). Currently, GNVQs have been developed and are being piloted at Levels 2 and 3. But it is possible that they will also be developed for Level 4 and will then be an alternative to the traditionally conceived undergraduate degree programme. For some institutions of higher education NVQs and GNVQs represent a market opportunity; others may perceive them as a threat. But none can ignore them and for this reason the next section presents a brief summary of the NVQ Framework and the main features of its model for assessment.

THE NVQ FRAMEWORK

The NVQ Framework provides the overarching, comprehensive structure for all NVQs. Through it, relationships between vocational qualifications are to be made clear thus making it easier for individuals to map out appropriate career paths. Five Levels of NVQ are incorporated into the Framework to cover progression from routine and predictable work activities to the complex and unpredictable. For colleagues in higher education, Level 3 is of interest as a possible entry level to first degree courses, and Levels 4 and 5 because graduates are likely to be required to perform at these levels on entering, or soon after entering, employment. Vocational courses in HE may, therefore, have to be reshaped to take account of them. The Guide to National Vocational Qualifications (National Council for Vocational Qualifications 1991) summarises these Levels as follows:

Level 3 - competence in a broad range of varied work activities performed in a wide variety of contexts most of which are complex and non-routine. There is considerable responsibility and autonomy, and control or guidance of others is often required.

Level 4 - competence in a broad range of complex, technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and the allocation of resources is often present.

Level 5 - competence which involves the application of a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources feature strongly, as do personal accountabilities for analysis and diagnosis, design, planning, execution and evaluation. (pp.17 - 18)

The Guide sets out in detail the criteria which must be met before a qualification can be 'hallmarked' as an NVQ. It goes on to describe the constituent parts of the Framework and the approach to assessment that has to be adopted. At each point the underlying rationale is made explicit. The current version of the Guide was published in March 1991 but in the rapidly expanding world of NCVQ some revisions are likely. (For example, it is probable that Occupational Standards Councils will be set up to ensure greater consistency between the qualifications accredited in related occupational areas.)

To be accredited as an NVQ, a qualification must meet the following fundamental criteria (among others):

- *be based on national standards required for performance in employment, and take proper account of future needs with regard to technology, markets and employment patterns;*

- *be based on assessments of the outcomes of learning, arrived at independently of any particular mode, duration or location of learning;*

- *be awarded on the basis of valid and reliable assessments made in such a way as to ensure that performance to the national standard can be achieved at work. (p.5)*

These fundamental criteria reinforce the point that NVQs are about occupational competence: what the candidate can do in the workplace. All NVQs must, therefore, consist of an '*agreed statement of competence, which is determined and endorsed by a Lead Body with responsibility for defining, maintaining and improving national standards of performance in the sectors of employment where the competence is practised*'. (p.7). The statements of competence are derived from an elaborate and rigorous process of functional

analysis in an occupational area. In order to avoid narrowly specified job competences, four components of competence are looked for (p.9):

- task performance in context
- task management i.e. the skills to manage a group of tasks and prioritise between them
- contingency management i.e. the skills to recognise and deal with irregularities and variances in the immediate working environment
- role / environment skills i.e. the skills to work with others and cope with environmental factors which are required to fulfil the wider role expectations

Some competences are common to many occupational areas (management, for example). NCVQ has therefore set up some cross-sectoral lead bodies to develop 'generic units' in these competences which can then be imported into other qualifications.

NVQ statements of competence have to adhere to a strict format. The Units of Competence (which are the smallest accreditable part of the Framework) must consist of a title, elements and associated performance criteria. An element of competence is a description of something which a person who works in a given occupational area should be able to do. '*It is a description of an action, behaviour or outcome which the person should be able to demonstrate and it must be assessable.*'(p.13) Performance criteria are statements against which an assessor judges the evidence that an individual can perform the activity specified in an element. They have to be written in such a way that they contain a critical outcome and an evaluative component.

Shown below are some examples of elements and performance criteria from units in the Business & Technology Education Council's NVQ at Level 5 in Management (BTEC 1992 pp 26 - 27). They are drawn from the specified key purpose of 'achieving the organisation's objectives and continuously improving its performance' and relate to the key role 'manage operations':

Unit II 1
Initiate and implement change and improvement in services, products and systems

Element II 1.3
Negotiate and agree the introduction of change

Performance criteria

(a) Information on projected change is passed on to the appropriate people with minimum delay and in sufficient detail for them to evaluate its impact on the area for which they are responsible

(b) negotiations are conducted in a manner which maintains good working relationships

(c) Agreements reached include implementation plans at the necessary level of detail and are in line with organisational strategy

(d) Records of negotiations and agreements are complete, accurate and legible and passed on to the appropriate people

(e) .....

Performance Evidence Required
Evidence must cover the introduction of changes within the manager's department or team and include the following items

Projected changes related to:
- personnel requirements / team composition
- employment and work practices
- work methods and patterns
- .....

Examples of negotiations with:
- higher level managers
- colleagues
- staff representatives .....

Forms of Evidence
Products of performance such as agreements, implementation plans, records supplemented by witness testimony from subordinates, line managers and colleagues, Personal report detailing actions undertaken and why.

In the absence of sufficient evidence from performance, additional evidence will be required. This should include questioning to satisfy "what if" and "how would" scenarios implied in the element and knowledge and understanding of the principles and methods relating to:
- communicating proposals for change
- quality assurance and control
- organising and presenting information
- negotiating with others ...

As can be seen, the NVQ Framework is explicit about assessment. It is also rigorous in its assessment methodology (Johnson & Blinkhorn 1992b). What it requires is rather different from the traditional, norm-referenced approach to assessment found in higher education. Assessment in NVQs involves the collection and evaluation of evidence against performance criteria. The assessor has to judge whether the candidate's performance meets the prespecified standards and whether the evidence collected is a sufficient basis for the judgement to be made.

Thus the concept of 'performance' is critical and natural observation of the candidate in his or her workplace is envisaged as the main source of evidence for assessment:

As a general rule, the assessment of performance in the course of normal work offers the most natural form of evidence of competence...Alternatively, some form of simulation of the required performance may be required. This may take the form of demonstrations in the course of training. (p.21)

However, it is recognised in the *Guide* that effective performance does depend on an individual having a body of knowledge, theory, principles and cognitive skills - and particularly so at Levels 4 and 5. It may therefore be necessary to assess this underpinning knowledge to provide supplementary evidence of whether an individual can perform effectively in, say, different situations or contexts. But the *Guide* stresses that knowledge and understanding are not in themselves sufficient bases from which to infer competence:

'*The assessment decision should be made on the sum of performance plus supplementary evidence.*' (p.9) ..... '*NCVQ does not propose a single format for assessment of knowledge and understanding. It will, however, wish to ensure that the knowledge assessed contributes directly to the performance required in the statement of competence and will also wish to consider whether the assessment arrangements proposed are appropriate and rigorous.*' (p.15)

As yet there can be little empirical evidence as to whether the NVQ approach to the definition and assessment of competence is achieving its purposes. (Some work has been done on the impact of NVQs at organisational levels and The Employment Department is about to implement an evaluation strategy.) There are certainly some attractive features in the NCVQ Framework including less fragmentation of qualifications, more open access to qualifications, easier movement between specific jobs in an occupational area, and a broader view of competence than hitherto. There were also some acknowledged early problems in design and implementation which included a tendency to narrow over-specification (in spite of the Framework's intentions), time consuming and costly assessment procedures, unreliability in local assessments of performance, and insufficient collection of evidence for inferences of competence to be fairly made (Mitchell & Cuthbert 1989). There are still fears that NVQs will focus on minimum, threshold performance - although again this is not NCVQ's intention.

General NVQs (GNVQs) have been designed to bridge the academic : vocational divide. The Government's intention is that they "*should cover broad occupational areas, and offer opportunities to develop knowledge and understanding, and to gain appreciation of how to apply them at work.*" (HMSO 1991a). They are also to form an accepted route to higher education with Level 3 of comparable standard to A and AS level qualifications (NCVQ 1991). Although they share the same structure as NVQs in terms of units, elements and performance criteria there are also some important differences:

- GNVQs will not attest occupational or professional competence. They are to be based on 'statements of attainment' rather than 'statements of competence'

- GNVQs are to be designed so that they can be administered and assessed in educational institutions
- candidates will be required to demonstrate acquisition of knowledge and understanding as well as their application (and skills). Written tests are envisaged for each unit to supplement assessment of performance
- core skills are to be integrated into the students' learning programmes and will be assessed

As mentioned earlier, the final 'shape' of GNVQs is not known at the time of writing of this report : development is still in progress with a small number of GNVQs at Levels 2 and 3 under pilot in schools and colleges.

There are several issues which the NVQ Framework raises for higher education:

- To what extent should modules or programmes of study, and their assessment, be redesigned so that they can be counted towards the award of an NVQ or GNVQ?
- Is there sufficient agreement between HE and NCVQ about the status and assessment of competence, knowledge and understanding to make dual awards possible?
- Could students in HE meet the performance requirements laid down for the higher level NVQs if their course includes training placements or if they already have appropriate work experience?
- Is there sufficient agreement about the nature and importance of core skills to continue their assessment in higher education?

We return to these issues periodically in the report and try to draw some general conclusions together in Section 5.

STRUCTURE OF THE REPORT

Following this introduction the report begins in Section II with an examination of the four purposes which seem likely to characterise higher education in the next ten years: provision of a general education, preparation for knowledge creation, preparation for entry to particular professions, and preparation for employment generally. The implications for assessment policies are teased out before a deeper analysis is presented, in Section 3, of current thinking on the inter-relationship of knowledge, understanding and competence.

Section 4 contains a selective review of what is known about how students learn in higher education and the impact of assessment systems on that learning. The lack of empirical work on the development of cognitive abilities in different academic domains is noted and the section ends with findings drawn from studies of novice and expert performance. Section 5 presents the conclusions arising from the earlier sections and returns to the issues raised by the NVQ Framework. It then sets out some recommendations for action at national,

institutional, departmental and individual levels. It is argued that, to be effective, any changes in assessment policies and practices must be introduced coherently and systematically and that the changes must permeate the several levels simultaneously. Permanent change will not be effected without a system-wide approach and adequate resourcing.

SUMMARY

Higher education is facing many tensions which make it hard to predict what the system will look like in ten years time. The very constructs of 'learning', 'teaching' and 'research' are changing their meaning and new relationships between learner, teacher and subject material are emerging. Perhaps it is safe to conclude that HE will become more diverse and more ambiguous in its functions as it adapts to a mass market and struggles with the problem of intellectual fragmentation. It follows that its traditional assessment policies and methods will need to be reviewed to see if they are still adequate or if they need to be extended and changed as well.

The purposes of Higher Education

This section seeks to answer two basic questions:

a What are the purposes of higher education?
b What implications for assessment do these purposes have?

THE PURPOSES OF HIGHER EDUCATION

While some attention, historically, has been paid to the idea of the university (Halsey 1985) and, indeed, to the 'multiversity' (Kerr 1972) there has been rather less analysis of the educational purposes of higher education (Barnett 1990). The government's current proposals for expansion in higher education imply that HE is a national economic investment. This certainly represents one perspective for defining the educational outcomes of a higher education and has attracted considerable interest from those seeking to explain the comparative economic performances of different countries (Economist 1992). But it is not the only rationale.

Allen, using a category framework developed in the USA, analysed the goals of universities as evidenced in mission statements. The result is a useful insight into the multiplicity of purposes to which institutions have committed themselves (Allen 1988, reproduced in Appendix 1). Although his analysis focused on universities and not the polytechnics of the time, there was nothing in the CNAA handbooks for first degree courses which could not have been classified using the same system (Squires 1990).

It is important to recognise this multiplicity of purpose when considering assessment policies and practices. There is no agreed, single, definition of the educational purpose of higher education: there probably never has been. Further, some purposes are likely to be in conflict with others. While critics of higher education may deplore this lack of 'clarity', defenders will see great strength in its diversity and ease of adaptation. It may be tempting to try to achieve greater conformity by imposing a common assessment model as the government has done in the schools sector through the National Curriculum and SATs, or in the FE sector through the NVQ Framework. But such an outcome is not inevitable even if NVQs or GNVQs find their way into higher education and any attempt to force conformity is likely to be opposed:

'Descriptions of learning outcomes in higher education cannot be expressed as a set of 'national standards' of the kind developed for national vocational qualifications, since higher education exists to meet the needs of a variety of client groups and a range of social, economic, scientific and actual needs, and properly embodies a range of different cultures and value systems.' (Otter 1992 p. ii.)

What, then, are likely to be the main purposes of higher education in the next ten years? We would suggest that four can be identified. They are:

a a **general educational experience** of intrinsic worth to the individual student in its own right

b a **preparation for knowledge creation** (or dissemination or application) in a particular subject or field

c **specific vocational preparation** usually linked to entry to a profession

d **preparation for general employment** not tied to any one profession, service industry, or occupational 'family'.

Each of these will be elaborated in turn. The coverage will include analysis of the characteristics of the purpose, review of supporting evidence, and analysis of the implications for assessment policies and practices.

However, before starting, it is worth noting six preliminary points:

i all four of these purposes may be implicit in the minds of lecturers when designing and assessing a particular learning experience

ii there is overlap between the categories

iii the balance struck between the purposes is likely to vary from subject to subject within an institution, and within a subject area across institutions (see, for example, Radford on the undergraduate curriculum in psychology (Radford 1992))

iv the balance between the purposes may shift at different points in an undergraduate course

v the balance between purposes may shift between undergraduate and postgraduate provision, between initial postgraduate training and continuing professional development courses, and between all of these and provision for 'Third Age' students.

vi employers and students may see the value accorded to the various purposes differently from lecturers.

The last point emerged particularly clearly in the recent exploratory study on learning outcomes directed by Otter (1992). While the work of the project was spearheaded by a small group of academic staff (21) drawn mainly from the new universities, 74 employer organisations, nearly 100 academic staff and over 500 students participated in the consultation process. The results showed that students and employers both valued the vocational, instrumental purposes of HE more highly than the intrinsic general purposes.

This purpose has probably received less explicit articulation recently in English institutions of higher education than in their counterparts in Scotland which make more use of general degrees, or in the U.S.A. with their tradition of Liberal Arts Colleges. In England a 'general' degree has come to carry overtones of low status (Squires 1990). Nevertheless one can distinguish various items in this category. These are:

a the development of the 'trained mind'. This in turn includes:

i critical thinking and reasoning skills including demonstration of precision, penetration and consistency in argument, and clarity and cogency in communication. This has recently been extended to the use of computer-based tools and numerical methods for the testing and elaboration of ideas.

ii the ability to think conceptually; to form, integrate and use abstract concepts with attendant concrete examples.

iii an intellectual perspective and independence of thought prepared to challenge orthodoxy, require evidence for claims, and render problematic those assumptions which are taken-for-granted. Some would add to this an understanding of the socially constructed nature of knowledge and its essential relativity. Recognition by the student of his or her own assumptions and biases might also be included.

b the acquisition of the knowledge needed to be an 'educated person'. This includes:

i exposure to different domains of knowledge, to different ways of thinking and to different perspectives that can be brought to bear on an issue or problem.

ii exposure to significant aspects of the culture of (western) civilisation and to important contemporary theories in both the arts and sciences.

iii encouragement of respect for other cultural traditions.

iv use of this knowledge to form a coherent personal view of life based on sound judgements.

c personal development for adult life. This includes:

i development of the affective, moral, social, aesthetic, and creative dimensions of personality as well as the cognitive.

ii development of the informed and responsible citizen, able and willing to play a positive part in the community.

iii development of attributes and skills that will lead to a satisfying personal life including use of leisure time, family roles, and health.

iv enjoyment of cultural experiences.

d *development of a base for lifelong learning. This may include:*

i preparation for a return to higher education at a later date.

ii learning how to learn.

iii establishing a wide personal repertoire of learning strategies and skills (Some lecturers would also include this point under the 'trained mind'.)

There is little evidence in the UK on whether or not these purposes are achieved. This is not particularly surprising since it is unusual for an institution to attempt to assess them as learning outcomes. Nor has there been substantial funding for research studies into the net effect, or the long term effect, of completing higher education, nor into the comparative effect of attending different types of institution.

There is, however, a considerable body of evidence on the general effect of higher education from North America most recently analysed and summarised by Pascarella and Terenzini (1991). This account, taken together with the more qualitative investigation of the cognitive, motivational and affective outcomes of the liberal arts curriculum conducted by Winter, McClelland and Stewart (1981) may be the best evidence we have - although it is acknowledged that generalising from North American studies to the very different traditions of higher education in England and Wales is risky. Nevertheless, there is good evidence from North America that items (a) to (d) above are achieved at least to some extent.

Winter, McClelland and Stewart (1981) conclude their study of how a liberal arts education affects students by saying that it:

- *"increases students' capacity for mature adaptation to the environment when students encounter new experiences*
- *increases students' critical thinking and conceptual skills by demanding that they integrate broad ranges of novel experience*
- *increases students' independence of thought, instrumentality, and Self-definition by setting them free from elaborate restraints on behaviour and thought*
- *increases students' motivation for leadership by endowing them with a sense of being special"*
  (pp. 177 - 178)

Pascarella and Terenzini compute an 'effect size' for each researched outcome of higher education and indicate the strength of confidence that can be attached to the studies. Most of the studies they analyse relate to the traditional 18 - 22 year old, full time student taking a four year course leading to a Bachelor degree. The summary is too long to reproduce in full and, as the authors point out, the interaction of direct and indirect consequences of attending higher education is difficult to unravel. But among the more interesting findings which relate to the general educational purpose of higher education are the following:

- *".. there is more extensive and consistent evidence to support the net impact of college on learning and cognition, moral reasoning, and career and economic returns than in the areas of attitudes, values, and psychosocial characteristics. (p567)*

- *College not only appears to enhance general verbal and quantitative skills as well as oral and written communication, but it also has a statistically significant positive net effect on general intellectual and analytical skills, critical thinking, the use of reason and evidence in addressing ill-structured problems, and intellectual flexibility. These effects cannot be explained away by maturation or differences between those who attend and those who do not attend college in intelligence, academic ability or other precollege characteristics. (p. 567)*

- *college graduates have a substantially larger general knowledge base across a wide range of topics than do individuals whose education ends with high school (p. 577)*

- *college-educated individuals consistently rank higher than those with less education on a clear majority of the quality of life indexes considered. (p. 584)*

- *students tend to demonstrate the highest levels of learning on subject matter tests most congruent with their academic major. Similarly, they tend to demonstrate the greatest proficiency on measures of general cognitive development when the content of problems is most consistent with their academic major or the disciplinary emphasis of their course work. ... Beyond these selective impacts, however, we found little consistent evidence that one's major has more than a trivial net impact on one's general level of intellectual or cognitive outcomes." (p. 614)*

There are several points to make about the general educational purpose of higher education in relation to assessment. First, the notion of the 'trained mind' has historically been a powerful rationale for university education. (A nice irony is its taken-for-granted, unquestioned status.) Newman, writing in the nineteenth century on the purpose of a university education, argued that it: "*educates the intellect to reason well in all matters, to reach out towards truth, and to grasp it.*" (Newman 1853)(para.126). Similarly Last, writing about Oxford Greats in the 1930s, stated that its aim was: "*to continue to the limits the training of its students' minds in accuracy, power and independence*". It

was concerned with "*powers of reasoning*", "*precision, penetration and consistency*", "*a readiness to examine convention and to think out problems to the end*" and "*to make men relatively immune from risks that are run by such as trust to beliefs, uncritically accepted from others*". (Last 1935) (pp. 32 & 33) The extent to which a university education in the nineteenth or early twentieth century actually achieved these exalted aims is open to question Newman wrote his account as an ideal, not a description of what existed, but the mythology remains very powerful.

In English universities the 'trained mind' is usually assessed as part of the acquisition and application of subject specific knowledge, and there may be good reasons to maintain this position (see page 24). However, the argument over where and how to assess these cognitive abilities is likely to intensify if the NVQ Framework is adopted in higher education.

Second, some (subject) knowledge is seen to have value in its own right, contributing to the idea of an appropriately educated person (purpose (b) on page 19 above). Perceptions of what that knowledge should be, and who should decide, will change over time and across cultures. For example, Last felt that in addition to training the mind the purpose of Greats was to: " direct [students'] thoughts to subjects on which reflexion will give them some firmly established and coherent view of life, together with insight into the nature of man's relations to his fellows and the methods by which progress in human affairs has been achieved" (Last 1935) (p. 33). More recently 'the environment' has entered the list of what an educated person should know about and turns up in the HMI core skill 'knowledge about society and the environment' (see p.30-31 below). There is perhaps less confidence now than in previous eras about trying to define and transmit what is 'central' to western civilisation. Yet there may well be a demand for such 'culture' courses, and particularly from those seeking higher education as a non-vocational interest. Assessment of knowledge has long been practised in higher education and the implications of purpose (b) will be discussed under section 2.3 below.

Third, development of the student's personal maturity (purpose (c) on page 19) tends not to be assessed formally in the U.K., though informally it is addressed through references and testimonials. As a sub-purpose it draws its importance from the fact that a large majority of undergraduates have entered higher education directly from school at the age of 18 years and are still relatively young. Although the proportion of students over the age of 25 years has grown to a quarter (Association of Graduate Careers Advisory Services 1992), and is proportionately even higher on part-time courses, most modules in the 1990s are still likely to be designed with the school leaver in mind. Pascarella and Terenzini (1991) show that some kinds of undergraduate education achieve more personal development than can be accounted for by chronological maturation alone. Their findings imply that older students, too, would benefit in similar ways. Nevertheless, we suspect that if the biographic composition of the student body were to change radically in the future there might be less emphasis on these items. It may also be the case that the residential element has been a powerful factor historically in these gains and it remains to be seen

whether non-residential study will have the same potency. The work of Winter, McClelland and Stewart suggests that it will not.

Fourth, the list of general educational purposes (pp. 19-20) is based on a notion of higher education as a personal investment by the individual student. The institution provides the opportunity to learn, to think, to develop. But it is seen as the student's responsibility to exploit those opportunities, and the outcomes will vary from individual to individual in quite complex and unique ways. As yet, knowledge of how this happens is underdeveloped (Pascarella, et al. 1991) but may need more attention in the future in order to guide the construction of differentiated learning experiences. Assessment may then include a review of 'learning contracts' negotiated between the student and the institution.

Fifth, assessment of some of the sub items of the general educational purpose would be welcomed by those supporting the more vocational purposes of higher education. For example, 'values and integrity' is seen as a desirable 'common learning outcome' by the CBI, taking responsibility for one's learning is a core skill in GNVQs, and 'managing and developing self' is a common skill included in all BTEC programmes (Otter 1992, note 4 pp. 104-106). However, other items might be less welcome. For example, would all employers or professional regulatory bodies welcome reinforcement of the critical, sceptical and challenging approach to norms and practices ? - though one can argue that they should (Eraut 1992b).

PREPARATION FOR KNOWLEDGE CREATION / DISSEMINATION / APPLICATION THROUGH KNOWLEDGE ACQUISITION

This purpose has the following characteristics:

a acquisition of the conceptual frameworks, major theories, basic formulae, and current accepted positions in the subject studied. If appropriate, understanding of the problems or issues in the natural world, industry / commerce or society which the subject addresses

b deep and detailed knowledge of some aspects of the subject. Development of personal preferences with a view to further specialisation

c an understanding and demonstration of the subject's methodologies and procedures, searches and tests for truth, ethical constraints, and ways of handling evidence and argument

d experience, at first vicarious but then first hand, of knowledge creation in the field through a small scale project or research study

e insight into how subject knowledge changes, problem solving occurs and into the provisional nature of current understanding

f uses and limitations of models, numerical techniques and computer - based analytical tools pertinent to the subject (if any)

g (if appropriate) grounding in technical skills, their safe use, and development to acceptable performance levels

h development of skills of communication typically used in the disciplinary culture to which the subject belongs

i (if appropriate) development of group or team working skills appropriate to the discipline.

There is little doubt that this purpose with all its characteristics is regarded as central to higher education by those who teach in it. And many would say that current assessment practices are designed to test for knowledge acquisition rather than anything else. The concern with 'content' has, however, made higher education vulnerable to external criticism. In its travestied form, higher education is depicted as filling up the heads of students with arid, irrelevant facts, recalled in formal examinations only to be forgotten. This 'ivory tower' stereotype, while understandable, makes discussion of this purpose more difficult than it should be - which is a pity if we are indeed moving into an information age where 'knowledge' will become the most marketable of commodities and knowledge engineers the elite of the new professions.

There are several good reasons to retain the purpose of knowledge acquisition. First, it underpins knowledge creation, dissemination and application which has traditionally been a legitimate and cost effective function of higher education. (The weakness of structured graduate provision in the UK, compared to the USA or European economic rivals, strengthens the case for this to happen at undergraduate level.) However, as argued in the Introduction, higher education is likely to lose its monopoly of knowledge creation in the future - so there are limits to this argument. Second, knowledge acquisition is also valued by those employers who are seeking to recruit graduates for technical posts (Roizen & Jepson 1985), (Review 1990). For example, one employer in the Otter (1992) study is quoted as saying:

'*.....the first thing we are looking for is a considerable amount of detailed technical and professional knowledge about the specific subject they have studied....this needs to be combined with the ability to harness this knowledge of facts and principles and systems to the solution of real problems....*' (p. 36)

The proportion of jobs requiring specific subject knowledge is currently put at 60% (Association of Graduate Careers Advisory Services 1992). Although it is difficult to make firm predictions it can be argued that this proportion will rise as the single European employment market takes effect and as more occupational areas require new entrants to have completed specific, 'professional' training courses.

The analyses of Pascarella and Terenzini (1991) show that higher education does achieve the purpose of knowledge acquisition rather well even in the US general degree programme. Undergraduates do make statistically significant gains in knowledge of the subject matter related to their major field of study between freshman and senior years.

There is then a case for preparation for knowledge creation through acquisition of subject knowledge, and some evidence that it is achieved.

What are the implications for assessment? There are several. First, the emphasis in this set of purposes is very much on 'deep', meaningful learning rather than superficial reproduction of facts - whatever the external critics wish to believe. But the assessment practices traditionally used are not necessarily congruent with this aim. For example, examination questions which can be answered merely through accurate recall of lecturers' notes and handouts are unlikely to lead students to think critically about the material or to extend and test their understanding through reading and discussion. Indeed, assessment procedures commonly allow students to play a strategic game of question spotting rather than encouraging them to learn for personal, conceptual understanding. In an (admittedly small) qualitative study of revision practices Entwistle and Entwistle (1991) concluded:

'*Here, we see how the nature of the questions not only affect the demands made and the ability of students to answer them effectively, but also influences the form of understanding which students are seeking in their studying. As many students look at the previous year's papers quite early in the course, the type of question anticipated will influence the approaches to studying adopted. Only questions which demand some reconstruction of the original lecture material and are judged on the basis of additional material and imaginative reorganisation will satisfactorily identify students who have sought, and achieved, conceptual understanding.*'(p. 225)

Further, an assessment system which focuses exclusively on learning of formal propositional knowledge, and which treats problems drawn from applied contexts as examples only, does have its dangers. If too low a status is given to knowledge derived from personal experience or from real problem solving, or if formal knowledge is not linked in any way to what students believe to be important and relevant in their lives, then students may find it hard to learn meaningfully (Marton, Hounsell & Entwistle 1984). An assessment strategy needs to ensure a balance in the nature of the knowledge assessed and in the way that students are expected to manipulate and use it.

Second, although there is a case for assessing knowledge acquisition, it is far from clear that the arguments justify the practice of differentiating students by class of degree. On the face of it, those with most to gain from classification are the academics themselves who use first class and upper second degrees as a mechanism to select those who will proceed to research and thence, perhaps, into the academic profession. Employers, on the other hand, are not particularly interested in the class of degree obtained even when they are

looking for subject expertise (Roizen, et al. 1985). The elaborate assessment structure which stands behind classification may be perverse when only 8% of graduates continue with academic study (Association of Graduate Careers Advisory Services 1992). (It is interesting to see that the University of London is now contemplating the abolition of classification.)

The third point is the poor accuracy and reliability of the present ways of assessing knowledge acquisition. Criticism is widespread, well founded empirically, and severely damaging to any claims of generalisation made on the basis of the assessment results. Many of the criticisms are reviewed in Heywood (1989).

Among the most serious are the following:

i There is no consistency in the assessment criteria used between subjects, within subjects, between institutions or within institutions for the awarding of class of degree. The situation has got even worse with the demise of the CNAA and we simply do not know whether a 2.1. from the University of Nottingham means the same thing as a 2.1 from the University of Southampton or the University of Sunderland. The baselines of entry ability from which institutions and departments are operating differ markedly and it is likely that internal examiners adapt their marking to the ability level of the students in front of them - whom they often also teach. This makes it very difficult to operate a fair, national performance indicator system and even if new 'exit points' are accepted at lower levels than the honours degree the same difficulty of assessing 'value added' remains.

ii Certain frames of reference which lecturers bring to assessment are known to bias systematically the way they mark (Heywood 1989). For example, those who use a 'peer' comparison approach will mark differently from those who are looking for evidence of change in performance since the beginning of the course. These frames of reference may be subconscious and unrecognised and are at their most pernicious in the marking of essay scripts. They may compound other common biases. For example, second markers tend to confirm first marks if they know them, examiners mark down scripts in the middle of a large pile out of fatigue and boredom, and the marks given can be influenced by knowledge of the identity of the candidates.

iii Internally, lecturers have little idea of how others set and mark assignments (Otter 1992). Worse, as a quality assurance system, the external examining procedure is badly flawed. External examiners are not usually part of the curriculum design team. It is also unusual for them, or the internal examiners, to be trained in assessment. The sample of work sent to the external examiners is often limited, and they rarely see the teaching which leads up to examinations. They therefore have no way of knowing whether a particular question called for reproduction of procedures given in a lecture, and subsequently rote memorised by the student, or whether it required synthesis by the candidate of independent work and good conceptual understanding. A paper can contain questions which look similar but in

practice make very different levels of demand on the student (Entwistle, et al. 1991).

iv Regardless of ability, certain types of question format are easier for candidates of a given ability than others (Pollitt, Hutchinson, Entwistle & Luca 1985). Pre-structured questions, for example, are easier than broad, abstract questions. But few lecturers in higher education understand the technical design factors which can affect assessment outcomes.

v In some institutions new forms of assessment have replaced the traditional end of course 'finals'. However, Heywood (1989) and others warn against complacency with these newer approaches. Continuous assessment of coursework can overload not just the lecturers (with rising class numbers) but also the students and is as prone to distortion as the marking of examination scripts. The reliability of project assessment is often low and may confound assessment of the ability to frame a problem with assessment of the skills of solving it. Assessment of 'practicals' in laboratories often degenerates into marking the write - up rather than judging the skills displayed in carrying out the experiment. Orals are prone to the biases found in any interview. 'Profiles can provide as much noise as information' (p. 280) while poor construction of so - called objective tests (such as multiple choice or true / false tests) leaves them vulnerable to the test - wise student who has become proficient at strategic guessing.

vi Although there are exceptions, in many departments the approach to assessment remains conservative through ignorance. The essay and unseen examination are unchallenged; the tutors are also the examiners (Otter 1992). In the final examinations candidates are given a wide choice of questions, marks are aggregated, and there is often no requirement to demonstrate understanding of the important basics of the subject in order to graduate.

The impression left from the literature is that the assessment methods commonly used to see whether knowledge acquisition has been achieved are badly in need of review. As they stand, they are unlikely to be acceptable to those critics who want to see a more rigorous approach to the assessment of learning outcomes. It will be necessary in the interests of reliability, if nothing else, to look again at whether norm - referenced discrimination between students is really as important as criterion-referenced assessment of development and mastery: as a minimum, explicit criteria attached to the award of grades would help. Clearly too, there must be greater awareness of how assessment affects learning and more staff training in assessment techniques. The recommendations for improvement which follow from these criticisms are taken up in Section 5.

SPECIFIC VOCATIONAL / PROFESSIONAL PREPARATION

In the last twenty years higher education has accepted an increasing number of degree courses preparing people for initial qualification to practise in a profession. (Even more recently, there has been growth in the provision of masters' and other advanced courses as part of continuing professional development for those already qualified and practising.) These trends can be expected to continue as long as the demand for formal credentialling of skills continues to rise.

One can analyse preparation for specific vocational or professional employment as follows:

a integration of relevant theoretical knowledge with knowledge of processes and principles developed from analysis of practice (self and other).

b acquisition of expertise derived from subject specific knowledge and from its application or interpretation in real contexts.

c development of skills or competences including those of interacting with clients gained through first hand experience of professional contexts and feedback on performance from skilled practitioners. These skills include ways of acquiring, selecting and interpreting information, and choosing between several possible courses of action.

d acquisitions of the norms, attitudes, personal qualities and collegial ways of working expected of members of the target profession including the concepts of autonomy and responsibility as understood in it.

e understanding and demonstration of the ethical codes and procedures expected in the profession particularly with reference to any 'client' groups.

f understanding of the organisational contexts in which one is likely to be working and development of the competences needed to contribute to them as well as to the evolving role of the profession itself in society.

g understanding of how professional competence and expertise is acquired and extended. Ability to seek and use feedback on performance. Ability to reflect on one's own practice in order to manage and assess oneself and determine one's own continuing development needs.

Although increasing in popularity, these courses have been the subject of cogent criticism. Eraut, for example, has made the point that the way in which courses have been designed, and students assessed, has more to do with power sharing between higher education and the professional regulatory bodies than with any analysis of what professional education should consist of, or any model of how professional expertise develops (Eraut 1992a). The major criticisms are the way

that patterns of study and placement separate 'theory' from 'practice', and the misguided belief that professional action consists simply of applying the former to the latter (Schön 1983). As a result, knowledge of central importance to the way practitioners work with clients may be given a low priority in higher education and often is absent altogether :

'... the central problem of the dual qualification system is that it separates theory from practice, whereas the essence of professional action lies in the relationship between the two. Moreover there is continuing pressure within higher education for theory to be situated within the context of discipline-based propositional knowledge, and continuing pressure in professional practice for theory to be sidelined. Neither side takes responsibility for professional performance. Higher education tends to avoid it by labelling it as 'training' and lacks an appropriate practical context; while in many professions workplace supervisors often have little time for facilitating professional development, and expect trainees to pick it up like they [the supervisors] did when they were trainees.' (Eraut 1992b, p.4)

There is empirical support for Eraut's arguments. Coles, for example, working with medical school curricula, has shown that medical students who completed the theoretical elements of the course before coming into contact with real patients did not elaborate their learning to the same extent as those whose theory and practice elements were interwoven. (Coles 1990).

The extent, therefore, to which vocational preparation courses are really succeeding in achieving their purposes must be open to question. These doubts, in turn, raise some issues for assessment.

First, it is important to note that in addition to establishing whether knowledge and skills have been acquired, assessment carries other purposes on these courses. In particular, assessment is used to select new entrants to the profession (and through restricting access performs a planning function as well), to ensure that new entrants are safe and competent to practise albeit initially under supervision, and to license their right to practise according to statutory regulations or the criteria of the regulatory external professional body. This means that defining sufficiency of evidence of minimum competence is a key task in designing assessment policies on these courses.

Second, it follows from the nature of professional practice that assessment should test knowledge generated from analysis of that practice as well as knowledge derived from the more traditional higher education sources of research and scholarship. Assessment procedures are critical to the success or failure of these courses. If they fail to demand of students that they integrate their learning from, say, formal lectures with their learning from placement experience, theory and practice will remain disjunct.

Third, it is clear that a competence-based approach to assessment of learning outcomes may be very appropriate for this set of purposes, and could include assessment of performance on placements during training. This is therefore one

potential meeting point between the NVQ Framework and existing HE practices. While the NVQ Framework puts most emphasis on 'performance' it does allow for the assessment of knowledge and understanding to provide supplementary evidence of competence. However, whether the current handling of 'knowledge and understanding' in the Framework would satisfy colleagues in HE remains an open question as does the extent to which students on vocational courses could be expected to have accumulated the breadth of experiential evidence required in the NVQ definition of occupational competence. This last point may be much less of a problem for post-experience courses and an excellent example of how such a course in the social services sector can be designed for both traditional and NVQ accreditation is the ASSET programme at Anglia Polytechnic University (Winter & Maisch 1991).

Fourth, assessment should require demonstration of the process skills of being a reflective practitioner (including self assessment and analysis of development needs). However, there is a danger that if assessment is targeted exclusively on making 'knowledge-in-use' explicit the assessment strategy could become quite limiting. (New) professionals need to be able to analyse the structural, economic and political factors that affect their profession and consider wider organisational issues as well as their own performance. Too narrow a focus on the individual practitioner runs the risk of disempowerment.

PREPARATION FOR GENERAL EMPLOYMENT

This category of purpose is all about the identification and development of those personal skills and competences which are expected to enhance performance and profitability in employment. It includes laying the foundations of managerial and technological skills which many believe will characterise successful employing organisations in the future. In spite of the difficulties inherent in the task, several attempts have been made to define appropriate lists of 'core skills', 'generic competences', and 'personal qualities' for general employment. Some of these are helpfully summarised in the Appendix of Otter's study and in Brown (1991) (who warns that the items are becoming 'dangerously close to everything that one does whilst one is awake'.) They include:

a preparation for the 'world of work' including first hand work experience and an understanding of the constraints in which employing organisations operate.

b development of the ability to reflect on and learn from practical experiences.

c development of mental skills and competences including numeracy, the ability to assimilate large quantities of information quickly, and to analyse issues from several perspectives.

d development of communication skills including oral presentation and report writing.

e development of technical skills including use of software, communications technology, and a foreign language for business.

f development of personal qualities including drive, self motivation, self assessment, time management, ability to work without close supervision, leadership potential, enterprise, initiative.

g development of applied skills such as working effectively in groups or teams, problem solving and decision making, evaluation of risks and consequences.

h understanding of the nature of change and preparedness to adapt appropriately.

In the latest AGCAS statistics roughly half (54%) the graduates from universities, polytechnics and colleges or institutes of higher education entered permanent employment on completion of their degree (Association of Graduate Careers Advisory Services 1992). The AGCAS figures reveal a surprising diversity of jobs entered, even from subjects which one might have thought would lead into a homogeneous family of occupations. Graduates from physics, the biological sciences, and modern foreign languages enter almost as wide a range of jobs as do graduates from English, history and the social sciences. The figures also show that a sizable proportion of jobs make no direct use of discipline-specific content: 40% of jobs advertised do not specify a subject. Clearly then, there is a case for preparing undergraduates for general employment.

The importance of preparing students for general employment has always been understood by those in higher education though recently more public emphasis has been placed on it. For example, Sir Graham Hills, the former Principal and Vice Chancellor of Strathclyde University, was recently quoted in a press interview as saying:

'*Universities are no longer just knowledge factories. They give young people confidence and competence. There is more attention to people and less to subjects.*'

In terms of personal socioeconomic outcomes it seems as though a degree is indeed a good choice of investment by the student. Evidence from the USA and the UK suggests that having a degree leads to a higher income in the long term, to fast track training opportunities and faster promotion, and to technical, managerial and professional jobs with high status, good social interaction and self direction. The higher income in turn enables graduates to purchase the goods and services for a more satisfying, healthier lifestyle (Association of Graduate Careers Advisory Services 1992; Pascarella, et al. 1991; Roizen, et al. 1985). It should not be a surprise, then, if students favour this purpose of

higher education above others. However, whether in a mass system the economic return on studying for a degree will continue to be as good as it is now is doubtful. It is interesting to note that a recent report queries the government's figure of a 25% return (which was used to justify the introduction of student loans) suggesting instead that the real return is currently around 7% for men and 6% for women. It would not take much of a drop to make higher education a dubious long term investment as is already the case for low level vocational qualifications (Bennett, Glennerster & Nevison 1992).

But what of the other side of the equation? What are employers looking for in graduates? The most detailed answer to this question is the government's Inter Departmental Review published in 1990 (Review 1990) and substantiated recently in the exploratory study by Otter (1992). The answer is more complex and ambiguous than might be imagined. Leaving aside the 'screening function' that a degree offers in keeping selection cost-effective, there is a clear distinction between recruiters who wish to fill technical vacancies and recruiters who wish to fill general posts. The former are interested in the content of the course taken; the latter are not. The former are interested in mastery of subject knowledge; the latter are more concerned with personality profiles and life experiences. (Even those, however, who are primarily interested in subject expertise are also looking for certain personality traits and one set of criteria can act as a filter for the other.)

For the general recruiters, a degree is an indication of general intellectual aptitude and perhaps of potential for further development to a middle or senior position in the firm. That said, it has been shown that personality, the ability to sustain social relationships, and the non-academic experiences associated with living away from home, with extra-curricular activities and with travel are the main criteria used for selection. So in spite of attempts to formulate a definitive list of skills and competences, no convenient, simple list emerges from a content analysis of what employers say they want. Rather, just as it was in the 1980s, the picture remains one of a multidimensional web of desired attributes and experiences with the recruiters working to a large extent through subjective impression and intuition (Roizen, et al. 1985, p. 56 - 57).

Once again, one can make certain points here about the implications for assessment.

First, those who believe strongly in preparing young people for general employment argue that the skills and competences listed (a) to (h) (p.30-31) above should have the status of being a 'core' in a student's experience of learning whatever the subject studied.

There is general agreement that in order to attain the centrality desired, these competences, capabilities and skills will have to be assessed (and recorded). However, the forms that such assessment should take and the claims that could be made for its reliability and validity have received rather less attention. But there are some exceptions. For example, the development projects on assessment of work-based learning, supported by the Employment Department,

have tried to tackle assessment. In the report on the projects the authors discuss the collection of adequate evidence. The means suggested include observation, recording (e.g diaries, logbooks, portfolios verified by supervisors), and demonstration (e.g. by presentations, project work, pre- and post aptitude tests, structured exercises). Several of the verification and accreditation issues are also discussed. (Duckenfield & Stirner 1992).

Another possibility would be to introduce the core skills component of GNVQs into undergraduate programmes. The GNVQ framework has made some core skills a formally recognised and assessed part of an award. These core skills are defined as: communication, problem-solving, personal skills (itself subdivided into 'learning to learn' and 'working with others'), numeracy (application of number) and information technology. In addition it is proposed that competence in modern foreign languages should be included for those who have the opportunity and wish to pursue it (NCVQ 1991). For each of these skills a scheme of levels, units, elements and performance criteria have been identified and specified. For example, the element statements for the unit 'responding to problems' includes:

- Clarify the nature of a problem
- Decide how to find a solution to a problem
- Judge the appropriateness of a potential solution to a problem
- Evaluate the implementation of a solution to a problem

while those for the Information Technology Unit 'Organising, presenting, processing and analysing information' include:

- Use complex operations with computer applications to input, edit, format and display textual, graphic and numeric information
- Set up and operate directory/filing system for storage, duplication and retrieval of information
- Devise and run searches and calculations
- Set up options within applications to meet working requirements
- Evaluate whether IT tools offer an appropriate solution when dealing with specific problems and tasks

(NCVQ 1991 Appendix G.)

However, as mentioned in the Introduction, so far GNVQs have only been developed at Level 2 and 3.

The second assessment-related point is the tension between seeing the development of these core skills as something that happens in addition to academic study or as something that should happen through academic study. If it is additional, then whatever module is devised runs the risk of being seen as a fringe activity with low status and contrived legitimacy. If, on the other hand, the core skills are to be developed and assessed as part of the conventional curriculum it raises the question of whether study of a subject can be structured both for knowledge acquisition and as a 'vehicle' for development of these core skills. More deeply, embedding the core skills in academic study raises the very

interesting issue of how the experience of studying in different discipline areas might affect the development of the core skills and personal competences desired. For having said that such skills cannot and should not be developed in a context-free manner, one has to recognise that the context may well have an effect on how they develop.

Third, there is a major assumption that such generic competences and skills, if acquired in higher education, can and will be transferred to employment. While there may be a common sense view that transfer is likely, the empirical evidence is not strong (Brown & Pendlebury 1992). Whether different forms of assessment would help to make transfer more likely and whether higher education courses should include training in the skills of transfer *per se* are key issues here.

Fourth, the items (a) to (h) above (p.30-31) are heterogeneous and several depend on personality attributes. Formal assessment of personality, other than through personal references, is not typical in higher education at the moment (though careers advisers and employers on the 'milk round' may use a variety of tests designed to produce a personality profile). There may be real disagreement among colleagues on the desirability of trying to assess personal attributes more formally. It must also be doubted whether it would be meaningful to measure and summate the results across such heterogeneity in order to communicate them in a simple form to potential employers - and any attempt to use records of achievement in this way should probably be resisted.

Fifth, several of the 'soft skill' items to do with interpersonal or cognitive competences have not yet been systematically analysed as factors which distinguish above average from competent performance - even though this is one of the main reasons for recruiting graduates as opposed to school leavers. The lack of rigorous analysis is likely to cause problems in assessment and indeed to hinder construction of suitable learning experiences through which students could develop the desired attributes (Spencer 1983). These items include the 'motherhood' concepts of 'problem solving' and 'enterprise' although, to its credit, the Employment Department is currently trying to find ways of assessing 'enterprise learning'. Other items have received considerable critical scrutiny in subject specific literature but this does not seem to have been taken into account by those compiling the lists. The notion of personal leadership qualities, with no accompanying explication of context or task, is a good example. Indeed, one of the findings from the study of Liberal Arts Colleges was that *'while instruction in techniques may facilitate the growth of the* skills *of leadership, it does not seem to produce the relevant motivation to use the skills appropriately.'* (Winter, et al. 1981 p. 179, original emphases.) It may be the case that these taken for granted competences need rather more critical analysis before they can be assimilated into the HE curriculum as learning objectives and validly assessed.

SUMMARY

1. Higher education is heterogeneous in purpose and likely to become even more diverse. Decisions about the mix and balance of purposes are likely to be taken at course or programme level and to be reflected in learning contracts where these are introduced. We should therefore expect to see new or differentiated assessment policies and practices emerging.

2. The purposes which are likely to characterise HE in the 1990s are not particularly new and do not offer insuperable problems of adaptation. Nevertheless one could expect, at least in some institutions, to see a more public emphasis on the vocational purposes and a shift away from knowledge acquisition.

3. Many existing assessment practices can be criticised for not reflecting adequately the espoused purposes of a course or programme of study. This is as true for knowledge acquisition as it is for the other purposes. In fact none of the purposes identified is particularly well served by current assessment policies or methods.

4. A major barrier to improving the quality of assessment is the low level of technical assessment expertise among lecturers. Awareness of assessment issues is also lacking.

5. The analysis of purposes suggests that there is indeed potential for dialogue between the NVQ Framework and traditional HE but, as the next Section will show, there are also deep differences in the conception of knowledge, understanding and competence.

The deeper issues

Underlying the analysis and discussion in the last section are several questions which have an important bearing on assessment and on the possibility of bringing the NVQ Framework into some sort of partnership with qualifications awarded in HE. The questions are:

1 *How should knowledge, understanding and competence be defined and how should their interrelationship be conceived ?*

2 *How useful is the concept of a 'learning outcome' when considering assessment practices?*

The first question cannot have a straightforward answer. Knowledge, understanding and competence are all inferred from behaviour (or performance) and are not directly observable. They are also constructs and as such are socially and culturally determined i.e. the meaning and importance attached to each may well differ from group to group and over time. This can be seen in the debate about competences where apparent precision in the assessment methodology can mask deeper ambiguities about the principal terms being used (Norris 1991). Further, what counts as (sufficient) evidence from which to infer knowledge, understanding or competence, and the weight to be given to any piece of evidence, are also open to negotiation. So the constructs are slippery, and we certainly need further careful studies of how they manifest themselves in professional performance. Nevertheless, the following subsections try first to define the terms separately, as they are being used in the current debate, and then to show the different ways in which they can be related to each other.

section 3

DEFINITIONS OF KNOWLEDGE, UNDERSTANDING AND COMPETENCE

Knowledge.
The nature of knowledge has been widely discussed in relation to assessment for vocational purposes (Black & Wolf 1990; MacLure & Norris 1991). Typically, the authors note that 'knowledge' is multifaceted, not unitary, and go on to offer a categorisation of their own.

MacLure and Norris (1991), for example, analyse 'knowledge' into three categories:

a content e.g. facts, findings, concepts, theories, procedures, formulae, principles

b cognitive processes or thinking abilities e.g. problem solving, decision making, reflecting, judging, analysing, predicting

c practical, situationally specific knowledge which derives from performance-in-action and subsequently guides it. Such knowledge is often personal

rather than public. It may exist at a tacit, subconscious level unless made the object of deliberate reflection and analysis. This definition of knowledge denies the distinction between theory and practice; both are interrelated in performance.

Eraut, by comparison, identifies six types of 'knowledge' (Eraut 1988; 1992a):

a situational knowledge i.e. the way people conceptualise situations, think about them and 'read' them. This knowledge is built up from experience and may be tacit

b knowledge of people and the basis on which one gets to know and make judgements about people

c knowledge of practice which includes not just simple factual information but also knowledge of the courses of action one could take in a situation. It is a prerequisite for effective decision making and problem solving

d conceptual knowledge including formal and informal theories which guide much of our behaviour but may, again, be tacit

e process knowledge i.e. knowledge about how to do things or get things done

f control knowledge (based on the cybernetic concept of control and applied to controlling oneself), being aware of how one is performing (seeking and using feedback), self assessment and self management.

Eraut argues that knowledge can be used in four ways: replication, application, interpretation and association. Formal assessment in higher education usually tests replication and application. (One can maintain that, in practice, replication shades into application since even in a formal examination a candidate is required to select from a possible set of knowledge that which is to be replicated for a particular question.) But Eraut argues that interpretation and association are more typical of the way a practitioner uses his or her knowledge base. By implication, then, these uses should also be reflected in the assessment of professional preparation in higher education.

Understanding.

By comparison to 'knowledge', 'understanding' has received little attention. Indeed Wolf (1990) argues that in vocational contexts knowledge and understanding can be seen as one and the same thing. This view is also implicit in the treatment of the two terms in NCVQ publications. But this lack of distinction may not be appropriate in higher education. There is a sense in which 'understanding' is reserved for a state of insight in which the relationships between concepts are perceived. It may also be used to signify a critical stage in 'mastery' of a discipline when a student passes beyond simplistic views of knowledge to appreciate the subtleties of the subject and the provisional nature of its theories. Entwistle and Entwistle (1991) catch the flavour of what is often meant by 'understanding'. Summarising what students

said about their experience of reaching understanding, they highlight the affective as well as the cognitive dimension in the construct:

"Within our sample, understanding was experienced as a feeling of satisfaction, although that feeling varied in its expression from the sudden 'aha', as confusion on a particular topic was replaced by insight, to a less dramatic feeling associated either with being able to follow a lecture or with an emerging appreciation of the nature of the discipline itself. This feeling was derived from a recognition of the meaning and significance of the material learned. It also emanated from a perception of coherence and connectedness, and what might be called provisional wholeness - completeness recognised as being only temporary. And associated with that wholeness, was a belief in the irreversibility of the understanding achieved - at least once it had been firmly established. The feeling of coherence and connectedness led students to express confidence about explaining - a belief that they could provide a satisfactory explanation of what they had come to understand, either to themselves or to others. They also recognised that understanding provided them with flexibility in adapting and applying ideas and information effectively. It was this confidence, both in being able to provide a convincing explanation and to adapt ideas flexibly for use in varying and novel contexts, which distinguished 'understanding' from 'knowledge' in the students' descriptions." (p. 211, original emphases)

These points are not new. Newman, for example, sought to distinguish a mere acquisition of ideas from an understanding of the relationships between them and the enlargement of philosophical perspective that this gives:

" the enlargement consists, not merely in the passive reception into the mind of a number of ideas hitherto unknown to it, but in the mind's energetic and simultaneous action upon and towards and among those new ideas, which are rushing in upon it. It is the action of a formative power, reducing to order and meaning the matter of our acquirements; it is a making the objects of our knowledge subjectively our own....It is not the mere addition to our knowledge that is the illumination; but ...the movement onwards, of that mental centre, to which both what we know and what we are learning...gravitates.....Accordingly, when this analytical, distributive, harmonizing process is away, the mind experiences no enlargement, and is not reckoned as enlightened or comprehensive, whatever it may add to its knowledge." (Newman 1853, paras. 134 - 135)

Understanding, taken from this perspective, implies that there is something intrinsically valuable in the insights obtained which is long lasting even when the details of subject knowledge have been forgotten. Further, the process of coming to understand may of itself be a powerful long term influence on how a person performs after graduation: his or her thinking processes may have been qualitatively shaped and enhanced by the particular forms of knowledge acquisition encountered during study. For this reason one can argue that new knowledge of substance cannot be built without understanding and understanding is therefore indispensable to innovation and creativity. So

understanding, as defined here, fits well with the HE purpose of knowledg· creation, dissemination, and application.

If knowledge and understanding continue to be treated as an undifferentiated concept in the NVQ Framework, and if, as we suspect, that position is not shared by all lecturers in higher education then a real difficulty can be anticipated in attempts to bring the two systems together.

Competence.
'Competence' can also be broken down in different ways. Jessup, whose thinking has had a profound impact on the NVQ movement, defines competence as 'the ability to perform to recognised standards' (Jessup 1991 p. 40). These standards are those used to maintain or improve 'quality' in the relevant occupation or profession. Jessup defines both occupational competence and (by implication) job competence; his concept of occupational competence is deliberately broader:

'*A person who is described as competent in an occupation or profession is considered to have a repertoire of skills, knowledge and understanding which he or she can apply in a range of contexts and organisations. To say that a person is competent in a 'job', on the other hand, may mean that their competence is limited to a particular role in a particular company.*' (p. 26)

MacLure and Norris (1991) themselves provide a wider view of competence drawn both from the different traditions in psychology and from empirical work with practising professionals. They distinguish four main approaches:

a Competence is based on a description of action, behaviour or outcome in a form that is capable of demonstration, observation and assessment. Desired competences are identified through an analysis of functions into their constituent elements. Assessment centres on whether performance meets the prespecified standards. (This is the NCVQ approach.)

b Competence is seen as broad clusters of abilities linked together conceptually. Interest is centred on identifying what distinguishes the excellent from the average performer and then on building training and assessment around these 'critical' skills or abilities.

c Competence is a deep cognitive structure of general ability which is not fixed but has the potential to develop. There can be assessment of particular competencies but not of competence *per se*.

d Competence is determined by the actors in any given situation. It is situationally specific, and will depend on the value judgements of the individuals present at the time. Competent practice cannot therefore be defined in advance.

The concept of competence has had less of an airing in HE. It is important on courses of professional training where decisions have to be made as to whether

a student is 'safe to practise', but on the whole lecturers see 'competence' in terms of minimum achievement and look towards mastery or excellence as assessable outcomes beyond it. This is probably one reason for the suspicion that the NVQ framework will lower standards to an undistinguished mediocrity - a criticism rebutted by those responsible for drawing up the NVQ statements of competence who claim to have encapsulated the best of forward looking practice in their performance criteria.

INTERRELATIONSHIPS BETWEEN KNOWLEDGE, UNDERSTANDING AND COMPETENCE AND THEIR IMPLICATIONS FOR ASSESSMENT

The conceptual and linguistic difficulties in defining knowledge, understanding and competence lead inexorably to difficulties over the quality of assessment practice and the extent to which claims for generalisation can be made from it. Differences in interpretation threatens the reliability of assessment i.e. the claim that it is consistent, accurate and fair in its operation from candidate to candidate. Where, as in higher education, the results of assessment are used to license or to select, consistency in the assessment process is highly desirable. But, as has already been argued in relation to assessment of knowledge (p.25above) variability is not easily eliminated. Some variability is also likely to occur in the assessment of competence when evidence of candidates' performance is judged at local level by a large number of assessors - however well trained. Standardisation is one way of increasing reliability but it can be at the cost of validity i.e. the claim that the assessment really does measure what it says it measures. In work - based assessment schemes, for example, any attempt to specify and standardise the task on which candidates are assessed would undermine the validity of the assessment: jobs and their contexts do differ. Even performance on a simulation would, to some extent, be artificial and might therefore be a poor predictor of how the candidate would 'really' behave in practice, especially where interpersonal skills are involved. Several of the technical aspects of variability are currently being addressed by the Employment Department (Johnson & Blinkhorn 1992a), (Nuttall & Thomas 1993). But ultimately the question of how much tolerance is acceptable in an assessment system remains one of professional judgement. It is therefore important to try to sort out the possible relationships between the terms before designing assessment policies and methods.

Knowledge and Understanding.

There is some justification for treating knowledge and understanding as one concept at least for the purposes of assessment (Wolf 1990). Knowledge, as argued on page 37 above, is more than just facts and, in higher education, assessment is usually more than just a recall test. When one talks of a student 'knowing' something, there is often a hint of cognitive skills as well as substantive subject matter behind the statement. Cognitive skills, such as being able to discriminate, or knowing how to choose between alternatives, are also associated with understanding. If this approach were adopted then it would be easier to find common ground between HE and the NVQ Framework.

But there are other ways of conceiving of the relationship between knowledge and understanding. If understanding is seen as a cognitive process, and if knowledge is defined as cognitive abilities (as it is in definition (b) of MacLure and Norris (1991) or in Eraut's category of control knowledge) then understanding is just one component of knowledge. Jessup (1991) takes this view and sees understanding as subsumed within knowledge. From this perspective, there is no problem to resolve: in assessing students, one would be looking for evidence that they handled material analytically or demonstrated that they could reflect critically on their own performance and learn from it.

Finally, one can argue that understanding is a higher order state of development than knowing. Understanding then subsumes knowledge. This is the position taken by Newman and more recently by Entwistle (see page 38 above). Assessment would then focus on whether students could demonstrate a deep and coherent conceptual grasp of their subject, whether they had evolved a feel for 'provisional wholeness', whether they could explain what they had learned cogently to another etc. - but it would not focus on factual recall.

Knowledge and Competence.

From the discussion so far it is apparent that there is little agreement at present on the extent to which knowledge merely underpins competent performance or is an important, active, ingredient in that performance. Consequently, there is little agreement as to whether knowledge should or should not be assessed as part of the assessment of competence. If it is, there is further disagreement as to whether knowledge can or should be separated out from skills and assessed independently, or whether assessment tasks should be designed as integrated, holistic experiences.

The NCVQ Framework makes it clear that for NVQs, knowledge-and-understanding underpin performance. The focus of assessment is therefore direct observation of a candidate's performance under normal operating conditions in the workplace; and in an ideal world no other form of assessment would be needed (Jessup 1991). But it is conceded that there may be circumstances when the collection of sufficient evidence by direct observation would be too costly or difficult. In these circumstances it is permissible to assess underpinning knowledge for evidence of whether the candidate would be able to perform on different but related tasks, or in different contexts. In other words, assessment of knowledge will reveal something of the candidate's potential to transfer competence within the required range and cope with future variations which might occur. Assessment of knowledge should therefore concentrate on:

a knowledge of the variation in circumstances that might be expected and how practices and procedures should be modified to meet different circumstances, over the range which is expected

b an understanding of the principles or theory which explain the nature of the function or activity to be assessed (Jessup 1991, p. 123).

However, even at the higher level NVQs assessment of knowledge is seen as providing 'supplementary' evidence for the judgement of competence. There is no justification for assessing knowledge for its own sake and assessment of knowledge can never stand alone in attesting to competence. Not surprisingly, the request by professional regulatory bodies to include pure knowledge elements in their NVQ scheme has, up to now, been resisted. (MacLure, et al. 1991). Further, Jessup argues that even if a case can be made for assessing knowledge obtained in higher education, it is likely to be so far removed from the knowledge base which practitioners actually use in performance, that it cannot be substituted for it:

'An analysis of the knowledge which people actually draw upon, and need to draw upon, to perform competently, may not appear in what is taught as the body of knowledge underpinning a profession or occupation, or if it is covered, may not be accorded the priority it deserves. Competent professionals tend to acquire a set of guiding principles, of which they are often only partially conscious, derived largely from their experience. These may build upon 'academic' theories and knowledge or be only loosely related. While this is recognised in areas such as management, it also appears to be true in well established professions such as medicine.

In summary, it would seem necessary, to create qualifications which assess the knowledge required to underpin and extend competent performance, directly in relation to such performance. It is suggested that this should occur even if the knowledge is assessed separately as part of an academic discipline' (p. 127)

These arguments contain clear echoes of the points made by Eraut with regard to those courses in HE which have as their purpose the preparation of students for specific professions. If the Jessup argument is accepted then there is little point in trying to bring the two systems together: in higher education knowledge will probably always be more than just an awkward assessment issue. But not everyone would agree that knowledge acquired in HE is irrelevant to professional performance or that its assessment should not be counted towards the award of an NVQ . The work on progression from novice to expert reviewed later (page 58) suggests that formal, subject-based knowledge remains a powerful force in informed professional judgement even when extensive experience of 'real' cases has been obtained. In order to move the debate further, and end the apparent impasse on the assessment of knowledge, it may be necessary to split apart the concept of 'professional' into general practitioner and specialist and consider their respective use of formal knowledge separately. A move by NCVQ to regard assessment of knowledge at least as complementary, rather than merely supplementary, would also be helpful.

But even this interpretation of the relationship between knowledge and competence may not suffice. For some authors, knowledge is not so much an underpinning ingredient as a main player in performance. Technical skills and knowledge of subject matter, it is said, cannot be easily distinguished, and no more can mental and manual skills in higher level occupations. Thinking is bound up in doing: there are no 'neat dualisms' (Black, et al. 1990). This

would suggest that knowledge should indeed be assessed as an integral part of assessment of performance. The case is strengthened by many findings which show that performance can be assessed as competent in spite of faulty or incomplete knowledge structures (Wolf 1990). But the problem for assessment here is that it is very difficult to get at the knowledge that is inherent in performance - much harder than to assess the more obvious (process) skills. The knowledge used in performance is often tacit and below the surface of conscious thought. Often, the more expert the performer is, the less he or she can explain the reasons for actions taken or the knowledge used. Further, the way that knowledge is brought into play may depend on how the expert practitioner is 'reading' the specific situation and may therefore vary from case to case. It is for these reasons that Norris has argued that assessment of performance and knowledge, whether separate or together, is not good enough:

It is not standards of performance that are required since these are beyond our capacity to specify. What is needed are standards of criticism and principles of professional judgement that can inform action in the context of uncertainty and change. (Norris 1991) (p. 337)

The third way of seeing the relationship between knowledge and competence is to place the greater importance on knowledge and, having assessed it, to infer or predict the likelihood of competent performance from it. This is a complete reversal of the NVQ position but forms the rationale behind many assessment practices in higher education. This approach to assessment is even more probabilistic than the NVQ model: evidence from assessment of knowledge can justify statements about the potential of a person but it cannot justify statements of certainty about how competently he or she will perform. Nor can it guarantee that what has been learned by way of subject knowledge, or acquired by way of intellectual skills, will indeed be transferred to a future occupational context. There are, therefore, some real problems with this approach. Eraut has suggested that we need a concept of 'capability' (and ways of assessing it) to represent the half - way house between the limited inferences about performance that can be made from traditional assessment of knowledge in HE and the full -blown assessment of the evidence of performance required in the NVQ Framework. Capability fits nicely with the sort of judgements made about students on professional training courses where they have had practice experience in placements as well as formally delivered knowledge components.

Understanding and Competence.

Interestingly, this relationship has received scant attention though it could be quite useful. Entwistle and Entwistle's empirically based summary of understanding (Entwistle, et al. 1991) has much in common with the broad definition of competence contained in the NVQ Framework. In particular, their focus on flexible use and adaptation of knowledge is congruent with the notion of contingency management and the ability to transfer knowledge and skills to new situations. Further, assessment of competent performance at the higher NVQ levels is almost bound to assess understanding as it reaches behind the manifest behaviours to ask candidates why they took a particular decision, or

to probe how their behaviour might differ in different contexts. Indeed, understanding, rather than knowledge, may be the true well-spring of performance.

There are some tensions, however, in bringing understanding and competence together in this way. Traditionally, in higher education, assessment of understanding has been achieved through assessment of the candidate's ability to cope with increasing **conceptual** difficulty. But in the assessment of competence, as the NVQ Framework has it, the focus is rather more on how a person performs in increasing **situational** difficulty. Progression upwards through the levels in the NVQ framework is not about developing conceptual mastery. It is about taking increasing responsibility - for oneself, for the work of others, for the allocation of resources.

Nor, by definition, is assessment of competence the same thing as the assessment of merit or excellence so often implicit in assessment of understanding in higher education. Assessment of competence is commonly concerned with whether a person is, or is not yet, functioning at an acceptable level. Assessment of understanding more frequently takes the competent threshold for granted and aims for discrimination beyond it.

Where does all this leave us? We could conclude that there probably are some fundamental differences in the importance that HE and the NVQ Framework give to understanding and to the role of knowledge in performance. But the 'slipperiness' of the constructs may be artificially heightening some of the differences and masking some potential common ground. One cause of the difficulty is the lack of good empirical data on how the different kinds of knowledge interact with skills and understanding in competent or expert performance. The absence of such studies force authors back on linguistic word play and the constructs are then formed and reformed as bewildering and inconclusive sets of categories.

Some comfort can be derived from the Otter (1992) study. Participants in that study began by trying to use the constructs as a basis for separating out desirable learning outcomes. However:

'The following stages of work suggested that it was not helpful to separate out learning outcomes under headings like knowledge, skill and competence, since, although all groups began by separating learning outcomes concerned with knowledge from those concerned with competence... the separation eventually led to problems when ways of assessing learning outcomes were considered. It was impractical to assess competence separately from knowledge, since knowledge acted as a vehicle through which the competence was demonstrated. Similarly the assessment of knowledge invariably required the demonstration of some sort of competence in communication, however defined.' (pp. 29 - 30)

Otter concluded that rather than chase the constructs round and round it was more profitable to pursue the idea of learning outcomes and it is to an analysis of the advantages and disadvantages of such an approach that we now turn.

LEARNING OUTCOMES

In the current language of assessment the concept of 'learning outcomes' is widely used. The Otter (1992) study, for example, was premised on the belief that :

'the measurement of learning might best be achieved through the description of outcomes (what a learner can do as a result of learning) rather than the more traditional description of learning input (syllabus or course content).

Robertson (1992) has also strongly endorsed an outcomes approach to curriculum design, arguing that it forces HE to be more accountable: the values and assumptions underlying courses, and the anticipated as well as the actual learning achieved are spelled out in the public domain and can be reviewed and checked.

Potentially, then, learning outcomes would move HE closer to the competence-based notion of performance in the NVQ Framework and might provide a coherent bridge between the two. However, there are critics as well as advocates of a learning outcomes approach and, given the diversity of HE purposes, it may well be that it is seen as inappropriate in some courses or programmes.

Advantages of Learning Outcomes.
Those who support the development of a learning outcomes approach to higher education make use of the following arguments:

a At the moment course documentation is poor: students often cannot tell from a syllabus what is expected of them. A learning outcomes approach sharpens up statements of aims and objectives. It tells students clearly what they are expected to do, or do better, as a result of studying a particular course and also tells them what criteria will be used to assess them. For this reason, learning outcomes are better motivators than syllabuses; they hold out targets or goals for students to aim at. They reward achievement rather than attendance

b Students can make better, more informed choices of which units or courses to take

c It leads to more flexibility which improves access opportunities for students. For example, by shifting attention away from course structures and towards what is achieved, learning outcomes allow greater variation to be accepted in how, when and where learning occurs. The approach also lends itself naturally to credit accumulation and transfer

d If students are involved in discussion and negotiation of learning outcomes and the assessment criteria to be applied, then this experience can be a good way of achieving part of the 'knowledge creation' purpose of higher

education. The students are being inducted into 'what matters' in the disciplinary culture of which their subject forms a part

e A learning outcomes approach may make it easier to give status, and credit, to achievements which have hitherto not been fully recognised in assessment systems. This includes achievement in the 'core competences' such as problem solving or communication skills which are regarded as particularly important in preparation for general employment

f Specifying learning outcomes may be the first step in a useful review of assessment methods and the extent to which they are congruent with stated aims

Disadvantages of adopting a Learning Outcomes Approach.
The learning outcomes approach does have some drawbacks. The worries are fuelled by memory of the battles over prespecified learning objectives in the 1960s (Macdonald-Ross 1973).

Among the sharpest criticisms are the following:

a Changing over from syllabuses to learning outcomes does not change the basic issue of who should decide what the learning objectives are to be and which values are to be encapsulated in them. It is all too easy to focus on the technical aspects of whether the assessment task appears, on the face of it, to 'fit' the learning objective specified and miss the fundamentally important questions of whether the learning outcome is intrinsically worthwhile and valuable. Put another way, 'fitness for purpose' in higher education should mean more than whether a test item looks as though it is congruent with the written objective.

b The apparent precision in the definition of the performance required or the standard expected may hide quite arbitrary decisions about what constitutes 'good' or 'acceptable' learning. This may make legitimate challenge to conservative traditions harder to initiate.

c As argued in the previous section, some constructs are slippery. They include the verb forms 'knowing', 'understanding', 'appreciating'. It is difficult to define learning outcomes using such words and achieve the precision required. The temptation is therefore to select as learning outcomes only those purposes which can be easily defined and immediately assessed. For example, learning outcomes may come to address procedures and operations rather than critical thinking or professional judgement. This downgrades the experience of higher education.

d The definition of learning outcomes may prevent students defining their own learning outcomes or valuing unplanned outcomes. In other words, it may limit the development of learner autonomy and independence which many see as the essence of HE. Similarly, it may detract from the development of professional judgement needed for practice in uncertain and unpredictable contexts.

e It is in fact quite difficult to get the level of specificity right. Too general a level makes a learning outcome impossible to assess; too detailed a level tends to trivialisation. If technical terms are used then students will not, in advance of the course, know what is meant but if the learning outcomes are expressed in lay terms they may be very cumbersome.

f While learning outcomes may make for flexibility, they may also lead to fragmentation and incoherence in the overall learning experience. The underlying model may become one of addition, not development.

Implications for Assessment.
From the analysis of advantages and disadvantages presented above several implications for assessment emerge. As one would expect, some are positive and some are negative.

First, as Popham has argued recently, there is much to be said for the clarity that a learning outcomes approach brings with it, especially when the criteria of judgement are made explicit too. It is perfectly possible to steer a sensible middle course that avoids the narrowness of over-specified objectives on the one hand and the vagueness of traditional general aims on the other (Popham 1992).

Second, with a learning outcomes approach, assessment needs to be designed and planned as part of the whole curriculum experience so that it is congruent with the statements of outcome and with the teaching / learning methods adopted. In practice, this is rarely done at present. For example, Otter (1992) found:

'the relationship between the course objectives and what was currently assessed was not always clear, and assessment was often not treated as an integral part of the course. There was little evidence of an assessment strategy in many courses, and little sharing of information about this between staff' (p. 6)

A learning outcomes approach is therefore likely to improve the quality of assessment practices which is badly needed.

Third, part of the planning will be to determine what counts as satisfactory achievement for each of the learning outcomes identified and whether some are so important that students cannot compensate for a failed performance in them. This again might be an improvement on the present assessment practice of aggregating marks across all questions attempted from a paper with no restrictions on choice.

Turning now to the negative implications one can see that if the learning outcomes include 'core competences' that can be demonstrated in several ways, and in different parts of a programme, then the assessment system must allow for the appropriate collection of evidence. It is likely that new forms of assessment and new ways of recording achievement will be needed. Several institutions are already developing these as part of their Enterprise in Higher

Education project or for admissions purposes. But, as Otter (1992) points out, there is still relatively little experience in HE of alternative approaches available.

There can also be difficulties if the assessment of learning outcomes is linked to a credit accumulation and transfer system - as it usually is. The basis on which differential credit weighting should be given to the different outcomes may be far from easy to determine. (Otter 1992).

Finally, an outcomes approach tends towards criterion referenced assessment. It is difficult to reconcile a criterion referenced assessment system with the present norm-referenced basis of awarding grades and degree classifications. However, there are various pressures for maintaining degree classifications and the only resolution would be for grades and classifications to change from a norm - referenced to a criterion - referenced basis. Such a cultural change may not be easy to accomplish.

One can conclude that an outcomes based approach is certainly worth considering provided that the dangers are acknowledged and the difficulties of implementation faced. 'Learning outcomes' do offer a sensible way of relating assessment in HE to the assessment system that graduates are likely to encounter in employment thereafter. However, the drawbacks are sufficiently serious to make it unlikely that learning outcomes will be adopted for every type of learning experience, and in the end it will probably be up to course teams to decide where the practice is introduced.

Assessment and student learning

The purpose of this section is to review briefly what we know about student learning and look at the effect that assessment has on how well students learn, how they become competent, and how they progress from being novices to experts in their chosen field.

How do students learn ?
There is no simple answer to this question beyond saying 'in lots of different ways'. This century has seen two dominant approaches to modelling learning: first that of the behaviourists and later that of the cognitivists - though both labels cover a broad group of theories. More recently a third approach - that of the social constructivists - has attracted attention with its views of the social nature of learning. Each of these approaches will be reviewed briefly with an attempt to show how they influence the current debates about the purposes of HE.

section

THEORIES OF LEARNING

The Behaviourist Approach to Learning.
Much of the most influential research in the middle years of this century, particularly in North America, was concerned with the external factors that influence learning. The more extreme behaviourists took the position that all behaviour was learned and therefore anyone who was not handicapped could, with sufficient effort, be taught anything. Great emphasis was therefore placed on manipulating the external variables to maximise learning.

In practice, research focused on two variables: analysis of a task into simple components so that they could be acquired step by step; and the role of reinforcement by way of feedback and reward. Although much of the research was conducted on animals and was limited to the acquisition of relatively simple skills, it was believed that even the most complex patterns of behaviour could be taught, or 'shaped' by the proper conditioning. Concern with what happened within the 'black box' of the brain was deliberately eschewed. Many issues about how learning occurs were thus avoided or at least put on one side.

Task analysis proved particularly relevant to the acquisition of motor skills. Even the most complex manipulative task could be broken down into component skills which could be acquired one by one. The simplest were taught first and then built up into hierarchies which were in turn integrated into ever more complex patterns. It did not matter that those who were already competent could not analyse and explain their own behaviour nor that those acquiring the appropriate behaviours did not understand them. The nature of knowledge was not at issue either: what mattered was recognising needs and ensuring that individual behaviour was conditioned so that necessary tasks were performed efficiently and the desired outcomes achieved.

Behaviourism influenced formal education in many ways. Its strongest influence on assessment methods came through the development of programmed learning in which the step by step approach was applied to the

acquisition of concepts as well as skills. In order to produce programmed learning course material, instructional designers had to define carefully the total learning task, break down that task into manageable, ordered, sub components, and specify criteria for success against which a student's performance could be measured to ascertain whether or not the desired learning had occurred. Assessment was therefore crucial to the success of the approach.

It can be seen that there are strong undercurrents of the behaviourist position in the current competence-based movement including the NVQ Framework, in the advocacy of standardised, self-study, learning packages as one solution to the problem of increased numbers, and fundamentally in the justification for a mass system of HE i.e. that many more people can be taught to benefit from opportunities in HE than are selected at the moment.

The Cognitive Approach to Learning.

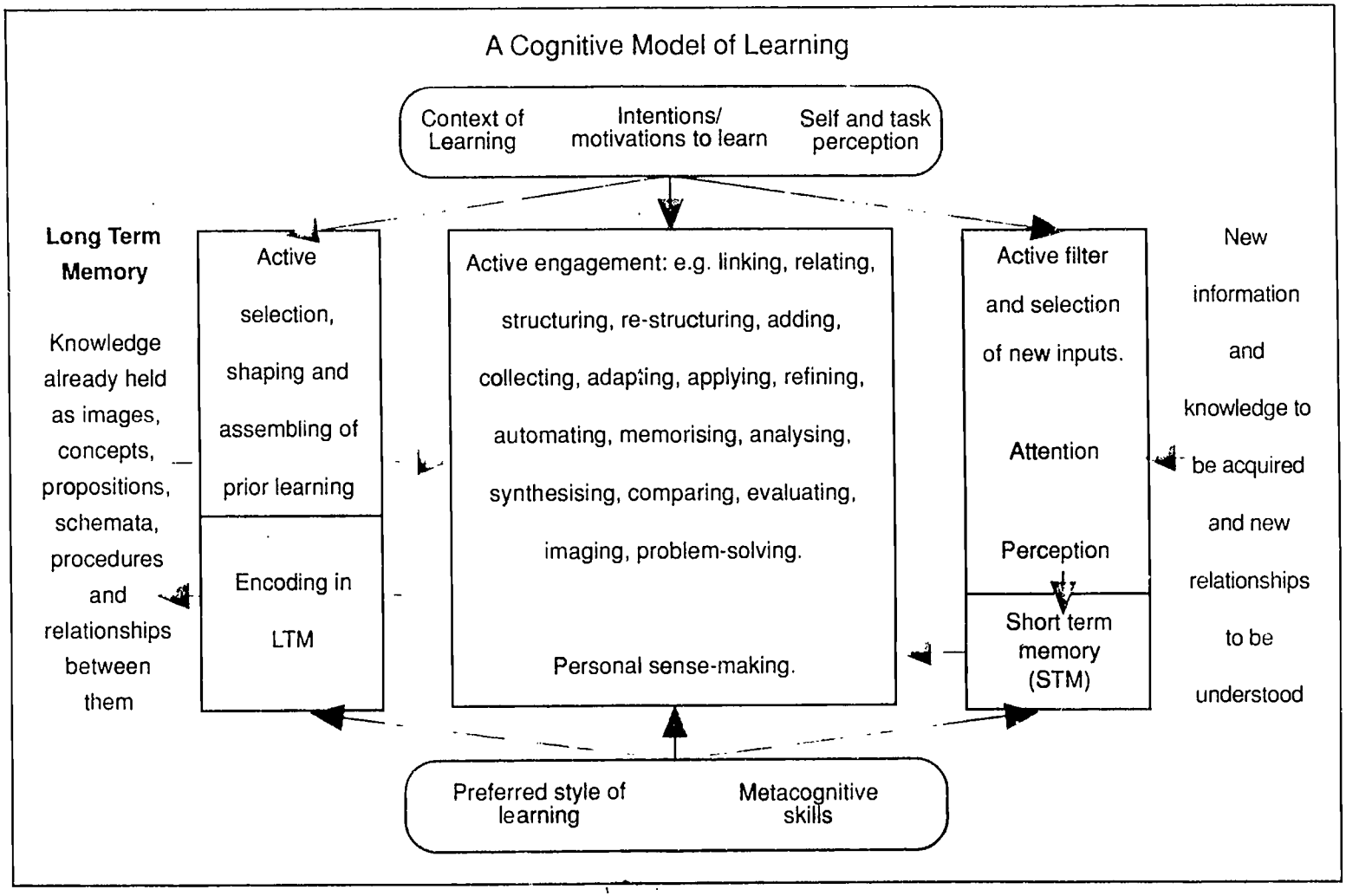
In contrast to the behaviourists, cognitive psychologists turned their attention to how the mind worked. Many of them came to see learning as a form of information processing. The metaphor of the computer was widely used to help explain how that mental processing might occur, although it is clear that the human mind is very unlike most present day computers.

Cognitive models place the learner, rather than the instruction, centre stage. The student brings to each task a unique set of prior experiences, prior knowledge, self and task perceptions (which may facilitate or impede new learning) and genetically endowed abilities (which may or may not provide an adequate basis for learning). Students can therefore be expected to differ markedly from one another in the way they respond to learning activities, and in their ability to transfer knowledge or skills from one context to another. This individual variability is not always acknowledged by those who advocate assessment of transfer of learning.

Most of the information processing models which are used to explain how learning occurs have three parts : first, a (preconscious) stage in which, through selective perception, certain aspects of the environment are given attention and filtered 'upwards' for conscious processing; second, active mental engagement with the new input so as to make personal sense of it, using selectively recalled prior learning in the process; and finally, a structuring of the resultant learning in such a way that it can be stored usefully in long term memory as a basis for future learning.

Figure 1 on the following page sets out a cognitive model by learning.

Figure 1



Behind this model is a view of knowledge as symbolic, propositional structures residing in the mind. The structures (called schemata) can be created, combined and changed by applying certain mental procedures (equivalent to software programs in the computer metaphor). To be useful, the newly processed information must be linked to the relevant knowledge structures already held in long term memory. Metaphors of nets, nodes, maps and hooks are commonly used to make the point. Knowledge is seen, therefore, not as the acquisition of discrete items in a declarative list, but as something more cohesive and holistic which provides a 'scaffolding' for later learning (Glaser 1992). However, there do seem to be boundaries around 'modules' or 'domains' in the mind suggesting that bodies of knowledge and their associated processing skills are stored and handled independently from each other (Ellis & Young 1988). If one adopts this view, a question mark is raised over the 'pick and mix' approach to learning which allows students to put together a programme from many different disciplines; the implicit assumption that cognitive skills and concepts will transfer easily and coherently may be faulty. Similarly, assessment systems which encourage learning of lists of separate, factual items may be violating the knowledge structures they are supposed to be eliciting.

Students vary in their acquired representational structures, in their ability to select, process and store in a way that is appropriate to a particular domain, and in their genetically determined mental architecture. Not only are some students better at learning than others in general, but some may have acquired the 'scaffolding' appropriate for a particular discipline more fully than others. These empirical observations have led to the development of a subgroup of cognitive theories labelled 'metacognition'. Metacognition can be defined as awareness of one's own thinking and the ability to select a suitable learning strategy for the task in hand. A student with good metacognitive ability will have a wide repertoire of appropriate learning strategies, will be able to plan and monitor his or her own learning performance dynamically and explicitly, and will be able to modify or change the learning approach needed. But not all students will have this ability in equal measure.

These points suggest that there are representational structures appropriate to particular subject domains as well as more general, cognitive skills and that both are important ingredients in learning effectiveness (English 1992). However, the suggestion that there are general problem solving or decision making skills has been queried. Critics cite the evidence accumulating from comparative studies of novices and experts in several domains. The findings (dealt with in more detail in Section 3.5 below) suggest that many cognitive abilities used in the conscious processing stage are domain-specific and not generally transferable (English 1992). Bruner (1992) also feels that the quality of the first stage - the preconscious handling of information - is improved by expertise:

'..I rather suspect that the conscious subroutines we develop and overlearn for doing our expertise "thing" very soon go underground and operate with a very large preconscious component....I think generally, then, that the kind (and depth) of preconscious processing we use in coping with our complex, cultural

environment - while it is never likely to be massive - is likely to reflect the degree of specialisation that goes into our adaptation to the world. The more, the more.'
(p. 782)

If these doubts about generalisability and transferability are confirmed, it will call into question the value of trying to assess 'common core' or 'generic' competences independently of subject context and may undermine one of the main planks of the competence movement. The debate also raises the interesting question of whether graduates in different subject areas have developed not only different knowledge bases but also different representational structures. Even if general skills are used, it is possible that the way they interact with specific subject knowledge will differ from domain to domain. There is as yet insufficient empirical work to justify more than speculation on these points but a note of caution has been raised over the enthusiastic pursuit of 'generic' thinking skills. As Donald (1986) says:

'..We do not at the moment possess a conceptual framework for understanding what and how knowledge is acquired in different university disciplines. A framework for the acquisition of knowledge would have to account for the manner in which forms of knowledge differ. Disciplinary differences could be expected to occur at four levels: in the nature of the concepts used; in the logical structure of the discipline; in the truth criteria used; and in the methods...considered important in different disciplines and their effect on the development of students' intellectual skills.' (p. 267, quoted in Entwistle (1992)).

The Social Constructivists' Approach to Learning.
The social constructivists have, in some respects, a more radical view of learning than either the behaviourists or the cognitivists. There are two points of particular relevance to this report. First, learning is seen as the subjective construction of meaning from experience by those involved in a specific context (Cobb 1990). Social, historical and cultural variables will therefore determine what counts as 'learning', as ' knowledge' and as 'assessment' (Lave 1988). Assessment is therefore bound to change as different actors negotiate what it means for them in a specific situation.

Secondly, students are held to deepen their knowledge and understanding through engagement with 'authentic' tasks in 'realistic' settings. They imitate, cooperate and communicate with others, becoming 'cognitive apprentices' to more expert practitioners with whom they engage in a dialectical process of interaction. Each student has a 'zone of proximal development' in which progress in understanding can occur through this interaction (Vygotsky 1978). The 'more expert' other may be a teacher but, for the more extreme proponents of these theories, the teacher is an unnecessary intermediary between learner and practitioner and formal classrooms are too artificial for real learning to occur. (Allen 1991; Brown, Collins & Duguid 1989). In terms of assessment, completion of the task or a qualitative change in personal understanding may be sufficient in themselves without the need either for formal verification or for formal assessment activities. (Cunningham 1991; Merrill 1991)

Although quite radical, at least in its extreme forms, some elements from the social constructivist perspective are apparent in the debate about the assessment of knowledge and competence in professional contexts. Eraut and Jessup both question the relevance of formal learning in the classroom to real practice, and argue that it need not necessarily be assessed to determine competent performance. The move to introduce more work - based learning for undergraduates in the 'real world', as seen in the Enterprise in Higher Education programme, draws support from this theoretical perspective as does inclusion of real practitioners in the development of units of competence which make up NVQs.

Further, the emphasis placed on learning as a social activity whether in an intellectual community or a professional context is supported by Entwistle, who found that students developed understanding through discussion of their subject with student peers (Entwistle, et al. 1991), and by McClelland, (Winter, et al. 1981) who found that students who attended a 'commuter college' did not make the same gains as those who attended college on a residential basis. Newman had made the same arguments a century earlier with some acerbic observations:

"when a multitude of young men, keen, open-hearted, sympathetic and observant as young men are, come together and freely mix with each other, they are sure to learn one from another, even if there be no one to teach them...Here then is a real teaching, whatever be its standards and principles, true or false; and it at least tends towards cultivation of the intellect; it at least recognises that knowledge is something more than a sort of passive reception of scraps and details; it is a something, and it does a something, which never will issue from the most strenuous efforts of a set of teachers, with no mutual sympathies, and no intercommunion, of a set of examiners with no opinions which they dare profess, and with no common principles, who are teaching or questioning a set of youths who do not know them, and do not know each other, on a large number of subjects, different in kind, and connected by no wide philosophy, three times a week, or three times a year, or once in three years, in chill lecture-rooms or on a pompous anniversary." (Newman 1853, paras. 146 - 148)

STUDIES OF STUDENT LEARNING

Having presented a brief overview of theories of learning, the report now reviews the empirical work on student learning. There are three groups of studies pertinent to the discussion at this point. First, there are the studies which have sought to identify characteristics of student learning regardless of the subject being taken. Second, there are studies which have sought to identify stages of intellectual development characteristic of students in higher education. These, too, tend not to take the student's subject into account. Third, there are the studies which have tried to tease out the stages and processes whereby 'novices' become 'experts'. These studies have often been derived from, and applied to, specific knowledge domains and embrace both undergraduate and

post - experience learning. Each of these groups of studies will be considered in turn together with their implications for assessment.

General Studies.
The most influential set of studies have been those conducted by Marton and his colleagues at Gothenburg (Marton & Saljo 1976), and by Entwistle and colleagues in Britain (summarised in Entwistle(1992)). Using interviews, attitude measurement and survey techniques to collect their data, they argue that there are two basic approaches to learning among students reflecting quite different intentionality. They have labelled these two approaches 'deep' and 'surface'.

The characteristics of students who have a 'deep' approach to learning are:

- Intention to understand material for oneself
- Interacting vigorously and critically with the content

- Relating ideas to previous knowledge and experience
- Using organising principles to integrate ideas

- Relating evidence to conclusions
- Examining the logic of the argument

By contrast, the characteristics of the surface approach are:

- Intention simply to reproduce parts of the content
- Accepting ideas and information passively

- Concentrating only on assessment requirements
- Not reflecting on purpose or strategy

- Memorising facts and procedures routinely
- Failing to distinguish guiding principles or patterns
  (Entwistle 1992)

While the predisposition to one learning approach rather than the other may be relatively stable, there is evidence that the goals students adopt for a particular course, and the way these interact with the learning environment, can shift students from deep to surface or vice versa. Entwistle and Entwistle (1991) for example suggest that a deep approach is fostered where students have the opportunity to talk about their work with other students. (Indeed, in an age of mass lectures, impersonal laboratory sessions and self study packs, conversation with peers may be the best experience of an 'intellectual community' that students have.)

Volet and Chalmers (1992), also working from the 'deep' and 'surface' constructs, have proposed several 'goal positions' on a continuum.These are, starting at the 'surface' end:

i remember key features of material presented

ii acquire more knowledge about the theories in this subject area

iii understand the theories

iv critically assess the theories as they apply to the 'real world'

v construct own theoretical perspectives to explain the 'real world' in the field of study.

The empirical results of their study revealed a bimodal distribution favouring 'remember' + 'understand' at the surface end of the scale and 'critical assessment' + 'construction' at the deep end of the scale. Moreover, between the first and last week of the module taken by the students, there was a marked shift in goals towards the surface end of the continuum. The authors attribute this shift to the nature of the module : an introductory first year unit on economics where it was quite reasonable for students to decide not to invest mental effort in critical thinking after all. (However, those who did achieved higher grades.) The authors do not, unfortunately, describe the assessment methods used on the module but their results do support the need to investigate student learning on a context specific basis.

The work of Marton and Entwistle shows clearly that assessment is one of the key factors in a learning environment which will influence students to adopt either a deep or a surface learning approach. Taking care over the choice of assessment systems and methods is therefore very important. But as Biggs (1991) points out:

'It is unfortunately rather easier to induce a surface than a deep approach. A surface approach is a reaction to external stipulations, communicated via the teaching context, while a deep approach is internally controlled, describing the way a student creates meaning. ... It is very easy to make students anxious, cynical or simply overworked - all excellent soils for surface strategies to flourish - but much more difficult to make them curious..... [Many teachers] find it easier, all too often with institutional help, ... to create a context of 'busywork', so that students' top priorities (in self defence) are to meet the letter of demands made on them. .....Getting a presentable assignment in by the deadline is institutionally more important than spending time on an excellent one.....'.

It seems clear that many students have a well developed strategic sense of what is needed to get good grades (or to get through with the minimum of effort). Murray (1986) has shown that high grades correlate with teaching that focuses on the tasks to be achieved and makes explicit what is expected of the student. But there is a further twist here. As Entwistle has suggested, on the basis of his analysis of students' revision methods, students can rote memorise not just content but also procedures, demonstrated by the lecturer, for setting out that content in examination answers. There is then a double superficiality : of

'knowledge' and of 'argument'; and what may be interpreted by the examiner as "deep" may in fact be a route-learned procedure.

'In higher education, there has always been an emphasis on a broader view of learning and on independent interpretation and judgement, but the way the course is presented to the student, and the nature of the examinations, may give students the strong impression that it is detailed knowledge, and the correct use of procedures, which will bring the greatest rewards.' (Entwistle, et al. 1991)

The work of Pask (1976) and related studies, reviewed in Cotterell (1982), are also germane here. Through a series of experimental studies Pask distinguished two distinct learning styles : the serialist and the holist. The serialist proceeds by breaking down learning tasks into small steps and reaches understanding through mastery of each step in turn. The holist needs an overall picture and proceeds by relating different parts of the task to that picture. Both styles have their pathologies: serialists, with their narrow focus, can miss the wider significance of their learning; holists can globe trot and make unfounded connections, never really getting to grips with the subject matter.

Turning to the implications for assessment, there is the obvious concern that a student will be disadvantaged if his or her preferred learning style is not the one called for in the test. Serialists, for example, are unlikely to do as well as holists on broad essay questions requiring integration of many sources. Conversely, holists may feel ill at ease with formats that require a rigid and specific set of operations to be applied in a certain order. It is a matter of debate, however, whether as part of the experience of higher education, students should be forced to extend their repertoire of learning styles and strategies beyond those to which they are predisposed (a metacognitive argument), or whether assessment methods should be designed so as to recognise competence in either style.

Developmental Studies.

One criticism made of the 'learning approach' studies reviewed above is the way that the constructs (deep: surface or serialist : holist) have been seen as discrete and stable (Volet, et al. 1992). Too little attention has therefore been paid to how students might develop a deeper approach to knowledge during their time in higher education (Winter, et al. 1981). Two exceptions are the work of Heath (1976) and of Perry (1970) in the admittedly untypical environments of Princeton and Harvard respectively. Heath worked from interviews conducted with students throughout their course and found a consistent trend of convergence towards an 'ideal type' of learner which he termed the 'reasonable adventurer:

'The principal characteristic of Reasonable Adventurers is their ability to create their own opportunities for satisfaction .... they are characterised by six(other) attributes: intellectuality, close friendships, independence in value judgments, tolerance of ambiguity, breadth of interests, and sense of humour.....In the pursuit of a problem, they appear to experience an alternation of involvement and detachment.' (p. 31. Quoted in Entwistle [1992]).

The work of Perry resulted in a hierarchical five stage model in which students progress from seeing knowledge in absolute and simplistic terms (e.g. there is a 'right answer') to a position where they understand that knowledge is relativistic. From this point, the student goes on, in further stages, to make a personal commitment to his or her own value position and lifestyle. Assessment was shown to be crucial for progression through the stages: feedback on assignments and marks in examinations were important catalysts in helping students make the transition from a lower to a higher state, especially if the feedback was at variance with the student's expectations.

Novice to Expert Studies.
The third set of studies tries to examine the stages or processes by which a person moves from less to greater expertise. These studies are therefore concerned with acquisition of skill as well as knowledge and tend to have been conducted in a specific domain.

The most influential stage model is that of Dreyfus and Dreyfus (1980) developed from studies of skill acquisition in airline pilots, chess players, automobile drivers, and adult learners of a second language. They argue that, as experience builds up, formal understanding of rules is replaced by intuitive comparisons of the current situation to past cases. They imply that review of the action taken on past occasions, and the consequences which followed, provide guidance in handling the present situation. By the time the 'expert' fifth stage is reached, the person is performing at an intuitive level without having to make conscious decisions at all. The key to successful progression appears to be the element of review and critical reflection. People who do not undertake these processes will continue to expand their experience but will not develop their expertise.

The intuitive nature of decision making characteristic of the fully expert stage would be supported by Bruner's view of the 'smartness' of preconscious processing of information from the environment (See above, pages 52-53). There are links here too to the alternation of 'engagement' and 'critical detachment' of Heath's 'reasonable adventurer' and to Kolb's learning cycle which has been much used as an aid to curriculum design in professional contexts (Kolb 1982). According to Kolb, an effective learner spirals upwards through repetition of: concrete experience - observation and reflection - conceptualisation - testing of conceptualisation in concrete contexts - and round again. Critical reflection, self assessment and analysis of observation have also been seen to be crucial ingredients in helping professionals to make explicit their 'knowledge in use' and thus develop more effective behaviours. The question to be asked of an assessment system, then, is whether it encourages this critical reflection and conceptualisation to take place.

The model of Dreyfus and Dreyfus is founded on an odd assortment of occupations not all of which are relevant even to the vocational purposes of higher education. But a string of studies of novice and expert practice in medicine provides some confirmation of the Dreyfus model while also suggesting a stage model that may be relevant to other professional training in

higher education. The studies have been usefully reviewed by Schmidt, Norman and Boshuizen (1990). They point out some interesting and unexpected findings on the nature of clinical competence:

- As mentioned earlier, the assumption that there are domain - independent problem solving skills which will allow transfer to, and successful handling of, new problems has turned out to be false:

  'Problem solving performance is highly dependent on the availability of knowledge relevant to a specific problem.' ' Availability of knowledge for one problem does not automatically imply that adequate knowledge for another problem is also available.' (p. 611)

  Assessment tests designed to identify and grade congruence to a predetermined **general** heuristic of patient management are therefore suspect.

- Experts do not gather more data, nor more 'critical', 'significant' or 'essential' data than novices when presented with a patient problem. In fact they tend to gather less. Paradoxically, experts are likely, therefore, to do worse than relative novices on assessment tests such as patient management problems (PMPs) where the candidate is rewarded for amount or apparent salience of data gathered. Since PMPs enjoy considerable popularity for their supposed validity, these findings are troubling.

- It has proved extremely difficult to set 'standards' for the assessment of competence. Even when general practitioners are used to develop criteria for specific simulated patients, they may suggest more or different criteria than the ones they themselves actually use on the same patients in their practice.

- While it is quite easy to show differences through assessment tests between junior and senior students, it has proved much more difficult to show differences between final year students and expert practitioners. Indeed, expert practitioners may do worse than final year students on some tests of clinical reasoning. Various hypotheses can be advanced to explain these findings. For example, one can suggest that the formal assessment tests do not address the kind of specialised knowledge acquired by experts in the field, or that experts do not use the formal pathophysiological knowledge learned in Medical School. Both of these hypotheses are congruent with the arguments of Eraut and Jessup.

Taking these findings on board, and working from a cognitive perspective, Schmidt, Norman and Boshuizen (1990) suggest a four stage model of evolution from novice to expert performance. The first stage is the development of elaborated mental networks explaining the causes and consequences of disease in terms of pathophysiological knowledge. (This stage would occur typically during the earlier years of medical school.) The perspective on disease gained at this stage is likely to be prototypical with only a limited understanding of the variability with which normal and abnormal conditions manifest themselves in reality.

The second stage, which begins with real clinical experience, sees these networks 'compiled' into high-level, simplified causal models. Repeated exposure to real patients increasingly allows 'short cuts' in reasoning to be taken. Formal knowledge is activated more and more selectively, and with repeated use is reorganised in the mind for efficient access.

By the third stage 'illness scripts' are beginning to emerge. In this stage practitioners give increased attention to the contextual factors under which disease emerges:

'*Instead of causal processes, the different features that characterise the clinical appearance of a disease become the anchor point around which the physician's thinking evolves.*' (p. 614)

Few pathophysiological concepts are now activated in understanding a case: the scripts are descriptively rich, idiosyncratic and bear only a superficial relationship to the 'prototypical' cases which are found in clinical textbooks. Depending on the nature of the cases a practitioner sees, the illness script for a particular disease may be well or poorly developed.

The final stage of the model sees the practitioner adding details of particular patient encounters to memory as 'instance scripts'. Instance scripts allow experts to base their diagnoses on the similarities and differences between the case in front of them and recalled prior cases. These prior cases are likely to be indexed, in vivid detail, in episodic memory (i.e. memory of lived experiences as opposed to formal propositional knowledge) according to the relevant illness script and can therefore be made quickly available to conscious processing:

'*We suggest that this availability of a store of possibly hundreds or thousands of previous patients is not simply an interesting curiosity but is instead a central feature of expertise in medicine.*' (p. 617)

As can be seen, there are similarities between Stages three and four of the Schmidt model and the importance attached by Dreyfus and Dreyfus to context and remembered experience in transition to expert status. However, unlike the Dreyfus' model, Schmidt et al. conclude that experts do not overwrite the earlier causal pathophysiological networks with the later illness and instance scripts. Rather, the earlier stages of the model remain available to support decision making if needed. This will happen, for example, if an expert is confronted with a new problem or if previous cases are too dissimilar for use as a guide in the present case. So all stages are needed for full expert performance.

The implications of this particular medical model for assessment are quite radical. Tests would need to reflect the experiential base of illness scripts and the non - analytical case instances held in memory. Moreover, the model implies that practitioners will differ in whether they use stages three and four, or one or two, on any given problem (depending on the real cases they have encountered), and this variability will be unpredictable. The solution proposed by Schmidt et al. is to use a staged assessment in which candidates are first

invited to 'solve' cases from minimal, contextual information under time constraints, applying their illness and instance scripts. Where a candidate is unable to arrive at a correct solution, more time and information will be given thus allowing the pathophysiological causal networks and models to come into play to 'reason out' an answer. In this way the two very different forms of expert thinking can be identified and assessed separately.

One cannot generalise from a particular line of studies in one field to professional development in other fields. Nevertheless, as more empirical work is done on novice - expert studies one could expect some rethinking of the nature of assessment tasks and procedures so that they better reflect the complexity of the development stages, transition processes, and types of expert thinking.

SUMMARY

1. There are several helpful models of learning on which those responsible for assessment policies and methods can draw. In the current debate about competence versus norm-referenced assessment one can see echoes of the differences in orientation between the behaviourists and cognitivists.

2. Assessment has a profound effect on how deeply students learn. Unfortunately, it is easier to induce a superficial approach rather than a critical and personally meaningful approach.

3. Assessment also has an important part to play in helping students progress through various developmental stages. It does this by forcing students, through the feedback they get, to reflect critically on their learning experiences and learn from them how to improve their performance.

4. There is going to be a very interesting debate on whether or not general cognitive skills exist independent of domain and whether they can be transferred from one context to another. Similarly, there will be interest in empirical studies which try to untangle the effect that studying in a particular subject domain or discipline may have on the way knowledge is represented and processed in the brain. There is some evidence that domain specificity is rather more important than we thought, and that the assumptions behind the current enthusiasm for assessing generic competences and core skills may have to be reexamined.

General conclusions and recommendations for taking action on assessment

section 5

GENERAL CONCLUSIONS

1. Four purposes are likely to characterise higher education in the next decade. They are:

- provision of a general educational experience of intrinsic worth in its own right
- acquisition of 'subject' knowledge and understanding as preparation for knowledge creation, or for dissemination and application in technical/specialist jobs
- preparation for entry into specific occupations and provision for continuing professional development thereafter
- preparation for non-specific employment including development of generic cognitive skills and appropriate personal competences.

2. While there is nothing radically new about these purposes, the balance between them is likely to change in some institutions, and in some programmes of study, away from knowledge acquisition and general education, and towards specific or general employment related outcomes. There are two factors behind this change: the erosion of the authority of universities as creators and definers of 'knowledge'; and the rapid expansion to a mass system of higher education by the year 2000.

3. There are significant gaps in our knowledge of whether higher education in the U.K. is in fact achieving its present purposes. As yet there is surprisingly little empirical evidence on any of the following:

(a) whether or not students do develop the personal competences and generic cognitive skills identified as desirable outcomes

(b) whether development of cognitive skills is domain specific and therefore whether or not 'transfer' between contexts is attainable

(c) the academic 'value added' from undergraduate study (which needs to be calculated against a firm baseline of students' entry characteristics and analysed comparatively on a subject by subject, or programme by programme, basis and not just on a university by university basis)

(d) the 'net effect' on the development of knowledge, skills and competences of entering higher education as opposed to taking up employment

(e) the impact that a mass system will have on the enhancement of personal lifestyle currently gained by completing a degree or further qualification given that the calculated economic return appears to be falling

(f) trends in how subject specific knowledge is (or is not) used in subsequent employment

4. Design of courses or programme of study, including the assessment strategy, should be driven from a discussion of the (mix of) purposes to be achieved and not from the particular organisational features of the institution. The tasks used for assessment, the way that evidence is collected and verified, the bases for judgement, and the way that results are recorded could all legitimately vary from one programme of study to another.

5. Many traditional assessment practices can be criticised for failing to measure achievement against stated aims and objectives, for promoting superficial rather than deep learning, and for failing to be reliable and consistent. None of the four main purposes of higher education outlined in 1 above looks particularly well served by assessment practices at present. While there have been praiseworthy attempts to improve the situation in some institutions under the Enterprise in Higher Education programme and related projects, innovation in assessment policy and practice has been limited, piecemeal and sometimes peripheral.

6. The arrival of NVQs at levels 4 and 5, and the possibility of developing GNVQs to Level 4 now means that the interfaces between higher education, NCVQ and professional regulatory bodies need to be sorted out with some urgency. CVCP could well take the lead in this process. There are, however, several apparent difficulties in bringing together the assessment of 'learning outcomes' in higher education and the assessment of competence or attainment in the NCVQ Framework. They include:

(a) in general, a varying and inconsistent conception of the relationship between knowledge, understanding and competence. Colleagues in higher education are likely to attach more importance to the assessment of knowledge and understanding than is relevant to the assessment of competence in the NVQ model, and to differentiate knowledge from understanding placing less value on the former than the latter. In practice, they are also likely to apply the label of 'competence' to a minimum, threshold requirement for effective performance, while reserving terms such as 'excellence' and 'mastery' to describe their preferred criteria. However, there is less distance between HE and the approach being trialled for GNVQs in which formal tests of knowledge are linked to each unit.

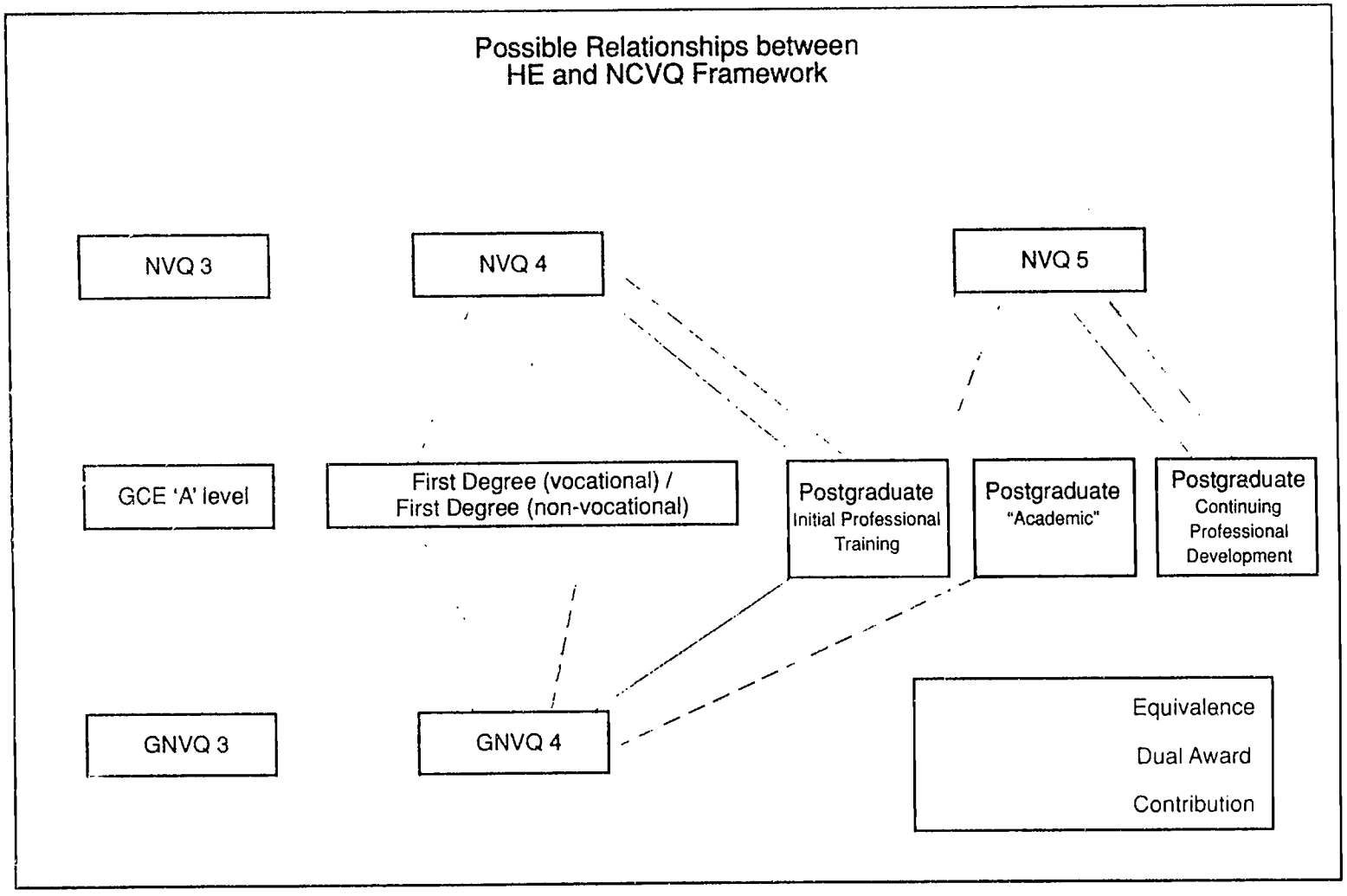
(b) substantial use of norm-referenced assessment in higher education, particularly to determine class of degree, whereas both NVQs and GNVQs are to be assessed on a criterion-referenced basis which makes comparative 'grading' of students difficult.

(c) the degree of coincidence along the dimensions of individual development and advanced level of working in NVQs Levels 4 & 5 on the one hand, and degree and postgraduate qualifications on the other. Academic programmes with no specific vocational purpose do not fit easily into the NCVQ model of vocational progression.

(d) a problem of equivalence and levels. If NVQ Level 3 is taken to be equivalent to A Levels then there is some logic in assuming that Level 4 would be roughly equivalent to a first degree and Level 5 to a post graduate qualification including those designed to prepare new entrants for a profession. But there are some difficulties with this solution. For example, post degree courses differ widely in the academic demands they make and in the extent of vocational 'exposure' that they give. Further, as the NVQ Framework requirements stand, it would be difficult for students to produce sufficient evidence from performance in a workplace to satisfy the requirements of NVQs at levels 4 and 5 even if they have taken a vocational course which involves substantial placements or work experience. More difficult still, there is no Level 6 in the Framework. Indeed the description of Level 5 implies that it is designed for those who are carrying their full organisational and professional responsibilities - something which new postgraduate entrants to employment may not achieve for several years. So it looks as though Level 5 is best considered as part of continuing professional development. But if this is done, and if the first degree is seen as equivalent to Level 4, then many will feel that there is an awkward gap at the postgraduate professional entry point where accreditation is vital to the professional regulatory bodies for licensing purposes.

7. While these difficulties need to be acknowledged and worked through, it is also worth looking at the advantages that could be gained for programmes of study if their content and assessment practices were redesigned to allow for dual HE-NVQ awards or for part accreditation towards an NVQ. Clearly, the courses with most to gain from such a revision would be those which are already designed to license future professionals, those offering accreditation for continuing professional development and those at undergraduate level from which students tend to enter a particular 'family' of occupations. A clear line of assessment embracing 'academic' study as well as work- based performance should enhance graduate employment prospects and facilitate career progression. It would also satisfy students' demands for clearer vocational relevance in their higher education studies.

But what of the non-vocational subject areas or those courses from which students enter a bewilderingly wide range of occupations with no apparent common features? There seems little point in trying to force the NVQ Framework to accommodate these realities of higher education nor in requiring colleagues to adopt an alien NVQ model of assessment. However, there could be some point in introducing the GNVQ assessment of core skills into non-vocational areas (assuming these are developed to Level 4) so that graduates would have gained credit towards a full GNVQ or NVQ which they could complete once in employment. At the time of writing this report, it looks as though there is potentially greater congruence between traditional undergraduate study and GNVQs than there is with NVQs. Assuming that the final specification of GNVQs is reasonably acceptable to HE, it may turn out to be more sensible to develop GNVQs at least to Level 4 than to try to 'bend' the NVQ Framework to meet the characteristics of learning and training in higher education. The relationships between the qualifications might then look like this:



However, whatever the eventual outcome, it is time for colleagues who value the general or specific employment-related purposes of learning in higher education to engage in constructive debate and joint development with NCVQ and to seek systematic HE representation in its policy making structures.

8. Discussion of 'learning outcomes' can usefully focus curriculum design in any subject area, while the rigour of a competence-based assessment system might also enhance the quality of some student learning experiences. These benefits should not be lost even where NVQs and GNVQs are inappropriate for a particular learning programme.

TAKING ACTION ON ASSESSMENT: INTRODUCTION

There are three real difficulties in the path of improving assessment practice in higher education which need to be acknowledged. The first is cultural: assessment is not seen as an urgent and important problem. Individual staff may feel that they have little direct responsibility for assessment practices: departments often have an Examinations Secretary, and the round of examiners' meetings cycles quietly on. Indeed, the system works well enough from the point of view of those who run it : the academics. And given other pressures on the time and energy which people can spare for innovation, assessment is unlikely to be a high priority except for a few. It might be thought that the new quality assurance procedures being introduced in higher education will mean that more attention is given to assessment, and indeed it may. But the experience of CNAA validation is not encouraging : extensive documentation and periodic 'inspections' do not necessarily change day to day assessment practice. (Otter 1992).

The second problem is the absence, in most departments, of expertise in assessment methodology, or in the design of tests and assignments. The customary is repeated without knowledge of alternatives. 'Unlearning' is hard, no one likes feeling deskilled, and change is inhibited. (And with rising student numbers there will be considerable scepticism about new methods which look as though they will take more time per student.) Further, unlike North America, there is no tradition of University Examinations Offices assisting course teams in the design and use of assessment methods and techniques.

One answer to this problem is clearly to include assessment in any programme of staff development established by an institution of higher education. There is a need at least to raise awareness of the issues, provide an opportunity for focused discussion of present practice and to suggest some useful alternatives. In practice, it would be hard to achieve more than this except, perhaps, on the mandatory courses for new lecturers where greater time is available. General workshops, however good, could do no more than introduce what is a complex and technical discipline in its own right. A second solution is to 'train up' a few interested individuals in each institution so that they can provide an internal

consultancy service to colleagues. A third is to establish a national unit which can offer consultancy and training to departments or individuals. This is elaborated further below.

The third problem is structural. To be successful, any change in assessment practices needs to be system-wide, enhancing coherence and integration in the whole learning environment. This requires commitment at the departmental level (and maybe wider than that in a modular framework). Where such a development has been introduced, for example on an institutional basis as at Liverpool John Moores University, or on a course basis as at Anglia Polytechnic University, there are many positive benefits claimed (Robertson 1992; Winter 1991). But achieving the consensus needed to move forward in a coherent way is not easy. Meanwhile, isolated attempts to change assessment, without departmental commitment, are likely to have only a limited impact or may fail altogether (Otter 1992).

This analysis suggests that the issue of assessment practices needs to be tackled at several levels simultaneously: at departmental or faculty level as well as at individual staff member level, at national level as well as at institutional level. Our recommendations for action are categorised accordingly.

RECOMMENDATIONS FOR NATIONAL LEVEL

1. A public debate in an appropriate forum is needed about assessment methods in relation to the purposes of higher education. The debate should raise awareness of the issues including the need to address the NVQ model. We would suggest that a set of articles in The Higher might be a useful spark.

2. Higher education should take the lead in establishing a national unit on assessment in higher education. Such a unit could have the following brief:

a review current developments in assessment practice in HE identifying those with potential for wider dissemination

b offer consultancy advice to departments and institutions on review of existing practice, on the design of specific assessment methods and tasks, and on the interpretation of performance indicator data

c run training courses for nominated individuals from institutions who wish to increase their expertise in assessment methodology, and who will return to act as internal consultants

d commission the development of assessment measures appropriate to the more general educational and vocational purposes of higher education which institutions or departments could use to establish entry baselines and exit 'value added'.

e commission or sponsor research inter alia into

i the 'net effect' of higher education, using comparative groups who have not entered higher education.

ii the differences in learning outcomes (if any) between residential and non-residential undergraduate study and between full and part-time attendance

iii the extent to which the development of cognitive abilities differs according to academic domains

iv the extent to which the development of cognitive and other desired learning outcomes are influenced by personality characteristics of the students, including their preferred learning styles.

f engage in the necessary dialogue and development with NCVQ to ensure, as far as practicable, that NVQs Levels 4 and 5 and GNVQs Level 4 (if designed) are developed in a manner which allows for sensible delivery within HE and sensible progression from HE.

g commission the development of a study pack, designed for individual lecturers, which would contain guidance on how to review individual and departmental assessment practice, describe different assessment methods with their strengths and weaknesses, give some worked examples of practice in different disciplines and suggest how they might be introduced.

RECOMMENDATIONS FOR THE INSTITUTIONAL LEVEL

1. For internal validation, accreditation or review of a course, an institution should require justification of assessment procedures in terms of congruence with course purposes or desired learning outcomes. It should also ensure that assessment is covered in the internal quality assurance of teaching processes.

2. Institutions should review the role of external examiners. In particular they should consider whether external examiners should be more involved in the design of learning tasks, review of assessment methods and setting of standards, and less in sorting out 'difficult cases' on the boundaries of classification or acting as referee between internal examiners.

3. This may also be the appropriate level for assessing, through an indicator information system, whether the general educational purposes of attending higher education have been achieved between first and final years of study. (However, we would not want to give the impression that the design of a useful indicator system is easy, or that interpretation of the resulting information is straightforward.)

4. Similarly, this is the level for tracking graduates more systematically into employment to get a firmer idea of whether the general vocational preparation of students has been effective and whether the claims of 'transfer' of general skills and competences are justified.

5. Courses for new lecturers should include a unit on assessment principles and methods.

6. Management support (and training) should be provided to departments to help them to conduct a review of their learning environment including the impact of their assessment systems.

7. Institutions should discuss, in their academic policy making committees, whether it is still desirable to classify degrees (or at least whether the structure could not be simplified) so that the time currently taken up on classifying students could be better spent - perhaps in recording a broader range of student achievements.

RECOMMENDATIONS FOR DEPARTMENTAL/FACULTY LEVEL

1. Departments need to review whether the assessment methods that students encounter are congruent with the stated purposes of the course or programme of study. From this review an assessment strategy needs to be articulated and communicated to students. A matrix which shows intended learning outcomes against the assessment tasks to be undertaken, and the formative and summative assessment points in the programme of study, is particularly helpful.

2. Departments which use a norm - referenced, rank ordering of students, with certain percentage levels defining degree classification, should consider making explicit the criteria for placing scripts above / below these key points on the distribution. In this way, the traditional ranking approach to marking is maintained but students, staff and 'end users' of the degree have a better idea of what lies behind the classification.

3. To improve assessment of understanding of the discipline (its methods, tests for truth, etc.) a faculty might consider introducing a general paper common to all students or, if more appropriate, a 'design and make' general task. No explicit teaching would be done for the paper / task, but it would be marked on a criterion - referenced basis. The criteria, which should be published, would incorporate characteristics of the 'deep learning' orientation and the domain - specific cognitive abilities.

4. Where a department runs courses preparing students for entry into a specific profession it should review the number of assignments in which students are required to reflect critically on their performance and the number of assessment tasks where they have to demonstrate an integration of theoretical and practical

knowledge. The assessment methods used on placements or work based assignments should reflect an agreed categorisation of knowledge - in - use which staff could develop themselves or modify from an existing source. (For example, a department could adopt Eraut's 'situational knowledge', 'practical knowledge', 'process knowledge', 'knowledge of people'. See p.37) As students move from novice to more expert status, the assessment methods should reflect the likely changes in the way students are expected to use their knowledge. (See page 58.)

There is also a case for a department systematically following up graduates to see to what extent the integration of theory and practice achieved on the course was appropriate and useful, and in what ways the formal learning has, or has not, proved to be important.

5. In order to justify the learning and teaching approaches used, and to demonstrate their effectiveness, a department may wish to consider setting up an indicator assessment system that establishes a base line of students' knowledge, understanding and competence on entry and repeats it on completion of the degree. ('A' level subjects and grades are not a particularly good baseline for computing all the desired outcomes of study.)

6. Departments should discuss the NVQ developments to reach an informed position about the likely usefulness of part or dual accreditation for their different programmes of study.

RECOMMENDATIONS FOR THE INDIVIDUAL LECTURER

1. Lecturers need to review, periodically, the suitability of their assessment practices against their intended teaching / learning purposes. The discussion of the findings from such a review could form part of appraisal interviews or be fed in to curriculum development groups.

2. The individual lecturer should inform students clearly about what it is they are expected to know, understand, do or do better, as a result of taking the module or course. The criteria on which the students' assignments or performance will be judged should also be made explicit.

3. Individual lecturers need to be more aware of the strengths and weaknesses of the assessment methods they are currently using and of alternative good practice in their subject area. This implies a willingness to attend staff development activities on assessment or to undertake some independent study. It is not within the scope of this report to provide a detailed list of assessment methods that could be adopted for the various purposes of higher education. The recommendations made above for action at national level include commissioning of an appropriate study pack which could meet this need. There are also several accessible texts. These include Brown & Pendlebury (1992), Gibbs (1986), and Heywood (1989; 1992).

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APPENDIX I

I THE ABILITIES AND ATTITUDES OF INDIVIDUAL STUDENTS

This section takes the form of a list of abilities and attitudes; in recent years various authorities have declared these to be desirable attributes of students emerging from universities. If the authorities do not say so directly, they strongly imply that the goals of universities should be to instil the desired attitudes and to ensure that students acquire the desired skills. However, it is not suggested by any one authority that all students should invariably possess all these characteristics.

I.1 Cognitive learning

I.1.1 **Verbal skills**
Ability to comprehend through listening, reading and doing. Ability to speak and write clearly, correctly, fluently, gracefully. Ability to organise ideas and to present them in writing and in discussion; ability to argue a case. Knowledge of more than one language.

I.1.2 **Quantitative skills**
Ability to understand statistical data and statistical reasoning.
Ability to use computers.

I.1.3 **Substantive knowledge**
I.1.3.1 A broad acquaintance with the cultural heritage of the west and of the student's own nation in particular, together with some knowledge of, and respect for, other traditions.
I.1.3.2. Broad awareness of the history and contemporary features of the worlds of philosophy, natural science, technology, art, literature and the social sciences.
I.1.3.3 A deep and detailed knowledge of one or more specific subjects, particularly in connection with training for the professions.

I.1.4 **Rationality**
Recognition of the importance of thinking logically; the ability so to do.
Ability and disposition to weigh evidence, to evaluate facts and ideas critically, and to think independently; ability to form prudent judgements and to make decisions; ability to decide whether strong emotional reactions are justified by facts or events.
Ability to analyse and synthesise; ability and disposition to solve problems; ability to plan ahead.

I.1.5 **Intellectual perspective**
Willingness to question orthodoxy and to consider new ideas.
Intellectual curiosity.
Appreciation of cultural diversity.
Ability to view events and developments in a historical and cosmopolitan perspective.
Understanding of the limitations of science and philosophy.

I.1.6 **Aesthetic sensibility**
Note: aesthetic sensibility is often classified under emotional development rather than cognitive learning, but since large elements of aesthetic awareness can be taught, it is included in the cognitive section of this analysis.
Knowledge of, interest in, and responsiveness to, literature, the arts, and natural beauty.
Appreciation of style; development of taste.
Participation in the arts.

I.1.7 **Creativity**
Imagination and originality in formulating new hypotheses and ideas, and in producing works of art.

I.1.8 **Intellectual integrity**
Disposition to seek and speak the truth. Conscientiousness of inquiry and accuracy in reporting the outcomes of inquiries.

I.1.9 **Lifelong learning**
Awareness of the value of scholarship, research, and education.
Ability to undertake self-directed learning; ability to locate information when needed; capacity to benefit from in-service training and continuing education.

I.2 Emotional and moral development

I.2.1 **Self-awareness**
Knowledge of one's own talents, interests, aspirations and weaknesses.

I.2.2 **Psychological well-being**
Sensitivity to deep feelings and emotions and ability to cope with them: emotional stability and resilience.
Ability to express emotions constructively.
Self-confidence; spontaneity.
Ability to enjoy life despite its vicissitudes.

I.2.3 **Human understanding**
Capacity for empathy, thoughtfulness, compassion, respect, and tolerance - towards all others regardless of background.
Ability to co-operate.

I.2.4 **Values and morals**
Awareness of moral issues.
Awareness of traditional moral values.
A personal set of values and moral principles; capacity to make moral decisions.
Sense of social responsibility.
Conscientiousness; honesty.

I.2.5 **Religion**
An awareness of, and respect for, the varieties of religious thought.
The foundations of a personal world-view.

I.3.1 **Traits of value in practical affairs generally**
Ability to apply knowledge in order to solve practical problems.
Motivation towards accomplishment.
Initiative, energy, persistence, self-discipline.
Ability to cope with change; resourcefulness in coping with crises.
Capacity to learn from experience.
Ability to negotiate and willingness to compromise.

I.3.2 **Leadership**
Capacity to win the confidence of others.
Willingness to assume responsibility.
Readiness to seek advice.

I.3.3 **Citizenship**
Understanding of and commitment to democracy.
Knowledge of the major political philosophies.
Knowledge of governmental institutions and procedures.
Awareness of social issues and knowledge of current affairs.
Respect for, and knowledge of, the law.
Commitment to justice and peace.

I.3.4 **Work and careers**
An awareness of the needs of industry and commerce (through direct experience).
Ability to make sound career decisions.
Knowledge and skills directly relevant to first employment.
Adaptability.

I.3.5 **Family life**
Personal qualities relevant to the maintenance of a satisfying family life.

I.3.6 **Leisure**
Capacity to maintain an appropriate balance between work, leisure, and other activities.
Resourcefulness in finding rewarding uses of leisure time.

I.3.7 **Health**
Understanding the basic principles of physical and mental health.
Participation in sport and physical recreation.

I.4 THE NEEDS OF SOCIETY

This section lists in broad outline a series of goals relating to the needs of society and the world in general; as before, the sources consulted have suggested that these needs should be met by the universities.

2.1 *Knowledge*

2.1.1 To preserve all the knowledge which has so far been accumulated, through scholarship, publications, libraries, museums, and other means

2.1.2 To disseminate such knowledge as is required to achieve the goals listed in section 1 of this catalogue

2.1.3 To discover new knowledge through research, both pure and applied

2.1.4 To apply knowledge, both old and new, to the solution of practical problems in industry and commerce and in society at large. To do so both by invitation, as in contract research, and spontaneously, through individual members of the university acting as social critics

2.2 *The arts*

To act as a centre of the arts for the benefit of both students and the surrounding community, through the provision of lectures, concerts, plays, exhibitions, and other means.

2.3 *The discovery and development of talent*

2.3.1 To identify those individuals with particular skills which are needed and valued by society; to develop those skills; and to certify the level of skill which has been achieved by each student.

2.3.2 To provide the skilled manpower which is necessary for the maintenance and growth of national productivity. 2.3.3 To offer opportunities for study to all those who seek a university education (including those from overseas), whether possessing formal qualifications or not, whether rich or poor, on either a part-time or full-time basis.

2.3.4 To provide continuing education courses, both vocational and non-vocational.

From: Allen, M. The Goals of Universities, 1988, pp. 98-102
(published by SRHE and Open University Press)

APPENDIX 2

EMPLOYMENT DEPARTMENT INVOLVEMENT IN HIGHER EDUCATION

The Enterprise in Higher Education (EHE) initiative was launched by the Employment Department in 1987. EHE funding, though marginal to total HE spending, has strategic importance. A typical budget of £1m per institution over five years is tied to curriculum change throughout the whole institution.

EHE aims to develop active and independent learning in students and to give a stronger focus to preparation for work in HE courses. This encourages HE institutions themselves to become more enterprising, to rethink teaching and assessment and to find new ways of developing student learning through placements and projects with employers.

EHE is now operating successfully in 63 HE institutions and having a direct influence on courses across all curriculum areas. As institutions come to the end of their five year funding, emphasis is given to continuation of EHE after ED funding ceases through the commitment of senior management.

Although the best known of the Employment Department's interventions in Higher Education, EHE is not the only one. Even before EHE was introduced the Department was funding a range of development projects and during the past five years it has supported over 100 such projects, some of them with substantial funding. These have embraced a range of issues including guidance, access, credit accumulation and modularisation, personal skills, learning contracts and APL. A significant group of projects has been concerned with the assessment of work based learning and its integration with academic programmes. Much of the work has been fundamental and forward looking tackling basic questions such as "What Can Graduates Do?" (UDACE 1991) as part of a major project on Learning Outcomes in Higher Education.

The Department's rationale for this can be found in its 1990 publication "The Skills Link" which states that the Department aims "to support economic growth by promoting a competitive, efficient and flexible labour market". It goes on to suggest that Higher Education is faced with three challenges to which it must respond if it is to make an effective contribution. Firstly, the creation of a system more relevant, flexible and responsive to the changing demands of the labour market and working life. Secondly, the development of new ways of responding to a changing range of students who are more ready and able to take responsibility for their own learning. HE must be more accessible to such people. Thirdly, a change of emphasis so that HE focuses more sharply on what is to be learned by students and how that can be assessed.

The Department's initiatives in HE and in the world of education and training more broadly suggest a real belief in the creation of a much more learner

centred approach to education and training. Taken together, its initiatives in EHE, the development work from which enterprising institutions can learn and parallel initiatives such as the Technical and Vocational Education Initiative (TVEI), Records of Achievement (ROA) and Investors in People (IIP) suggest a wholly new paradigm. In the new world of learning implied by all these developments individuals would have the ability to exploit learning opportunities wherever they were available, support would come from employers, mentors and professional facilitators, learning experiences and achievements would be recorded in a record to be maintained throughout life and awarding bodies would be expected to develop new ways of assessing and accrediting learning irrespective of where and how it was obtained. It is a challenging agenda borne out of a belief that the workforces of the future will need constantly to update skills, acquire new qualifications and embrace change in a mobile labour market.

3 / 15134 / 1093 / 23