A Liberal VOCATIONALISM

HAROLD SILVER AND JOHN BRENNAN

Also available as a printed book
see title verso for ISBN details

A LIBERAL VOCATIONALISM

A LIBERAL VOCATIONALISM

Harold Silver
and
John Brennan

METHUEN
LONDON AND NEW YORK

First published in 1988 by
Methuen & Co. Ltd
11 New Fetter Lane, London EC4P 4EE

This edition published in the Taylor & Francis e-Library, 2003.

Published in the USA by
Methuen & Co.
in association with Methuen, Inc.
29 West 35th Street, New York NY 10001

British Library Cataloguing in Publication Data

Silver, Harold,
A liberal vocationalism.
1. Vocational education
I. Title II. Brennan, John
370.11'3 LC1043

ISBN 0-203-47251-9 Master e-book ISBN

ISBN 0-203-78075-2 (Adobe eReader Format)
ISBN 0-416-09262-4 (Print Edition)

Library of Congress Cataloging in Publication Data

Silver, Harold.
A liberal vocationalism/Harold Silver and John Brennan.
p. cm.
Bibliography: p.
Includes index.
ISBN 0-416-09262-4 (pbk)
1. Technical education—Great Britain. 2. Business education—Great Britain. 3. Vocational education—Great Britain.
I. Brennan, John, 1935– . II. Title
T107.S56 1988
607'.1041–dc19

Contents

Acknowledgements

This book grew out of a project supported by the Council for National Academic Awards, and our thanks are due primarily to the CNAA for that support. The original project was one of three it supported simultaneously under the umbrella title of Higher Education and the Labour Market (HELM), with a project committee chaired by Sir Bruce Williams until the summer of 1986, and then by Professor Gareth Williams. We are grateful to them and to the rest of the committee for their active support and help. The work benefited considerably from experience shared in seminars with colleagues from Brunel University, North Staffordshire Polytechnic, and elsewhere—including the CNAA itself.

We would also like to thank the Commission of the European Communities for the grant which enabled John Brennan to visit a number of European institutions during the work. There are too many people in the British, American, and European colleges and universities which we visited to whom we owe major debts for their help and co-operation for us to be able to list them all here. We would only say that wherever we went we met with uniform willingness to collaborate. This was particularly important in relation to the four British institutions which we explored in some depth. To the people named at appropriate places we record a particular debt.

At different stages in the research and in its elaboration into its present form two other people, Pamela Silver and Jolanta Pieniazek, have made major inputs. Although their names do not appear on the title page, they have contributed substantially to the work on which the book is based. We are deeply grateful to them both. Finally, we would like to thank Jackie McDermott for preparing the index.

Harold Silver and John Brennan
April 1987

Part One

FRAMEWORKS

1

Confuse or clarify?

'If it's easy to start an argument about transport', commented the Duke of Edinburgh in 1961, 'it is just as easy to start a riot about education and training' (Edinburgh 1962:293). Wherever the entry is made into such educational vocabularies, the riot follows. Education and training, theory and practice, the liberal and the vocational—the polarities have centuries of turbulent history, mounting as the concepts and the processes have become explicit elements in social and economic pressures and conflicts. The focus of this book is on the vocational and, as Margaret Thatcher underlined, as opposition spokesman on education in 1970, when she wrote about the fledgling polytechnics: 'they have tended to provide training for specific jobs; in modern jargon (which often seems to confuse rather than clarify) the courses are vocationally motivated' (Thatcher 1970:16). The aim of the book is to rescue a usable interpretation of the vocational.

Confusion is not eliminated by definition, or bypassed with negatives. What the vocational is has no stable meaning, and it cannot be established by simply listing the things it is not. The elements of social processes exist only in relationships, and the discussion here can focus on the vocational only by adventuring into the relationships in which it is held. From Aristotle to modern technological policy-making the 'liberal' and the 'vocational' have been in tension—though through most of that history it is the voices of the liberal that have been most heard. One of the purposes of this book is to hear and to interpret the sounds of institutions, courses of study, and teachers now commonly perceived as vocational—to listen to other voices.

How deep the confusion surrounding the vocational and the liberal has been in this century can be best illustrated from Monroe's *A Cyclopedia of Education* published in the United States in 1914. In

it John Dewey wrote a piece on 'Liberal Education', outlining its trajectory from Aristotle's definition as associated with knowledge in the context of leisure and the cultivation of mind by a leisured class freed from the preoccupation with practical matters of slaves, serfs, mechanics, or tradesmen. The distinction was between a liberal education as an end in itself, and professional training as a means for practical ends 'beyond itself. Dewey emphasizes the basis of the distinction between liberal and servile education in Greek class distinction, and the complexities later introduced by the rise of natural science, and the claims of vernacular languages, literature, history, and other disciplines. In a society which bases its constitution on class distinctions it is 'comparatively easy to assign a distinct content and a distinct purpose to liberal education', but modern changes—including 'the democratic ideal'—make that increasingly difficult:

> Liberal education becomes a name for the sort of education that every member of the community should have: the education that will liberate his capacities and thereby contribute both to his own happiness and his social usefulness…. In short a liberal education is one that liberalizes. Theoretically any type of education may do this. As matter of fact, all of them fall much short of accomplishing it.
>
> (Dewey 1914:4–6)

Just as any type of education may liberalize, so any may be illiberal if it is excessively narrow and restricts the imagination.

In the search for clarity one then turns to the brief editorial entry under 'Vocational Education', which begins:

> In a certain sense, all education is vocational in that it aims to prepare one for the more efficient and satisfactory performance of the activities of life. Even liberal education is in a sense vocational, for in its various forms it has aimed to prepare for the life or calling or 'vocation' of a statesman or man of public affairs, of the gentleman, of an ecclesiastic, or whatever the particular social concept of the liberally educated man may have taken.

In 'ordinary usage', however, vocational education is differentiated from 'the more general stages' of education by being chiefly concerned with 'the practical application of knowledge acquired in early stages of the educational process

and the education of selected or differentiated groups. The reader is therefore directed to other encyclopedia entries under Theological Education', 'Technical Education', 'Agricultural Education', 'Teachers, Training of, and so on. The brief discussion ends by underlining the fact that 'the vocational aspect of education is becoming a topic of very general importance, and is discussed in its theoretical aspects, in addition to the above topics, in the articles on Education; Art in Education; Citizenship and Education' (Monroe 1914:740). It is unlikely that the search for clarity would end with Dewey's assertion that any education may be liberal or illiberal, set alongside the view that 'in a certain sense, all education is vocational'. Across the two interpretations the analysis relates to social structures, subject content, happiness, social usefulness, stages of education, preparation for professions, the application of knowledge, theories, and ordinary usages. It is not only modern jargon which may confuse rather than clarify.

We are concerned in this book predominantly with the nature of the vocational as it is perceived in, and in relation to, higher education. Another set of relationships is implied by such a focus—including the relationships with social structures, social processes, and the economy that have become increasingly close and intricate internationally in recent decades, but also relationships with other levels of education. The exploration of the vocational in higher education relates on the one hand to industry, manpower, social service, and the professions, but also on the other hand to secondary schools, full-time and part-time educational opportunities beyond the secondary school, access, and inservice and continuing education. Focusing here on how the vocational is perceived in relation to undergraduate education, the discussion is continuing a prolonged historical debate about the purposes of such an education, and echoes of that debate. The participants in that debate have always, however, had to have in mind—with one degree or another of explicitness—the total process of producing the 'educated person', including the assumptions that can be made about prior learning experience, and what can be assumed about later learning. The curriculum of the secondary school, and its appropriateness for what society conceives to be desirable goals for this stage of education; the existence of postgraduate routes into the professions and therefore the opportunity to delay

certain subject content or specialization; the existence and nature of apprenticeship; 'second-chance' entry into the educational process: these and other features of the total educational picture are not ultimately separable from a discussion of undergraduate education. It is a question here of focus, and of the specific directions in which illumination is being sought.

The point of entry into the discussion of vocationalism in higher education is therefore the undergraduate course of study, and in some of the investigation conducted here two limitations have been placed on the field. The first has been to look mainly, but not exclusively, at engineering and business studies as exemplars of the areas of study which have been most labelled or discussed in terms of vocationalism (though in different ways and with different chronologies). The second has been to focus on the 'public sector' of higher education in Britain—though with a strong interest in associated international developments. The public sector—as the polytechnics and colleges and institutes of higher education in England and Wales, and the central institutions and colleges in Scotland came to be called—grew out of, and were identified with, local authority traditions. For England and Wales the 1987 White Paper *Higher Education: Meeting the Challenge* rightly pointed to the misnomer, since university funding was equally 'public', and it referred instead to the 'polytechnics and colleges sector'. The public sector, as it is still most commonly termed, however, has been specifically identified with vocationalism in higher education since the late 1960s, and probing its meaning and implications in the public sector has been a means of exploring a difficult and often passionate public debate at its most self-conscious and explicit. In broad terms the public sector has often been seen to have what the Americans call a 'mission'. That part of it which from the 1960s was validated by the Council for National Academic Awards has had to define its institutional and curriculum purposes in public ways not familiar in the university sector. The national peer-review system developed initially by the National Council for Technological Awards from the mid-1950s, and then by the CNAA from 1964, led to documented and accessible views about course intentions and procedures, debate and judgement about course content and purposes, the review of experience within institutions, and comparative analysis across institutions and within subject areas and disciplines. The 'new higher education' in the landscape has been a way into vocationalism in relation to policy and practice

in a period when the vocabulary of vocationalism has become more widespread and more strident. It has been, again, a question of finding a focus which makes the currents of debate most visible.

As the references to the Monroe encyclopedia illustrate, the elements of the debate are neither insular nor new. The nature of 'a liberal education' for 'the liberal professions' has been one important historical thread, and the growing accountability (suasive as well as structural or financial) of higher education for its service and economic roles has relentlessly in the nineteenth and twentieth centuries confronted the defensiveness of the traditional liberal educator with the demands of the scientific, the technological, the professional, and the economic. T.H.Huxley, in a discussion of technical education in 1877, was anxious to set technical skills alongside other ends not to be forgotten, including 'the end of civil existence, I mean a stable social state without which all other measures are merely futile, and, in effect, modes of going faster to ruin' (Huxley 1899:430). The converse of this mode of going faster to ruin was, of course, the failure to develop science, technology, and other modern studies adequately to ensure economic survival, and the pressures were therefore increasingly strong in the late nineteenth century and into the twentieth century to incorporate such studies into the university curriculum, or to develop appropriate parallel institutions. These competing demands on the curricula of higher education and on the very conception of a university or college were presented differently, and had different outcomes, in Europe and the United States, and the tensions and accommodations involved have different national resonances. In the resolution of the conflicts that took shape different hierarchies of values were established in the different countries, and cultural and social traditions weighed differently in determining the status of subjects, institutions, and graduate employments.

In Britain, the eighteenth and nineteenth centuries saw accommodations with mathematics and science, but with enormous ambiguities about industry-related and professional studies laying claim to a place in university provision from the late nineteenth century. In a famous passage of an inaugural address at St Andrews in 1867, John Stuart Mill laid down guidelines that were to be followed widely in thinking about university education. The university, in his stentorian phrases, had a proper and well-understood function:

> It is not a place of professional education. Universities are not intended to teach the knowledge required to fit men for some special mode of gaining their livelihood. Their object is not to make skilful lawyers, or physicians, or engineers, but capable and cultivated human beings.
>
> (Mill 1867:4)

There was good reason to have schools of law, or engineering, or the industrial arts, but separate from—although perhaps in the same locality as and under the general superintendence of—'the establishments devoted to *education properly so called*' (our italics). The hierarchies of knowledge and institutions are here clearly delineated, and the inclusiveness or exclusiveness of conceptions of culture are equally clear:

> What professional men should carry away with them from an University, is not professional knowledge, but that which should direct the use of their professional knowledge, and bring the light of general culture to illuminate the technicalities of a special pursuit.
>
> (Mill 1867:5)

The professional—that is, the new professional—claimants to university positions faced the dual obstacle in late nineteenth-century Britain of having neither easy access to the universities, nor high-status specialized institutions of the kind that had become common in France, Germany, and other European countries. In the second half of the century the new university colleges, the University of London, the Scottish universities, the newly created polytechnic institutions, were available for such purposes to varied extents, but there was a dominant set of 'liberal values' which continued to determine the conditions on which the professional and the technological were admitted, and the resistance which continued to operate.

An important contextual statement of the position for the discussion here was the equally famous analysis that Cardinal John Henry Newman offered in the 1850s. Newman's view was in one important respect almost identical with Mill's—professional or scientific knowledge was not a 'sufficient end of a University Education'. Newman was not hostile to either, and accepted that a university could teach specific branches of knowledge, but there was an important distinction to be made between the teaching of

law, medicine, geology, or political economy inside and outside a university. Outside a university, there was a danger of narrowness, of giving lectures 'which are the Lectures of nothing more than a lawyer, physician, geologist, or political economist'. In a university, on the other hand, a comparable lecturer

> will just know where he and his science stand, he has come to it, as it were, from a height, he has taken a survey of all knowledge, he is kept from extravagance by the very rivalry of other studies, he has gained from them a special illumination and largeness of mind and freedom and self-possession.
>
> (Newman 1852, 1943 edn: 104–6)

Newman's entire argument rests on the identity of a liberal education as pointing to these last-named qualities, the worth of knowledge in itself, irrespective of results: 'not to know the relative disposition of things is the state of slaves or children'. A liberal education, in this view, is 'useful'—Newman explicates the concept at length—in that it is an instrument of good. The cultivated intellect was 'in a true and high sense…useful to the possessor and to all around him; not useful in any low, mechanical, mercantile sense, but as diffusing good, or as a blessing, or a gift, or power, or a treasure'. The whole position Newman adopts, and one which was to remain at the heart of twentieth-century discussions about higher education, is contained in one simple statement: 'I am prepared to maintain that there is a knowledge worth possessing for what it is, and not merely for what it does' (Newman 1852, 1943 edn: 157–60). The distinction between *is* and *does*, the different senses of 'useful', the in and out of the university, the concept of what is 'sufficient' or 'special'—all of these are echoed in the modern debates and practices.

The relationship between the 'cultural' and 'professional' purposes and processes of higher education has been subjected to long nineteenth- and twentieth-century debate in the United States. From the mid-nineteenth century, but particularly from the turn of the twentieth century, Americans have had a major preoccupation with the nature and purposes of a college or university education. The nature of the college curriculum, the role of the liberal arts, accommodations to technological and economic change, the expansion of access, the zigzags of institutional competition and strategies for survival in hard times, the impact of the system of electives at the undergraduate level from the end

of the nineteenth century, and the relationships between a college education, professional preparation, and the employment market have all been hotly debated. They have at times had direct implications for the shape and the existence of institutions.

The acceptance, much earlier than in Europe, of undergraduate studies in subject areas like business and forestry, and the history from the 1860s of the growth of education in agriculture and the 'mechanic arts' in the 'land-grant' institutions, present quite a different trajectory of discussion and development from that in Britain and Europe. Within these American frameworks of concern and action questions of breadth and narrowness, specialization, the nature and purpose of a liberal or general education, the role of a liberal education as a preparation for the professions, and the sequencing and structure of study in secondary and post-secondary education, have been subjects of profound academic and public concern. In the pre-industrial United States, as in Europe, it was, as Dewey stressed, comparatively easier to assign a 'distinct content and a distinct purpose' when the class constituencies and their social and professional aspirations were clearly understood. In the 1790s Bowdoin College included 'useful and liberal arts and sciences' in its Charter (Sills 1944:401). Following the Morrill Act of 1862, Massachusetts—like other states—looked to its new Agricultural College 'to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life' (Massachusetts 1863). The former presents the 'useful' in association with the liberal arts and sciences within a confident understanding of overall purpose. The latter presents the liberal and the practical ('without excluding other scientific and classical studies, and including military tactics') in confident juxtaposition, and in the American context it was not to be difficult to argue the case for the incorporation of the useful and the practical into the developing pattern of higher education. As one commentator has put it: The utilitarian tradition has deep roots in American life. A continent had to be developed' (Mosely 1971:38).

The intrusion of the utilitarian into higher education curricula did not go without resistance and controversy, but the struggle over the reconciliation of the two threads in American higher education—its relationship to work and careers, and a liberal preparation for life (Newman 1979:51)—took place in different

circumstances from those of nineteenth-century Britain. Many historians and educationists have commented on the uniquely American persistence of attention to the problems of a 'liberal' or 'general' education, and the battle to move curricula towards or away from a greater integration of the liberal/general and the professional has been a significant feature of higher education in the United States. It penetrated, much more explicitly than in Britain, the debates surrounding engineering education, for example, and the much more articulate American general education movements of the nineteenth and twentieth centuries have at times gone much further than in Britain in addressing the curricular issues of breadth and specialization, the nature and balance of professional and pre-professional studies, the virtues and dangers of vocationalism, the role of the liberal arts as 'tool' subjects for professional curricula (Sanders 1954b:8), and the possibilities of interpreting and shaping professional courses as a liberal education. The nineteenth-century juxtapositions and antitheses, and attempts at reconciliation, have therefore been projected firmly into late-twentieth-century American debate. In the 1940s, Van Doren was arguing around the alleged contrast between the liberal and the useful, and the confusion that abounds between the useful and the utilitarian, ending with a plea for liberal education to move closer to the technical arts, and for technical education to be more intellectual (Van Doren 1943:166–7). Meyerson, a quarter of a century later, was emphasizing that the universities had always been centres of professional education and specialization, and was arguing for a creative tension between the pure and the applied, the concrete and the theoretical, the rationalistic and the empirical (Meyerson 1969; 1974).

By this stage the argument both in the United States and in Europe was no longer about what subjects should be admitted to the university, or to 'higher education' as it had now become, but about the modalities, about control, not only about creative tension, but also about the specific elements of the tension, and who decides the contents and processes within the tension. Accountability, planning, economic responsiveness, had moved into the equations. As in Snow's *The Two Cultures and the Scientific Revolution* (1959), the debate was now about claimants to cultural identity and acceptance, about obstacles to understanding in a particular national context; and in Ashby's *Technology and the Academics*—published the previous year—the debate was about particular

historical paths in relation to science and technology, debate which assumed increasing prominence in Britain as its international economic position continued to weaken. Some of these tensions have been less pronounced in other countries, but they have surfaced strongly elsewhere at different times, as some of the discussion in this book will illustrate. Lynn White's defence of a technological culture and rejection of an old 'aristocratic humanism' is one American version of the continuing cultural contradictions and failure properly to understand and absorb engineering and technology (White 1968).

Attempts in the 1960s and afterwards to remodel French higher education and its curricula are another illustration and one which, as in Britain, points to the importance of looking beyond the universities in search of the practical and vocational in higher education. The development of short-cycle higher education in the *Instituts universitaires de technologic (IUT)* reflected a suspicion by the state that the universities were too preoccupied by theoretical and academic concerns to respond positively to a need for greater practical and technical training (Cerych and Sabatier 1986). Not dissimilar sentiments have surfaced from time to time in discussions about the role of the English polytechnics and the German *Fachhochschulen*.

Looking further across Europe, we find in Poland a longstanding tradition of state ambivalence about the universities and a relatively early establishment of a strong system of non-university institutions. The Polish polytechnics and other monotechnic academies had already been developed prior to the outbreak of the Second World War and they enjoyed and continue to enjoy considerable prestige. Their emergence and their relationship to the universities have to be seen in relation to the historical role of the Polish universities and intelligentsia (and in particular their role during the period of partition), their prestige, and their relative cultural autonomy from prevailing political authority. Today, while the planned socialist economy gives a strong central direction to both higher education and the economy, and therefore in principle much greater potential for achieving a close match between the output of higher education and employment needs, the curricula of Polish higher education, in universities and non-universities alike, reveal the legacy of the historical role of the universities in Poland's divided past. Curricula in all subject areas are broadly-based and emphasize the theoretical foundations of knowledge.

Central planning of employment for graduates may not ensure that they are adequately prepared (Brennan and Pieniazek 1984).

Although the main focus here is on Britain, these international resonances of the issues cannot be ignored. While the concept of the vocational is often used with confidence, therefore, it is surrounded by historical and operational ambiguities. Science was reluctantly accepted in Victorian England into the canon of a liberal education, but is today often listed in vocational categories. There is frequently confusion arising from difficulties over what constitutes a course of study or a subject. Chemistry, for example, came to be regarded in Victorian England 'as not only useful in a vocational sense', but also widely accepted 'as part of a liberal education' (Bud and Roberts 1984:166)—but was it *itself* a liberal education, an education, in Mill's phrase, 'properly so called'? What, similarly, is an engineering education, when some curricula include subject areas-such as economics or business, social studies, and the humanities—*within* the definition of engineering education, some regard them as useful extras, and some ignore them completely. The specialist discipline-based honours degree of the recent English tradition places such debates in a different context from the broader and longer courses found in other places and at other times. Clearly, definitions and operations are responsive to national traditions, the pressures of the market place, changing public priorities, changes in knowledge frontiers and statuses, fashions. What is said about an education is also responsive to what needs to be heard—for purposes of recruitment, funding, development, or self-protection. People have to be persuaded. A concept like the vocational becomes a political counter, more amenable to the taking of positions than to the reaching of understanding.

The central purpose of the discussion in this book is to try to pin down some of the implications of the vocational in terms of precise courses and precise institutions. We are not, as is explained in greater detail in a later chapter, examining student *experience* of such courses and institutions. The emphasis is on intentions, explanations, claims for content and procedures. The important general consideration to be borne in mind, however, is the long continuity of the dilemmas inherent in the discussions. There is still, for example, a considerable ambiguity that surrounds 'vocation' and the 'vocational' (and in American usage the equivalent ambiguities of the 'professional'). Dewey encapsulated

the vocation/vocational distinction in 1917, pointing out that the meanings

> vary from the bread and butter conception which identifies 'vocational' with an immediate pecuniary aim to a conception of the calling of man in fulfilling his moral and intellectual destiny. With the first idea it is not difficult to attack the growing trend toward the vocational as the source of all our educational woes; with the latter, it is easy to glorify this trend as a movement to bring back the ideal of a liberal and cultural education from formal and arid by-paths to a concrete human significance.
>
> (Dewey 1917, 1980 edn: 151)

There have been attempts along these lines to rescue the concept of vocation for the 'bread and butter' activities of vocational education, but the two poles are not easily brought together, and the attempt may cement rather than resolve the confusion. A British example, from a Conservative Party document on education during the Second World War, illustrates the point:

> it is impossible to overstress the importance of personality and vocational ability in the teachers, and the necessity of so revising the conditions of recruitment and training for the teaching profession, that training becomes a supplement to vocation rather than a substitute for it.
>
> (Conservative Sub-Committee on Education 1942:91)

The difficulties arise from the complex historical legacies, the unresolved conflict of value systems.

Newman's attempt to define acceptable professional studies in university terms, and Mill's attempt to bring 'the technicalities of a special pursuit' into the 'light of general culture', did not, in fact, come near to resolving the conflict, which could only intensify as the processes which they resisted grew stronger. What the twentieth-century protagonists attempted, therefore, was some kind of reconciliation between the polarities. The most famous version of this reconciliation was A.N.Whitehead's, first published in 1917 and then more influentially in *The Aims of Education* in 1932. Here Whitehead explored the exaggerated claims, the defects, the strengths, and the future needs of a 'liberal' education and a 'technical' education. The core of his argument lies in the emphasis on action: 'the insistence in the Platonic culture on disinterested intellectual appreciation is a psychological error.

Action and our implication in the transition of events amid the inevitable bond of cause to effect are fundamental' (Whitehead 1932: ch. 4). The separation of the intellectual and the aesthetic from event and effect points to 'the decadence of civilisation'. He concludes: 'essentially culture should be for action'. The goal of scientific curiosity is 'the marriage of action to thought'. From that argument to the rejection of the separation of literary, scientific and technical cultures is a short step, resulting in one of Whitehead's most quoted passages:

> The antithesis between a technical and a liberal education is fallacious. There can be no adequate technical education which is not liberal, and no liberal education which is not technical: that is, no education which does not impart both technique and intellectual vision.
>
> (Whitehead 1932: ch. 4)

Dewey, Van Doren, and many others have battled with the same 'fallacious antithesis', and the proposals for curricular reforms of many kinds that have surfaced frequently in higher education since the 1950s in particular have often reflected such arguments. In the new universities of the early 1960s, in evidence to and recommendations of the Robbins committee on higher education, in the degree structures developed by the polytechnics in the late 1960s and 1970s, in the debates within the CNAA about course balance and sandwich courses, and in the views of the professional associations on education and training there are constant echoes of the struggle to define how the marriage of the liberal and the technical or vocational can be effected. In Britain, as in the United States and elsewhere, the focus of debate has frequently shifted—especially in relation to curriculum issues—from Newman's distinction between *is* and *does* to Whitehead's emphasis on the marriage of action and thought. American debates, particularly in the 1980s, about the rescue of a liberal education from overwhelming pressures towards 'bread and butter' vocationalism, indicate that older tensions remain and that complexities have not been eliminated in the shift of debate.

In Britain, as we shall see, vocationalism has—notably in the 1970s and 1980s—become a central concept in policy-making and in public debate about education, and the confusion that Margaret Thatcher saw in the term has if anything deepened. Short-term demands on the educational system for correctives to national

economic inadequacies have, in particular, brought the concept into sharp focus. In higher education this has meant the taking of positions on the structure of higher education itself, as well as on the balance of its curriculum, and on the status of and relative support for specific subject areas and employment-related courses of study. A major theme of such discussion has been the relationship between the universities and the 'public sector' institutions on the one hand, and industry on the other. In Britain this relationship was growing in many instances (Sanderson 1972) just as the views of Mill and Newman and others were making their main impact. The form and content of such relationships have been controversial ever since, and the discussion of vocationalism in relation to policy pronouncements in Chapter 4 suggests how difficult in British conditions it has been to achieve clarity on the nature and extent of higher education's responsiveness to public needs and political and economic overtures. The slow emergence of a 'binary' system of higher education in the late nineteenth century and early twentieth century, crystallized in the creation of the polytechnics in the late 1960s, has been one feature of the difficulty. On each side of the 'binary line' claims and assumptions about what is distinctive and what is common have been expressed and refuted.

Peter Scott, in charting the transition from the 'liberal university' to the 'modern university', emphasizes that the development has been in response both to external pressures and to the 'internal momentum, even dynamism, of knowledge and its constituent academic disciplines' (Scott 1984:61). In the university sector itself the balance and shape of the responses have varied considerably between kinds of university and individual institutions. Amongst and within rough and ready categories—the colleges of advanced technology which became universities after the publication of the Robbins Report, the new greenfield or cathedral-town universities of the 1960s, the late nineteenth-century provincial university colleges-become-universities, Oxbridge—there have been differences of curriculum structure and interpretation, as well as common features. Within the public sector, similarly, there have been major differences of range and aspiration between the polytechnics and the colleges of higher education, and equally significant differences within each of the categories. In Britain, as in Europe and North America, the outcomes of debates about specialization and breadth, both within the traditional areas of liberal education and in the new areas of preparation for the

professions, differed widely across institutions in the late-nineteenth century and during the twentieth (Ben-David 1977: ch. 3). As we shall see, it has not been easy in those situations to assert distinctive purposes and locate the vocational within them. Dewey saw the ease of assigning 'a distinct content and a distinct purpose' to education as having gone with the disappearance of society which was explicitly and constitutionally committed, as in slave or feudal society, to formal class distinctions. It has certainly been clear in the conditions of the nineteenth and twentieth centuries that purposes, including vocational purposes, have been made massively more difficult to define and to agree by competing pressures and priorities, as the institutions themselves and others have struggled to interpret them.

It is against these backgrounds that we attempt in the following chapters to look at the British and international versions of vocationalism, and to retrieve a usable concept for discussion and action. We consider a typology of courses and look in depth at some of them. We record the views of people whose voices on the subject of the vocationalism ascribed to them have been little heard. We try to assess, in the realities of the late twentieth century, where we now are with a cluster of concepts and processes that has had, in changing circumstances, centuries of scrutiny.

2

Stigmas and dichotomies

In a lecture on 'The place of the engineer in society' in 1966, Lord Snow expressed his surprise that engineering had not 'become more of a humane education', and that engineers were not more respected and active in the decision-making processes of government, parliament, and the civil service. British social history had to explain why other countries in the nineteenth century had paid more attention to the engineer and engineering education, and England had done the reverse: 'if we had put one tenth of the effort into engineering that we put into the Indian Empire, we should now be a very prosperous country' (Snow 1965–6: 1,260–1). There is no need here to examine in detail the particular British, not just English, historical complexities surrounding the difficulties over the vocational to which we have referred. It is important, however, to emphasize further the difficulty that nineteenth-century spokesmen for a liberal culture and values had in adjusting to the new realities of an industrializing society. Newman's defence of knowledge as 'its own end' and Mill's defence of the universities against preparation for the particularities of professions and livelihoods were simply the most eloquent thrusts of the debate. In spite of the critically important new dimensions brought by the establishment of London University and later by the provincial university colleges, the public voice of the English universities contained strong, if varying, degrees of concern about the position of technology and professional or 'modern' studies in the liberal canon. Scotland, by and large, did not find it difficult to incorporate and to justify these components of a university education.

Martin Wiener's persuasive argument is that Victorian England, while building an industrial economy, inherited a strongly entrenched suspicion of technology, a desire to evade the realities

of industrialism, the gentrification of the new industrial and professional classes, and the taming of the industrial spirit as not 'truly English'. The economic crises of England from the 1970s onwards were, in his words, preceded by a 'century of psychological and intellectual de-industrialization' (Wiener 1981:5–19, 81, 157). The anti-industrialism of what Wiener terms a 'gentry ideal' became an integral part of late nineteenth-century models of culture. A liberal education continued to be associated with 'certain privileged callings', and science, technology, business, and other aspects of modernity had to struggle to enter, or to acquire status in, the standard-bearing institutions of what we now know as secondary and higher education. In the early 1930s Sir Michael Sadler was arguing that a liberal education was 'not a veneer of culture', but that commerce and industry had so far failed to establish a secure place within it: the 'connection between a liberal education and business life became strong in Scotland sooner than in England' and the rest of western Europe and the United States had moved more rapidly (Sadler 1932a). The relationship between 'intellectual de-industrialization' and the schools has been widely documented and analysed. Discussing the nineteenth-century public schools, Bamford describes the least favoured employment outlets as being science, engineering, and medicine, 'where the attitude of the schools amounted to a virtual boycott until the 1860s; even then the increase was largely confined to Rugby'. Science and engineering were almost ignored by the public schools until the end of the century (Bamford 1967:213, 221). Wilkinson's study of *The Prefects* suggests that the late nineteenth- and early twentieth-century public schools bred complacency, over-confidence, and lack of imagination (contributing to the military mistakes of the First World War, and the failure to resist fascism), and the continuing process of 'gentrification' was one of the obstacles to the mastering of the problems of industrial and economic change (Wilkinson 1964:87–90). Even English and modern languages had a difficult time penetrating the ancient English universities (Lucas 1933).

While Germany, France, the United States, and other countries were establishing different forms of scientific, technological, and 'modern' studies in their secondary- and higher-education systems in the nineteenth century, Britain made slow and sometimes painful adjustments to the changes being thrust upon it. In the late nineteenth and twentieth centuries British higher education had

to respond to international competition, pressures from professional, commercial, and industrial organizations, the changing role of the state in the promotion, management, or control of educational and other institutions, the manpower demands of the increasingly vociferous state or employers, the pressure of new clienteles. As Moberly pointed out in 1949 (and Trow in the United States was to demonstrate in detail as the process accelerated in the 1970s), 'these changes in the provenance and character of their students naturally affect the universities' own aims and methods. They call into question older ideals, whether christian-hellenic or liberal' (Moberly 1949:48).

Although, as commentators underlined with particular vigour in the 1970s (James 1971; Watson 1973; Edwards 1977), the nation and its higher education were in continuing identity crisis, the underlying features of the crisis were of long standing. Hanson located them in 'ambiguities', 'contrasts', and 'dichotomies' (Hanson 1957:117), and many of the university colleges went through sharp versions of these contrasts at their point of establishment, or as they developed. Many of the late nineteenth-century colleges, their founders, patrons, and staffs, agonized over an appropriate curriculum and its range. Even after the First World War colleges were surrounded by disagreements about their curricula and purposes. In Leicester, for example, there were public expressions of view that the college should specialize 'on the kind of training needed for our local industries' and help to enable Britain to keep up with foreign competitors, but also that for the institution to 'do real university work it must be done on broad lines, and with high ideals, giving foremost place to the humanities' (Simmons 1959:70–1). Such debates stretch back into the nineteenth century and before.

The dichotomies were expressed in many forms. Faced with the demands of technology, industry, commerce, and the professions, English liberal education could not decide—particularly from the 1850s—whether it aimed to produce experts or amateurs (Haines IV 1959). Given the long tradition of vocational education for the church or the law, and the long nineteenth-century debates about the place of science in a liberal education, universities were torn between a version of the vocational and various (mainly European) models of mental training or objective enquiry (Fores 1972:13; Edwards 1977:4). Whatever the accommodations with science, those with

technology were more difficult to make. The authors of *Science Versus Practice* demonstrate that tensions surrounding Victorian chemistry handed on a legacy of mistrust of the practical, and in general that 'as in modern industry, the relationship of science to technology in mid-Victorian Britain was problematic' (Bud and Roberts 1984:149, 165). Whereas Europe in general, and Germany in particular, had by the end of the nineteenth century largely removed the 'second-rate stigma' from its technological institutions, Britain had failed to do so (Ahlström 1982:82–3), and had neither sufficiently adapted its existing institutions nor established adequately recognized and resourced new ones. Technology continued to be perceived in Britain, as the Finniston Committee was to lament, as a subordinate branch of science (Committee of Inquiry 1980:25). The same tension had existed in the United States in the decades following the Second World War, as attempts were made to bring technology back from over-identification with abstract science and mathematics, to rescue it from a position as hand-maiden to science (Truxal 1986:12; Kanigel 1986:22) and to assert its independent cultural identity. In Britain particularly, however, whether inside or outside the university, technology was widely feared by the proponents of a liberal culture as 'inhuman' (Redwood 1951, I:97–8; Nuttgens 1978:9).

Adjustments to this changed world might rest on a number of premises. New subjects might, for example, be admitted if they were sufficiently abstract (Engel 1983:293), and therefore sufficiently distanced from the world of work, and indeed some of the arguments in favour of university science were posed in such terms. There might, on the other hand, be seen to be virtue in admitting 'professional' subjects in order to render them, as Newman argued, useful in the sense of tending to the public good, rather than as practical preparation for employment—to be judged in relation to the corpus of university knowledge, not in relation to the world of work. Sir Joshua Fitch extended the argument at the turn of the century, in a form which revealed the major changes that had already taken place since the 1850s. Universities, he argued, were not places of useless learning, but providers of 'instruments of culture and intellectual power'. Their traditions needed to be enlarged in order to harness them to the new needs of society, and one such tradition was that of ennobling and liberalizing 'the higher employments of life', as had long been the case with law and medicine. He therefore recommended that the

universities should add English, chemistry, electricity, architecture, textile manufacture, agriculture, banking, and commerce to their provision—and he used as his model the London School of Economics, which was 'broader and more comprehensive than any academic institution hitherto known in England' (Robertson 1980:174–5).

By this stage, of course, enlargements of the tradition were already in train. The provincial university colleges accepted some of these broader areas of study—and some were established in order to provide them. The beginnings of an 'alternative' system of higher education had been made with the creation of the London polytechnics in the 1880s and 1890s. The older order of a liberal education as conceived for much of the nineteenth century was already being undermined by the emergence of a conception of professionalism as service. Such a conception, accelerating in the final decades of the century, set the idea of the professional man against that of the business man, that of service and duty against that of profit. Rothblatt describes the professional ideal as an emergent solution to the Victorian crisis of university and society (Rothblatt 1968:86–93; 1976: ch. 12; 1983:133–6). By these means various kinds of skills and approaches to them were being admitted into the curricula of the universities and what, later in the twentieth century, was to be seen as the system of 'higher education'.

The processes we have described are, of course, not the only ones at work in the twentieth century's inheritance of various forms of anti-industrialism, but they are the ones which most directly affected education, and higher education in particular. They are also the ones which provide the most obvious and important framework for a discussion of attitudes in the recent past and in the present of the 'vocational' content of higher education. They help to explain the ways in which universities from the late nineteenth century distanced themselves from the technical colleges, and contributed to a continuing definition of culture which many expanding areas of study, notably engineering, found it more difficult to enter than was the case in many other advanced industrial countries. Lord Eustace Percy pointed out in 1950 that the field sciences had only just begun to be accepted as 'instruments of general education', and laboratory-based sciences were still not accepted as being similar in status to archaeology—and he foresaw a future in which industry might

recruit its administrators from among zoologists as well as arts graduates (Percy 1950:55). While important, if belated, changes had taken place by the 1980s, a polytechnic director could still, in 1985, consider that 'the climate was now *more propitious* for the acceptance of engineering as an integral part of the British culture' (J.M.Illston, reported in Reid and Farrar 1985:3; our italics). Finniston, speaking to an international audience in 1984, compared the lack of public understanding in Britain of what professional engineers do with their position in France, Germany, Japan, or the United States, and hence their lack of public recognition and status in Britain. 'In my country', he commented crisply, 'engineering falls into a category of public ignorance' (Finniston 1985:4).

A 'category of public ignorance' sums up part of the story of engineering in higher education, as it does to some degree the later story of business education. It is also applicable to the position of the institutions which have most recently entered the category of higher education—the polytechnics and the colleges and institutes of higher education. This tripartite typology of higher education appears simple, but is in fact, as we have noted, overlaid with complex considerations of function and status, within as well as amongst the categories. Having launched the binary system, Anthony Crosland as Secretary of State for Education and Science explained in 1967 that the new polytechnics were to be 'distinctive from the universities', more comprehensive in their student intakes, but not divided by 'too rigid' a line from the university sector. He defended the policy against the criticism that 'we are preserving a privileged position for the universities by deliberately trying to create inferior institutions outside' (Crosland 1974:217–19). One of the threads in considering the nature and categorization of courses of study and their legacies is also the nature and categorization of the institutions with which they are most closely identified. The struggle for public recognition of the range of institutions entering higher education in the 1960s and 1970s has been as much concerned with 'public ignorance' and long-standing stigmas as has that of the subjects of study which acquired their vocational labels in the nineteenth century. The binary development in Scotland has been different from that in England and Wales, with its central institutions having been prevented from developing liberal arts courses as in the polytechnics, and the 'practical arts'

having greater historical recognition in Scotland. The Scottish Tertiary Education Advisory Council (STEAC) review in 1985 proposed that this historical divide between the central institutions and the Scottish universities should continue, but, as we shall see, the apparently clearer dividing line leaves questions about vocationalism in courses and institutions as salient as elsewhere in Britain (STEAC 1985:55–6).

Apportioning 'blame' is of direct interest to the policy-maker, given the pressing need in the policy process to abandon or change a direction, and justify the choice. A brief account of the cultural context of industry, commerce, the professions and their educational analogues has to be concerned, however, not with apportioning but with hearing the messages of blame. In contemporary debate Britain's industrial and economic 'failures' are discussed in terms of unionism and mangement, the direction of public and private endeavour, public need, and private choice. It is not so much these contemporary public debates as the dominant signals of blame that they have transmitted in the recent past that have influenced the discussion of vocationalism in higher education. When the Engineering Employers' Federation responded to the Finniston Report in 1980, for example, it believed that 'the extent to which professional engineers may be regarded as responsible for the economic situation in the UK is overstated' (Engineering Employers' Federation 1980:1). If it is not the engineers who are to blame, the answer must be elsewhere, and the Director General of the Engineering Council suggested the answer in 1985: 'The cultural attitude fostered by succeeding generations of academics has been one of the most powerful forces contributing to the decline of our industrial base' (Miller 1985:13). We have seen, however, in Wiener's analysis, that the 'academics' themselves inherited the Victorian legacy of a 'gentrified' approach to industry and commerce shaped above all by the successful middle class acquiring gentry values and gentry ideals. Wiener presents the debate around vocationalism in education in the precise form of divergent attitudes in British conservatism. Bamford and others blame the public schools.

The problems surrounding the meanings of vocationalism, and attitudes towards it, have to be situated in that context of controversy, misunderstanding, and confusion of value and judgement. That historical context also provides some essential explanations for rescue operations, or important innovations or

curricular changes that have taken place in answer to the decline in the industrial base, or in recognition of weaknesses in inherited educational processes and their outcomes. An example would be the requirement of the National Council for Technological Awards from the mid-1950s that courses for the award of its Diploma in Technology should contain a component of 'liberal studies', the precise nature of which was to be left to institutions, but which should ensure a measure of curriculum breadth. The 'liberal-studies' movement in technical and higher education related to government policy which favoured curriculum breadth and saw the addition of studies of this kind as one important way to 'liberalize' the technical curriculum. From 1964 the CNAA took over this emphasis and the early history of the Council contains an important emphasis on the need for 'complementary or contrasting' studies in its validated courses. When the CNAA's newly created Business Studies Board, for example, held its first meeting in 1965 it had 'liberal studies' as an item on its agenda, in the context of the procedures that the CNAA had inherited from the National Council for Technological Awards. The minute reads:

> The Board discussed whether it was necessary for Liberal Studies to be included as a specific subject in a business studies course…. Some members thought that particular reference to it was not required, and others considered that the course as a whole should be so balanced that it was liberal in its entire conception…. It was finally agreed that the Board would expect to see in a business studies course some provision for the student to gain an appreciation of a contrasting discipline to those already covered in the course.
>
> (CNAA 1965:2–3)

The hesitations and decisions recorded here in the emergent area of business studies are explicable only in terms of the prior failures of the university system, and the colleges of advanced technology and other technical and further education institutions, to establish coherent and widely acceptable twentieth-century understandings of what was meant by an education 'liberal in its entire conception'.

The Council itself continued to grapple with the need to establish such an understanding for the new public sector of higher education, specifically with regard to the qualities that a

CNAA degree course should promote in students: 'all courses must include studies which by complementing or contrasting with the main subjects studied will help to provide a balanced education'. It should be possible to convey to students that scientific method ('in the sense of a critical and sceptical approach to enquiry and a readiness to test hypotheses') is important in arts subjects, and that the activities of the scientist and technologist involve 'speculative enquiry, the exercise of creative imagination and the capacity for making value judgments' (CNAA 1969:2). The CNAA was faced, as had been Whitehead, Snow, and many others, with the outcomes of generations of isolation and mistrust across cultures and institutions. The liberal studies approach was intended to mend or at least compensate for the break, and overcome some of the limitations imposed on various kinds of curricula by the hermetic structures and attitudes that resulted from a particular set of social and cultural traditions. 'Modern' studies were still having to be negotiated, not just to meet new circumstances but also to contend with profound, unresolved disputes and difficulties of the past.

The dominant, inherited dichotomy has been that between the liberal and the vocational, but there have been many others in attempts to address different versions of the issues, or to evade the difficulties of the liberal-vocational divide. It should be emphasized that the vocabularies are not uniform even across English-speaking countries, and the meanings are by no means stable across either time or space. The modern American usage of 'humanist', for example, has not been domesticated in Britain, and 'further' education does not carry in America the implications of its British or Australian usage. The problems of pinning down the social and educational resonances of the terminologies are, however, international.

What the nineteenth century did for the concept of the liberal, as contrasted with the vocational, was to impose on it an association with gentlemanliness, leisure, and privilege, of learning for learning's sake, the cultivation of detachment, the attainment of qualities of character, and 'the intellectual and moral cultivation in academic-preparatory schools, colleges, and universities reserved for the male children of a country's social elite'. It was these qualities, not those of a specific training or preparation, which pointed towards the church and the bar, politics and (later) the civil service, colonial service, the professions, and the role of the

country gentleman: 'these positions in life were, after all, considered to be the proper rewards of a liberal education' (Herbst 1980:32–4). Herbst includes industry and commerce in the above list, but these can be included in the British analysis only with the reservation that their status remained somewhat different from the remainder of the list, and those employed in them had to learn to display the characteristics thought proper to those other callings. Vocational education was therefore readily identified with preparation for socially inferior occupations, stripped of its historical association with 'vocation', as understood to apply to the priest or the barrister. The vocational acquired the sub-meaning of specific low status and related to the servile operations of industrial, commercial Britain. It also became associated with narrowness and practicality, and came as a result to be contrasted with breadth and the academic. These were not semantic distinctions, but reflections of attempts to define social hierarchies: the academic ranks above the practical (Hawkins 1973); knowing (science) ranks above doing (technology); higher honour is paid to the academic than to the technical (Harvard Committee 1945). Liberal comes to denote general or unspecific—and therefore free-ranging and superior to the vocationally and directly 'useful' (Cheit 1975:3). The vocational therefore comes also to be reserved for the 'less talented', which—whether explicitly or not—acquires the implication of 'lower class'.

In American terms the essential dichotomy in the nineteenth and twentieth centuries has been that of general and professional education. Although the concept of a liberal education has remained a central feature of the vocabulary of American education, it is the shape of a general education, and of its opposites, amidst the growing complexities of knowledge and of social and economic demands that has been the important parallel focus to the British discussion. Subsumed in the American debates have been such familiar tensions as those between the scientific and the classical, narrow professionalism and broad requirements and choices (Thomas 1962). General education has been promoted (and there have been scholars who have spent their lives interpreting and promoting the concept and its various models of implementation) as an antidote to narrow-gauge professional preparation, as an alternative to the patchwork of electives that developed from the end of the nineteenth century, as a battering ram against the dominance of departments and specialization, and

as the common foundation which enables students to go on to an understood and flexible professionalism or vocationalism. As the demands for increased vocational content to undergraduate studies have grown in the 1980s, the general education idea has been increasingly seen to be in distress or disarray, and further reinterpretations of the general and the liberal have been urgently sought. An essential difference, however, between the American and British attempts to understand and bridge the various dichotomies involved has been the existence of a much more massive postgraduate superstructure in American higher education. Arguments for delayed specialization, and for the extension into undergraduate education of the general education insufficiently provided at secondary-school level, have been persistent American themes. The extensive foundation or preparatory programmes of American colleges and universities, and the expansion of remedial components as new constituencies of students have entered higher education, have been possible within that structure, and the vocational/liberal or professional/general tensions have to some extent been constantly pushed further up the educational system.

Different emphases are attached to essentially similar debates in Europe, where longer undergraduate programmes of study can more easily accommodate 'liberal breadth' with 'vocational specialism'. A first two years of broadly based 'general education' can, as in France, provide the base for subsequent professional specialization. Not unrelatedly, employers in many parts of Europe make much more sophisticated use of educational qualifications in recruiting staff. Posts may require the possession of specialist qualifications in subjects such as business studies where the British employer would be content to recruit 'generalist' arts graduates, although preferably from one of the prestigious ancient universities. Such recruitment practices themselves raise questions about how far British employers are persuaded of the vocational possibilities of higher education.

Central planning of both education and employment provides yet a further context for these questions. In Poland there is a sense in which all higher education exhibits a vocational purpose. For all fields of study the planned economy ensures a high degree of certainty about what graduates will be doing after graduation and an expectation that they will have been prepared adequately for doing it in their higher education. All courses of study follow

a state-imposed curricular pattern consisting of three main elements—theoretical subjects, vocational/professional study, and social sciences and state ideology. Courses take between four and six years to complete, but incorporate elements which would be reserved for postgraduate study or in-company training in Britain.

Longer courses located in a different kind of labour market can attempt different things. More precise delineation of institutional function (for example the German *Fachhochschulen* and universities, and the French *grandes écoles,* universities, and IUTs) can alter the form and the vehemence of debates about the vocational/ liberal and professional/general tensions which arise in all systems of higher education.

We are not at this point concerned directly with the various attempts to break down such antitheses inherited from long battles of this kind. To address these issues would mean exploring the many attempts, for example, to define general and vocational education as a combined entity, and the explicit movements to bring together the twin traditions of liberal and utilitarian purposes. It would mean looking at the attempts to combine liberal learning and career education, strategies based on a denial in modern circumstances of any separation of education from the workplace. Such a consideration would take in John Dewey's efforts to promote the abolition of barriers between school and work, by reforming the school in response to the changing, increasingly technological dimensions of work, and more recent similar emphases—suggesting that a liberal education has to address the reality that work has a 'powerful impact…on our lives. Confronting this reality should be a central concern of the common core curriculum' (Boyer 1977:150). The discussion would encompass the cycles of attention paid to the liberal arts as an integral component of professional training, and of the citizenship towards which all education should point. Some of these analyses and strategies will be visible in later discussions of specific programme areas in higher education.

In British terms such a discussion might, for example, take in attempts in the 1920s to overcome curricular distinctions between hand and brain, manual and academic, in the schools (Silver 1983: ch. 7). In higher education it would examine Sir Walter Moberly's 1949 discussion of a threefold typology of traditions—Christian-Hellenic, liberal, and technological and democratic, together with

such 'spurious remedies' as scientific humanism. More important for our purposes is the range of structures, curricular devices, and processes which appeared at various points in the twentieth century, and notably in the 1960s and 1970s, in order to address the institutional, subject, and career differences and statuses of a rapidly changing social and educational environment. The liberal could no longer be automatically associated with the general, and liberal 'narrowness'—particularly in its classical and literary guises—came under attack. Breadth could be seen as fragmentation. The vocational, in higher education, could be seen as broad. The pejorative version of 'vocational' could be confronted as 'narrowly vocational'. There were many who argued from the mid-century that the boundaries between the vocational and the non-vocational had been either blurred or removed. Proponents of technology as a 'third culture' saw it not as a bridge but as the fusion, if properly translated into the right educational processes, of the two main traditions. There were attempts to rescue vocational meanings of an older kind for the modern use of the vocabulary, and, broadly interpreted, there were calls for *more* vocational relevance of certain kinds in types of education which had previously been considered as exclusively liberal.

Littered across this historical wasteland of vocabularies are other dichotomies which have left imprints on contemporary British education—specialist and non-specialist, specialist and generalist, academic and practical—many of them more directly relevant to secondary or further education. Some of these dichotomies, or 'tensions' in an interpretation by George Tolley have had major implications for public-sector higher education well beyond the discussion of 'liberal', 'complementary', and 'contrasting' studies to which we have referred. In 1982 Tolley looked specifically at the way he saw sandwich courses, combining college study and industrial placements, bringing these tensions—of which he identified four—into relief. The first was between teaching and learning: 'In sandwich courses there is an intrinsic recognition of the need to base learning upon experience and to provide opportunity for ordered reflection upon that experience' (Tolley 1982:67). This, in Tolley's formulation, reflects longstanding traditions of debate about the nature of the university's guardianship of knowledge, about the priority to be given to 'experience', and the power to decide on its relationship

to the acquisition of essential knowledge. It is a tension which emerges in various guises in the interviews and discussions later in this book.

Tolley's second tension is between 'abstraction' and 'application': 'All knowledge must have a base of abstraction…. But abstraction without application…cannot sustain the real world or the aspirations of most students.' This tension, again, is widely reflected in our discussion, and has relevance to the analysis of differences between subjects, between courses, between institutions. The third tension is a version of these first two—that between 'detachment' and 'involvement'. Tolley acknowledges that an environment in which detachment is possible is 'one of the necessary attributes' of an institution of higher education, but 'if detachment becomes an end in itself, then education becomes both suspect and lacking in purpose'. Involvement enhances 'learning and competence'. The history of higher education is not without frequent debate about just such a tension. The public sector has been particularly anxious to define and strengthen its forms of 'involvement', its purpose of securing student competence, and its identity as against what it has seen as the relative 'detachment' of the universities.

Tolley's final tension is that between 'generality' and 'particularity'. In all of the previous three cases he sees the sandwich course as making at least a distinct and unmistakable contribution towards resolving these tensions, and in this fourth case the same is true:

> Most teachers in higher education…seek to enlarge the territory which their specialism occupies in a course. But there is always a contrary pull—towards the generalisation of concepts. The sandwich course emphasises the particular, set within the context of application, so that the limit of generalisation may be explored and defined.
>
> (Tolley 1982:67)

Tolley summarizes the implications of this analysis of sandwich courses for vocationalism as a basis for a discussion of the future relationship between education and work:

> If sandwich courses are vocational (as indeed they are) then their vocationalism may be said to relate to and be founded upon, not a preparation for a career but to the characteristics of

> emphasis or bias in resolving or maintaining in balance these four tensions. The bias is towards learning, application, involvement and the particular.
>
> (Tolley 1982:67)

Similar arguments for the virtues of effectively combined work experience and academic study are to be found in the United States. Hawkins, for example, in arguing for undergraduate study to be based on prior work and other experience, is picking up the tradition of 'co-operative' education (that is, mixing college-based and employment-based experience) pioneered by colleges like Antioch (Hawkins 1973). Although most of the courses explored later in this book are of the sandwich type, we are not concerned specifically with the sandwich-course role in relation to these tensions. None the less, Tolley's analysis is germane. It indicates, first, forms in which traditionally expressed dichotomies can be and are reinterpreted in modern terms; secondly, the nature of the vocationalism highlighted by the development of a non-university sector of higher education; and, thirdly, the possibility of shifting the emphasis in a discussion of vocationalism away from a vague notion of preparation for a career towards the various structures and balances represented by courses of study, as well as their precise relationship to the world of work. All of these tensions and dichotomies are present in some form in the discussions which follow.

In terms of higher education, the contemporary echoes of older debates have become louder as the economic and political uncertainties and pressures have sharpened conflicting views and made institutions more introspective. The movement towards greater public, or at least explicit, accountability, and towards central intervention in the name of manpower and other economic goals, has compelled institutions, and the universities in particular, to relocate themselves in contexts and relationships established largely by government and public authorities and agencies. The distance travelled by the 1980s in revising meanings and assumptions is illustrated by a response from the London School of Economics in 1984 to an enquiry by the University Grants Committee, amidst continuing anxieties about funding, and with a pressing need for self-explanation and self-defence: 'In a civilized society there is no conflict between academic excellence and vocational or more generally practical usefulness. It is by insistence

on quality that one avoids the pitfalls of a narrow and badly-defined "vocationalism"' (London School of Economics 1984:1). What this and much of the debate of the 1980s reveal is the extent of the changes in attitude towards the vocational (and in the LSE document what is termed a 'humane professionalism') in the academic community, as well as the political strength of the 'narrow and badly defined "vocationalism"' against which this comment is directed. In the arenas of politics and policy-making, public discussion and academic attitude- and decision-making, there was neither consensus nor common understanding around these issues, whether in terms of what higher education could and should provide, or what the curriculum of secondary schools should contain. A report by the American business community in 1985 reflected another version of the same set of difficulties over using a vocabulary that had accreted ambiguous or unacceptable overtones. Discussing school-level vocational programmes, the committee concerned recommended that

> the term *vocational education* should be limited to those programs specifically designed to prepare students to enter a particular field upon graduation (from high school). All other forms of nonacademic instruction should be identified by a different term to avoid confusing them with programs that impart specific job skills.
>
> (Committee for Economic Development 1985:8)

The committee did not suggest what the different term should be.

3

Preparing students for employment

We shall return to these considerations, but it is important at this point to look at the possibility of breaking down the global vocabulary of the vocational in higher education into more manageable components in the discussion of higher education specifically. Vocationalism, as we have seen, has commonly come to imply deliberate preparation for employment, but in the higher-education system of the late twentieth century, after considerable institutional and course diversification, such preparation can be seen to relate to employment with different degrees of directness and specificity. To examine these differences is to approach the dichotomies and ambiguities we have considered from another direction.

Ways of delineating the relationship between higher education and the labour market, or segmented labour markets, have been of increasing interest in the 1970s and 1980s, notably in the United States. In that context there have been various attempts to describe the processes and functions concerned. In Scotland, Burnhill and McPherson have suggested that the universities engage, broadly speaking, in five sorts of 'vocational preparation'. 1) Preparation for employment in the subject disciplines themselves, especially in research. 2) The vocational preparation of professionals, 'explicit, purposive, and planned in relation to a segment of the labour market'. 3) Vocational preparation by the non-professional faculties, with a 'largely fortuitous' connection with the requirements of employers, in spite of attempts at manpower planning. The vocational significance of such courses 'often stems from what the student makes of the fortuitous connections between the specifics of the course and the labour market'. 4) A form of vocational preparation 'characterised by the "generalisability" of skills and

fundamental, theoretically-mastered knowledge'. 5) A form of 'general preparation' which sees the graduate as 'a person with a set of values, skills, personal dispositions and habits of thought that make him or her valuable to employers irrespective of the particular contents of the university courses followed' (Burnhill and McPherson 1983). What this typology does is extend the discussion of the vocational beyond what has been traditionally labelled as such, in order to describe relationships between courses and potential employment, relationships which appear in this list in descending order of specificity and explicitness in the design and presentation of courses.

The American analyses of such relationships have often attempted to categorize the knowledge base and content of courses, as they relate to their potential use by students graduating and entering the labour maket. Geiger, for example, describes the content of college courses as divisible into 'general, disciplinary or instrumental knowledge':

> General knowledge would encompass both basic skills, acquired or refined, plus the diverse bits and clumps of information that are picked up during the course of undergraduate studies…. Disciplinary knowledge is the most problematic. Academic disciplines provide the infrastructure of American colleges and universities…disciplinary knowledge…serves the special purposes of the discipline that engenders it. It is only a partial reflection of the real world…. Instrumental knowledge, by way of contrast, exists for an ulterior end.
>
> (Geiger 1980:17–18)

The problem faced by institutions in offering and designing programmes is therefore to package these kinds of knowledge to satisfy the particular balance institutions wish to achieve between their own definition of academic propriety and the perceived needs of students and the wider society. These perceptions, again, are open to categorization, and in the United States Martin Trow more than anyone has attempted to address the problems of doing so in periods of rapid changes in social needs and values, and in institutional scale, opportunity, and responsiveness to pressures from many directions. He portrays higher education, for instance, as performing three types of functions for the occupational structure of society:

> *First,* it selects and forms intellectual and governing élites… creators of knowledge, the scientists and scholars; professional leaders…teachers in universities and elite secondary schools; politicians and civil servants. This is done through a combination of what might be called a higher vocational training…
>
> *Second,* there is another kind of function, and that is to train large numbers of highly skilled people, not only the institutional leaders, but also the rank and file, of the professions and semi-professions, both technical and managerial….
>
> *Third,* there is another set of functions of a large and comprehensive system of higher education, and that is to educate a whole society to be adaptable to rapid social and economic change…. These, in broad terms, are the central functions, respectively, of elite, mass and universal access higher education.
>
> (Trow 1974:35–6)

The vocabulary of functions and their particular features as Trow presents them, as well as the deductions for higher education that might be drawn from them, are less important here than the fact that Trow reflects the need of systems and institutions of higher education to define their relationships, or combination of relationships, with the occupational structures which they serve. Accountability pressures from the society and state have made that need increasingly felt.

The American analysis, in the context of a larger and more diversely funded and defined higher education system, does not precisely fit the British situation, but it points towards the same need to be more specific about the ways in which institutions and their courses, students and their intentions, and employments and their changes, all interrelate. Irrespective of where they may fit into a liberal/vocational dichotomy, academic qualifications of all kinds are being used to regulate entry into employment. The international implications of the 'qualifications spiral' have been vividly described by Dore and a further dichotomy of certification/education has been introduced into the vocabulary of the vocational (Dore 1976). The social functions ascribed to educational qualifications are many and varied and are frequently contradictory: they are the mechanism of equality of opportunity, they legitimize social inequality, they ensure the social exclusiveness of the professions, they provide a 'screening' service

for employers. Whether they also reflect an educational experience of the slightest relevance to actually doing a job seems almost immaterial!

The widening of access to higher education coupled with the increasing levels of unemployment in society makes a growing instrumentalism in students unsurprising. Most students need and want to get jobs after they graduate and they expect, and most higher education institutions promise, that their degrees will help them. The promise of a 'meal ticket' is only partly dependent on the nature of the courses offered. The currency of the resultant qualifications in the labour market is what ultimately matters. This currency can be considered from two points of view: (i) the power of the qualification to regulate entry into employment; and (ii) the extent of the occupational training which has been delegated to higher education by employers.

A degree as a regulator of entry into the labour market gives higher education a role in employee selection. From the employer's standpoint, a degree in a particular subject is essential, desirable, or irrelevant for selection. Although the recruitment process is dependent on decisions made by the graduate (to apply for a particular job) and by the employer (to offer a job to a particular person) the actions of both employer and employee will be constrained by the level of professional closure of the occupational field (Saks 1983). It is the effects of these constraints on the recruitment process which are of concern here.

The following uses of degree qualifications to regulate entry to employment can be identified. They reflect declining determinacy in the employment outcomes of a course.

(i) A specified degree as sole regulator

(a) Output matched to employer demand: entry to a specific field of employment is regulated by a specified degree qualification and numbers in training are controlled effectively and matched to employer demand. The specified degree is thus both necessary and sufficient to gain entry.

(b) Imbalance between output and demand: entry requires a specific degree qualification, but numbers in training are not controlled effectively with the possibility of shortage or over-supply. Possession of the degree is necessary, but it may not be sufficient to gain entry.

(ii) A specified degree as partial regulator

(a) Output matches demand: entry can be achieved by a number of routes, some but not all of which require a specified degree qualification. Numbers in training (graduate and non-graduate) are controlled effectively. Although not necessary to gain entry, possession of the specified degree should be sufficient.
(b) Imbalance between output and demand: where numbers in training are not controlled effectively, possession of the specified degree is neither necessary nor sufficient to gain entry.

(iii) An unspecified degree

(a) In the graduate labour market: an unspecified degree is a requirement for entry. As numbers cannot be controlled, possession of a degree is necessary but not sufficient to gain entry.
(b) In the general (non-graduate) labour market: a degree qualification is not required; it is not necessary and it is not sufficient. (It might be of considerable 'market value' in securing employment, but the market is not 'fixed' in favour of graduates.)

In regulating selection for employment, the above categories represent a movement from a very high degree of closure to an 'open market'. They also represent a movement from minimal employer and student freedom (regarding whom to employ and where to seek employment) to a very high degree of freedom. Category (iii) is the classic 'keeping of options open'. Vocational objectives may characterize courses in all categories, but where courses in (i) and (ii) seek to prepare students for quite specific employment, courses in (iii) must necessarily be concerned with more general and transferable knowledge and skills.

A further dichotomy in the vocabulary of vocationalism to which we have so far made relatively little reference is between education and training—a dichotomy of particular importance also in discussions of British further education. It is a dichotomy full of resonances. In the present context of the currency of educational qualifications in the labour market 'training' is being used neutrally and perhaps rather loosely to refer to any process of preparation, formation, or socialization for employment. As

understood here training will involve changes to a person's knowledge, skills, and attitudes in a direction useful to employment. Higher education's contribution to training for employment will vary in scope and significance and in the employer recognition attached to it:

(i) Initial occupational preparation completed. The graduate is fully qualified to 'practise', e.g. medicine, education, social work. (In some cases a period of post-qualifying work experience may be necessary before full professional status is obtained.)
(ii) Initial occupational preparation partly completed. Further training is required (within higher education or in-company), but graduates may be exempted from the full training programme, e.g. accountancy, law.
(iii) A necessary educational base for training. Subsequent training assumes the base of a specified degree, e.g. psychology. (iv) An optional educational base for training. Employment relevance is claimed but subsequent training does not presuppose it, e.g. business studies,
(v) No explicit employment relevance is claimed.

At one end of the scale the employer has entirely sub-contracted the initial training function to higher education. At the other end the employer retains full responsibility for and control over the training process. It should be emphasized that the above is not making any assumptions about the efficacy of training. Whether undertaken in higher education or in employment it may be done well or badly. The distinctions introduced are intended to refer to the location of responsibility for training, to the formal recognition that, in full or in part, training has taken place.

Underlying the regulation of entry and occupational training roles is a consideration of the diffuseness of the employment outcomes from a course. A medical education is intended to lead to a specific occupational role. A course in geography can lead to employment in a wide range of occupational fields. In so far as there is vocational intent in the design of a geography degree it is to provide the graduate with knowledge and skills which are usable in a variety of employment settings. Unlike the example of medicine, there is no one-to-one relationship between the course and a specific occupation. The design of the medical curriculum is informed by what a doctor is thought to need to know and to be

able to do. Such direction is less easily available to the designer of a geography degree because there is much less clarity about what the graduate will do and what he or she will need to know in order to do it.

In summary, a course's relationship to employment will be specific or diffuse and will vary in the nature and degree of selection and training which is undertaken. Empirically a strong relationship between specificity, selection, and training can be expected. Occupationally-specific training both requires a specific employment referent and helps to legitimize the use of the degree qualification in the regulation of entry.

None of this necessarily indicates the ease with which graduates from particular courses will obtain jobs. Employers may reveal preferences in the 'open' labour market for graduates of particular types (e.g. Oxbridge historians) so as to produce strong empirical relationships between particular courses and particular employment. Such cases of selection and strong regulation of entry may entail no explicit training at all. The degree is used as a 'screening mechanism' whereby graduates with certain individual attributes—such as personality, social background, 'A'-level scores—can be identified by virtue of the criteria and effectiveness of the selection procedures which have been used in regulating entry to higher education.

We have used the dimensions of selection and training in a formal way to imply regulation and control by a professional body or statutory agency. In the absence of formalized regulation and control, course-employment relationships will be determined by market demands and preferences. Strong relationships might still occur, but these will be contingent on the recruitment policies of individual employers and on the job applications of individual students. For example, the value which individual employers attach to degree qualifications in business studies is an empirical question, whereas health authorities have no choice but to attach validity to medical qualifications (and to deny validity to others). Similarly medical students will be quite clear about their employment destination whereas business studies students will be more uncertain.

In the case of diffuse relationships, different levels of training relating to different occupational destinations may be achieved within a single course. For example, a law degree represents both a partial completion of professional training and a general base

for a wide range of other forms of employment. Such examples are not uncommon although they raise questions of the extent to which a course can both perform a highly selective role for one occupation and successfully develop more diffuse relationships with others. The perceptions and expectations of both employers and graduates are likely to associate the diffuse relationships with failure to achieve professional goals.

Figure 1 summarizes the dimensions and indicates the kinds of empirical variation which can be found. Two clusters of course types are indicated, reflecting respectively specific and diffuse employment links. The justification for the two exclusive clusters is: (i) that specific occupational training must assume a specific and identifiable employment outcome; and (ii) that selection must assume specific and identifiable characteristics in those selected which are not possessed, or not possessed to the same extent, by those who are not selected.

Eight different types of course-employment relationship are indicated. Some courses may straddle types and the precise classification of individual courses is not attempted here. The rest of this section considers the eight types in general terms. The main characteristics of each type are set out, their problems and advantages are indicated, and some examples of the type are suggested.

When courses are directed towards preparation for a specific employment category, the possibility of the over-supply of graduates for a finite number of jobs must necessarily arise. The consequences of this situation are considered separately for courses of each type.

Type A: Sole regulation and completed training

This provides the perfect manpower planning model of higher education. Graduates have no difficulties in securing jobs for which they have been explicitly prepared in higher education. Their initial training is complete; they represent the only source of manpower to the employer.

In view of their absolute dependence on the output of higher education and their preparedness to sub-contract the whole of initial training to it, employers may be expected to be heavily involved in course design and operation. Academic autonomy over the content of the curriculum will probably be limited by professional body control and regulation. Many courses of this

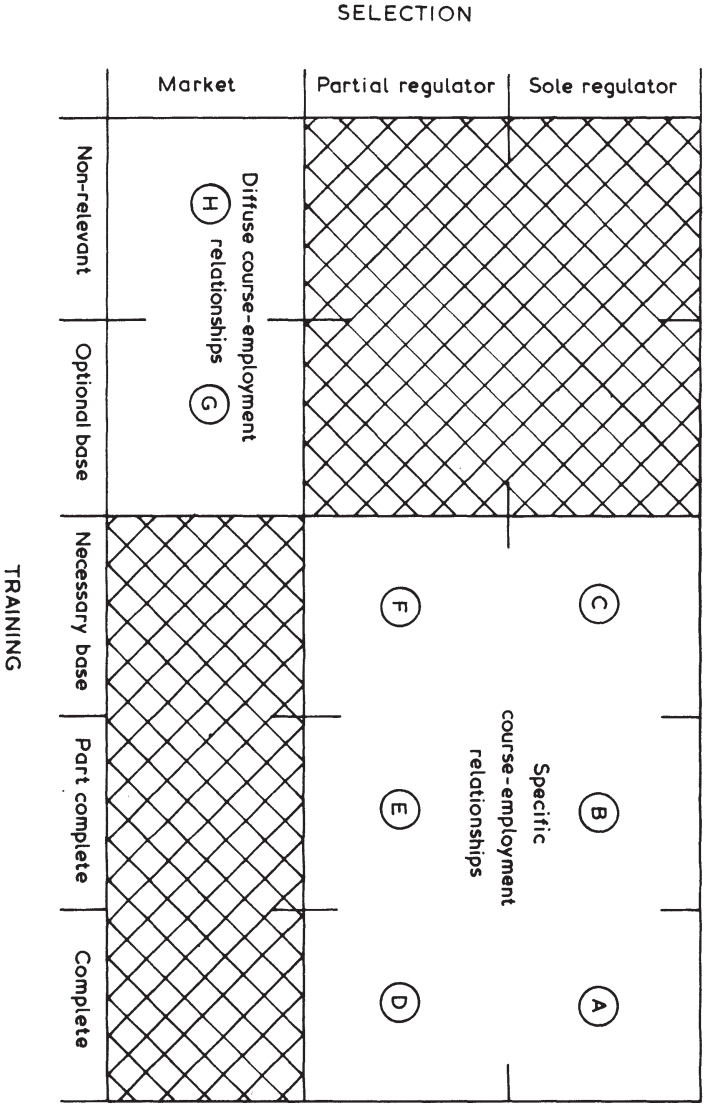

Figure 1 Relationship between degree courses and entry to employment

type will contain substantial periods of work experience, although in some occupational fields practical work in the laboratory or studio will be an effective substitute. The academic staff who support such courses will normally have substantial 'professional' experience and will maintain continuing links with 'practice'. The constraints imposed by employers' needs and professional bodies' requirements will limit both their opportunities for innovation and the amount of individual and institutional variation in course design and teaching.

For students, occupational choice has taken place before entry to higher education and there will be a high level of commitment to the vocational objectives of the course. Higher education is occupational preparation and socialization for these students. They are likely to identify more with the professional group to which they aspire than with the general student body. Their involvement in student affairs and commitment to student 'culture' will be limited. They will expect to find 'relevance' in their studies and will evaluate them primarily in these terms. Examples: medicine, pharmacy.

Over-supply

The manpower planner's model of higher education runs into difficulty as soon as a course's exclusive supply of manpower is met by inadequate employer demand. The assumptions of all parties—teachers, students, and employers—will be undermined. If over-supply of graduates is large, considerable disillusion will arise among students whose vocational motives may be replaced by academic or other sorts. Over-supply enables individual employers to be more discriminating in their recruitment and systematic preferences for the graduates of certain institutions may exacerbate the problems for students from lower-status institutions.

Where they exist, external control mechanisms are likely to be used as soon as possible to reduce the over-supply, either by closing courses or by restricting student numbers. Either way the morale of staff and students will be low as they face uncertain futures.

Type B: Sole regulation and part-training

Exhibiting many of the characteristics of type A, courses of this type share the initial occupational preparation of graduates either

with postgraduate courses or with in-company training schemes. The degree is not itself a licence to practise. This division of labour allows greater scope for the 'academicization' of the curriculum by teaching staff not all of whom will be professionally qualified. There may be less emphasis on work experience as part of the course as this can be reserved for the post-graduation phase of training. Employers will be less involved in and prescriptive about the content of courses when they have opportunity to remedy failings in in-company training.

Students will be no less vocational in their motivations, but may less readily perceive the relevance of the course and be impatient for the beginning of genuinely professional work. Occupational socialization will be less powerful. Completion of the course does not represent 'qualification' in professional terms. All of these factors may lead to some students changing track into different occupational fields at the end of their course. This 'wastage' represents a weakening of the course-employment relationship. Example: engineering.

Over-supply

As the graduates are only part-trained for an occupation which is over-supplied, the 'shock' of encountering difficulties in obtaining employment will be less severe. In such circumstances, a rather more academic approach and looser employment links may actually be of benefit to students. A logic of justification in terms of broader educational values will be more acceptable to students and to employers both of whom will recognize that a degree in the subject does not necessarily, logically, or empirically entail professional practice. Thus, employment outcomes in non-professional fields will not be equated with personal failure. Indeed, the two-stage process of preparation for employment will facilitate the 'cooling out' of students before the final professional and qualification stages and thus provide a more effective means of regulating entry.

Type C: Sole regulation and the educational base for training

Courses of this type display similar but heightened characteristics of type B. There may be a greater discontinuity between the academic world and the professional field. Many teachers will

not be professionally qualified or experienced and will relate primarily to an academic research culture rather than a professional work culture. The motivations of students will be more varied and there will be a danger that some students will confuse the academic subject with the professional field and, as a consequence, find their vocational objectives frustrated. As the course itself may not emphasize the occupational role model, students are more likely to develop in different directions, in particular towards the researcher/teacher role models provided by their lecturers. Rather more graduates from this type of course will be retained within higher education, taking research degrees or masters courses. Employer interest in and professional regulation of the curriculum is likely to be minimal with higher education performing primarily a selection rather than a training function. Example: psychology.

Over-supply

The above characteristics are positive advantages when professional outlets are limited. Students have made relatively little progress in acquiring professional role models so that a forced change in occupational direction is more easily accommodated. The construction of such courses primarily according to educational rather than occupational criteria will more easily meet the needs of students with a multiplicity of motivations. Nevertheless, there is a danger that intending students will perceive courses as leading to employment destinations which few in fact will reach.

Type D: Partial regulation and completed preparation

These courses will share most of the characteristics of courses in type A. The important distinction is that selection and training are shared with other entry routes—for example, there may be non-graduate entry or non-relevant graduate plus professional training routes. Employers are thus faced with a choice between different types of occupational preparation and they may reveal systematic preferences for the output of one type. Certain entry routes may come to be associated with and/or be monopolized by leading employers. In this potentially competitive situation, the status of the specialist graduate training route will be crucial for the career

prospects of students. Consequently there may be considerable 'status insecurity' among students who are likely to make particularly strong demands for relevance in their courses in order to give themselves an advantage over competitors from different routes.

As such courses have no monopoly over selection, employers may be less interested and involved in the design of curricula. If dissatisfied with the product they can turn elsewhere. Where there are multiple entry routes into an occupation, these sometimes relate to differentiation within the occupational field. Thus the BEd entry route into teaching has become particularly associated wth primary education and the less academic parts of secondary education. Examples: education (BEd), social work (degree + Certificate of Qualification in Social Work), physiotherapy, dietetics.

Over-supply

Employer 'route' preferences will be crucial for the success of these courses. Students may well perceive themselves to be 'better qualified' than the competition, but unless such perceptions are shared by employers, disappointment and disillusion will be particularly high. However, where their standing with employers is good, such courses can be as successful as any other vocationally specific course.

Type E: Partial regulation and partly-completed training

Compared to the previous forms of vocationally specific preparation, courses of this type represent decreasing 'value' to students. They provide a route to a specific job, but training is not complete and there are other, and possibly more desirable, routes to the same occupation. In large and differentiated occupational fields, other routes may be associated with more prestigious destinations.

Nevertheless, students who are vocationally committed and have made an early career choice will be attracted to such courses, particularly where other routes are more competitive and outcomes less certain.

Employer involvement in and professional control over course design will be variable. Some occupations will place great emphasis

upon the specialist graduate entry route as a means of enhancing professional status. In cases where professional control over recruitment is affected by other means—for example, professional examinations in accountancy—there is likely to be much less interest in higher education in general and ambivalence towards specialist undergraduate programmes in particular. Examples: accountancy, law.

Over-supply

When jobs are difficult to obtain, the nature and standing of the competing routes will be particularly important. The degree represents an element of employee training which would otherwise need to be undertaken by the employer. The employer has to balance the relative quality and costs of higher education and in-company training, the wage costs associated with different routes, and the calibre of recruit from different routes.

Type F: Partial regulation and educational base for training

The conviction with which such courses can claim to provide specific employment outlets for students is unlikely to be high and their vocational intent might be more accurately described under types G or H. The exception is where the competing routes are unpopular with employers or potential employees in which case a situation approximating to that found in type C will pertain. Type F courses are most likely to be associated with expanding occupations which are undergoing rapid professionalization.

The characteristics of type C will appear in accentuated form. There may be no 'professionally' qualified teachers and professional considerations will not be significant in the design and delivery of the course. The professional field and the academic area will share a common subject matter that will ensure a basic relevance to students with vocational motivations. But perspectives on that common subject matter are likely to be very different and emphasis on critical academic values may even be subversive of vocational ends. In such cases vocationally motivated students may be 'converted' to academic values, may be 'turned off' the course, or may successfully come to inhabit the multiple realities of academic and professional worlds. Because of the potential conflicts, some employers may actually be antagonistic to graduates from this sort

of course who will be knowledgeable without having received any occupational training or socialization. Recruits of this kind would be well placed to be critical and disruptive of existing work practices.

Such courses would be attractive to students with weak vocational interests. The course would commit them to little, but might provide them with useful information on which to base a subsequent career decision.

An example of a type F course might be those social science courses which, although not engaged in the preparation of social workers, are recognized as 'relevant' to those purposes and permit access to accelerated professional training.

Over-supply

The relatively slight investment by students in professional preparation when coupled with difficulty in obtaining jobs will quickly lead to students seeking alternative occupational outlets and the 'diffuse' employment relationships described in types G and H will be approximated. Nevertheless, there are some important differences in so far as some students are attracted to the courses out of specific vocational considerations and may then have to cope with the non-achievement of career ambitions.

Diffuse links with employment

Courses in this general category have a complex relationship to the labour market. Their graduates enter an open labour market which is not 'fixed' in their favour by professional bodies or by statutory control mechanisms. A degree is but one attribute which they bring with them into the market. Even at the end of the course, major career choices remain to be made, and employment outcomes are potentially diffuse and indeterminate.

Much of higher-education provision is to be found here. It would be a considerable mistake to regard it as non-vocational. Although there may not be explicit preparation for a specific occupational role, courses in this general category may contain curricular features of relevance to employers over a wide range of fields. Examples of employment-related competencies which can be acquired are computing skills, modern languages, quantitative Preparing students for employment 49 methods, and skills in report writing

and in oral presentation, analysis, and synthesis. The major distinction to be made amongst courses of this sort concerns the explicitness with which they attempt to prepare students for employment. (It should be noted that it is not meaningful to refer to 'over-supply' in relation to these types of course. There is no clearly-defined area of employment to which a concept of over-supply could be said to refer.)

Type G: Open market and employment-relevant educational base

An increasing number of courses set out to produce graduates who will be useful to employers over a wide occupational field. Curricula are devised in relation to perceived employment needs. Although graduates will enter an open employment market, the designers of such courses hope that they will be particularly well-equipped to compete in that market. Their studies will have been 'relevant'.

The aims of these courses are to lay a foundation for work, to transmit knowledge and develop skills which are transferable, at least within broad occupational fields. Students will select these courses out of general, if ill-defined, vocational concerns. Lecturers will possess a commitment to employment relevance although the diffuseness of employment outcomes will make relevance difficult to achieve. The problematic and diffuse links with employment are nevertheless central to the justification of the whole enterprise and considerable staff time will be given to developing them. The preservation of a compulsory period of work experience may be zealously guarded for similar reasons.

The employability of such graduates is very much an empirical question. However, some studies have suggested that where they are able to recruit in a relatively open employment market, employers are more interested in individual attributes than in types of course (Gordon 1983). Much will depend on the 'quality' of students recruited to the courses. Unless this is at least as high as that of other 'open market' courses, the claims for a relevant curriculum may be of limited advantage to graduates. In so far as they reflect differences in student quality, institutional differences may be more significant than course differences in effecting links with employment. Nevertheless, the potential advantages of this sort of course are considerable. Graduates are not tied to the market

demand in specific fields but are equipped—in terms of knowledge, skills, and disposition—to be mobile across a wide range of employment contexts. Examples: business studies, public administration, computing, hotel studies.

Type H: Open market and non-relevant education

Sometimes thought of as non-vocational, graduates from these courses—which include most humanities and pure science courses—may possess many characteristics which are of value to employers. However, curricula are not designed primarily in relation to employment needs, nor are students attracted to the courses from vocational motivations.

In so far as employers believe that graduates possess qualities which are not generally found in non-graduates, courses of this type will provide access to a restricted graduate labour market. However, the expansion of higher education has outpaced any growth in this market and an unknown but almost certainly large number of graduates compete for jobs in a potentially open (non-graduate) labour market.

Courses of this type will be designed in relation to educational considerations. Teachers will have little or no experience of non-academic work and may have very little knowledge of what their graduates actually do after leaving higher education. Until they leave, the students may also have little idea of what they will do.

The uncertainty and potential diffuseness of destinations prohibits explicit preparation either in terms of knowledge and skills or attitudes and values. The transition from higher education to employment may be difficult.

For those employers who wish to take full control of employee training and selection, graduates from such courses have much to offer. Employers will be looking for abilities—intellectual or other-which have been identified by and/or developed in higher education. However, given the absence of restrictions on employer choice in this particular labour market, the graduate will need to demonstrate attributes of value to employers in addition to the possession of a degree.

Given that precise career aspirations have not guided their choice of course, students' involvement in and satisfaction with their experience of higher education will be impervious to employment considerations. Difficulties in obtaining employment will not be

relished but there is less reason to suppose that they will influence the student evaluation of higher education.

What we have tried to do above is to consider the likely implications for the vocational of the different kinds of currency which degree qualifications can possess in the labour market. This currency provides an important context both for the designers of the courses and for the students in pursuing their educational and career objectives. The context is of course a changing one. Professionalization has increased the importance of educational qualifications in both selection and training. The growth in higher education and the numbers of graduates has inevitably affected their position in the labour market. Growth has been accompanied by diversification—of institutions, courses, types of student. The eight kinds of relationship to the labour market described above illustrate this diversification.

The labour-market context for course planning is not a fixed one, but nor is it directly amenable to control by educators. Employers, professional bodies, government, all have interests in the role of educational qualifications in the labour market. At the extremes, these interests can have a crucial impact upon the educator. High levels of interest are likely to be accompanied by statutorily enforced controls on the content of curricula, admission of students, length of study, form of assessment, and pedagogy. At the other extreme, a situation of almost complete lack of interest may obtain where the problem for the educator is how to get the employers to 'take notice'.

What the model presented in this chapter suggests is the susceptibility of the whole range of higher education courses to interpretation in vocational terms of one sort or another. An important part of the history of public-sector higher education has been the introduction of new, vocational, fields into the curriculum and the attempt to secure their acceptance, both by the academic world and employers. They have had varying degrees of success. But what a significant part of this growth has entailed is a 'reaching out' by higher education to form a partnership with other interests to raise the currency of particular qualifications in particular fields of employment. Partners have been more or less willing, but clearly the structure, and in particular the diffuseness, of particular labour markets can have a considerable effect on the success of the endeavour.

In Part Two, we shall be looking in particular at two major fields of study which occupy contrasting positions in the model presented above. In engineering, degrees have an established position in the structure of qualifications which regulate entry and provide training in the profession. Business studies has no equivalent professional structure, and business-studies degrees are relative newcomers to the employment scene. Engineering degrees have a longer history. Both relate to employment fields which are large and diffuse. In terms of our model, engineering is probably an example of category (b), sole regulation of entry and part-training, and business studies is an example of category (g), open market and an employment-relevant educational base. The importance of the typology to the discussion in terms of engineering and business studies is its demonstration of the range of perceptions available in higher education of relations with the world of employment, and therefore of course purposes and contents, responsibilities to students, and accountabilities to a variety of constituencies. The interviews conducted reflect how those responsible for courses situate themselves in the traditions and diversities that we have outlined.

4

The language of policy

The primary focus of this study is on the definition, description, and interpretation of courses and institutional aims and activities. Before we turn directly to a consideration of these, it is important to set both the analytical model we have propounded and the views of those engaged in the processes on the ground alongside some British policy statements which illustrate the debates to which all of this relates, and to which in many respects it is a response. Perceptions of course and institutional goals are conditioned by public expectations and rhetoric, and by financial and political considerations, as well as by the academic and professional logics of the courses and institutions themselves.

The tension between dichotomous expressions of the liberal-vocational, liberal-technical elements in education has run through the policy formulations of recent decades, particularly where technical and technological expansion and manpower planning to meet national 'needs' have been concerned. One of the early policy documents which encouraged the development of 'liberal studies' in technical colleges, many of which later graduated to higher technological status, was a Ministry of Education circular in 1957, which stressed 'the importance of introducing a liberal element into technical education', and outlined various ways of 'liberalising a technical course' (Ministry of Education 1957). British traditions and assumptions about technical education, science, and the nature of the liberal were different in this respect from those of Europe and the United States, where underlying assumptions and social, cultural, and educational processes and structures were translated into different post-secondary and higher-education curricula. In the reverse direction, seeking not to make the vocational more liberal, but the liberal more appropriate to future

careers, the process assumed greater urgency in Britain with increasing economic difficulties and sharper competition for graduate employment in the 1970s. One of the earliest policy expressions of this concern was in the White Paper, *Education: A Framework for Expansion,* issued in 1972 by Margaret Thatcher as Secretary of State for Education and Science:

> The Government have sympathy with the sincere desire on the part of a growing number of students to be given more help in acquiring—and discovering how to apply—knowledge and skills related more directly to the decisions that will face them in their careers and in the world of personal and social action. This is what is meant by 'relevance'.
>
> (Secretary of State for Education and Science 1972:31)

Developing from such a concern in the late 1970s and 1980s was to be a mounting emphasis on the 'relevance' not only of emphases within and help relating to particular courses of study, but also the importance to the nation's needs of those courses of study themselves. The relevant and the vocational could be interpreted in relation to individual needs and career aspirations, the changing structure of the labour market, and estimates of manpower needs and national futures.

In 1983 the Secretary of State invited discussion and advice on the future of higher education in the next decade. What followed indicated the extent to which the language of vocationalism had become central to debate about higher education, and the ways in which the system was responding to the pressures from political and economic directions. The first paragraph of the response to the Secretary of State from the University Grants Committee contained the explanation that 'the universities provide the bulk of the country's science and engineering graduates and research workers, as well as qualified graduates from medicine, law, architecture and numerous other professions'. The UGC went on to accept that there would be a shift towards the sciences and engineering, but underlined a need for additional resources 'if there is to be a significant increase in places for science, engineering and other vocationally relevant forms of study' (UGC 1984:4–5). The emphasis on science as 'vocationally relevant' raises questions about both the interpretation of science, and the extent of the 'other' forms of study-likely to be considerable when science in such a general formulation is included.

On behalf of the public sector, the National Advisory Body for Local Authority Higher Education responded more fully on this area of debate. It issued a consultative document in 1983 addressing some of the issues directly. It defended the sector against accusations of not being as responsive to employment needs as it should be: 'it is difficult at the system wide level to discern clearly what these needs are'. It defended the sandwich system as an important route for the 'qualified professional', experiencing college-based study integrated with practice, suggested that in various ways the system had been responsive to manpower needs (directly in medicine and teacher education), and pointed to reports and pressures over the years from industry and commerce asking for higher education to be 'more immediately vocationally specific'. The questions the NAB asked of the institutions, therefore, included: 'what should be the balance between general courses, and more specifically vocational ones?' (NAB 1983:2, 5,10). By the time the NAB issued its final advice to the Secretary of State the following year, it had formulated answers to some of its questions. It continued to emphasize that the sector was concerned 'primarily with serving professional and vocational needs', but, with a firm and explicit dismissal of the passage in the 1972 White Paper, it realized how difficult was the terminology:

> Vocationalism is an imprecise term which has led to a confused debate. The notion of relevance as set out in the 1972 White Paper 'Education: A Framework for Expansion' is even less helpful. What lies behind both these terms is the view that the higher education experience should equip students with the skills and abilities to enable them to meet the economy's need for highly qualified manpower…. The economy will not be well served by providing too narrow a specialist focus in initial higher education provision. A policy which identifies one side of the binary line as more vocational than the other is neither accurate nor helpful.
>
> (NAB 1984a:24, 39)

In an important joint statement by the NAB and the UGC, these questions of skills, narrowness, and the qualities needed by future contributors to the professions and the economy were addressed directly and in the context of defining the purposes of higher education generally. The statement warned against emphasizing

'specific knowledge', which quickly becomes out-dated. Initial higher education:

> Should therefore emphasise underlying intellectual, scientific and technological principles rather than provide too narrow a specialist knowledge. The abilities most valued in industrial, commercial and professional life as well as in public and social administration are the transferable intellectual and personal skills.
>
> (NAB 1984a:4)

The statement included among such skills the ability to analyse complex issues, to identify the core of a problem and the means of solving it, to synthesize, clarify values, make effective use of numerical and other information, work effectively with others, and communicate clearly: 'a higher education system which provides its students with these skills is serving society well (NAB 1984a:4). Although in other respects the binary division between the universities and the 'public sector' remained strong, there were emphases and claims regarding purpose and student attributes and learning that were visibly common to higher education as a whole.

When, following this consultation, a Green Paper was produced in 1985, the dominant themes were set in the context of Britain's poor economic performance since 1945, and the higher rate of production of qualified scientists, engineers, technologists, and technicians in competitor countries. The paper warned against 'anti-business' snobbery, underlined the importance of the 'entrepreneurial spirit', and called on higher education to 'foster positive attitudes to work' and to strengthen links with industry and commerce. It attached special importance to vocational qualifications, and castigated employers for recruiting graduates 'by reference to general ability and leadership qualities', without providing 'clear signals of the importance they attach to competence in science and technology'. Employers needed to make a greater effort 'to persuade more youngsters to opt for the relevant subjects'. The paper, in a final paragraph in the section concerned with subject balance, recognized that employers value broadly based personal skills, and stressed the importance of providing adequately for the arts—although the proportion of arts placed in higher education 'can be expected to shrink'. The dominant emphasis in the paper, however, and one to which the paper drew

clear attention, was not left in doubt: 'In higher education the Government believes it right to maintain a distinct emphasis on technological and directly vocational courses at all levels' (Secretary of State for Education and Science 1985:3–9). Higher education in both sectors maintained that it already worked with industry in ways urged by the Green Paper, and widespread objection was voiced to the dominant tone of the document. Its 'vocational' emphasis provoked a good deal of adverse comment, as did the general thrust and many of the specifics of the argument. Sir Keith Joseph found himself having to defend the paper against what he considered an unfair reading of its message. Speaking to the Committee of Vice-Chancellors and Principals he reaffirmed his recognition of the importance of the humanities in higher education, and in its response to the Green Paper the UGC welcomed that recognition and made a broad, clear statement to the Secretary of State:

> As you said, the training of the mind provided by an arts course is highly valued by industry in its own right, and in this sense the humanities generally are no less vocationally relevant than the sciences. Vocational relevance is not confined to courses preparing students for a limited number of specific kinds of employment.
>
> (UGC 1985:4)

The UGC statement was broad and clear in its interpretation, though it indicates how diverse the use of the term 'vocation' could now be.

Sir Keith offered another defence against accusations of 'espousing the "new vocationalism" which seems to mean an excessive concern with the immediately useful to the neglect of wider cultural values'. He told a conference on the Green Paper that he had always believed in the humanities as ends in themselves, and rejected the 'alleged philistinism' perceived in insistence on the contribution of higher education to wealth creation. He saw no dichotomy in higher education combining the pursuit of learning for its own sake ('the contribution of higher education to a humane and civilised society') with preparation for employment. There was also no incompatibility with emphasizing science and technology in higher education, when economics and demography made it necessary. He referred in passing to some subjects outside the sciences and engineering as 'highly vocational',

for example modern languages and business studies, but reaffirmed his commitment to 'liberal intellectual traditions' (Joseph 1985:2–3, 12–19). In 1986 he was reported as regretting his inattention to technical and vocational education (he was not here referring specifically to higher education) in his early days at the Department of Education and Science, again reasserting his support for the tradition of liberal learning for its own sake, and emphasizing the need for a workforce that was not narrowly skilled, was versatile, and had the ability to respond to change and use a range of personal skills (Joseph 1986).

What some of this debate indicated was a continuing lack of clarity about what to include in any definition of liberal or vocational, and the difficulty of sustaining a discussion about either without constantly separating off the 'sciences and engineering' from the remainder of higher education. A commitment to the liberal could easily be translated into a commitment to the arts or humanities. A discussion of the relation between higher education and employment, particularly in a period of higher education's self-defence against a variety of accusations and pressures, could easily ascribe wide, indeed universal, meanings to the term vocational which made it unrecognizable from the term as it was being used by critics or opponents.

Those difficulties become more apparent as the range of policy statements is widened. The STEAC report on the future of higher education in Scotland, following on the heels of the Green Paper, supported the Government's 'wish to see a higher proportion of students studying subjects of vocational relevance', but at the same time considered it essential for Scotland's broadly based educational tradition to be protected: 'we would moreover caution against the sole pursuit of industrial and economically "relevant" subjects, vitally important though they are' (STEAC 1986:48–50). The very use of the vocabulary of vocationalism produced attendant reservations and cautions.

It would be important, for a full consideration of the problems we are identifying, to look beyond higher education, for example to the definitions of vocational objectives, work-related courses, and occupational considerations at other levels—including some of those discussed by the Business and Technician Education Council (e.g. BTEC 1983), and in relation to the Technical and Vocational Education Initiative in secondary schools, launched by the government through the Manpower Services Commission in

1982. Here, however, it is possible only to remain within the various constituencies of higher education itself.

Without reference to the same vocabularies, the Finniston report on engineering took care to warn against the 'narrowness of outlook' about which many employers had complained. The report drew attention to the neglect of skills and understandings which contribute to 'the whole engineering dimension', or, as was reported from regional engineering conferences, 'neglect of the human and creative aspects of engineering' (Committee of Inquiry into the Engineering Profession 1980:78, 84–6, 188). Finniston himself, in the years following the report, stressed the importance of widening engineering education, enabling engineers to understand and relate to other people, and even making an engineering education broad enough to point towards other forms of employment (Finniston 1984:63; 1985:5). The direction of breadth and versatility, however, was not the one in which the DES was prepared to go in permitting new courses to be mounted in the public sector. Its circulars sought a precise match between courses and employment needs. New courses would be approved only if they could 'be demonstrated to be of clear value in meeting the needs of industry for skilled technical, technological or scientific personnel, or otherwise essential to meet the operational needs of industry, commerce, the professions or other employers' (DES 1982). The National Advisory Body, in the meantime, was stressing the ambiguities of the vocational discourse. In its commentary on the conclusion of its 1984/5 planning exercise the NAB commented that there had been a shift of balance 'into the more technological and directly vocational programmes', and these were listed as engineering, science, mathematics, and business-related courses. The most obvious question raised by the list is: if mathematics is directly vocational, what is not? If mathematics is included, presumably English should be? Vocational is beginning, in such discussions, to equate 'usable skill' or 'applicable knowledge' (NAB 1984b:1).

It is revealing to pursue this discussion at a different policy level-that of institutions. The polytechnics have in the 1970s and 1980s had to try to define themselves in positive terms as a group of institutions, and as compared to the universities, given the late-comer's need to justify the incursion. Both of these elements of definition are visible in the way the polytechnics present themselves and their courses in their prospectuses (and we shall

subsequently see how they do so in other ways). British institutions of higher education do not adopt 'mission statements' as do American institutions, but prospectuses (and to some extent the institutional review documentation of CNAA-validated colleges and polytechnics) indicate, however crudely, the institutions' interpretation of their policy positions regarding courses, recruitment, and a variety of other matters. Not all the polytechnics—to which the discussion at this point is confined—offer an explicit statement about themselves, and in their recent prospectuses Birmingham, Kingston, Newcastle, Wolverhampton, and Thames polytechnics do not do so. All of the others describe themselves, either as individual institutions, or as part of a sector, or both, in terms which indicate how they view their curriculum balance or their relationships with the labour market. Many of them are anxious to identify what is 'distinctive' about the polytechnics, and most of them include some reference to their vocationalism.

The interpretations of the vocational roles of the polytechnics vary in these statements, either explicitly or in the apparent assumptions on which they are based. Some describe their courses as 'realistic' or related to 'real-life situations'. Some refer to the wide range of their courses, the different levels at which they operate, or the variety of their modes of teaching and of their students. In some cases the concept of vocationalism is closely identified with that of interdisciplinarity. The most common explanations of the polytechnics' vocationalism, however, relate to their commitment to prepare students for employment—sometimes with references to 'general' or 'specific' preparation, and this is occasionally contrasted with 'traditional' or 'purely academic' courses (with the implication that these are more likely to be available in universities). There is frequent reference to the close relationship between the polytechnics' courses and industry, the professions and commerce—to which 'the community' is sometimes added. Some examples will illustrate the range of interpretations.

In 1984 Brighton Polytechnic explained that 'some specifically vocational qualifications are offered only by polytechnics', and reprinted on the first page of its prospectus a statement by the Committee of Directors of Polytechnics proclaiming the polytechnics to be 'distinctive in having a clearly defined role combining the closest relevance to industry, commerce and the

professions, the widest range of studies at all levels, and the greatest variety in the age, background and interests of their students'. A polytechnic provided 'a unique learning environment'. In subsequent years, Brighton omitted this CDP statement and substituted a description of its own 'corporate goal':

> To provide a teaching and learning environment which can foster the personal and professional development of young people…and the continuing recurrent education of men and women of all ages having particular regard to the need for courses which aim to improve national productivity and which aim to improve social and economic conditions. To provide educational leadership to the community…. To provide the resources and opportunities for the advancement of knowledge.

To achieve these ends, the polytechnic needed to 'attempt to preserve an academically well-balanced institution'.

Bristol Polytechnic, in a statement entitled 'Polytechnic Jargon', explains that the majority of its courses require study 'closely related to the needs of a profession'. Many of them cover more than a single discipline and provide the 'cross-disciplinary education which is increasingly demanded by employers…. It is in this vocational bias and the frequent interplay of disciplines that polytechnics provide an alternative form of higher education to the universities' (1983/5). Huddersfield Polytechnic contrasts its range of courses—from doctorates to certificates—with that of the universities, adding: 'We also tend to preserve the traditions inherited from our constituent colleges and provide courses which are strongly vocational' (1984/5). Liverpool also points up the difference between universities and polytechnics:

> It is clear that more and more people are aware of the tangible differences between the education offered in the University sector and the Polytechnic and for many the latter, with its vocational emphasis, is becoming an increasingly attractive proposition at a time when career prospects are a prime determinant of education choice.
>
> (1984/5)

In considering such claims alongside, for example, the National Advisory Body's insistence that the university and public sectors are not divided along vocational lines, the nature of the respective

statements and the audiences addressed have to be borne in mind. It is not easy to explain to students or the general public the distinctive features, if any, of a polytechnic in a way that will influence student choice. Those who compile prospectuses, like those who write 'rationales' of courses, have to identify the distinctive, persuade, and judge what customer or critic may wish to hear, as well as what to display or to underline.

Some features of the polytechnics, their histories and present identities, are commonly presented by all or many of them. The comprehensive nature of the polytechnics is one such feature that is widely stressed. Oxford Polytechnic provides a 'more comprehensive range of levels of courses' than the universities, offering vocational, technical, and traditional degree courses (1985/6). Middlesex Polytechnic offers one of the most 'richly varied' range of educational opportunities in the country: 'some courses are traditional in their approach; others are unusual and even unique' (1984/5). Portsmouth Polytechnic describes its vocational courses as useful or necessary for particular careers, but stresses that not all its courses are directly related to careers in that way. This does not mean that graduates from 'non-vocational' courses have no jobs available:

> Graduates and diplomates are sought by many employers on the assumption that higher level study in any subject will develop the general abilities to enquire, to argue, to analyse, to criticise and perhaps to produce original ideas. Most employers will also be interested in an applicant's personality, ideas, manner, appearance, ability to get along with people and willingness to be trained and to work hard. These factors will often be more important than the subject or level of qualification. (1983/4)

Sheffield Polytechnic likewise describes its courses in 'academic subjects', but also its 'less traditional courses…which give realistic vocational and professional preparation for careers in the modern world' (1984/5). On the other hand, Scotland's central institutions, unlike the English polytechnics in being prevented from offering liberal arts courses, which are the preserves of the Scottish universities, have no difficulty in presenting their courses. Robert Gordon's Institute of Technology in Aberdeen, with an emphasis typical of these institutions, explains that 'the majority of courses at RGIT are vocational or career-oriented and we at

the Institute undertake to provide you with the necessary education and training for you to commence your career in your chosen profession' (1983).

These institutional statements, which are policy statements only in their continuing announcement that their chosen or designated direction is the one they intend to pursue, have over the years been paralleled by institutional and course statements for validation purposes as submitted to the CNAA. Since the CNAA has taken a direct interest within the validation procedure in the employment prospects of graduates, such submissions have—increasingly in the late 1970s and 1980s—addressed the question of vocational definition and content, particularly in subject areas sensing themselves to be at risk in the prevailing climate. A 1983 BA resubmission in Social Sciences repeated an earlier formulation of aims which included the following:

> The provision of a sustaining undergraduate education for those who expect to be engaged subsequently in activities for which an understanding of social relations, institutions and organisations is essential. The view is taken that this understanding is made feasible from a basis of academic analysis which is related to the contemporary world but which is strongly informed by theoretical, comparative and conceptual approaches. The programme is vocational in the important sense that it lays the foundation on which subsequent professional, postgraduate, in-service or post-experience vocational education and training may build; and that it equips its graduates with the means of coping with a world of change.

More succinctly, but less clearly, another Social Science submission (1983) describes such an undergraduate course as providing 'a broadly relevant education which covers many of the aspects to be found in postgraduate, vocational and professional training'. A 1982 BA resubmission in Modern Studies describes the structure of the course as 'directing students towards areas of vocational or postgraduate study'. Another CNAA-related institution, discussing vocationalism in its 'progress review' documentation (1985), accepts the need to respond to economic and technological demands. Though vocationalism remained the dominant goal of its courses, 'increasingly determined by manpower planning objectives', it threatened to 'swamp the traditional liberal concept of education beyond Advanced level…. The need to preserve

these humanising pursuits will become greater during the next decade'.

Crucial features of the polytechnics and similar institutions in the United Kingdom are highlighted in some of these examples. Their work relates to the technical and further education traditions from which they derive—though we shall return to a discussion of the adaptation of these traditions. They have felt it essential to present themselves in sharp and distinctive vocational terms. The meanings of their expressed vocationalism embrace the employability of graduates (an ingredient which pushes the concept ever wider across the curriculum); the relationship of institutions and their courses to future employers (including, and especially, relationships through sandwich structures and the part-time students already in employment); the expectations of employers (including personal attributes, and interdisciplinary experience). Even where no direct vocational content or relationship is claimed, as with the social science courses quoted, it has been felt necessary to indicate their relevance to possible future vocational intentions. To what extent such indications represent an interpretation of course goals and realities, or a response to the needs of the market or the validator, or some combination of the two, is an underlying question of institutional policy analysis, and is part of the concern of this and related discussion.

In all of these self-scrutinies, the polytechnics and other public-sector institutions have had the distinctive feature of operating within the validation procedures of the CNAA, the universities, and other professional bodies. Of all these the CNAA, which has been the central validating body for all of the polytechnics since their designation at the end of the 1960s, has had the most explicit requirements, and has been most public in its responses to the policy formulations likely to influence its own operations and those of its related institutions.

In its own policy statements, regulations, and principles, the CNAA has addressed directly, though not always in detail, the curricular issues raised in this discussion. In its early years the CNAA was operating in subject areas seen as vocational, and its efforts to encourage broader studies, complementary and contrasting courses of study, discipline-based enquiry, and the integration of academic study and practical work through sandwich courses, pointed towards a generous definition of its essential vocationalism:

> 77% of all courses approved by the Council are sandwich courses and most of these are designed to meet a vocational need, whether it is in industry, business or the professions; this is not to say of course that the content of the courses is narrowly vocational.
>
> (CNAA 1967–8:10)

A decade later the CNAA was considering the margin of difference between the courses in its institutions and those in universities, and was describing the complexities involved in making the comparison or contrast:

> Generally speaking, Council's degrees cover the same range of subjects as those of universities (except for medicine, dentistry, veterinary science and forestry), though a greater emphasis may be given in many CNAA courses to vocational or practical work. This is particularly true in the technology-based courses where a significant number are in the sandwich mode of study. However, the CNAA is not unique in this respect as several of the technological universities offer courses which incorporate the sandwich concept. The CNAA also approves degree courses in subjects which are not normally taught in universities, such as art and design and creative and performing arts.
>
> (CNAA 1979:19)

In the 1980s the Council emphasized the range of its validated courses of study:

> some programmes will seek to prepare students for a particular profession or vocation; some will seek to develop a student's general problem-solving skills; some will seek to promote a student's artistic development; some will seek a breadth of subject coverage, while others will encourage specialisation and yet others will transcend traditional boundaries of knowledge.
>
> (CNAA 1983a:22)

A primary aim, however, had to be the development of the student's 'intellectual and imaginative skills and powers…. The direction of the student's studies must be towards greater understanding and competence…. A programme of studies must stimulate an enquiring, analytical and creative approach.' Against the

background we have considered, therefore, the CNAA tried to portray an approach to learning that would militate against narrowness:

> The student must be encouraged to appreciate the nature of attitudes, modes of thought, practices and disciplines other than those of his or her main studies. He or she must learn to perceive his or her main studies in a broader perspective. As part of this process he or she must be enabled to develop an informed awareness of factors influencing the social and physical environment.
>
> (CNAA 1983a:23)

These formulations had given the CNAA some difficulty from the beginning: the 'informed awareness of factors' had taken the place of the aim to 'give the student an informed awareness… of the contribution they can make…in widening man's imaginative horizons and his understanding of his culture and environment'. That formulation, adopted in 1974, was itself considered by one commentator to be a watered down version of a more splendid aim: 'to give the student an understanding…of the contribution they can make…in widening man's imaginative horizons and his understanding of the universe' (Smith 1978:341; see also Oxtoby 1972).

The Council remained attentive to the issues, but did not go further than the brief statement in its Principles in elaborating a categorization of its courses. In its response to the Finniston Report in 1980, it accepted the thrust towards more broadly-based, more application-focused engineering degrees, considering that many 'vocational broadly-based courses' were nearer to the Finniston goals than single-discipline courses. Equally important, however, were those 'general engineering degree courses with vocational slants meeting specific needs, such as Engineering with Business Studies' (CNAA 1980:15). In its response to the 1985 Green Paper, the Council emphasized the existing close links of the public sector with the world of work, with 'a strong emphasis on applied studies and a willingness to respond to changing employment needs'. Given the range of public-sector higher education many of the courses validated by the CNAA did 'not fit into the simplified categories of arts or science, liberal or vocational, pure or applied'.

The CNAA's view was that, although higher education existed to serve society, its duty was not 'simply to respond to society's

perceived needs; it should help to shape the expression of those needs through critical discussion'. Flexibility was a question both of provision and of the graduates themselves, whose adaptability, 'analytical communication and interpersonal skills' were welcomed by all employers. In 1986 the CNAA emphasized, as did the UGC, the relationship between arts courses and employment:

> As the Green Paper says, rigorous arts courses prepare students well for many types of employment. We believe that public sector arts, humanities and social studies courses are particularly effective in developing both general and specific skills relevant to employment.
>
> (CNAA 1986a:2–5)

The need to move away from rigid boundaries between the vocational and its perceived opposites was a theme picked up in a variety of contexts by the CNAA in the mid-1980s. When the Review of Vocational Qualifications (launched by the government in 1985 through the MSC and DES) was taking place, the CNAA wrote to suggest that 'one of the factors that has led to the difficulties currently being experienced is the rather arbitrary distinction made between "vocational" and "academic" qualifications and the higher status generally accorded to the latter' (CNAA 1985). A CNAA working party on long-term developments expressed the view that the public sector had a 'creditable record as far as the provision of vocational courses is concerned', but it was anxious that the concept of 'vocationalism' should not be interpreted in a narrow sense. It agreed that it was desirable that 'any course of higher education should give the graduate the kind of intellectual grounding which will stand him in good stead for performing a responsible role in a number of walks of life' (CNAA 1983b:7). In its evidence to the STEAC inquiry on higher education in Scotland, the CNAA acknowledged that one of the characteristics of the public sector in general was that 'its courses mostly have a vocational orientation' and that this was markedly so in Scotland 'where it has been deliberate policy that the public sector degree work should complement rather than compete with that of the universities'. The CNAA's point in the evidence was that the significant contribution of these public-sector courses within Scottish higher education had not always been fully appreciated (CNAA 1984:3). In its 1986 response to the STEAC report itself, the CNAA had a different point

to emphasize, one that reflected its response to the Green Paper concerning England and Wales:

> While the CNAA recognises and respects the SED policy that the central institutions should concentrate on courses with a specifically vocational orientation, the CNAA believes that well designed arts and humanities courses also provide a valuable preparation for a wide range of occupations.
>
> (CNAA 1986b:3)

What the CNAA's own discussions, and wider debates throughout the system, had highlighted by this time was the diversity of possible responses to known needs and political and other pressures.

From its creation in the mid-1960s the CNAA had sought to evade the pejorative associations of 'vocationalism', adopting it with wide connotations, guarding against its identification with narrowness and training implications unacceptable in higher education. Increasingly in the late 1970s and 1980s, as economic and manpower-planning pressures mounted, government and national bodies of various kinds also adopted the vocabulary and its associated extensions of meaning, in attempts to alter or defend the structures and practices of higher education. What exactly vocationalism was, in the new conditions of the late twentieth century, and how palatable it was as an alternative to traditional 'liberal' higher education values, or as a version of that tradition, were not questions to which there were simple or unequivocal answers. If policy has to do with both intention and strategy, the language of policy is both future-oriented and burdened with the meanings which may have remained unchanged or unquestioned as the realities it attempts to reflect have undergone important changes. Vocabularies, locked into attitudes and procedures, are some of society's most immovable and intransigent objects. Policy at national strategic levels and at institutional levels remains buttressed by terms whose uncertainties and ambiguities have been constantly probed in the past, but need to be subjected to fresh controversy and situated in new understandings.

Part Two

VOCATIONALISM—A PROJECT

5

Concepts, courses, and institutions

It is in the context of the history and policy frameworks described in the previous chapters that the institutions of the maintained sector have developed to become the major providers of undergraduate higher education in the United Kingdom. As we have seen, a vocational content and purpose has been an important feature of the way these institutions have seen themselves and have been seen by others, including the CNAA.

As the validating body with responsibility for the standards of the majority of degree courses in the maintained sector, the CNAA agreed in 1983 to support a project which would inquire into the meaning of 'vocationalism' held by those who had worked and were working in 'vocational traditions'. In agreeing to support the project, the CNAA was acknowledging that a concept central to the stated objectives of many of its courses was in fact subject to considerable ambiguity and confusion. The project proposal stated that:

> The importance of this proposed exercise in clarification lies in the largely unexamined assumptions about vocational education in judgments made from outside it, in the unspoken or unheard assumptions of those engaged in self-declared vocational activities, and in the often confident assumption that there is a consensus of meaning around the concept. The usage is in fact most confused and ambiguous, including by institutions offering CNAA degrees, in what are sometimes announced as specific or general areas of vocational study. The ambiguities include different assumptions about course content, about the nature, level and timing of vocational elements, about teaching methods, about students' and employers' expectations of professional

> relevance, about the assessment of work-oriented learning, and the viability and acceptability of vocationally relevant content within the institution, and by the various constituencies involved.

The project was to attempt clarification of these issues by exploring them with polytechnic and college teachers who were closely involved in the design and teaching of courses widely regarded as-in some sense—vocational study. The objective was to explore the congruence of understandings and interpretations of teachers with the wider perspectives and vocabularies in which policies at national level were being articulated. This was to be achieved through a series of interviews with 'insiders'—experienced academic staff who had made their careers in fields generally regarded as vocational.

As we have already noted, the vocabulary of vocationalism has been drawn into discussions of courses in virtually all the subject fields. The interviews were to concentrate on only two of them, but two which have considerable importance in the profile of public-sector higher education—engineering and business studies. All of the English polytechnics have degree courses in these fields, as do most of the Scottish central institutions and a number of colleges and institutes of higher education in England. The broad areas of business, science, and technology accounted for 49 per cent of CNAA-registered undergraduate students in 1985. The two subject fields are important to the sector and important to any explication of the nature of the vocational. Engineering education has a long history in the United Kingdom and has received considerable public attention in recent years. The growth of business-studies degrees has been an important feature of the development of public-sector higher education over the last twenty years, where it exists as a distinctive kind of course not found in any numbers in the universities.

The selection of engineering and business studies was important to the aims of the study, however, for reasons other than size. In terms of the typology described in chapter 3, they occupy almost opposite extremes in the spectrum of the vocational. Engineering degrees play a crucial role in the regulation of entry into a highly professionalized occupation. Employers and professional bodies impose explicit requirements upon undergraduate curricula as an important stage in the process

of occupational training. In contrast, business-studies degrees possess little regulatory force in a diffuse occupational field characterized by a multitude of entry routes at different educational levels. Business-studies graduates face an essentially open labour market in which they must compete with graduates from other subjects and in many cases with non-graduates. As there is little consensus among employers about what a person entering business needs to know there is relatively little external constraint upon the undergraduate curriculum. For the teacher of a business-studies course, there is a smaller degree of certainty about the employment destinations of students.

The interviews based on engineering and business-studies degrees took place in four institutions: Humberside College of Higher Education, Leicester Polytechnic, Napier College, Edinburgh, and Oxford Polytechnic. The issues in which we were interested were live ones, however, in many other subject fields and for this reason we took the opportunity to investigate a limited number of other courses at the four institutions. Those were architecture (in two institutions), estate management or land management (in two institutions), and planning (in one institution).

Although the relevant literature of the professional institutes and other bodies was scrutinized, the focus for the interviews was specific courses in specific subject areas in specific institutions. The starting point for discussions was the course descriptions, contained mainly in initial and review submissions to the CNAA, prospectuses, handouts to students, and some internal documentation, all of which were obtained in advance. These provided the basis for an initial analysis of changes in courses and their expressed purposes. The interviews focused on the aims of courses and units as laid down in this documentation, the strategies and concepts most salient in the definitions and presentation of courses, and the applicability and implications of 'vocational' definitions as offered and perceived (or avoided or rejected) by the courses and their leaders. In a small number of cases deans of faculties or heads of departments with direct experience of a course or courses were also interviewed. In addition, we interviewed the directors of the four institutions in order to explore institutional 'missions' and associated interpretations of their 'vocationalism'. Since two of the directors concerned were engineers with important profiles in public-sector higher education engineering, they were

interviewed twice, once as a preliminary to the work on engineering, and once later as directors of their institutions. Given the basis of the interviews in course and institutional documentation, interviews could only be loosely structured, and they varied according to the course or institutional history concerned. Where an interviewee placed emphasis on a particular concept or process (for example, interdisciplinarity or problem-solving) the topic was allowed to assume some priority in the interview.

In addition to the main body of interviews in United Kingdom institutions, the project recognized the relevance of international parallels and the need to go beyond Britain for usages and meanings of the vocational. The project proposal suggested that

> British attempts to use and understand some of these definitions have international parallels, but also that there are difficulties in borrowing other countries' experience. The United States has a longer history of admitting—and more extensively admitting—vocational subjects (such as accountancy, business, forestry…) into the university curriculum. European—notably German, French, Swiss…—specialized institutions have a longer and more prestigious history than their British counterparts—even where British counterparts exist. In spite of such historical and structural differences it is important to establish the range of meanings of the vocational as developed in other countries, and to take account of the institutional and curricular differences in which they are visible.

It was therefore decided to include European and American dimensions in the study. In the United States a number of state colleges (in the process of being redesignated state universities) in Pennsylvania were included with particular reference to their business, engineering, or pre-engineering courses, and American engineering education was looked at more broadly. The European study included a consideration of business education as conducted by those institutions in France and West Germany working in tandem with British colleges and polytechnics in the promotion of 'European business studies'. A special study of relevant dimensions of higher education in Poland was also commissioned in order to provide opportunities to contrast a society with different labour-market conditions and different principles of social organization.

Although reference is made to these dimensions of the study, detailed accounts are not included here. Our central concern was to focus on the British interviews and investigate how conceptions of the vocational enter into the everyday practices of teachers and the courses they provide. We were well aware that statements about course intentions did not necessarily describe the realities of courses as experienced by students. Indeed, many of the people we interviewed were at pains to emphasize the discrepancy between intentions and realities. Formal statements of course objectives have frequently been framed to meet the perceived preferences of particular publics, including potential students, institutional managers, funding bodies, and—particularly important in CNAA-validated institutions—the appropriate subject board of the CNAA. More generally, the policy context described in the previous chapter forms a part of the work environment of all those who are responsible for the design of courses. The way in which they describe their courses publicly will partly reflect the messages they hear from the wider environment, but as we have seen the messages from outside are ambiguous and vague. What do staff working at course level make of them?

In the following chapters we describe the concerns of those involved in designing, managing, and teaching degree courses in the areas of study concerned. In the main we present these concerns in the words of the people involved who—unusually for a project of this kind—agreed that their comments need not be presented anonymously. Before we turn to the interviews and to preliminary chapters outlining something of the background of the fields of study, it is important to ask the question—what sort of clarifications might a study of this kind be expected to offer? The hope was not the unrealistic one of resolving controversy or ambiguity, but simply one of making unexamined assumptions more explicit. Such a process is essential if policy at any level—government, national accrediting and validating bodies and other national agencies, local authorities, institutions—is to remain in touch with the realities it purports to represent. Research may affect policy in a variety of ways, according to what it sets out to do, how it does it, and how its procedures and outcomes are interpreted. Research knowledge does not accumulate and have its impact, if any at all, in uniform and predictable ways. It may or may not be listened to-and is therefore itself part of the fluid processes it investigates. What it may do is affect public life 'through its effect on global, diffuse and

hard-to-control systems of knowledge and belief. It influences 'broad assumptions and beliefs underlying policies, not particular decisions' (Cohen and Garet 1975:38–40). The research on vocationalism, therefore, is concerned not with decisions but with discussion and direction.

Into the discussion came voices which have been heard only infrequently in debates about the vocational. They are informed voices, and it is important that they be heard in deliberations about the purposes of institutions and their courses, about the education and training of students, and about their preparation for entry into employment.

6

Engineering education: a background

The growing nineteenth-century concept of the 'professional' as playing a service role developed also into one of the 'expert'. The marriage of the two produced a relationship and a tension: service, good practice, and 'professional' attitudes were increasingly allied to specific skills, knowledge, and 'mastery' (Jarvis 1983). Preparation for such professions ran parallel with that for engineering, although the problems were not the same. Engineering was perceived as being 'merely' about mastery, about information and skills, about techniques and manipulation. While European and American engineers came more and more to be seen as needing other attributes—personal, academic, and professional—for which preparation and training of some kind were necessary, Britain was slower in the twentieth century to recognize these extensions as possible or relating to the basic processes of higher education. The 'liberal studies' developments of the 1950s and 1960s were an attempt to find a new definition not so much for engineering as for the curriculum which contained engineering. They were almost an acceptance that engineering and the engineer were established, stable entities to which something needed to be added. Engineering was often 'larded with management and liberal studies' (National Council for Technological Awards 1964:5). Eric Robinson ridiculed attempts to liberalize courses (in technical colleges and universities) by 'adding capsules of culture in the form of literary, artistic and social studies—almost anything will do provided it has nothing to do with science and technology' (Robinson 1968:77).

The role and status of liberal-studies courses in programmes of engineering education were controversial and their weaknesses evident. Throughout the 1960s and 1970s there was anguished debate about their content and propriety. There were those who

thought that *any* subject might be liberal, as long as the *breadth* of a liberal education was being achieved (Adams 1963:274–8). Some institutions, including Brunel College (as it then was), rejected the 'special subjects' approach to the liberalization of technology, and attempted to construct programmes in which liberal education would be carried by the staff as a whole, including the technologists (Jahoda 1963). If engineering education was too narrow or too instrumental, the questions to be addressed included whether that was necessarily the case, and if so what constituted appropriate balance or breadth? Was a broader scientific or technical base the answer? If complementary liberal studies were the answer, why was the United Kingdom the only country which, in a survey of engineering education covering seventeen European countries and the United States, used the concept of 'liberal studies' in that way (Conference of Engineering Societies 1960:44–5)? Not that the problem, whatever the vocabulary, was uniquely British. Proposals to marry professional and liberal education in the United States included approaches which recommended 'peppering the curriculum with value courses. By adding courses in ethics or religion or morals, it is presumed, a countervalence to a value-free curriculum is achieved'—an attempted remedy for student disillusionment with 'the skill-oriented, value-empty training so predominant in professional schools' (McCinnes 1982:214). The widespread inclusion of humanities in technological and engineering courses had led, in one analysis, to the problem of 'transvaluing', of bringing humanities faculties to an acceptance of technology to the point at which a reconciliation of different value systems could take place (Scally 1976).

The range of answers to such problems was visible in the ways in which institutions responded to the greater 'flexibility' introduced by the CNAA in 1971. Some polytechnics, like Sheffield, laid stress in their prospectuses on engineering as a 'generalist' course-civil engineering, for example, being both 'academic and practical' and 'broadly based'. Such a course, including both communication and technology and society, makes no obeisance towards the conception of liberal studies as it emerged under CNAA auspices in the 1960s (Sheffield City Polytechnic, prospectus 1984/5). Lanchester Polytechnic, on the other hand, not only remained within the CNAA definitions, but continued to use them in its prospectus to explain the presence

of liberal studies in some full-time and sandwich courses in applied science and engineering. The liberal-studies scheme was intended to introduce students to 'subjects outside the scope of their main subject offered in sufficient depth to provide a basis of knowledge for continuing interest', and 'to provide an opportunity for students from different courses to study together and thus to integrate the educational community' (Coventry Lanchester Polytechnic, prospectus 1984).

Many prospectuses, in introducing combinations of engineering with other subjects (for instance languages, business studies, or economics) emphasize that these subjects are not peripheral to the course, and—particularly following the Finniston proposals—have defined industrial engineering practice, management, and other components as part of the 'engineering dimension'. The prospectus of Brighton Polytechnic is indicative of the group of polytechnics which moved away from the liberal-studies-as-breadth approach to engineering education. The Faculty of Engineering and Environmental Studies introduces its courses as 'unashamedly specialist in nature right from their commencement'. The degrees in electrical and electronic engineering provide 'a design-orientated professional training'. The main aim of the mechanical engineering course is to educate engineers who can overcome the problems of change: 'this course is unashamedly "vocational". ...social, economic and environmental consequences of engineering decisions are considered sufficiently important to justify the inclusion of a subject entitled The Engineer in Society throughout the course' (Brighton Polytechnic, prospectus 1984). The important point is the emergence of parallel interpretations of engineering education in terms of breadth and specialism.

The range of views and the extent of change over two decades can be illustrated by two statements. An inaugural lecture by E.W.Parkes as Professor of Engineering in 1961 looked in detail at what should constitute the education of an engineer. Parkes's analysis of the features which distinguished the engineer from his fellow scientists included an interest in design and the time spent on decision-making (both of these being continuing emphases in the 1980s). The background to the latter was not simply technological, since it required economic and social factors to be considered. Nor were the results simply technological. The conclusion was that to complete the education of the engineer

'we must take him outside the faculty of science and expose him to the faculties of arts and social science as well. Such teaching was 'essential to the engineer's education, and it is his courses in arts and social science, rather than those in his own faculty, which stamp him as an engineer, and distinguish him from a mathematician or natural scientist' (Parkes 1963:17–18). This is an extremely strong statement of the 'liberal-studies' case, but it represents the aspiration of the engineer to a form of completeness which was rarely achieved in practice in the decades which followed.

Twenty years later W.A.Turmeau, Principal of Napier College, was wrestling with the same implications of the preparation and impact of the engineer that Parkes had considered. The ends he postulates are the same: 'society today is affected by problems associated with energy, transportation, communication, manufacturing industry, pollution and with the environment, and engineering education must embrace all these areas of concern'. It is no good, however, 'adding fragments of the study of the humanities or the social sciences to the curricula of existing engineering courses'. Engineering education has sought to provide a broad technological base, and to introduce students to industrial methods and to relevant sociological and economic factors, adding the study of the humanities and social sciences: 'the changes, however, have been perfunctory and fragmentary'. Turmeau's remedy, therefore, has a different emphasis from that of Parkes: it is not just a question of exposing the engineer to courses in other faculties, but rather one of achieving an integration within engineering education. His emphasis, using the experience of Napier College, is on 'integrated non-technological studies'. Whether the solution is this degree of integration, or affirmation of design-based, project-based, unashamedly vocational or specialist courses, it is clear that for at least some engineering educators and institutions the terms of the debate have changed significantly since the 1960s (Turmeau 1982).

Sir Gerald Nabarro, MP and engineer, told a conference on engineering education in 1973 how he had entered engineering untrained, knowing nothing of any engineering process: 'it was all self-taught, at a time when higher education was not readily available. Engineering is, after all, only commonsense' (Goldberg 1973:6). His definition of engineering, little more than a decade

old, would not be credible anywhere inside or outside engineering. Other definitions might stress its scientific base, its manipulation of the physical environment, its outcomes, or the use of resources of 'men, money and materials' (Isaac 1982:51; Ministry of Technology 1977:1). As the engineer and engineering assumed a more critical place in economic consciousness, more attention was paid to defining them both. Isaac's portrait of the good engineer, in 1982, included a knowledge of engineering science, an enquiring mind, a creative technical imagination, an ability to communicate, an informed and sensitive view of the environment, and active interests outside engineering (Isaac 1982:49). Many aspects of available definitions came under attack—with the Finniston Report, for example, criticizing 'the misleading national tendency to regard engineering as a subordinate branch of "Science"' (Committee of Inquiry 1980:25).

Like teacher education or business studies or town planning, engineering is not a 'discipline'. Courses of education and training 'have been called into being by a professional need, rather than having developed out of the inner structure of a subject' (Lane 1975:60). The search for an appropriate identity, between the nineteenth-century university world with its emphasis on knowledge for 'its own sake' and the needs of a modernizing society, lies at the heart of dilemmas regarding course structures in engineering education in Britain or the United States. The crucial tension is that between the theoretical (or fundamental, or scientific) and the practical (or applied, or instrumental) which the 'liberal university' had sought to evade or to exclude. In different forms this tension has governed the shapes of engineering and other professional curricula in Britain, as elsewhere, in recent decades and has been at the core of discussion about the vocational (although traditionally liberal areas of the curriculum have themselves also been subjected to considerable change). The engineering curriculum has in addition been pulled in a variety of ways towards and away from a comprehensive view of the social responsibility of the engineer. A presidential address to the Institute of Mechanical Engineers in 1970 echoed the 'common complaint that the applied scientist is made to work so hard that he has no time to think of wider issues', whilst 'in some other faculties the undergraduates seem to have so much spare time that…they devote an inordinate amount of it to a consideration of the imperfections in the world around them' (Morrison 1970–1: 54–6). Whatever the

difficulties, much attention has been paid to the question of the engineer's 'wider role', and to the position of these 'contextual' insights in the curriculum—as *extensions* of engineering or as *part* of engineering.

The mounting interest in the engineer's social role runs through the literature of engineering education since the Second World War, accompanied by attempts to translate the interest into undergraduate curricula. In 1967, for instance, Thring, discussing the chartered engineer of the future, talked of 'the engineer's responsibility to mankind', and his role in helping to 'steer civilization in the right direction' (Thring 1967:10–12). In 1975 the Council of Engineering Institutions underlined that training develops abilities which can respond to 'technical, economic, financial, commercial, social and other relevant factors' (Council of Engineering Institutions 1975:8). By the 1980s there was increasing stress on this range:

> the real challenge for engineers is to optimise the use of resources whilst continually enhancing the quality of life…the functions of design, manufacture and use of engineering systems need to be established not just as respectable intellectual fields of study but as a corner-stone of engineering education.
>
> (Turmeau, Grant, and Rankine 1982:47)

A basic tenet for the Engineering Industry Training Board was that students should be helped to 'develop an appreciation of their wider role in the engineering industry and in society' (Engineering Industry Training Board 1983:6). One of the most detailed analyses of the content and aims of engineering education, reporting in 1983, confirmed the view of the majority of engineers and those who worked with them that what was needed was a broader, less specialized education (Beuret and Webb 1983a; 1983b).

Debates around such issues fed complex pressures back into the curriculum. There were other considerations—preparation for leadership in industry or in the wider society, for example, raising the question of how early potential for a leadership role in engineering itself could be identified. The Engineering Employers' Federation, for instance, contested the 'streams' proposed by the Finniston Report, and argued that it was not possible to recognize leadership potential as early in courses as Finniston suggested (Engineering Employers' Federation 1980:2–3). The concept of

leadership itself involved ambiguities. Leadership in *engineering* pointed towards mastery and specialization, with concessions to broader contexts; leadership in *industry* raised much wider concerns. The engineer's aim of improving the product, the process, and the profession competed with other professional, commercial, and industrial aims.

The most obvious issue arising from these concerns was that of the range and shape of the undergraduate engineering curriculum. The diverse pressures involved have been recognized throughout the century (White 1906). Possible components in addition to the central core of science and mathematics, have included the 'practical arts' interpreted in various ways, industrial practice, the social and economic sciences, communication, management, design, languages, and other borderline or contingent subjects. Various patterns of training, more or less 'generalist', have emerged in recent decades, reflecting one or another interpretation of student motivation or professional or industrial needs. Within accepted subject areas-for instance materials science—content and purpose have changed, and subject boundaries have become blurred (Diamond 1970). Demand for the inclusion of new subjects has raised the difficulty of omitting or pruning the old. The debates around the Finniston Report have indicated how imprecise have been the aims, and therefore the content, of engineering education. The report underlined not only that technology had in Britain become too synonymous with science, but also that some of the deficiencies in engineers and engineering had to do with qualities under- or unrepresented in the traditional curriculum. In discussions with employers the committee found that shortages 'were sometimes more concerned with the experience and personal qualities they sought than with absolute numbers of engineers'. The committee received evidence of the 'poor communicative skills' of engineers and engineering students, and of their 'narrowness of outlook'. The traditional university emphasis on fundamentals as preparation for future flexibility resulted in students graduating with a knowledge of engineering science and analytical tools, 'but they usually have little experience and skill in their application to engineering tasks as they occur in practice: they are also often without an understanding of the constraints under which engineering work is conducted in practice'. Students therefore needed to have early contact with engineering practice 'within

the working environment' in order to identify them with the profession and provide a more coherent base for future activity (Committee of Inquiry 1980:25, 54, 77–84; Finniston 1984).

Responses to the committee's interpretations and suggested strategies reflected some of this range of pressures, but pursued the target of an acceptable modern definition of engineering education and its goals. A national conference to consider the report expressed the view that there was support for a new system of engineering formation 'which includes teaching courses more comprehensive than present ones, and which recognises that engineering is not merely science applied, but a fundamentally separate activity with its own intellectual framework' (quoted in Battersby 1983:17). A polytechnic conference to discuss post-Finniston strategies reviewed the basis on which they were to be decided. A paper presented by two officers of the CNAA not only attempted to present the desirable attributes of the engineer but also underlined how courses stultified them. It considered the 'intellectual skills' of the engineer (the ability to communicate, interpret, analyse, solve problems, make decisions, work with others) and their 'activity skills' (project management, market design, production planning,) and suggested that the overall aim should be the 'Citizen Engineer role…evident on the Continent' (Warren and Reid 1981:43–7). Engineering education was being debated in terms both of specialism and of broad range, curriculum shape, and intention.

In recent history, Ashby points out, specialization has come to be associated with science and technology, but, as he rightly points out also, there is no particular or necessary association between specialization and subject (Ashby 1963: ch. 4). The British sixth form and university traditionally produced the singlehonours student and supporting structures which the Robbins Report sought to undermine. Suspicion of specialization emerged slowly in the immediate post-war years, but accelerated under the impact of expansion and institutional diversification. In 1954, the Chancellor of the University of London told the graduates that 'having obtained the specialised education which this University offers it is your business to obtain a general education' (Harris 1955:53). The concept of specialization has aroused controversy and passion. Engineering, some have argued, is no more or less a specialization than anything else (Christopherson 1967:4). Robinson and others have argued that the really narrow

specialization occurs in some of the traditionally liberal areas, and that creative thought is exercised most emphatically in science and technology (Robinson 1968:72–3). The Duke of Edinburgh carefully teased out the role of specialist training in a broader framework for the engineer:

> The qualities of imagination, enthusiasm and compassion are present to a greater or lesser extent in all of us. It needs the process of a general and liberal education to give them point and direction. Specialist training can give people the ability to make sweeping technological innovations but it needs a broad and liberal education to enable people to foresee the effects of those innovations.
>
> (Edinburgh 1962:298)

Most of the discussion about curriculum breadth in engineering in recent years, certainly in the United States, would probably accept as a frame of reference the argument of Lewis Mumford that

> specialised knowledge must be treated as only a part of organised human experience…. Instead of over-stressing subject matter and forgetting relationships, we must stress orientation, and make it possible for the student to find his way from any given starting point to every other relevant part of human experience.
>
> (Mumford 1946:54)

This is where the argument for breadth has normally pointed. While the starting point for concern about the curriculum may be the product or the industrial or economic need, it leads on to consideration of the 'engineering personality'. In some versions this has led to resistance to specialization (or to over-specialization or narrow specialization) as undesirable or ineffective (Edington 1969; Runge 1963), in others to the promotion of the wider range of curriculum content and outlook. The Engineering Institutions agreed unanimously in their submissions to the Robbins committee in the early 1960s that such breadth was essential, and the Federation of British Industries said the same, seeking to marry vocational education with broader understanding (Committee on Higher Education 1963: pt 1, vol. B, evidence of Institution of Production Engineers and FBI; vol. D, Joint Advisory Committee on Engineering Education). The Royal Aeronautical Society, the

UGC, and a host of others have weighed in at various times with similar arguments and demands (Royal Aeronautical Society 1964; UGC 1964). Engineers themselves, it is clear from the Goals of Engineering Education project, share views of this kind: they and their colleagues, the research showed, believed that engineers needed to see engineering in a broader business context, to express themselves, to chair and take part in meetings, to reflect several disciplines—all based on a more practical engineering education. Without proper attention to human purposes and the wise application of skills, engineering would retain the low esteem it had enjoyed since the late nineteenth century, engineering education would remain a poor preparation for the real roles of the engineer, and the personal qualities would be lacking that would enable engineers to play a serious role in the policy process (Beuret and Webb 1983a:9–14, 22–4; 1983b:6–8). Engineers were fairly critical of their education, and two comprehensive demands followed:

> The broad direction of change sought is away from a specialised theoretical, academic treatment and towards a more thorough vocational preparation for the profession of engineering. This is expressed as a demand for a broad general preparation for the full range of abilities required of an engineer.
>
> (Beuret and Webb 1983a:64)

The important emphasis here is the contrast between specialized and vocational—to practise the profession requires a certain kind of breadth.

Related arguments are legion. Breadth is necessary for flexibility and to cope with the unknown (Committee on Higher Education 1963, pt 1, vol. B: 406, evidence of Institution of Chemical Engineers). Breadth and relevance in training are essential because of the half-life of specialized knowledge (Turmeau, Grant, and Rankine 1982:48). Skills and knowledge rapidly become obsolete, and should therefore be left to industry (Pearson 1972:189; Porrer 1984b:5). Too much stress on 'relevance' may lead to 'spurious vocationalism' (Porrer 1984b:5), and the emphasis should therefore be on transferable skills (National Advisory Body 1984:4). The job the engineer does rarely requires those highly specialized skills (O'Flaherty 1969:5).

In engineering as in other areas of study—and many of the above arguments might equally apply in, for instance, teacher

education, business studies, or architecture—the problem has been how to achieve the breadth, and what to sacrifice in order to achieve it. There have been, in business studies, the same appeals for wider understandings and the elimination of narrow and fragmentary approaches (Fairhurst 1982:126–7). In this case also, there has been the question not just of over-loaded curricula in a technical sense, but also of what constitutes an appropriate preparation for the 'full range of abilities required', in the context of the human personality and experience. In engineering as elsewhere the question has often revolved around the notion of 'fundamentals', interpreted differently within different traditions of engineering education. The 'engineering science' approachidentified for the Finniston committee by the Engineering Professors' Conference as the one associated with the universities and better students (Engineering Professors' Conference 1978:30–1)—has priorities different from those of the 'professionally oriented' approach. Many employers, as the Finniston committee found, were critical of engineering education as too theoretical and scientific (Committee of Inquiry 1980:83), although a report to the British Association for the Advancement of Science in 1977 had emphasized what it saw as a trend in all countries towards a 'fundamental education in engineering', including an agreement that the first half of a degree course should be 'non-specific and designed to give the student a broad base in engineering science' (British Association 1977b:C39). In the 1970s there were analyses of engineering education and engineering science which strongly emphasized the role of the undergraduate degree as an introduction to scientific thinking, resisted the inclusion of the practical and the managerial in the first degree courses, and considered the possibility of 'engineering education' becoming postgraduate, based on a broad undergraduate curriculum of pure and engineering science (Chilver Committee 1975:26–7; Calderbank 1973:60).

Questions of range and balance therefore break down into curricular sub-questions subject to debate and controversy. One example is that of relevance. Here, as in other areas of higher education, the concept has been commonly used but elusive. A number of studies have shown that in recent decades there has been a strong undercurrent of student expectation that higher education will have direct or indirect relevance to career intentions (Marris 1964: ch. 2; Silver and Silver 1981).

Disentangling the dimensions of relevance has, however, never been easy. Oakley pointed out, for example, in relation to the planning of specific polytechnic courses, that relevance has to be considered differently in 'academic', 'vocational', 'interest centred' or 'project based' courses (Oakley 1973:14). Course relevance relates to the activities of the engineer, or to roles as perceived by employers—and it is clear that industrial employers have a variety of interpretations of what they consider relevant to their operations, basing their recruitment on criteria often far from those associated with immediate relevance (Pearson 1984:35; Roizen and Jepson 1984). In 1984 approximately one-third of all vacancies for graduates were described by employers as being for 'any subject'—and the percentage was increasing (Central Services Unit 1984a; 1984b; Porrer 1984a). Relevance, within the engineering curriculum and elsewhere, remained a difficult concept to handle, and its utility in analysing the vocational has been doubtful.

A second example is the pressure in engineering towards the inclusion of management and business in the curriculum of undergraduate engineering students. The argument has frequently been in terms of postgraduate management courses, but the demand for an undergraduate contact with management, economics, or related areas has grown. Sir Denis Rooke stressed 'the importance of teaching technological and basic business skills as an integrated experience of undergraduate studies (Rooke 1982:128). The Finniston Report was cautious about them, and critical of the new, enhanced engineering courses as including 'a substantial component of business topics and engineering management plus some required experience in industry rather than the extension of engineering practice which we wish to see' (Committee of Inquiry 1980:86–7; Jobbins 1980:8). The Institution of Mechanical Engineers had three years earlier expressed the view that business studies should be included in training—but with two conditions: they should be presented by practising mechanical engineers from industry, and they should not be at the expense of basic engineering studies (Institution of Mechanical Engineers 1977:56). In these as in previous respects the wider world was intruding into the curriculum and altering the basis on which engineering had been defined in the past. The vocational, as it applied to engineering education, was being reinterpreted.

The curriculum solutions sought for engineering education have included ones of central importance to any discussion of its 'vocational' or 'liberal' or other characteristics. Not least has been the attempt to emphasize engineering as essentially a problem-solving activity. One of the motivations for finding new approaches to the curriculum has been the persistent criticism of existing courses as incapable of promoting some of the qualities required in the inventive, imaginative engineer, the 'citizen engineer', the 'humane technologist'. Alongside the critique have run parallel and urgent analyses of the needs. The authors of *The Humane Technologist* pointed out that technology has depended on 'the juxtaposition of imagination, free-ranging curiosity, and inquiry' and 'disciplined implementation of patterned instruction' (Davies *et al.* 1976:151). The classic American statement of technology as action, driven by those kinds of forces, was Lynn White's *Machina ex Deo,* which more than any other analysis of recent decades has highlighted the humanistic function of engineering, designating engineers as the chief revolutionaries of our time, who promote new humanistic concerns and give to established humanists as much as they take from them (White 1968). It has not been easy for engineering education to respond to such imperatives, but the accent on problem-solving has been one response, and a related emphasis on project work has been another. The problem-solving approach developed particularly strongly in the 1970s, partly as a way of encouraging students to operate both as specialists and as members of an interdisciplinary team. In some institutions the project became the grand finale of the various learning processes, in others it was an early and regular introduction to the realities of engineering problems. A General Education in Engineering Project report on projects was critical of early attempts at liberal and complementary studies, and emphasized instead the range of skills and knowledge and integrating activities involved in project work, promoting engineering not only as a professional study, but also as an 'exciting, worthwhile and useful education' (Goodlad 1977:3–8; Armstrong *et al.* 1982). There were those who were critical of projects as exercises for assessment, riddled with weaknesses of preparation and analysis (Harding 1973), but at the University of Bath and elsewhere there were committed attempts to define the objectives of project work, to plan it, to enable students to see what were the challenges, the constraints, and the purposes (Black

1975; Cowan and McConnell 1970). The intention was to promote such attitudes and skills as initiative, co-operation, communication skills, awareness of the organization of knowledge, and sense of responsibility.

The shape of the curriculum, the content and nature of the education, and the recruitment of students, have been clearly determined by the image of the engineer. The low status of British engineering has to some extent related to the image of engineering as torn between science and craft (McCulloch *et al.* 1985: chs 8 and 9). The portrait of the engineer as 'homo faber' has been a particularly British one (Glover 1980:27) and the components of his activity as traditionally seen in Britain have been either unflattering or misunderstood, or a combination of both and more. Nabarro's engineering as 'commonsense' is a view from the inside mirroring a longstanding view outside the profession. Attempts to recast the curriculum have gone alongside attempts to enhance professional status by widening the role of the engineer in industry and society (Turmeau, Grant, and Rankine 1982:47).

The image of the engineer has therefore been governed by old notions of the craft identity of his work, on which more recent versions of competencies have been superimposed. The image as widely perceived has contained little of the exciting vocabulary of the Duke of Edinburgh's or the GEEP project's characterization. Personal development aims have not been accepted as serious components of an engineering education (Jenkins 1983:7). Yet employers and others have complained of the weakness of graduates' interpersonal skills, and various research analyses of employed engineers' reflections on their undergraduate experience underline their and their employers' concern about the lack of emphasis on personal qualities (Laycock 1978). One reflection of the felt need for such an emphasis is to be found in a recruiting leaflet issued in 1980 by the Institute of Civil Engineers. It contains a set of guidelines regarding the 'O' level examination base that school pupils should consider acquiring:

> English, mathematics and physics are obviously essential; chemistry and a foreign language desirable, and because a civil engineer has to understand the world around him, geography, history, art, economics, and environmental studies are valuable extras. Sport, music, and drama can help you to get on with

> other people as team work is an important feature of civil engineering.
>
> (Institute of Civil Engineers 1980:7)

Similarly, at university level, the early efforts of Birmingham University's electrical engineering department to promote discussion groups and the like were aimed at producing 'a certain calibre of man' (Tustin 1950:267). Here, as elsewhere, the nature of an engineering education, its school base, its undergraduate components, its assumptions about the appropriate characteristics of an engineering graduate, were being redrawn. Beuret and Webb found a considerable emphasis on human and social skills (Beuret and Webb 1983b:8), and the concepts of personal skills and personal relations appear frequently in the engineering literature of the 1970s and 1980s (Council of Engineering Institutions 1975; Engineering Industry Training Board 1983).

Related to such concepts have been many of the elements discussed above—communication, social and economic studies, professional responsibility, for example—and particularly the project as a method of undergraduate work, a way of approaching what the authors of *The Humane Technologist* discuss in terms of interactive skills, the ability to motivate colleagues, and perceptive interpretation of large numbers of people as citizens and customers (Davies *et al.* 1976). The implementation of strategies to promote such characteristics and skills is complicated by the characteristics of students on entry. Past definitions of engineering have tended to build on the known personal characteristics and quality of entrants. In 1977, the Institution of Mechanical Engineers considered that student quality in Britain was lower than that in the United States and other EEC countries (Institution of Mechanical Engineers 1977:57), and there has been widespread discussion in recent decades about the reasons why engineering has failed to attract the higher-quality students. The nature and quality of students, their school experience, their personalities and expectations, do not define the purpose of an education, but they do help to explain some of the intentions of those who have designed and run engineering courses, and the characteristics of the courses themselves.

Some of these issues, raised in the literature of engineering education and reflected in the history of engineering in Britain, were explored in this study by examining course histories, and in

the interviews which related to them. Although some of the courses studied contain the word 'technology,' in their titles, and some of the discussion relates directly to the study of technology and its implications, it is with the range of courses generally understood as 'engineering' that we are concerned here. Many of the issues discussed in terms of vocationalism in engineering courses point also to questions of concern in business education and in other areas, and are followed up in those further discussions in later chapters.

7

Engineering education: courses and explanations

Humberside College of Higher Education

Engineering

A part-time BSc in Engineering started at Humberside in 1980. Four years later the course was approved for honours also, and became a BEng. The 1984 submission, agreeing with the Finniston, GEEP, and other findings, underlined that many new graduates, trained to enter careers in research and development work, were in fact employed in the application of engineering in industry, transforming ideas into hardware or services, operating within the constraints of 'scientific knowledge, engineering techniques, available time, cost limits, problems of manufacture or construction, the state of the market and the competence and willingness of the work force'. There was an insufficient number of degree courses 'with a broad engineering approach which reflects the needs of many practising engineers'. The college therefore defined as the major aims of the course:

(i) to provide a sound academic education in the fundamental principles of electrical and mechanical engineering;
(ii) to provide a knowledge and understanding of present practice in electrical and mechanical engineering;
(iii) to develop initiative and imagination in the solution of engineering problems;
(iv) to develop the applications skills required by a professional engineer;
(v) to develop an understanding of the role of the engineer in industry and society.

The vocabulary of this statement will recur throughout the course histories and interviews—'fundamental principles', 'practice', 'imagination', 'skills', and the 'engineer in industry and society'—and particularly 'problems' and 'problem-solving'. Recent submissions to the CNAA, prospectuses, and statements by the engineering institutions and the Engineering Council echo concerns with application, a broad, basic foundation, and an awareness of the engineer in the wider world.

As elsewhere, Humberside also itemizes in its statements some of the characteristics it seeks to promote in engineers and the relationship between its own endeavours and the future employment of its students. The sandwich element, the industrial training, built into the course (in this case during the second and third years) is seen as a particular vehicle for the development of the student's 'personal abilities and skills, e.g. self reliance, judgement, the ability to communicate and work with others, confidence, and sense of responsibility'. It introduces the student to the world of work, helps to develop interests, and provides a clearer picture of career opportunities. The 1984 course description emphasizes the roles of 'design and manufacture' and 'engineering systems' as integrating subjects, the importance of a 'cross-disciplinary approach' and the development of 'a systematic, logical and creative approach to the solution of applications and problems'. Breadth, an 'economic and industrial framework' through 'management and organization', and the aim of coherence through specific topics and especially the project in the final two years of the four-year course, are all emphasized. Attention is paid to teaching methods, with the earlier years conforming to 'traditional tried and tested methods revolving around lecture, tutorial and laboratory sessions'—given the need to transmit information efficiently, to reinforce understanding and to teach facility in analytical techniques. The 'supportive' and 'coercive' (the word is in the submission) relationships are then relaxed, and the number of case studies and problem-solving assignments increases. Students on the honours course are faced with less well-defined problems, require greater skills in problem identification, and have to accept greater responsibility for the learning process.

THE COURSE LEADER (DR TATE) thought that the aims of promoting initiative, imagination, and an ability to solve problems were achieved particularly through the course in design, which

was 'the subject that helps to integrate the rest of the course', and those subjects, notably in the final year, in which students were asked to solve real problems derived from local industry and consultancy work: 'We tend to wrap our course around real problems and case studies'. *Given the high information content of the course, when do students begin to think for themselves?* 'Right from year one. We try not simply to concentrate on the information content of the course. The syllabuses are really very flexible, in that we attempt to incorporate the information required to solve the problems set.' *How do the students react to the stress on problem-solving right from the beginning?*

> They are generally speaking very 'anti' at the beginning.… During the first term they are very anti-experimentation which is a problem-solving exercise, unlike traditional laboratory work…. The students are given a very basic statement of what is required, and freedom to use and adapt the equipment available. In effect they are thrown in at the deep end, and often get upset and frustrated. They are not led, but encouraged to question 'What is?' and 'What if?'…generally speaking, they are made to think for themselves, which they do not like.

He thought that the students settled down by the end of the first year and enjoyed it, and by the end of the final year they appreciated the importance of the experience.

Given the breadth of the course, there was a problem about achieving what the submission describes as a coherent course, 'not a collection of isolated Electrical and Mechanical Engineering topics'. The course tended to be coherent amongst small groups of lecturers (experimentation feeds into design, materials technology into design…). By the third year the student began to feel it was all coming together, after the industrial placement, which puts 'everything into perspective'. The project was crucial in this respect, together with the assignments in the final-year subjects: 'if somebody does an assignment on control, then it will tend to pull in some design and some electronics for example'. The project embraced all aspects of the course.

Does the problem-solving pull against the 'coercive' information needs? The question had to be seen in the light of the quality of students who were relatively weak when compared with those attending universities and some polytechnics. This made remedial English and mathematics necessary for a number of first-year students.

Their knowledge and understanding of physics might not be at an appropriate level, which could cause some problems. Confidence was, however, built up, and a BTEC student, for example, who previously had been used to 'spoon-feeding', could experience an initial shock, but by the second year he would have learned how to learn. Importance was attached to developing learning skills, and attention was paid to teaching methods, 'though not all staff seem to appreciate the need'. Although discussion of teaching methods did take place, there was no formal, college-wide scheme of support: 'I came from Oxford Polytechnic, which was my first teaching post, and I found that the Education Methods Unit there…was excellent, and very supportive towards staff. We do not have a similar system.'

Do the course content and contact hours mean that criticisms of engineers as 'narrow' people (engineering students had little time to do other things) were true? 'I still think it's very true. Sad.' *Do employers worry about that?*

> Some employers do, some not…. The issue that concerns me is that some professional bodies like the Institution of Mechanical Engineers emphasize the importance of schoolchildren being culturally well provided for, yet suggest substituting technological subjects for humanities.

How much discussion is there by students, how much questioning? At the end of lectures, he felt there was little feedback on anything other than engineering. Within the lecture theatre, the laboratory, the workshop, the amount varied according to the lecturer. He personally tried to take account of current events, preferring not to give a 'straight' lecture, and welcoming opportunities to develop discussion.

The industrial placement helped. Students were prepared for the placement with discussion, advice, check lists, documentation, and in many parts of the course lecturers made use of the experience afterwards. Those teaching operations management, engineering appreciation, design, found it 'difficult to work without it'. *In what sense, then, can the course be described as 'vocational', given that the term is often used to imply narrowness, a lack of critical ability?*

> It is a vocational course which is broad based, and emphasizes the 'application' of engineering…. However, it is not as all-

> embracing as I would like to see it. Engineering is not simply about problem-solving, but should take into account the wider implications of what we do.

The 'engineering appreciation' unit was important in this connection, and every member of staff teaching on the course was responsible either for giving a talk or finding an external lecturer (for instance, a lawyer on industrial law). Some of the desired change that would 'more meet the needs of industry than our present course' was, he underlined, constrained not so much by the CNAA as by the Institution of Mechanical Engineers, and the information requirements it imposes.

Against the background of nineteenth- and twentieth-century debate about the purposes of higher education, and the long time it took for engineering to be accepted as a legitimate higher education (interruption: 'It's still a question as to whether it's been accepted') *what is the purpose, the justification of the course?*

> I look at it from this point of view—how can I justify engineering as a career for a prospective school leaver?…I am frequently asked by parents about engineering as a career…and it takes time to explain the wider view. At the present time, schools of engineering place emphasis on the traditional subjects, rather than trying to assess engineering ability at the point of entry, although this is beginning to change. It is important…to enrol the more able, all-round, student, which may be possible if the subject range, considered to satisfy entry requirements, is widened, as is often the case for other professions.

THE PRINCIPAL (DR EARLS) commented on engineering in general, not on engineering at Humberside specifically. *Where is engineering now in a discussion of traditional liberal/vocational dichotomies? Do engineers see engineering as a modern liberal education, or as essentially different from a liberal education?*

> I think quite a few people who organize engineering courses would like to think that engineering was a fairly liberal type of education. I don't think it's easy to defend that position…it's taught very much as a linear progression from one set of circumstances to another set of circumstances, where it's deductive, it's reasoned, it's progressive, it's hierarchical, and

> so on, and I think one of the deficiencies of engineering education is that it doesn't have the ingredients of lateral thinking.

Nor, he believed, did it have some of the 'unbounded environment' of the social studies, where there are multiple solutions to a problem, the most *appropriate* depending on another set of circumstances which are 'political, economic, sociological, cultural, and so on'. The engineer tended to be brought up to think there was one good solution and the rest were inferior—his job was to find the good one:

> if he is careful he will progress inevitably, inexorably, towards a good solution. So in that sense I don't believe it's a good liberal education…. An engineer tends to have what he assumes are a set of given, valid facts and he doesn't have to, if you like, question his starting point.

Pressures on engineering education included demands—from Finniston and GEEP for example—for more intellectually able people, and from industry for graduates to be more immediately useful. The more generalized courses of the 1940s and 1950s had been supplemented by new courses more narrowly technical, covering a narrower range of concepts (electronic as against electrical engineering, control and instrumentation as against electrical, and electrical as against engineering science):

> This produced graduates who have narrower horizons, in a sense…their intellectual versatility has been reduced in some ways, although the content in a depth sense has become much higher…a deeper attack in a very much narrower spectrum. …In some curious ways this has maybe been appropriate because the students who do courses at polytechnics are as a piece intellectually less able than students who go to universities, in terms of 'A' level scores, and I think many of us believe that the narrow course is the one for them, the less able student, and the broader course is the one for the more able student.

Britain had not followed the American route of postponing a lot of the specifics to postgraduate courses, partly because the narrower focus had suited many colleges and universities, and partly because of the lack of a strong tradition of postgraduate education.

The fact that more able students taking, for example, engineering

science had a more versatile base was a commentary on the type of student rather than the course. One attempt at 'liberalization' was the CNAA's 'Principle 3' (which had required a balanced programme of studies aimed at 'the development of the student's intellectual and imaginative skills and powers') and its attempt to introduce 'contrasting or liberal studies', which had been 'a terribly artificial way of meeting an identified problem: it was a totally inappropriate and singularly, catastrophically inappropriate method of…patching on something that might be called liberal education'. Few engineering courses, in fact, tackled the social role of the engineer ('they might make a passing gesture by trotting in a sociologist'). The problem was partly the people doing the teaching—'they are themselves enthusiasts about their own technology or their own specialism'—so the system was trying to produce a type of product that could not be produced from the available ingredients. The danger of producing culturally or intellectually isolated people was not greater than in the case of, for example, mathematics or zoology, but

> I think you have to go back to the type of people who study engineering. They tend by and large to be the more introverted type, the type with a narrower range of interest…. You mustn't always simply look at the process as being at fault, you must also look at the raw material.

Where does engineering stand in relation to the curriculum of higher education, which has accepted mathematics and science into its cultural definitions, but not so readily engineering? Dr Earls found this unacceptable, since the 'non-vocational' was taken to include law and medicine, which in fact pointed directly towards careers: 'I don't believe that the curriculum of a lawyer or the curriculum of a medic yields that much wider a view of role than would be true of the curriculum of an engineer'. There was no difference in purpose between the curriculum of an engineer and that of the scientist or mathematician, or even the theological curriculum—though it might be wider. There could not really be any significant difference from that of the dentist, the vet, the medic. Discussions of the differences between a vocational and a liberal, a general or a professional education were 'fairly substantially' about differences amongst students rather than curricula ('that doesn't mean that the curriculum couldn't be improved').

Leicester Polytechnic

Engineering Technology

The polytechnic submitted a scheme for a BSc/BSc (Hons) in Technology in 1978 and it began in that year. The 1983 proposal for a renamed course, a BEng and BEng (Hons) in Engineering Technology, set out the general aims of the course with only minor adaptations from those defined in the earlier submissions:

> To provide initial preparation for professional work as an Engineering Technologist in industry with specialist knowledge in one of the four areas defined by the Post Foundation programmes.
>
> To provide education in problem identification and solution, where problems may involve science and technology, human factors, economic and social factors and communication, but without requiring early specialisation.
>
> To provide an environment conducive to personal development.

The second of these aims echoes some of the Humberside terminology, with a more explicit reference to 'communication', and spelling out professional and personal goals which are implicit in the Humberside statements. The more detailed objectives set out by the Leicester course relate to a variety of attitudes, skills, and knowledge, including the 'ability to think logically, in quantitative and conceptual terms, to analyse situations and problems critically and objectively, to postulate solutions creatively and to make independent judgements'.

The 1978 submission talked of its being a 'problem-solving education', and built in to the 'broad based technological course' a measure of specialization in one of four 'vocational activities': engineering design, operational engineering, systems engineering, and energy utilization. A degree of coherence was to be achieved by a scheme of 'integration studies' and 'project work'. 'Balancing studies' included human geography, the English legal system, economics, and sociology. The more recent course has dropped the 'balancing studies', partly because the original structure, which incorporated a diploma in higher education and sought to attract students without the usual science 'A' levels, has been changed,

after a disappointing response. The programme now includes 'balancing modules' for all students, including 'industrial organization and administration'. Foundation studies include 'industrial economics' and 'integration studies' which, taken together with other studies, 'are believed to satisfactorily provide for the realisation of the general education and integration aims at this stage'. The general-education role continues to be supported in later stages by studies 'requiring broad multi-disciplinary approaches'. The course aims at 'a graduate who possesses technological competence with an appreciation of the complexities which surround the application of technical knowledge in the real world'—in the spirit of the issues highlighted by the GEEP project (which was based at Leicester Polytechnic). Projects, case studies, and a variety of teaching methods are emphasized in the submission.

THE COURSE LEADER (MR RUE) explained that the Leicester commitment from the beginning had been to applications. Beginning as an external London degree, part-time, the course had been based on engineering science. It was then transferred to the CNAA, which was re-examining engineering degrees and emphasizing their vocational aspect:

> We were very keen on that, having seen that the London-type degree worked well with our part-time students because they'd got industrial experience, but would not be really appropriate to the student we wanted to produce. So we started off with the idea that as far as we could, recognizing that you've got a core of engineering science that you have to cover, we based the whole thing on applications. And we actually started at the output end…. We started off by saying—what sort of jobs were our students going to do? That defined our four programmes…actually vocational areas…. It was far easier than we envisaged to develop a core base of a year and a half, and then still allow them to diversify into their vocational areas for the final year and a half [the Leicester degree is not a sandwich course].

With falling demand for specialists for research and development departments in industry, the course had sought to produce graduates who were 'much more vocationally orientated, but had a broad perspective, who…knew something about design or knew

something about the total field of operations, rather than perhaps the narrow field of production engineering'. The course had been designed with specific exercises in mind to develop logical thought and abilities connected with problems and solutions, but it had also set out ('somewhat glibly') to permeate the course with them: 'you have to get an attitude developed in the student…one of the main philosophies of this course was to broaden students, to get them more flexible'.

Not all students were responsive and motivated on entry, he thought, but some developed increased motivation, even as late as the third year. Many coming on to the course needed a year or so to 'realize what's going on'. The problem,

> ironically, is that we made the entrance broader to try to attract the broader student. The trouble with the broader student is—he's taken his broader 'A' levels because he doesn't quite know where he's going, so you almost have to accept that some of the broader students are not quite as well motivated as those that have decided they're into technology at sixteen.

One of the difficulties of discussing teaching methods and their effectiveness was that 'we're having the same raw material… the output might change but you have to recognize that you're working with the same raw material'. The students have acquired the same type of 'A' levels, been through the same sorts of teaching situations. Now they had to acquire more information (the BEng had meant the incorporation of more material), and changes, albeit slow ones, were having to take place: 'we do role playing for instance, we do much more computer aided, we use the computer where we can to demonstrate things'. There was a slow swing towards student-centred activities—but in terms of 'A' level points and previous experience, however desirable it might be, 'you can't radically change your basic material'.

Attempts had been made to ask if there was a different way to present information or reduce material, but unfortunately, and even with the modern technology, 'there is a very hard core of scientific, basic knowledge that students have to know in engineering…it's a slow, drip drip process…. There's also a number of very hard conceptual things that you need to know before you can ever approach any real engineering problem.' Contact hours were longer than desirable. *If students have little or*

no time for other things, is the course inevitably producing narrow engineers? That, he considered, was one aspect of the situation, but there was another:

> This student has been brought up on not doing art and geography and history and the things that get them out. They've been brought up on maths and physics and chemistry, where you sit in a lecture room, and you sit with your apparatus …you don't need to mix with people, and I'm quite convinced that the average student in technology has gravitated towards technology because he doesn't like people—that's an extreme statement but there is something about our students that discourages them from taking part in student union activities for instance—one is time, but I think the other is character.

In some cases students worked in pairs on projects, in others individually. In the former case they were teamed on the basis roughly of one student who had come through the 'A' level route with one via technician courses, in the hope that this would have some educational benefit. Group case studies brought students into exercises with local industry—energy surveys of buildings, swimming pools, factories, robotic surveys—within given, broad briefs, but involving original thought. Individual projects required students to show depth in an area, but especially the ability to see the particular problem in context—and they give a twenty-minute 'presentation' before a group of at least three people (supervisor, second reader, industrial contact) but possibly other staff and students. Throughout all of these projects and case studies there was explicit emphasis on written and oral communication skills. *What, then, is the answer to the accusation of narrow vocationalism?*

> I realize that we are missing out on some areas of 'education' in inverted commas…. I as course leader would not like to think that the course is totally geared to mass-producing people for engineering, full stop.... I run this thing called 'integrated studies'…and while I won't say we go as far as going to archives and things, we do try to force them slightly broader, and certainly into social interactions.

Does 'force' mean there is student resistance?

> Oh yes, again, students don't want to know about the environmental effects of what they're doing, for instance. The role playing we do is a public inquiry…centred on something basically technological—we're doing the Channel Tunnel this year, for instance—it will be concerned with the technicalities of it, but it will also be concerned with social implications, environmental implications, transport, economics, ethics…. In a way I don't have to force students to do that, that they find quite interesting…. I've brought in sociologists and others to talk, and it is difficult for us, without quite a bit of working together, to see each other's viewpoint, because we do seem to be in different worlds.

Students did not argue and question a great deal, however, because in a sense there was little to argue about, and the students' background was such that they did not debate a thing because 'a) you don't know enough about it, and b) factually, you can't debate it'. There was some constructive debate while students were working on group projects, particularly in design. The proportion was different: on many other courses 70 per cent of what students did might be debatable. In a subject like economics students could be faced with questions like: 'You can prove anything by statistics, can't you?'

> That obviously infers that they've had discussions about this sort of thing. Our engineer's answer to that would be: 'yes sometimes'. Full stop. Because he wouldn't think it was worth discussing it any more. He knows what numbers are. He knows what they can do. He's not philosophical. In our courses we spend 70 per cent of the time taking factual information down. So it's the proportion, it's what the students are used to.

It was a sad fact that students might sometimes be discouraged from discussing because there was material that they had to get through.

Is the course vocational, and if so, in what ways?

> I think in two ways. One is that it reflects what actually goes on in industry, as opposed to what goes on in a textbook, and secondly it does impart certain manual skills that can be directly applied on the first appointment in industry…. In that way it does fall in with the arts definition of vocational, because they

say that their courses are all vocational because they finish up with manual skills.

The difference was in the industrial applications.

Textile and Knitwear Technology

Leicester Polytechnic's BSc and BSc (Hons) course in Textile and Knitwear Technology took its first students in 1971 on a course which had a modular structure. The reorganized course approved by the CNAA for a 1977 start was structured around a series of 'subjects common to all students', plus 'additional group studies' with an industrial placement in the third year of the four-year sandwich course. The aims of the course as defined in a 1985 course document were:

(i) to develop in students ability to retrieve and correlate information; think critically and logically; make informed decisions; and communicate clearly;
(ii) to provide a sound education in the fundamentals of textile and knitwear technology and to make students aware of the scope and limitations of the methods employed;
(iii) to sustain and stimulate the interest of the student in order to provide a firm basis for continuing education and to develop the ability to adapt to changing circumstances.

One of the 'general objectives' of the course was defined as the provision of a 'well-balanced vocational education through the study of knitwear and related technology', with an emphasis on literacy and numeracy, with a specialism in scientific, managerial, or aesthetic appreciation, and with an ability to appreciate 'the dynamics of industry with the thrust and flexibility to adapt and innovate'. 'Introduction to the textile industry', one part of the course, touches not only on the industry itself and its social and economic importance, but also on its history, the sociological context of fashion and textiles, the psychology of colour, and the roles of the technologist and designer. Many of the components of the course have a substantial information base, some—chiefly 'management science' and 'industrial organization and administration'—emphasize a case-study approach, and others underline the importance of investigation, problems, and projects. The final project is described as 'an extremely important part of

the course and enables the student to apply the techniques and knowledge gained during earlier study'.

THE COURSE LEADER (MR WILLMORE) saw the first aim (correlating information, thinking logically…) as informing the course generally. The basic science, maths, and statistics—including textile science-were presented in the first semester, and the applications of that knowledge became a natural progression throughout the course. Students found it easier to establish a participatory, questioning role if a good 'class identity' was established. Since they were all together during the 'induction semester' they felt 'sufficiently relaxed to ask questions and participate'. By the end of that semester 'they know where they're going…perhaps they've even changed their mind' and people commented on the change in their confidence.

How easy is it for students to be responsive, given the heavy information load and time demand?

> I suppose that depends on the style of lecturing…. If you just fire facts at them with very little discussion then there is no time, but we try and have a tutorial system, tutorial back-up. … I like to, and certainly other classes…try and stimulate discussion, and to talk around a subject…the way to get through the work is to give them some printed handouts, and then talk through the handouts, and I guess most other people use a similar kind of system.

Is there dialogue, questioning, as in many other subjects?

> Yes. It would be rather different of course because we have a very high practical content, and a lot of this dialogue perhaps would take place in the practicals. Some of it would take place in class…we try to design it so that [the practical] runs more or less in parallel with the theory classes, and of course that's the ideal opportunity because the students then are totally relaxed.

The course submission talks about a 'well-balanced vocational education'—what is the significance of 'well-balanced'?

> I think to some extent some of these terms are quite nebulous, but I suppose well-balanced in the sense that it contains all the elements of textile technology…this is why we do the textile

> science in the first year, so even those students who don't have a scientific background know what polymers are, and how polymers lead on to yarns, yarns lead on to fabrics, fabrics lead on to garments, finishes, clothes, design, and so on.

The specialist options dealt with other areas—personnel management, industrial relations, plus management economics, finance. Under the previous, modular structure students have found the course more fragmented, and it had now tried to become more integrated—the same member of staff, for example, teaching textile testing, textile fibres, and maths and statistics.

The emphasis on the practical, he indicated, meant that students were not just in theory classes and were not just seeing machines demonstrated; they were rolling up their sleeves, getting the spanners out, and using the machines. They actually produced something which was all their own work. Students could spin yarns, they could enter competitions for fancy yarns. They had a design project to complete at the end of each academic session, something they presented and had externally examined. In the first semester students working in groups of three (ideally a design student, a management student, and a technology student) had a design project to solve and had experience of working together and learning from one another's strengths. The word 'communication' in 'design/communication studies', implied the intention that students

> actually talk to each other, but also that they communicate what they achieve to us. They write a report, where they first of all summarize what they attempted to do, whether they did it and how successful it was…but also how they communicated with each other.

There was also a formal component of communications: in all subjects there was a course work element—a case study, a report, a practical dissertation, or a seminar. The topic of their final-year dissertation was negotiated during their third, industrial year. Whilst on placement during that year, they gathered information, explored possible questions, sought advice on worthwhile topics. By the beginning of their fourth year they pretty well knew what they were doing—it was something they were interested in and it became 'a joy, or it should be a joy to actually try and achieve

something in that area'. By becoming an expert in the area they were also enhancing their career prospects:

> I think that it is a better reflection of a student's ability to first of all set out right at the beginning with an idea and see that idea reach fruition and along the way there are all the peripheral things that are involved in the project—they've got to liaise with members of staff, secretaries, they've got to meet the demands and the deadlines.

Are these students any different from others in higher education?

> I'm not necessarily looking for high academic flyers. In fact you could almost say that high academic flyers and practical ability are almost mutually exclusive. People that are good with their hands, are able to be both creative and also able to translate those ideas into positive end products are quite rare …a rare breed. Obviously there is a minimum set of grades that I'm looking for…people that have an interest in textiles …that shines through at the interview.

All the students entering the course were motivated to enter the industry, 'virtually in every case. There's perhaps one or two who want to be textile teachers maybe ultimately'.

There has been discussion for 150 years about higher education being for self-critical members of society—does this course match the criteria for that sort of higher education ?

> An education rather than a training, I take your point…. I think it's got to be a combination, ultimately we've got to supply industry with graduates that can do the job, that's what the students want, they want to get meaningful jobs in the industry, that's what industry wants, and I guess it's our responsibility therefore to meet the demands of industry, and to some extent they say, 'we want people who know the technology, not that just know the principles…[know] what the machines are capable of doing, what the limitations are'.

Is the course, therefore, a vocational course, and is it what some people might term 'narrowly vocational'?

> We're trying to educate our students. We're trying to say, 'these are the facts, these are the limitations, these are the capabilities, these are the parameters in which we would ask

> you to work, now go away and think about how to relate these things, how to improve it possibly, what your comments are, what are the limitations that *you* think are implicit or explicit'.

Unlike students on arts courses, he emphasized, these students were relating information to an industrial environment: 'we are not encouraging them to go away and be metaphysical'. In some respects the process was the same, though in this case the message was: 'it's vocational'.

Napier College, Edinburgh

Napier College was the outcome of a merger in 1974 between the Edinburgh College of Commerce and the Napier College of Science and Technology, and it transferred to Scotland's central-institution sector in 1985. It is not unlike other Scottish non-university institutions of higher education in being debarred from developing courses in the liberal arts, and in concentrating on 'vocational courses' (STEAC 1985:55–6). The college reported to the CNAA at its institutional review in 1981 that it had continued 'to develop vocationally orientated degree courses, with inter- or multi-disciplinary curricula'. The sentence, 'most of the courses at Napier College are vocationally orientated', is a permanent feature of its prospectus. Although the courses discussed below are comparable with the ones in the English polytechnics and colleges, it is important to remember that Scotland has different traditions and structures of schooling and higher education, and in particular that Napier and similar institutions operate in a different institutional and policy framework.

Communication and Electronic Engineering

A BSc in Communication and Electrical Engineering was approved by the CNAA for a first intake in 1976. Proposals to add an honours component were approved to begin in 1981, and the degree was converted to a BEng as from September 1985. The 1980 submission, for implementation in 1981, described the programme of studies as being designed 'to provide for the development of the intellectual and imaginative skills and powers of the student and to stimulate

an enquiring, analytical and creative approach'. Three aims were specified for the degree:

(i) to provide an education in Communication and Electronic Engineering at degree level based on a broad foundation of fundamental principles of Electrical Engineering Science;
(ii) to give some insight into the behaviour of industrial organisations in a changing environment;
(iii) to produce graduates who are attracted to a sector of industry which can offer relevant and rewarding employment.

The honours degree would provide students 'of appropriate calibre with a deeper and more rigorous understanding of subjects particularly relevant to the Communication and Electronic Engineering industry…to have a greater awareness of the applicability of the subject matter and to demonstrate conceptual abilities of a higher order'. Different parts of the programme stressed the broader context (organization studies), final year 'investigations' (in which students faced, among other things, the need to curb excessive enthusiasm and apportion their time judiciously), and the importance of communication.

By 1985 the three stated aims had been extended to five, with the additional aims of providing an educational foundation 'on which a progressive and continuing education may be built during the student's career after graduation', and of providing 'a programme of engineering applications which enables new graduates to make an immediate and lasting contribution to the solution of engineering problems in industry'.

What was presumably an error in the earlier submission had now been corrected: graduates were no longer to be *attracted* to a sector of industry, but *attractive* to it. The application to transfer to a BEng degree recognized the emphases in the Finniston Report on applications, management, and organization as a contribution to 'the engineering dimension', and communication, and all of these were given greater prominence—as was design.

THE COURSE LEADER (MR RAE) described the course as broad (in engineering terms) at the beginning, becoming fairly specific, with the accent on communications and a supporting role by electronics. For a student to address the problems of communications adequately, it could not be 'diluted' in a general degree. A student was not a fully-fledged engineer by the end of

the fourth or fifth year: but through the course and its supervised work experience what he obtained was 'a good idea of what's going on …how to apply the stuff that they do here'. Since 1980 the aims had become more elaborate and specific:

> What's happening is we're demanding more of ourselves and the students, trying to do it in the same amount of hours—which is one of the problems…in the BEng submission a lot of emphasis was on applications…. What we've tried to do is move it, keep some of it in the syllabus content, but also move it more into the laboratory…. They've got to make more decisions.

Students did have to get to grips with a great deal of very specific information in a broad field, some through lectures, some through documentation, and in tutorials, laboratories, and engineering applications. Lecturers from industry took seminars on practical problems, their solutions, and the technology. Students were active, involved in decision-making in the laboratories. On a design exercise they had specifications, 'work in groups, talk among themselves, come to a decision…get all the detailed information and they just carry it through'. On different kinds of projects they worked alone or in groups. The group experience was important and was deliberate, knowing that it paralleled what took place in the work situation, and

> pressures are on us from the outside bodies to look at group behaviour as well…one of the problems of group work is identifying what the individual's doing…you don't have to get the groups to be too large, because you're always going to worry that somebody's going to sit back and not bother…. On our mini-project our largest group would be four. Doing lab work…an exercise must be done in three hours, we hope to work with groups of two…. With the mini-project which lasts a few weeks someone might be responsible for putting together some drawings for it, and you might not need to do anything until the second week…but you must listen in in the first week…and there might be somebody who's going to build it, and somebody else is going to test it…you're learning from the group activities what actually goes on.

Is fostering of 'intellectual and imaginative skills' a responsibility of the whole or specific parts of the course? Students might not be expected

to be creative in all subjects, he stressed, but they needed to be 'enquiring and analytical' throughout. While exposing them to all the fields, you might expect them to be creative in some. In lectures they were encouraged to question, 'find out why we're saying something'. The analytical basis lay in students' being set problems and having to solve them. Creativity came in an area like a project, which they enjoyed doing and wanted to be creative in.

Is the emphasis on the creative and the analytical the answer to outsiders who think engineering and technology are 'narrowly' vocational?

> As an outsider I could say that all you do if you go into history is history…. You try first of all to expose them to the field… that's the first objective of the course…to get them to understand what the actual field they're in is about…you must tell them what's there and why it's there and get them to do dissertations and background reading to try and find out why something occurred in a certain manner…when it seemed obvious it should do it another way…and then from that expand it into techniques that hopefully when they come to an unknown they can apply…to try to solve the problem.

Communication was an integral part of the course, and had been adjusted in the new programme 'to try and meet the requirements that Finniston was asking in a course outside the sort of skills required of what you'd call the standard engineer'. Exercises like case studies, projects, and assignments of various kinds helped students to pull things together, especially in the later years—including the work on the major project which is

> a technological project…. We expect them to be able to take this specification and produce working models…design, hardware, software…collate and produce a report, and put it all together in a report…he also gets interviewed during the first term [of the final year], and he presents a talk in the second term on it, to his peer group plus members of staff.

He believed problem-solving occurred in various ways, but explicit preparation for problem-solving and decision-making was a minor part of the course at present, with attempts being made to integrate it into management and organization and elsewhere.

How much questioning and challenging do students actually do? They challenged in class and seminars, they did discuss. It was not a matter of writing on the board and saying 'take it all down'. The trouble was that other fields of knowledge required questioning and challenging as 'a prime function of their mind':

> The prime function of a lawyer is to be inquisitive and analyse and look at the background information…. I'm not saying that for an engineer that's not a prime function, but he's got a lot of other things to take over in his actual work than the major decision-making role…. When an engineer leaves a course, should he walk into an industry, take major decisions, etc? I don't think he can…in the early years it's very difficult, because they're frightened to say in front of people…it's in these years that you're trying to convince them-you must ask. If it's a stupid question—it's not stupid if you didn't understand it.

Is there discussion about the role of the engineer? Not as a syllabus. In communication systems or digital transmission, for example,

> when you look at the syllabus it's all technology, the words are all to do with engineering. However, when I'm in the class—now this is where the difficulty comes in-saying what the course is actually *doing*…discussion that's taking place is the implications of what we're actually talking about, the implications of sort of foisting technology on people, and looking at the role they could play.

What did not come out in the documentation about the course was the 'flavour of engineering' that was present, which was being aimed at while still 'satisfying a special need' and course-content requirements.

Is the course vocational, and if so, in what sense?

> I think I've got to say *yes.* It *is* a vocational course, it's satisfying a specific need in industry. I would say the vast majority, I can't say all…get jobs in communications, in communication engineering…the point about the vocational aspect is that it is seen to be directly satisfying a specific need, that's the point. That doesn't stop you using all the other techniques that other courses use…to be enquiring…what you're doing is channelling what the enquiry's about.

Is students' time so committed that they can't do other things?

I think that's still a problem on engineering courses. It was a problem when I was at university. There was nobody in engineering when I was there who got involved with anything to do with the students' union or extracurricular activities…most of our lads get involved more in sports than the other activities. … I don't hear anybody complaining that they wish they had more time to take up a particular interest.

Energy Engineering

A BSc in Energy Engineering was approved by the CNAA in 1980, and converted into a BEng unclassified and with honours in 1984. The 1980 scheme was not unlike the Communication and Electronic Engineering degree in its broad aims—to produce an engineer with an 'enquiring, analytical and creative approach to problems', with a knowledge of the fundamentals and applications of mechanical, electrical, and control engineering, understanding the economic structure of industry and 'financial methods of measuring performance', taking a wide view of the energy implications of an engineering project, and acquiring the skills necessary to analyse and design complete plant energy systems. There was an emphasis on skills and creative problem-solving, the broad base of energy engineering, 'which crosses the boundaries of established disciplines', and the importance of different approaches to learning. An important change in the definition in 1984 was to extend the aim of 'an enquiring, analytical and creative approach' to problems to one of 'problem definition, analysis and solution', involving a more explicit reference to 'an awareness of the commercial and business objectives of an industrial company', and 'an awareness of the role of the engineer in society'. The addition of honours meant the inclusion of a project in the fifth year. The move to greater laboratory and practical work led to an emphasis on continuous assessment.

THE COURSE CO-ORDINATOR (MR BANNISTER), on secondment to the Scottish Vocational Education Council (SCOTVEC) at the time of the interview, confirmed that the change to BEng had meant only a slight change in the philosophy of the course, especially in its later years, though the course had already

been oriented towards engineering applications, as witnessed by the group assignments towards the final year: 'the emphasis is very similar to what it was originally'. It was a broad course, 'not an easy course', and the students had some difficulty piecing together at the beginning what it all meant:

> We spend a lot of time at the beginning…trying to tell them what the course is about, and invariably out of maybe 30 or 40 students you get one or two who find they're on the wrong bus as it were…sometimes they get this impression of energy being alternative energy—looking at solar energy, wave energy and things like that, and this course is not about that.

The ones who were on the 'right bus' still found it difficult at first:

> because even when you get through to the second year, and sometimes even in the third year, they're still saying—'Why are we studying such and such a thing? What's the relevance of this?'—you have that on a lot of the courses anyway. On interdisciplinary courses you do have that problem. It takes a while for them to get the idea, some catch on quite quickly—the ones that have sort of a broad view of life catch on quite quickly.

'Energy studies' was included in the first year with the specific aim of giving students 'the broad picture':

> They look at all the energy sources, and they look at the wider view of where energy is used…where you can get energy and what you can do with it…an interest generator…the first year we had that in the course we overdid that…they were tending to get carried away with that subject and leave the others.

Energy studies was taught by a combination of engineering and business-studies lecturers, including an economist. *Do the students see economics as part of the course, or as something separate?*

> The economic side of it is emphasized throughout the engineering side. We keep emphasizing the point that it's all very well making this thing technically feasible, but it's got to be economic…reinforced in all the other subjects…What we're leading up to is a project in the final year.

How much note-taking is there, how much information from lectures?

He thought there was a tendency to less note-taking, 'in fact we're getting off this business of note-taking', though some lecturers used old-fashioned techniques. The trend was towards 'letting them find out', and he believed students really did get to grips with the problem-solving that was emphasized in the course aims at the end of the first year. Before students went out on their skills training period they did a skills project. Even in the first year they designed and made something. The 1984 scheme emphasis on solutions was reflected in work the students were doing in the first year, and in the later group project. Project work, with students working in groups of different sizes and alone, was spread across all years of the course. Right from the start they were not merely absorbing information, but designing and making, working on complex energy analyses, demonstrating creative ability.

Where do they develop their communication skills? This is a big problem. They should pick this up all the way through, in all the lab work they do…. There isn't a subject called "communications." They did written and oral reports, particularly in the third and fourth years, did group assignments, role played—for example with the staff acting as a parent company and the students as a board of directors—and they had to report: 'so it's a sort of traumatic event for them, having to speak in front of their colleagues and in front of the staff. In the fifth year under the new scheme it was intended that the project would make a major contribution to bringing everything else together.

Do students argue with each other and staff, engage in dialogue…? Not so much, he felt, in the first year when they were in need of guidance, though they did in the period of preparation for the skills training.

> In the third and fourth years this comes out more than in the first and second years…. Particularly after their industrial training period they'll argue. That changes them. After they've been out in industry…they've been in the adult world, and they've had to argue with adults. In fact if you go and visit them in industry, you're liable to get—This place is a load of rubbish, they're doing this wrong and they're doing that wrong'.

Is that confidence one of the strongest arguments for sandwich courses? Some people said that the students went out as boys and came

back as men. He did not think it was quite like that, but there was in fact a tremendous change. *And are students too occupied to take part in other things, as in the past?*

> It's still the same, I'd reckon. Very few of them-there's the occasional odd one that'll take part in the students union… but not like the arts student. They tend to have their heads down in lab reports. I don't think they want to, and they're not that way inclined. The political scene they want to avoid… sport—that's okay, but union activities…very much less than arts students.

Students even had to have their arms twisted to attend lectures on engineering by outside speakers.

Is it, then, a 'vocational' course?

> A difficult question.... It depends what you mean by vocational. Does it suit them for a particular job? If you take vocational as that, and he does have this feeling in his mind that he's not only getting a job, he's getting a worthwhile place in society.

Do you use the word 'vocational'?

> No, I tend not to, in fact, because it tends to be a sort of in-word educationally, but…I would use it in the sense that he's going to get satisfaction out of this job, he'll get respect from—well, he may not, engineers don't get respect from the rest of the community…. He'll be doing a worthwhile job in society …and fulfilling for himself…. We're very conscious that we educate them for a job and a position in society.

A 'liberal' education once implied a gentleman, and a 'vocational' education dungarees—are you arguing that division no longer makes much sense?

> That's right. One of the things we try and emphasize is that when you solve engineering problems you've got to be careful that you don't just create other problems…you've got to be aware of what an engineer would call engineering and society. …There are certain ethics, right and wrong, of the result of your engineering skills.

But students did not really talk about these issues, only some of the 'far-thinking' ones. *People argue that you don't get enough of*

those? That's almost like saying you don't get enough *good* students'.

Technology with Industrial Studies

The BSc degree in Technology with Industrial Studies was approved by the CNAA for a 1975 start, was approved for honours four years later, and as a BEng in 1984. The 1979 submission emphasizes the aim of producing graduates who, 'through studies of both technology and industrial studies, will be able initially to take up technological positions in the fields of engineering and manufacture and a wide range of management services and who will be capable of proceeding at a subsequent stage in their careers to positions in management'. Society increasingly needed people 'qualified by the nature of their inter-disciplinary studies to deal effectively with the implications and consequences of technological, sociological and economic changes', and the course set out to produce graduates responsive to those challenges, and adaptable to the career changes they would face—to be flexible enough to cope with 'new responsibilities, new functions and new jobs'. The thematic subject of 'manufacture' was introduced in that year as the principal means of 'ensuring coherence and integration of the degree curriculum', and an 'integrating assignment' in the final year furthered the same end. By 1984 the aims of the course were being itemized along the lines followed by other Napier courses—an 'enquiring, analytical and creative approach encouraging independent judgement and critical awareness', a broad course of study, encouraging the ability to reason logically, communicate clearly, and read critically, understand principles and their application, understand 'financial, commercial and business objectives', and appreciate industrial relations and industrial and social change. For honours students there were greater intellectual demands and the need for original and creative thought.

THE COURSE CO-ORDINATOR (MR GLEN) underlined engineering applications as the main change in the translation to a BEng degree. It was difficult not to treat these as discrete and a lot of effort was being made to spread these activities across the curriculum, including design. An attempt was made in the first year to relate the industrial studies and technologies, which began by seeming remote from each other. The

interdisciplinary emphasis was difficult to achieve in the student's early years:

> What we do in the final years (the existing BSc in this is similar to the BEng) is to run student-centred activities called course weeks, and this is where they get a typical industrial problem. They work as individuals or in teams and it's not just the technology they have to sort out—they have to sort out the economics, the costing, marketing.

There were two of these in the final year, one emphasizing the technology, the other biased more towards management and economics.

Contact time, he indicated, was quite high, but students spent much of it in effect working on their own, with total hours per week falling to about fifteen in the final year. The students' main problem was the management of their work load, 'whether to concentrate on their course work or concentrate on lecture and tutorial material, to consolidate that—sometimes there's a conflict'. Students were presented with real problems, often quite open-ended and 'requiring a good depth of analysis'. *Do students understand the interdisciplinary, integrating aims?*

> What is happening really (remembering the BEng is still only in its second year) is that on the mainstream courses like maths, computing, manufacture and technology, we're still building these up as skills. In design we're making an attempt to use these subjects in an integrating role.

Students did a product assessment and analysis, looking for example at hair driers of different qualities and price ranges, dismantling them, looking at the technical points, at the marketing and retail outlets, and trying to get figures on sales. The project (replacing 'integrating assignments') served the same purpose. *How does the course actually stimulate creativity, independent judgement…?* On traditional university courses in engineering, which are or used to be engineering science oriented, engineering problems came late, if at all. That way, students developed skills of analysis and synthesis, but creativity was not developed at all—hence the importance of the course on design,

> where we do very little lecturing…because all the foundation work has been done in other subjects so what we're saying to

> them is that we're giving them open-ended problems, and this is broadening the outlook…think as broadly as possible about all possibilities and then focus in on a solution to the problem.

He explained that there was nothing in the course labelled 'communication', but groups had to make presentations to the whole class, often using overhead projectors and slides. They were retrieving information, using a library, learning to work in groups. Preparing to go out for a period of 'skills training' they were asked to design something, to do proper drawings…

> They do all the design activity here, all the paper work…in a way performing an engineer's role, because this is what an engineer does in industry, he talks to other people, he comes up with ideas…the machine shop chap will say 'we haven't got a machine that can handle that size of material….' This is what they get used to until they come up with something that they're actually going to make, and they make it…they find that very often they have to make modifications.

In this way students realized that the different parts of the course belonged together.

In tutorials in some subjects there is a lot of discussion and debate—is this true of students on this course?

> In fact the industrial studies people make a very strict point of that—they want tutorial groups of round about eight…to get this dialogue…. In design this goes on all the time…there's a lot of work to be done by the student there and tutorials as such are more guidance to…help think through the problem. …Each subject has its own methodology…. They're questioning all the time, very much so.

Is there a difference between these aims and those of a traditional 'liberal' higher education?

> We're trying to get some sort of balance between being too focused in on the technologies at the expense of the broader issues, the sociological implications, the economic considerations…. Engineers should not be simply concerned with solving technical problems, they should be much broader based and be in charge of the money for a change-to see where the funding should go.

Some of the words used to describe course aims were 'terribly general'—so that when CNAA visiting panels came they asked: 'What exactly do you mean by that? How are you going to implement that?'.

Students gained confidence and breadth by, for example, facing a viva with the dean of the faculty on their project, by their experience of industry on their placement, and by the research work taking place which 'rubs off on the students, as it should'.

THE PRINCIPAL (DR TURMEAU) had previously published views about the ability of engineers to comprehend the position of modern man, perhaps even better than those in the arts and humanities. There was a particular logic, he explained, about the engineer and the way he thinks that was very different from social science, for example, often 'without any cognisance of what's going on in the outside world'. If, however, the engineer could be taught

> to recognize the outside and the consequences of what he is doing…which is what we have done with a lot of our courses, to bring sociology and psychology,…accounting and management into the courses, if one can do that…if one can have this precise logic and, if you like, mechanical mind—it is a mechanical mind, a very logical, sequential type of thought process-if you can have that as the centre piece which is capable of appreciating all the sociological and economic and psychological aspects, I think that provides a very, very sound management capability or decision-making capability…a very sound basis for somebody who can aspire to higher positions…. That has not happened in the UK, it has happened in other countries.

What some courses have tried to do was simply add 'a bit of management' on the end of the final year.

Would the word 'liberal' be a description of these engineering courses?

> No, I wouldn't use the word 'liberal', I don't like the word 'liberal'…. The word we've been using is 'broad-based'—it's not a very good word…. A lot of people would argue that we should give them the mechanics of the course here and they'll then go out into the outside world and learn all these things, but I don't think that's the case…. It took me a long time to get to the stage

> where I realized that…people were more important than machines, that the human being was by far the most complicated machine of the lot.

Is there really a difference between an engineer aware of the social implications of what he does, and someone in the humanities who becomes, say, a teacher?

> Yes, the reason I think the engineer…can sometimes give a more balanced opinion than fairly traditional people…[is that he has] a more balanced view and can come back to the nub of the problem…. Sociologists and economists get carried away…and they don't know where the centre is…. The engineering mind or the radical mind for that matter, or even the scientific mind, can always home in and usually see what the problem is.

Finniston, he thought, went too far in the stress on practice, which was fine in the shape of sandwich experience after two or three years of a college environment, but was a waste of time at the beginning: 'Young people need to work out, I find, some kind of self-discipline, they've been under the control of a school, …of parents, they find quite a change when they come here.' A later industrial placement could influence the teaching, because by then they could benefit from the experience, they would know something about the jobs they would be doing in the future, know how to talk to people.

One of the advantages of a college like Napier was the ease of crossing department boundaries—in universities departments were 'all-powerful'. If engineering in the college wanted service from a department of economics, for example, it got their top-line people.

Are there critics saying 'vocationally oriented' undergraduate education is not really a higher education at all?

> I know the argument and it's one that I would not accept, it's one that we don't accept here. You can use all sorts of vehicles for education, you can use the liberal vehicle and you can use the vocational vehicle as well—that's the one we happen to think is best…an educational process can go along many tracks…the vocational one, where the education can benefit and widen the person's mind, give them new horizons in terms of thought and learning…but at the same time provide them

with a background of information which could be useful to society, not just themselves…and that would be our definition of vocational.

Some might argue that a liberal education points towards a diversity of employments?

We've had students who've gone into the publishing business, into public relations, all sorts of things—and not necessarily going straight into engineering jobs. In that sense the education is being used as a basic education…. I think the reason that engineers tended to become engineers is that… they're fairly dedicated people.

People use the word 'vocational' disparagingly: is the liberal/vocational distinction at all useful?

I don't think it is very useful. The words don't mean anything any more, and they're used so much that I think they've become meaningless. Certainly, they've changed their meaning over the years…. Liberal studies is a dirty word around most educational establishments. Vocational tends to be used in the wrong context…vocational in our sense…is an education which recognizes the way the world operates.

Oxford Polytechnic

Engineering

A BSc in Engineering was approved by the CNAA for a 1974 start, and replaced a BSc (Eng) honours degree of London University. The degree was extended to honours in 1978. The course was redesigned and resubmitted in 1981 and 1983, and again in 1985 as a BEng, unclassified and with honours. In 1974 the aim of the course was described as being 'to produce graduates having a broadly based education who are prepared for professional careers in electrical and mechanical engineering and can qualify as professional engineers without further academic study'. The course had been designed 'to develop the student's interest in the technological and sociological aspects of engineering' Creativity, the formulation and solution of problems from real situations, communication and the 'role of engineering in the development of civilisation', and of the engineer in society and industry, all

featured in the statement. Design, manufacturing processes, management, and 'the professional engineer' were part of the curriculum of this three-year, non-sandwich course. By 1983 the aims were stressing breadth ('a firm foundation for a variety of careers in engineering'), a critical approach to studies, basic principles, the 'management of the financial and human considerations in engineering', the applications of knowledge, communication skills, and 'an awareness of some of the present and future problems facing engineers'. Analytical skill and competence in solving engineering problems were stressed. The 'sociological' aspects were now de-emphasized, and engineering practice was more strongly emphasized, broadly reflecting the aims of engineering applications as defined in the Finniston Report. Here and in the application to transfer to a BEng there was a commitment to 'engineering awareness', as well as to the knowledge base, skills, and competences needed by an engineer. A course report covering 1982–4 included among the changes 'the formal presentation of Engineering Awareness lectures to first year students by industrial speakers', and emphasized that 'various elements of the course aim at integration of subject matter and relating the different areas to each other through design studies, project work and application exercises'.

THE ACTING HEAD OF THE ENGINEERING DEPARTMENT (DR BREMBLE) stressed the escape from past traditions of engineering courses which had gone down an 'intellectual route', relying on the measurement of students' intellectual ability, degrees, and qualifications. It was now important to understand how to make use of knowledge and intellectual capacity to tackle open-ended problems in the real world: 'in the past we have asked people to solve problems, now we are asking them to formulate problems at the same time and then to solve them, and that's probably more difficult'. Historians, for example, might also be concerned with strategies and techniques, but they were not producing solutions in the real world. Project work, case studies, design, were integrative elements, pointing to connections which in the past had come up only accidentally:

> We really do go down the route where we do say it's vocational, we do tell people that 'you're going to be engineers at the end of it', but we really shouldn't be saying that. We Engineering

> education: courses and explanations 125 should be saying that 80 per cent of our students are going to be engineers at the end of the day, but it really is a tremendous training to do other jobs as well…. If you've trained as an engineer you'll be able to handle yourself better in the real world than if you've trained as a historian.

When students *apologized* if they had decided not to go into engineering then they had got the wrong impression, 'we really ought to try to break out of that straitjacket'.

Has the BEng narrowed the course, with more emphasis on producing engineering automata?

> No, I don't think that's right at all. I think it's broadened out their perspective and it's broadened out staff's perspectives in that we are having as staff to talk to…other disciplines so that we can interact and interrelate with them, and we are also giving students much more freedom to pursue problems in the way that they would want to pursue them.

Laboratory work in the past, he suggested, had required students simply to back up theories and write a report, but open-ended design-focused problems make students think a lot more and work together. *Some courses in the earlier programme have been dropped—is that repackaging, does the material get followed through in other ways?* 'Communications' had been dropped in the first year, on the assumption that it was happening in other parts of the course—that had been a mistake, and it might be reintroduced. 'Engineering and civilization' and the civic role of the engineer, also dropped, were probably not being picked up enough in other parts of the course, and it had probably been narrowed down to some extent in that respect. Too much time was still spent in communicating information, but 'I have a feeling that it is changing, and that we need to cause it to change more so'. Conditions and funding were forcing a change in the direction of less formal approaches to teaching, but there was still a fair way to go: 'we're a very entrenched, very conservative bunch of people'. *Some people might not expect engineering students to disagree, argue, engage in controversy as much as students in the arts and social sciences—would that be true?*

> That's an overstatement, I think of the situation. It does happen, and it's happening more, as we cause more open-ended problems to be tackled, as we cause students to define their own

> problems…. I accept that by and large they will go down the direction in which I will direct them…. One of the basic problems, one of the basic constraints, is that we are looking …at a science where we are producing artifacts at the end of the day, and the opportunity for argument is less, I would have thought, than it is in other areas where people have opinions.

The course had to satisfy the CNAA and the profession, two pressures for slightly different things. The conservatism of the profession itself said 'you can't be an engineer unless you know this, this, and this'. The Engineering Council had pointed to the existence of a lot of obsolete material which was not necessary, and had urged more computer-assisted learning and self-teaching packages. An advantage of working through the CNAA was that

> we have to sit down with people from other departments when we have our various visits and we push each other along. …I am becoming more and more convinced that [peer review] has tremendous value and it worries me that if we don't have that sort of thing happening, if you like from the CNAA, we won't do it very well for ourselves.

Are you doing something 'vocational'?

> I'd say yes, we are doing something basically vocational, and 80 per cent of our students would see that we are doing something vocational…. The aims of our particular course are fairly broad. …I have just been looking at another course…where they are much more specific about identifying the particular role of the engineer that they would be producing, and they make no bones about the fact that they are producing engineers at the end of the day…. We had the Institutions in fairly recently, and they said 'it would be easier to see what the aims of your course are if you were more specific about the particular role that you see your students undertaking when they go into industry' and I…would be inclined actually to…argue against that, and say 'yes, it's vocational: we are really wanting to produce people who can go into a variety of jobs within engineering…. We are wanting to make them think…at the same time as providing them with the opportunity of moving into a career outside engineering. Basically we are vocational.

But not 'narrowly vocational'? The course did not explicitly prepare people to go in other directions, but that was something that was happening, and needed to be addressed. And it was not true of students going into engineering jobs: 'we are producing people who are better able to expand into engineering. I don't think there's any question about that'.

Civil Engineering

The CNAA approved a BSc in Civil Engineering Construction in 1977. In 1983 this became a BSc, undifferentiated and with honours, in Civil Engineering, and in 1985 a BEng. The 1977 submission pointed out that the preparation of graduates for both design and production roles had become more difficult as a result of technological advance and increased design complexity, and the Oxford course was therefore primarily concerned with the preparation of students for the production sector:

> It aims to develop mathematical and scientific abilities, and an informed and creative approach to the technological, economic and managerial aspects of construction work. It also aims to develop the student's awareness of the impact of construction work on the physical and social environments and his capacity for making informed environmental judgements in the ordering of his professional activities.

Communications and surveying featured in the first year, 'environmental and integrative studies' in the second, and the latter continued, together with a project, in the fourth year of this sandwich course.

The general aim defined in 1983 was 'to provide a sound education in the fundamentals of civil engineering with an emphasis on the process of civil engineering construction', based on a thorough understanding of scientific and technical principles, human resources, organizations and systems, and the legal, economic, social, and political environments in which organizations operate. The specific aims included an understanding and experience of engineering design and construction, an understanding of the principles and techniques of management, the development of the power 'of logical argument, an imaginative, open-minded and questioning approach to problem solving and an enthusiasm for independent learning', and an awareness of the

need for good communication. In 1984 the Joint Board of Moderators of the Institutions of Civil, Structural, and Municipal Engineers was told that a discrete subject of 'communications' had disappeared, but that the material was covered by construction practice, in which communication skills were to be developed in relation to topics 'directly related to civil engineering, at an early stage'. Environmental and integrative studies had been redesigned and reduced, but continued to play a vital role. Ninety-five per cent of the graduates entered civil engineering on completion of their course.

THE HEAD OF DEPARTMENT (MR MORRIS) indicated that transition to the BEng had made little change, given that the course already had a higher practical content than many traditional courses. The four-year course was a preparation, and the Institution would not expect any graduate to be 'fully formed'. Employers, however, liked graduates to be as useful as possible from the start—and how much so depended on which side of the industry:

> The contractors, who actually build what's been designed, like graduates to be immediately useful…normally that relates to site skills with instruments, and so on—the capacity to read drawings and interpret them…and transmit information…. Consulting engineers, on the other hand, expect a certain basic quality of academic understanding…. A lot of consulting engineers, I think, take the view that in that highly professional environment, where a graduate is surrounded by seniors who've gone through the same processes, the in-house learning is easily accommodated. But with contractors, I think very often a graduate engineer may be the only graduate on the site.

The sandwich experience made a great deal of difference: 'they're only too keen to graduate and get back into a job that's permanent'. At graduation students felt themselves to be 'partially formed engineers', which might not be true of non-sandwich graduates.

'Construction practice' now included much of what had been 'communication', but it added to it an element of introductory material on the industry and on certain technological processes. Students learned communication skills within the groups in which they worked and they had leadership roles to act out. Within the

department there was a general belief that all subjects in the first year, and in subsequent years, needed to be vehicles for enforcing communication skills. In the past,

> students felt that the first year of the course…was too wholly academic, that it was to do with engineering science. It was to do with materials science…mathematics, statistics, computing, and the only really practical skill that they started in that first year was surveying, and they couldn't really identify what they were doing as having any great significance for the profession they aspired to.

In the second year, 'engineering and the environment' (replacing 'environmental and integrative studies 1') brought together a variety of historical, technical, and professional material, and in the final year an 'integrative studies project' brought together the main core subjects 'in an interlocking manner'.

The course aims use words like imagination, questioning, open-minded—aren 't those aims for all students on all courses?

> I think what we've suggested there is probably the general view now in most engineering courses…whereas I doubt whether it was even considered as being a sensible aim of the course thirty years ago…. There was a fairly rigorous view taken that they had to extend their skills, in certain numerate subjects particularly, and then develop them in discrete packages, and then go out into whatever job they were going to do and make use themselves of those packages. In fact you can't begin to integrate subjects of the sort on our course in civil engineering without introducing some historical background as well, which is liberal in a sense, and without relating the problem-solving they might do to technical subjects…. Some staff are fairly rigorous tunnel-vision engineers who have no vast imagination but a lot of knowledge of their subject…. But we have a fairly good team of engineers in this department, several of them are liberal.

Students normally had good motivation, and they needed it—first because the course was demanding academically in terms of time ('engineers are second to medics I suspect') and they had to commit themselves to a lot of time in lectures, labs, practicals, and seminars compared with 'some more liberal studies'. They had to get stuck in quickly—'there's no honeymoon period'. Secondly, construction

was not as profitable an industry to work in as it had once been: 'the palmy days of the fifties have gone and the old days of the Raj have gone as well.

Laboratory-based students did not have as many opportunities to take part in other activities. At Cambridge, on a 'narrowly mathematical' course,

> we were booked for twenty-four hours a week, 9 till 1, Monday to Saturday (plus work in the drawing office)…. Partly because of room availability I suspect…we couldn't practically programme [our students] to have all their lectures, say, in the mornings…the only free afternoons are Wednesdays …most of them then probably feel they've got project work to do.

The important period for the project was the final year, with experimental, laboratory-based inputs and a substantial report. The 'integrative studies project' was one for which the scenario was generally but not always produced by the staff, this year looking at a redevelopment scheme for a town-centre car park site, which at one time used to be a canal basin. Students visited the site, examined historical photographs and drawings, and role-played at different stages of the development project over two terms.

THE INTEGRATIVE STUDIES TUTOR (MR SMITH) explained that in the normal traditions of an engineering discipline students had studied subjects in relative isolation from one another:

> One of the purposes is to try to integrate these through the project, so that they can actually see the interaction between the different subjects they have studied. Another is to practise potential engineers in the planning, design, and construction of a project from its inception through to completion. So in one sense it's a design project…in the very broadest of senses…. We try to include at least one external person to be involved with the subject each year…usually it's a civil engineer but this year we had a city planner…. They are taken through week by week with specialist staff…putting the students in a position of having to respond…we commonly adopt role playing…. To be honest, there are a few who find it tough-those few tend to be the ones

> that are less imaginative and perhaps whose industrial training experience didn't give them the breadth of view that one would have liked.

This experience included the writing of reports and letters, feasibility studies, and obtaining information. Most of them enjoyed it, 'because they can see the reality of it'.

Do you use the word 'vocational'? The head of department agreed that they did:

> Yes, we use it. Not always happily because of certain inferences, but it's inevitable it's going to be used in the institution, as is the concept that there are pure academic courses in the arts and sciences, and there are also within the institution vocational courses like architecture, estate management, town planning, civil engineering.

The course has the necessary breadth for the field, but is it also limiting in certain ways?

> Yes, necessarily so, though sadly. I think students are now required to be more prepared for employment than our generation was. Even so this course is less narrow than mine was, but it would be exciting to broaden it still further. But would it then attract students, I wonder?

Commentary

The interviews focused on a number of areas which suggested how the concept of 'vocationalism' related to courses, their content and purposes; students and their characteristics; teaching strategies; the influence of the world outside—employers, the engineering institutions, the CNAA, the recommendations of the Finniston Report. Comparisons emerged with other subject areas and with university practice. The strengths and limitations of courses were visible. Against the background of the extensive course documentation (in addition to CNAA submissions there were course handouts and outlines, statements for accreditation purposes, publicity material) the concern with course aims and their implementation was prominent and explicit.

One range of explanations which produced variations of emphasis was that which was concerned with the students themselves: with the particular characteristics, backgrounds, and

limitations of engineering students; the qualities required of engineers and the nature of an engineering culture; the career patterns of graduates—their immediate and longer-term needs and roles; the students' 'cast of mind', capacity for logical thought, creativity, and imagination; their willingness and opportunity to take part in debate and controversy; the nature of any differences from students in the arts and humanities.

A second area of interest, in the context of CNAA and professional body requirements, was the emphasis on practice, real problems in a real world, the ultimate outcomes in terms of artifacts and designs and professional involvements, and therefore—in terms of courses—the emphasis on experience and applications, problem-solving and decision-making (and the formulation of problems, and the particular importance of open-ended problems). There was often a feeling that Finniston had made less impact on the public sector than on the universities, because in terms of problem-solving, applications, and the 'engineering dimension', the public sector was already well down that path.

The aims of courses as set out in submissions for validation and in explications by staff related generally to the promotion of desirable qualities and skills, as well as to preparation for employment—normally interpreted with a breadth which included some aspects of the civic role of the engineer, some aspects of management or economics or business, social and psychological considerations, and environmental and ethical issues. The pattern of involvement of these aspects, alongside technological and 'engineering science' (rarely in these cases called that) and other competence-related areas, was not uniform, and in many cases there was an expression of regret that a course did not do more in these respects—or in the field of communication. Older, discrete approaches to some of these topics had in many cases been abandoned for more diffuse forms of 'permeation', and almost always with an eye to integration across the wide range of subjects included in these broadly based, interdisciplinary courses. Integrative strategies (which also called for student qualities of independent work and judgement, and frequently the characteristics needed to work in groups) have been assuming greater importance—for example with the use of case studies, individual and collective projects and assignments, and the clearly articulated importance of design. The sandwich element of those courses which were constructed to contain such an extended period

of industrial placement is presented as not merely an important experience in itself and as clarification of employment opportunities, but also as contributing to final year teaching and learning strategies.

The limitations which some interviews underlined in terms of student previous learning or personalities also entered the discussion of staff/student contact hours, and the willingness or ability of students to take part in activities outside the engineering course. That they rarely did so (with the occasional exception of participation in sport) was seen as a result both of the course and its demands and also of the students' personalities and commitments.

Generally speaking, the dichotomy expressed in the past in terms of liberal *vs* vocational won little support. 'Liberal' was used only sparingly in interviews to indicate a measure of breadth beyond the traditional frontiers of engineering. 'Vocational' was used to suggest preparation for jobs, but in all cases without accepting an inevitable implication of narrowness or a closed mind (though one interview did strongly underline the narrowness of students and the course as at present described—with relatively poor-quality recruitment and the need to remove some constraints on course structure). Many of the interviews rejected 'vocational' as a useful or usable term, and those that did accept it often drew attention to the difficulties of using it. The overwhelming impression given by those interviewed was of a conception of vocationalism interpreted as an education which takes account of 'the way the world operates'. It is that recognition which dictates the interdisciplinary nature, emphases, breadth-with-a-view-to-integration, problem-focused, employment-conscious shapes of courses. The courses are diverse in many ways, but they also display many similarities in their histories and definitions, in the explanations they offer of their distinctive purposes (and the distinctive features of engineering in the public sector generally), and in the intentions and attitudes expressed in interview.

It is important to remember here, as at other points in this study, that we are concerned with vocationalism and related concepts such as intention, interpretation, and understanding. There is no attempt, as we have indicated, to evaluate these intentions and their embodiment in course and programme design as they are experienced in practice. There was no attempt to follow students and staff through lecture theatre or classroom, laboratory or

workshop, or to elicit responses to teaching processes or sandwich placements. Those discussions of higher education which suggest that any subject or topic can be taught 'liberally' or 'illiberally' point towards quite different analyses of teaching methods, student learning, and the broad and complex experience of higher education itself. While aspects of the higher-education experience in those terms are touched on in this study, they are not the focus. The analysis of the course histories and the framework of the interviews were concerned primarily with prevailing understandings of purpose and explanation, in order to see the extent to which those most actively involved in this segment of education responded to past and present emphases in public debate. In that respect, what the engineering interviews themselves most uniformly and clearly indicated was the explicit and considered nature of that response, and the awareness of the academic and professional contexts within which it was formulated.

One comment made was that the professional institutions took the view that 'you can't be an engineer unless you know this, this, and this'. Therein lies the dilemma for the engineering educator. In our typology of the vocational described in chapter 3, we located engineering in category (b)- 'Sole regulation and part-training'. Engineering degrees play a key role in the regulation of entry into the profession. Employers and the professional institutions expect that a large proportion of professional training or 'formation' will have been completed during an undergraduate course. Consequently, there are quite explicit external expectations and requirements concerning the content of training.

Employment outcomes are specific. Few graduates will move out of engineering, at least initially. Many courses, however, had even more explicit target outcomes. In addition to the major branches of engineering—civil, electrical, and mechanical—we have looked at courses in textile and knitwear technology, in energy engineering, and in communication and electronic engineering. In the words of one of our interviewees, courses are under pressure to 'supply industry with graduates that can do the job'. And those are jobs which have a high knowledge content and require the possession of particular skills. There is a lot that the 'practising engineer' needs to know. As we noted in chapter 3, courses which possess such a central role in selection and training for employment face external pressures

and controls over the curriculum which severely limit the autonomy of educators.

Nobody we spoke to wished to dispute this essential vocational goal of an engineering education. The problem was rather how it was to be achieved for the distinctive kind of student that engineering degrees recruited. Tensions were apparent between 'immediate usefulness' and longer-term career needs. Such tensions were picked up in the range of external pressures that courses faced. Employers, the professional institutions, Finniston, the CNAA-all provided different emphases, different models for the goals of an engineering education, but engineering educators themselves possessed some distinctive views.

Differences in emphasis could not disguise an overwhelming consensus that engineering education should be vocational but should avoid being 'narrowly' vocational. There was a near universal aim to achieve application and breadth with a consideration of context. There was concern to 'broaden' students, to provide a 'balanced' curriculum, but to do so in ways relevant to the 'needs of practising engineers'. The constraints were the high information content of the courses and the students themselves.

The students were the products of specialized, some would say narrow, sixth-form educations. They had specific career intentions and higher education provided the route, the only route, to achieve them. In three years of college study, plus in most cases one year of professional placement, the detailed requirements of professional formation had to be accomplished, with whatever elements of a general education could be achieved in the time. Objectives which in other national and subject contexts might require several stages of education, moving from the general to the professional over four or five years, had to be achieved in England in three. Little wonder that several of the interviewees felt that engineering students tended to 'lose out on an overall education'.

A major concern of engineering educators was an attempt to combat the external pressures towards narrowness. Staff tried to get students 'to think for themselves', to be creative and flexible. There was substantial evidence of concern about study methods, partly in the context of what some saw as the poor quality of the students, but also as a way of achieving extremely ambitious course objectives. Students therefore experienced a range of teaching and

learning methods with much emphasis placed on projects and practicals as ways of 'letting them find out'. Students were expected to 'make presentations', and could be subjected to vivas. The industrial placement had a key role to play.

The development of students as individuals and their formation as engineers were not held to be contradictory. Most staff appeared to believe that a broadly based but practical course would achieve both ends, within the constraints of the requirements of the professional institutions, the students themselves, and shortage of time.

The starting point for the design of engineering degrees was 'What sort of jobs are our students going to do?' This was known with some confidence. Getting a job was not the central problem. However, in moving from a knowledge of employment outcomes to the construction of a suitable education for that employment, staff had to work within light constraints. As we shall see, this situation was very different from that faced by their colleagues working in business studies.

8

Engineering education: a note on the United States

One reason for taking a side glance at engineering education in the United States is that a series of major inquiries before and since the Second World War have made it the most visible undergraduate curriculum in the United States, and probably anywhere. As elsewhere, American engineering education has been scrutinized in terms of balance amongst science, technology, the position of engineering in contemporary world society, and the range of studies and activities necessary for the ability to synthesize required of an engineer. More perhaps than any other aspect of American undergraduate education, engineering has been the subject of persistent experiment, with colleges and universities like Carnegie-Mellon in Pennsylvania, Harvey Mudd in California, and Worcester Polytechnic in Massachusetts promoting a range of experimental engineering programmes. The American Society for Engineering Education, the journal *Engineering Education,* and the professional associations of specific branches of engineering have sustained throughout this century an acute interest in the content and direction of engineering education, and—particularly since the Mann Report of 1918—have regularly surveyed curricula, students, and the profession: 'quite possibly no other professional group has studied its own curriculums in greater detail and with more enthusiastic criticism than have the engineers' (Griffith 1981:488; Walker 1971:823). All such experiments, and all the reports on the deficiencies of engineering education, start somewhere close to Lynn White's 1960s comment about the professional that 'only by being more than a specialist can he remain an adequate specialist' (White 1967:145). Not many analysts of engineering education from the inside could match the passion which White devoted from the outside to his interpretation of technology:

> As [engineering schools] modify their educational structures to meet the newer professional needs of engineers, they will feel increasingly the shift towards common human concerns, and this in itself will promote humanistic attitudes. When this happens, engineers will wake up to the fact that engineering has humanistic functions of the highest order.

It was the responsibility of engineers to understand themselves as engineers and to share that understanding with the rest of society, to be conscious of their own history, to build bridges towards humanist scholars, especially in the history of technology and science, to transform technology itself into a fully-fledged humanism: 'the study of technology as one of the forms of the creativity of mankind is as yet little developed' (White 1968:146–7,167). It has been with some sense of the potential of engineering as a new culture, as well as with the requirements of the market, in mind that many experiments in engineering education have taken place, frequently with an eye to interdisciplinary new subject areas attempting to marry engineering functions with socio-humanistic concerns (the hybrid term is common-place in the engineering curriculum), with human studies of various kinds, with management, and with ethical, historical, and other studies. They have had an eye also to teaching methodologies, to the processes of problem-solving, and to developing in often conservative, job-oriented engineering students the ability to handle uncertainty and ambiguity and the wider demands of non-instrumental elements in the curriculum (Holloman *et al,* 1975:42–7).

Carnegie-Mellon University exemplifies the aspirations in these processes. The Carnegie Institute of Technology, one of its constituent parts, sought to make its engineering science courses 'culturally balanced' and a 'liberal professional education'. In the 1940s and 1950s it was trying to prevent the 'humanistic-social' part of the programme from being 'a thing apart—a decorative misletoe'. An effort was made to bring the humanities and social sciences into the 'self-reliant learning and problem-solving' mode which was to be the feature of all courses. The problem-solving focus, which was to become a motto for engineering education widely, had a specific intention of combating some existing features of engineering courses:

> Problem solving is the main task of the engineer, and when employed in the right way, is one of the most important activities

> in engineering education. It can do much to remedy the lack of a critical understanding of the engineer's tools of thought, and it is a means of preparing the student to deal with new problems, of equipping him to answer questions that have not yet been asked.

'Social relations' and other courses were to underpin this ability to deal resourcefully with problems (Smith 1954; Smith *et al*, 1957; Teare 1948). The 'Carnegie Plan of Professional Education in Engineering and Science', a product of the 1940s and promulgated by the Institute in a variety of ways, made a simple distinction between training and education:

> The aim of professional education at Carnegie Institute of Technology is to equip students to go on learning after graduation and to grow throughout their lives in professional and personal stature and in usefulness as citizens. Carnegie does not seek to *train* students to *be* professional practitioners at graduation, but rather to *educate* them so that they will *become* professional men of full stature.
>
> (Carnegie Institute of Technology 1954)

The pursuit of that aim continued. A University 'program in technology humanities', begun in 1975, aimed to develop courses which would 'stimulate interest, teaching and research in the relationship between technology and society' (Tarr 1980:1). In 1981 the Professor of Civil Engineering and Public Policy was retracing the Carnegie-Mellon 'unique tradition of liberal professional education'. In the late 1960s Robert Hutchins, proponent of the Great Books approach to a core undergraduate curriculum, had spoken on the CMU campus advocating the abolition of all institutes of technology, but 'if he had looked carefully beyond the Great Books, he would have discovered that the leading institutes of technology were in the forefront of promoting a well-rounded general education in our technological society'(Au 1981:2).

In places such as Carnegie-Mellon that search for a redefinition of aim and practice has been consistent across decades, and with less invention in many other institutions preparing engineers. The pressures to redefine have come through the requirements of the professional institutions and the processes of accreditation. The extent and form of the incorporation of the 'socio-humanistic stem',

for example, has been explored and constantly reinterpreted in past decades by committees of the American Society for Engineering Education and regularly debated at its conferences and in the pages of *Engineering Education*. The Accreditation Board for Engineering and Technology lays down 'the equivalent of one-half year as the minimum content in the area of the humanities and social sciences' (ABET 1980:3). Institutions themselves also define core requirements that engineering students, like all others, have to meet.

Given the breadth of engineering courses, therefore, it is not surprising that there are claims—perhaps more credible in some American institutions than in Britain and elsewhere—that engineering is the model of a modern liberal education (Harrisberger 1984:139). It is also not surprising that there are equally strong criticisms of the failures of engineering education, resulting from incremental approaches to the curriculum, its distance from practice, and in many cases a failure to implement the grand designs and rhetoric of institutions' public statements and accreditation claims.

The trajectory of American engineering education from the late nineteenth century was one of growing attempts to detach it from identification with craft pursuits, a process of transition that has been described as a shift 'from experience to science' and an attempt to supplant *experience* with *understanding* as a basis for engineering education (Seamans and Hansen 1981:24). Science had been the instrument used to transform engineering 'from what had often been considered a craft to what was increasingly called a profession' (Haber 1974:267). It was, as we have underlined, a movement of the 1970s to bring engineering more widely and systematically back towards a problem-focused engagement with technology. The time sequences, models, and curricular structures have been different in the American case from that in Britain, but some of the issues emerge in similar terms, and the overall attempt to locate the engineer amidst the many academic, professional, and wider public demands suggests similar questions, if not solutions. The comparison, to be complete, would need to probe more deeply not only the histories of engineering and its comparative academic and social statuses, but also the histories of secondary-school curricula, the processes through which students enter engineering programmes, and the quality and characteristics of the students

who do so. One mechanical engineering instructor summarizes engineering students as

> a multi-faceted challenge to the educators. They represent a diversity of academic backgrounds, preparedness, motivation skills and attitudes. They also are rather unique among college students, being better prepared, more career orientated.
>
> (Brillhart 1981:119)

American engineering educators, certainly in recent years, have in public discussion been reasonably satisfied with the quality of students being attracted to engineering, and have often seen their graduates as 'better prepared' and more widely educated, and the products of an important blend of a general and a professional education.

Engineering educators with whom we discussed some of these issues operated comfortably amongst these competing models, pressures, and requirements. At Pennsylvania State University, for example, the head of the department of mechanical engineering saw undergraduate curricula conforming to the ASEE view of engineering as the application of science for the benefit of mankind, and saw the programme as responsive to the implementations of that definition. The department's course is presented in its publicity as broad in range and career opportunities. Like all degrees in the College of Engineering at Penn State emphasis is placed on the 'application of engineering method', and

> all majors include a social-humanistic stem which extends throughout the eight semesters and gives the student a knowledge of social and human relationships and duties of citizenship, as well as an appreciation of cultural interests outside the engineering field. The stem includes a required course in economics and electives to be chosen from the fine arts, humanities, and social sciences.
>
> (Pennsylvania State University, Bulletin 1985/6)

As with some of his British counterparts the head of department counterposed engineering with its applications in the real world to the arts and humanities which did not. The accreditation board, ABET, insisted on only restricted professionalism at the undergraduate level, though the aim in the future was likely to be greater specialization. The design courses were where qualities of imagination and innovation were most encouraged. One required

course in the seventh semester, for example, in engineering design, aimed at 'synthesis, analysis and evaluation procedures in creative mechanical and thermal design, integrated with engineering fundamentals through authentic design projects' (*Curriculum Information and Planning Manual* 1985). In this, he indicated, students could work in small teams, identifying needs—for example, that of a hospital for inexpensive machines to solve particular problems of handicapped patients. This presented students with the need to evaluate ideas, produce models, work together, make oral presentations, and confront real human problems. As a result of such experience a small proportion of students, perhaps up to 10 per cent, was tempted to graduate work or conversion programmes in disciplines other than engineering—including law, sales, and medicine.

The acting head of the electrical engineering department at Penn State discussed a curriculum contained within the same regulations as other engineering curricula in the College of Engineering, meeting the same university requirements and similar accreditation requirements, feeling there was no difficulty in satisfying both. Most graduates did enter electrical engineering, but a small fraction used their experience in other directions—concerned, for example, with patents in law firms. The engineering faculty discussed their own teaching methods and ways of learning—including strategies for encouraging students to plan 'self-learning'. Design skills were taught in lecture courses and in laboratories. Some courses were inevitably more concerned with fundamental principles and theories than others. The amount of laboratory instruction was extensive, and was presented to students as a course of assignments with a series of objectives, the final one of which was 'the growth in your justified *self-confidence,* knowing that even quite unfamiliar assignments can be tackled by you and moved toward successful completion' (*The EE Stem laboratories* 1986). In addition to these assignments there was stress on the importance of projects in the final two years, and overall on engineering as problem-solving.

It is doubtful whether American educators in engineering or other vocational or professional areas would claim to have established an entry into a new technological culture quite of the order promulgated by Lynn White. What Americans do present is a well-grounded, if still confused, debate about issues of vocationalism more explicitly detailed than is often the case in Europe. Given the scale, diversity, and career orientation of

American higher education it is not easy to detect patterns of interpretation except through accreditation requirements, and in the similarities of structures induced both by accreditation and by state-wide consultation and planning amongst state institutions. Where student expectations and experience are similar across the American system it is as a result of those processes, and of the general influence of particular professional bodies. The difficulty of drawing clear and rigid distinctions between the vocational and the liberal emerges particularly sharply in that situation, where the system, institutions, educational processes, and presentation of knowledge are subject to rapid change and constant reappraisal.

9

Business studies: a background

Compared with engineering, business studies is a relative newcomer to higher education in Britain, and its development has been accorded less public and political attention. Within the overall expansion of higher education in the last twenty years, undergraduate business education has been a significant growth area. It has been so in both public and university sectors although the growth has been on a different scale and taken a different form in each. The universities have introduced courses in banking, accountancy, industrial economics, and business studies. In the public sector, the four-year sandwich degree in business studies has predominated. By 1980 there were forty-one such degrees with a total enrolment of nearly 8,000 students. Today, about 5 per cent of all CNAA courses are in business studies, accounting for about 7.5 per cent of all CNAA students. In addition, there are courses in accountancy, secretarial studies, business economics, and specialist degrees such as retail marketing. However, it is the four-year sandwich degree in business studies which is the focus of this chapter. Every polytechnic has one and there are several in colleges and institutes of higher education. They attract large numbers of applicants and, as we shall see, their graduates appear to be much in demand in the labour market. On all kinds of criteria they have been a success story in the growth of public-sector higher education. But a success of what sort? It is this question which we shall seek to explore in this and in the following chapter.

We are here concerned with some of the contextual factors, both inside and outside higher education, which affect undergraduate business education in Britain. We shall outline some of the debates which have surrounded the development of business-studies degrees and chronicle some of the changes which

have occurred in them since their emergence in the mid-1960s. The chapter which follows will report on a series of interviews which we conducted with staff who are closely involved in the running of these degrees. We shall also in a later chapter draw some comparisons with the approaches to business education found in other countries.

In a foreword to the proceedings of a conference on 'values in business education' held in 1982, the then Chairman of the CNAA Committee for Business and Management Studies wrote: 'it is not clear whether the underlying concern of staff and students in those courses is a study of business or a study for business' (Graves 1983:5). George Tolley was here making a distinction which recurs in the discussions about the growth of undergraduate business education. As he was undoubtedly aware when he made the statement, course philosophies and aims have been overwhelmingly on the side of 'for business' with the full support, even requirement of, the CNAA subject board. What Tolley may have suspected was that the educational reality of the courses was sometimes rather different.

If there has been a fairly unambiguous employment-related purpose in the business-studies enterprise, a major problem for its realization has been the diffuseness of the occupational roles to which it is directed. There is no profession of 'businessman' with clear job specifications, career structures, entry routes, and qualification requirements. You do not need to be a graduate, still less a business-studies graduate, to become a businessman. A degree in business studies carries with it no special professional status. It may facilitate exemptions from some professional examinations in business and commerce but then so do qualifications in other subjects. For most jobs, business graduates face open competition from graduates from other disciplines and, in many cases, from non-graduates. According to a variety of surveys (Gordon 1983; Roizen and Jepson 1985) and public statements, many employers appear to prefer the competition, that is, they seek graduates from traditional disciplines from traditional universities.

However, although they face a potentially very open labour market, business-studies graduates appear to do remarkably well in it. Whether on the basis of the First Destination statistics or the results of the CNAA graduate survey (Brennan and McGeevor 1987), a comparison of business-studies graduates

with other graduates reveals the vast majority of them entering employment immediately on graduation, obtaining jobs which are at graduate level, and after three years being among the highest salary earners of polytechnic graduates. Another feature of their employment, and one which contrasts with university business graduates, is the high proportion who enter industry rather than commerce and the significant numbers who enter manufacturing industry.

If obtaining a relevant job is to be taken as a measure of successful vocational higher education, then business-studies degrees appear to be doing a good job 'for business', even if it is one which employers do not always recognize. It does however appear to be recognized by school-leavers who form the vast majority of business-studies undergraduates (there are very few mature students on business-studies degrees). A survey by Horner (1982:15) revealed the vocational motivations of most business-studies students. The three most popular reasons for choosing a business-studies degree were (a) they wanted a career in commerce or industry, (b) they would find it easier to obtain employment with a degree in business studies, (c) their final career choice would be easier because of their experience of industrial placement.

Practical success but lack of formal recognition in the labour market marks the short history of CNAA business-studies degrees. A consequence of this lack of formal recognition is that business-studies graduates will find themselves working alongside graduates from a wide range of other disciplines. Except where in-company training is highly individualized, this means that employers will not be making any special assumptions about the knowledge and skills of their graduate intakes. How can they if they have no special requirements in recruitment? One of several consequences of this lack of formal recognition by employers is that course designers are not constrained either by the requirements of external professional bodies or by less formal but clearly articulated wants of employers.

At the admissions end, course designers are also free from external constraints imposed by specific pre-entry qualifications. The subjects of 'A' level study are largely immaterial for admission to a business-studies degree. Some subjects, for example economics or mathematics, may be desirable but course designers and teachers can never assume that all of their students will

possess them. Thus, in seeking to provide an education 'for business', staff in institutions have neither a specific academic foundation on which to build nor a set of professional/employer requirements to meet. Being in the public sector, however, their courses have to be validated and for that reason it is important for us to give some attention to the role and approach of the CNAA subject board for business studies. Before doing so, however, and before looking at the curriculum of business-studies degrees, there are some further contextual factors which need to be recorded briefly.

One consequence of the relative newness of degrees in business studies is that very few of the staff who teach on them have themselves taken business courses as undergraduates. Typically they are graduates in disciplines such as economics, law, sociology, or accountancy or, in some cases, with completely unrelated first degrees but with substantial practical experience of business. They do not therefore possess inherited models of what a business-studies degree should be like. They do not even necessarily possess a detailed knowledge of all its constituent parts. Business-studies degrees, as we shall see, adopt a generalist approach to business education but are dependent on discipline specialists for teachers.

We have seen that the concept and curriculum of business-studies degrees are not heavily constrained by professional or employer requirements. Such degrees are not dependent on a particular academic base provided by 'A' levels. Their teachers have not themselves experienced such a course as undergraduates and may have only a partial knowledge of its content. There are, however, other sources of influence on businessstudies degrees which derive from other models of business education available in the United Kingdom and we should refer briefly to them before turning in detail to the business-studies degree itself.

The CNAA business-studies degree is the major form of degree-level undergraduate preparation for business. But it is far from being the only educational route into a business career. We have noted that graduates from many disciplines embark on careers in business. Although their business education may begin with in-company training, for many it will lead to a postgraduate course of some sort. The main postgraduate qualifications are the Master in business Administration (MBA) and the Diploma in

Management Studies (DMS). Both are post-experience and accordingly have rather different goals from those of the undergraduate business-studies degree. Nevertheless, potentially they provide a major source of influence on the undergraduate curriculum. How far that potential influence is realized is open to some doubt, however, because a peculiar characteristic of business education in Britain is the organizational separation of initial undergraduate education and training from post-experience education and training. Indeed they are frequently called different things, 'business' referring to initial education and the term 'management' being used for post-experience education. The university business schools are exclusively post-experience, postgraduate providers and even in the public sector management departments are frequently organizationally distinct from business studies.

The other major source of education and training for business is provided by courses leading to the certificates and diplomas awarded by the Business and Technician Education Council (BTEC) and its Scottish equivalent (SCOTVEC). These courses are offered in England and Wales by most polytechnics and many other further and higher education colleges in the public sector. The growth in courses and in student numbers has been considerable and has paralleled the rise of the business-studies degree. The BTEC courses are relevant to our interest because BTEC has attempted to impose on them an educational philosophy which has undoubtedly had some carry-over effect on degree courses in recent years. BTEC courses are intended to be practical and problem-centred, and to eschew the teaching of academic disciplines and the traditional forms of cognitive skill which accompany them. The focus is upon the practice of business and the development of those practical skills which will assist it. BTEC course philosophies, however, do not always sit comfortably in the conventional academic milieux of polytechnics and institutes of higher education. The implementation of the courses is frequently at odds with their philosophies. Nevertheless, BTEC has undoubtedly provided a fund of often radical new thinking about curriculum, pedagogy, and assessment in the field of business education. Many teachers on business-studies degrees teach also on BTEC courses. There can be little doubt that there are reciprocal influences in play between the two levels of course.

These, then, are the main institutional and educational/professional contexts in which business-studies courses are located, and we can now examine their nature in general terms before turning to the case studies in the next section.

All of the full-time courses are four-year sandwich degrees (there are in addition sixteen part-time business-studies degrees) with in most cases a 'thick' sandwich—that is, a single block industrial placement of at least forty-eight weeks, usually located in the third year of the course. The first referent for discussions about the curriculum of business-studies degrees is usually the Crick Report of 1964, produced for the National Advisory Council on Education for Industry and Commerce. That report saw the degrees as essentially multidisciplinary, stating that 'the courses should be firmly grounded on a few basic disciplines, the essentials of which the student would need to grasp so as to be able to use their modes of thought and tools of analysis in tackling business problems' (National Advisory Council 1964:10). The main disciplinary candidates for this role, according to Crick, were economics, accounting, law, and sociology. The first ten years or so of the history of business-studies degrees saw course teams attempting to work such a formula. The disciplinary essentials could safely be left to the discipline specialists as far as the inner logic of the disciplines was concerned but could not be so left if their essence was to be determined by the practical needs of business. A search for relevance, in curriculum selection and organization, ensued in order to identify precisely those bits of disciplines which would have most to contribute and to put them together in such a way as to create a meaningful whole for students.

In 1981 a report from a working party of the CNAA Committee for Business and Management Studies found that

> although the core disciplines outlined in the Crick Report continue to form the academic base for business degrees, changes have taken place in their treatment and location within the curriculum. In very general terms, curricula have come to be organised on the basis of business rather than disciplinary themes and categories. Although most degrees continue to provide a disciplinary foundation in year one, there is an increasing tendency to introduce the study of functional areas of business at a relatively early stage of the course.
>
> (CNAA 1981:2)

The main functional areas examined in business-studies degrees have been finance, marketing, and personnel and all but two of the degrees running in 1983 included provision for specialist study of these and other functional specialisms as part of the final year. The time accorded to specialist study varied considerably between courses. Notwithstanding the provision for specialization, business-studies degrees continue to profess aims which are general in character, seeking to produce graduates who are knowledgeable and competent in all areas of business activity. The prospectus descriptions of business-studies degree courses in the mid-1980s have expressed these aims in varied yet similar terms, and with emphases important to our discussion here. A course would provide 'a general education in business related subjects of sufficient breadth to offer students a range of career opportunities in industry, commerce, the professions and the public sector' (Liverpool Polytechnic 1984/5). A course would be 'broadly-based' in the 'major business associated disciplines so as to equip its graduates to contribute immediately to the day-to-day functioning of the organisations which first employ them. It is an intellectually demanding course that seeks to develop in its students a constructive yet critical approach to business and industry' (Teesside Polytechnic 1983). The aim of a course was to provide a broad education which prepared students 'for a business career that can evolve as tastes or circumstances change' (Manchester Polytechnic 1984/5). The sandwich element assumes considerable importance: 'As a sandwich course it integrates academic knowledge and practical training' (Hatfield Polytechnic 1984/5).

The subject basis of business-studies courses in the 1970s and early 1980s is still visible in some of these definitions of aims, but so also are the practicality and the broad career-relatedness. Trent Polytechnic spelled out the position clearly at that point in the development of business studies courses:

> Although most graduates will follow careers in finance, personnel work, marketing, production, or the public service, it would be a mistake to assume that the courses offered in the department are just narrow training for specific occupations and professions. For instance, the honours degree in business studies involves a close study of the underlying business disciplines of economics, mathematics, sociology and accounting, with the

> emphasis on the application of these subjects to business problems. To achieve this educational objective great stress is placed on participatory teaching methods such as case studies, business exercises and group tutorials.
>
> (Trent Polytechnic 1984/5)

Many of these elements surface again in the interviews in the following chapter, with an emergent emphasis on the study not of disciplines but of business functions. Whatever the curriculum balance, the overall declared aim—whether or not the vocabulary of vocationalism was used—in polytechnics and colleges offering business-studies degrees was invariably in tune with the succinct Middlesex statement: 'The course has been designed to provide an academic education in a vocational context, thus enabling graduates to succeed in a dynamic business environment' (Middlesex Polytechnic 1986/7). Achieving the desired balance and connections amongst the components of these courses, however, was not a simple matter.

A problem identified by the 1981 CNAA report was the difficulty of achieving 'a cumulative integration which was both academically sound and vocationally relevant' (CNAA 1981:5). This is invariable seen as the task for the final year and is a twofold problem of (i) integrating the academic elements of the degree, and (ii) integrating the academic and placement parts of the degree. Project work, integrating courses in business policy, business-organization or decision studies, a shift of emphasis from business structures to business processes, are all potential solutions which have been tried. The CNAA report concluded 'that considerable progress has been made in the integration of disciplines but that significant problems remain in relating the placement to the academic programmes (p.6).

Where then are business-studies degrees going? Compared with courses in many areas there have been considerable changes to curricula in their relatively short history. Reflecting current preoccupations, Roy Bailey has commented that business studies is 'about doing something, not simply about knowing something' and advocates continual movement away from concern about 'academic problems' to 'problems of action, of choice and decision' (Bailey 1983:22). Noting the increasing rejection of academic disciplines as the basis for the organization of business-studies curricula, David Brown has examined the epistemological

problems which this throws up. Both the disciplinary model of Crick, with its view of disciplines as tools to be brought to bear on the underlying reality of business problems, and the BTEC-influenced approach which attempts to tackle that reality more directly through use of case studies and practical problem-solving, are for Brown examples of an educational model of business studies which emphasizes a 'practical reality which should be mastered'. Such a model is essentially conservative, aiming to produce people 'who can work within the organizations in the way they are now' and regarding change as 'immanent in the system and beyond rational human resistance' (Brown 1983:26) or, for that matter, control. In contrast, Brown advocates a model drawing on Kuhnian approaches to science which sees business as 'some sort of language community' and business education as 'teaching people the languages which are used' (p. 27). Thus Brown has provided two very contrasting ways of looking at what business-studies courses are doing. In our view it would be wrong to look directly for the curricular consequences of Brown's 'phenomenologist' model. In the same way as we need to be alert to different 'realities' of business, so too may there be different 'realities' of business-studies degrees. What we need to look for is the ways in which teaching staff are tackling the design and delivery of their courses when the Crick disciplines no longer provide the organizational framework for the activity. The same questions of intention, interpretation, and explanation that we have considered in the case of engineering then come into play.

In chapter 10 we consider the views of people who have responsibility for business-studies degrees, and an important context for their activities is the role and views of the relevant CNAA subject board. We noted the relative absence of formal external constraints on the development of business-studies degrees. Yet despite this, an analysis by Anthony Saul reveals a very considerable homogeneity among business-studies courses (Saul 1983). The requirements, real or perceived, of the CNAA represent one source of influence which may bear some responsibility for this homogeneity. The formal position of the CNAA subject boards is that they are not prescriptive. Consequently, BTEC-type guidelines on philosophy and curriculum do not exist. Nevertheless, the views of CNAA board members as they interact with each other and as they respond to course developments up and down the country throw out

potentially powerful messages to teaching staff in the institutions. Most usefully for our purposes, the Undergraduate Courses Board of the CNAA Committee for Business and Management Studies recently tried to make explicit its own thinking about business-studies degrees. The board's discussions indicate some plurality of perspectives but also some underlying points of consensus. A distinctly 'for business' definition of business education has been provided by the board's chairman, R.J.Bull, and appears to have received broad endorsement by other members: 'Business education is the personal development of the organisational, administrative and management skills which draw upon relevant knowledge and analytic skills to facilitate the education process' (Bull 1985:5). Bull goes on to identify the components of (i) understanding of context, (ii) understanding of business process, and (iii) 'the development of an individual's managerial and interpersonal skills needed to transform knowledge and cognitive skills into practical action'. Thus, although business studies accommodate the familiar academic skills of 'the acquisition and application of …knowledge and cognitive skills', these are not seen as ends in themselves but as a vehicle leading to capacity for 'practical action' and requiring the development not only of cognitive but of *effective* skills—managerial, administrative, and interpersonal.

Similar sentiments are echoed by other contributors to the board's debate. Fitzgerald observed that 'skills and knowledge bases are simply the instruments to subject effectiveness. More important are the attributes of mind and attitudes created by study' (Fitzgerald 1985:4). McKenna sees 'a desirable outcome of the business studies course [as] the blending of relevant knowledge and practical experience. This overall process contributes to cognitive development, as well as the enhancement of interpersonal and communication skills, in the better programmes' (McKenna 1985:7).

What emerges is the view that the aims of vocational business education may be achieved less through curriculum contentthat is, what business graduates know—and more through the development within graduates of dispositions and capacities for practical action in business settings. And as Bull indicates, this has as many consequences for pedagogy and assessment as it has for the content of the curriculum. What these are can only be answered by looking at courses. However, it is worth observing that these

debates within the CNAA reflect some dissatisfaction with business-studies degrees. The reasons for it are not difficult to find. They reflect the lack of recognition accorded to business-studies degrees by the business community. As Fitzgerald puts it: 'Business employers time and time again say that they do not consider business studies graduates preferentially at initial recruitment point' (Fitzgerald 1985:2). For these reasons, there is considerable emphasis in debates about business-studies courses on the need for innovation and change.

The apparent indifference of employers may well be overstressed by business educators. After all, they do seem to employ business-studies graduates in ever-increasing numbers. Each year, nearly 2,000 students are found placements in industry. Yet a sense of marginality to the professional education of the business community pervades the debates about undergraduate business education, notwithstanding the very significant success of the courses in establishing themselves as a major force within public-sector higher education.

Business activity is diverse. It contains many functional roles and occurs in varied organizational settings. It remains unclear for which roles in which settings an undergraduate business qualification is relevant preparation. This is a question which appears to have little troubled the business community.

The failure to answer it, however, creates problems for business educators. Graves has commented that curricula tend to assume large-scale organizational contexts for business activity (Graves 1983). Bull complains of the relative neglect of public-sector organizations (Bull 1985). How transferable are the knowledge and skills acquired from a business-studies degree? How interchangeable are a business-studies degree holder, a BTEC diploma holder, a history graduate, in terms of what they can do in what kind of role in what kind of organization? The lack of any consensus about the answers to these questions creates an underlying uncertainty about undergraduate business education.

In terms of the typology introduced in chapter 3, business studies occupies the position of an open market and employmentrelevant educational base. It operates at the diffuse end of educational-employment relationships, its awards are not used systematically by employers to regulate recruitment, and although employment relevance is claimed for the curriculum subsequent professional training does not presuppose it. Some

of the problems which arise for vocational work in higher education in such circumstances have been illustrated by the preceding discussion. Yet there are also advantages. Business education does not have to struggle to free itself from the requirements of professional bodies or the interference of employers. We do not find, as in other employment-related fields, the concern to protect educational values against the instrumental goals of occupational training. This kind of debate has scarcely been heard in business studies. Business educators have been far more concerned to attempt to persuade business of the vocational value of business-studies degrees than they have been to protect their educational value against instrumentalist pressures from outside. This may be because the pressures are not there but it does mean that the educational nature of business-studies degrees has received relatively little explicit attention. However, one or two points can be made.

In the early days of business-studies degrees, the placement appears to have carried most of the work preparation load. The taught curriculum was a multidisciplinary attempt to provide a relevant academic base to that preparation. Its academic strengths were those of its constituent disciplines and the academic breadth of the curriculum meant that accusations of professional narrowness were never seriously made. After all, if economics, law, accountancy, and sociology could each separately constitute an honours degree, there could be no need to further broaden a programme which contained all four. However, as the visibility of disciplines has declined, so the educational qualities of the programmes have been recast. Educational purpose is no longer defined in narrowly academic terms. The claims of business studies to provide a broad, liberal higher education rest not just on the breadth of knowledge acquired, but on the challenge of application, of doing as well as knowing, of the interplay of the cognitive and the effective in Bull's terms, although, as Bull himself points out, course-assessment methods have not been developed to test these claims fully. But, it must be remembered, in so far as such educational values obtain, they exist in order to serve an overriding value of the effective preparation of students for careers in business.

The predominant concern of business educators has been and is to gain acceptance and recognition for business studies as a vocational qualification of value in the business world. Its value within the educational world has not been problematic. Speaking

to an international audience of business educators, an assistant chief officer of the CNAA summed up the achievements of the CNAA business-studies degrees:

> there has been a determination on the part of course teams to make their courses more relevant to the world of business, to link discipline areas to business concerns and business problems, to produce curricula organised on the basis of business rather than academic disciplinary themes and categories.
>
> (Goldman 1984:4)

The success of their endeavours can be judged by the enormous demand from school-leavers for course places and the success of graduates in the labour market. The absence of professional regulation and closure has not prevented the achievement of vocational goals.

10

Business studies: courses and explanations

Humberside College of Higher Education

Humberside's four-year honours degree in business studies was approved by the CNAA in 1977. It runs alongside BA honours degrees in Accountancy and Finance, and in Secretarial Studies, which—unlike the degree in business studies—are not sandwich courses. Accountancy and Finance has operated since 1978, and Secretarial Studies since 1980. All three share a common first year, and were resubmitted for approval by the CNAA in 1983. An honours degree in Business Information Systems was also approved in 1985.

The aims of the business-studies degree were described in 1977—and reaffirmed six years later—as being that the programme should have

> both an educational and vocational aim. We see the differences between these aims as being matters of emphasis rather than of kind. It is intended that the student should acquire habits of mind, through critical analysis and evaluation of all that he, or she, studies, which are a prerequisite for a successful career, whether in the field of business or elsewhere.

The degree therefore needed to explore the world of business, but also the way in which 'it reacts with a dynamic environment'. Alongside a balance between 'vocational and educational' elements and considerations of business in the present and its likely changes, the course sought to improve the students' prospects of employment, 'inter alia by developing their potential as individuals'. The 1983 review of the course reported student criticisms—in a generally approving framework—that the course was too 'theoretical and abstract'. The review made suggestions

for 'improving the vocational content' of the course. Two types of integration were aimed at: the integration of academic work and business activity (mainly through industrial training and a project or dissertation), and integration amongst a range of academic disciplines (including through experiential learning techniques). The course was self-consciously interdisciplinary and various means of achieving integration had been tried: studying in depth 'an area of activity relating to business for a full week' was a current approach. The final-year project more than any other element in the course 'enables students to display qualities of originality, independent thought and initiative'—and it was proposed in 1983 to introduce assessment based on projects in the second year also in certain units of the course. The first two years of the course, largely 'Crick-based' in the 1977 submission, now contain only one of six units which is a 'Crick' discipline.

THE COURSE LEADER (MR CUTTS) emphasized that the wide variety of employment opportunities mentioned in the prospectus was a range of business and administration employments, with many students going back to jobs in companies where they had had sandwich placements, jobs in retail management, and public utilities, and a few-when the college was training secondary teachers in business studies—into teaching, either in schools or further education after a PGCE. The vast majority of the graduates went into business 'in the broad sense', and were motivated to do so on entry to the course. *Is the reference to 'an educational and vocational aim' still applicable to the course?*

> Yes. One of the reasons it's in that particular document, one of the reasons we laid more stress on the vocational element is that if you looked at the original submission (in 1977) there was more emphasis on the educational side than there was on the vocational side, and the faculty as a whole in terms of its ideology has been moving more towards an applied form of business education.

There is reference to students acquiring 'analytical and evaluative skills commensurate with degree level higher education' -what sort of skills are these mainly? That applied, he considered, to most of what happened in the fourth year. In the original submission there had been too much of 'this is the answer' and not enough of 'what is the answer?'. One aim now was to get the students to do the

searching, to identify the characteristics of a particular business situation, giving a hint of 'what kind of answers are likely to be best in a commercial sense'. There had been a move away from 'the gospel according to the staff': this had been the first degree course put up by the newly formed college in 1976, and inevitably it had been conservative. The later version embodied a 'more taxing way of teaching'. A course like 'The state and the economy' changed as personnel and attitudes changed—it was designed to be as contemporary as possible, and the content therefore changed according to what was happening, particularly in Europe and in national politics. The intention was to give students an understanding 'of the political-economic factors which affect businesses'.

Some parts of the second year were designed to prepare students for the industrial placement. Students on placement were often required to produce company reports: they had originally been producing 'academic essays' on the course—and the two did not match. There was now more case-study work, therefore, in the second year, and students were more used to writing reports designed to say: 'this is the best way for the company to go'. Student assignments in marketing, labour studies, and operations were in the form of a long case study, perhaps comparing and contrasting two companies and making recommendations about their marketing. *How much use, then, is made of the industrial year when they return for the fourth year?*

> To be honest the answer has to be—not as much as we would like…. [People who teach on the fourth year] have encouraged the students to relate their own practical experiences to the theory they are being taught in the fourth year…. One of the things that students are undoubtedly coming up with is… that some of the theory just doesn't match their practical experience.

The interdisciplinary links were difficult to establish, though a full week's discussion of a theme like the nuclear power industry (with a visiting America professor to introduce a discussion of Three Mile Island) and its ramifications did manage to cut across the economic, political, and other boundaries—important particularly for the younger students. Students, particularly straight from school, found it difficult to respond to an injunction to remember that 'business is about everything and we just find it convenient to teach

it in terms of law, economics, or behavioural studies, and you need to think across discipline boundaries'. In the first year the Crick model of separate disciplines still operated, but the course was moving away from it and had already done so in the second year. A 'business environment' or similar component was under discussion for the first year.

Projects were produced in second-year courses—students might work together but had to produce 'an individual response' to a problem and were encouraged to get help from staff in such things as research methods. The dissertation in the fourth year was intended to be much more 'academically rigorous' and benefited from previous experience of that kind of operation. Topics were selected by students, in consultation with a dissertation supervisor.

Is there any way in which a higher education in business studies is different from a higher education in other subjects, such as geography, history, economics…?

> With some university education I think the answer would be yes…. My own university education was in law—essentially the kind of requirement which the university put to me was knowledge based…. 'Can you tell me what the legal position is?…'There was no attempt to train me in skills of advocacy, for example. I would argue that a business-studies degree, if it's going to be successful, explicitly or implicitly must actually train its students in skills which they can apply to business situations. In other words I don't believe that knowledge in itself is sufficient in business.

Some people would argue that you're shifting the balance away from a 'real' higher education ?

> This is not the first time that this accusation…has been put to me in those terms…. You have to look at the market place. This is probably very much a business-orientated approach. I believe that ultimately *one* of our responsibilities…is that we must produce people who are capable not only of getting employment but of getting employment and being valuable in that employment.

The argument might continue—humanities courses induct students into an approach to knowledge which includes critical abilities, judgemental ability…. *Are your students critical and judgemental, or*

more passive recipients of information and learning skills to survive in business?

> If you'd asked me that question five years ago I would have had to admit that they tended to be passive. The answer to it now is that they are becoming much more judgemental…. I don't know whether the difference is that the students have changed, or whether they have changed because the course has changed…probably a combination of both.

There was now, he emphasized, more competition to enter the course, students were more motivated. In the fourth year, students did discuss and dispute—very much so, in the second year quite a lot, and in the first year not very much. The most significant change was 'the gap between year 2 and year 4'. He had no doubt that the year in industry had 'an incredible effect on them. They come back far more mature, far more worldly wise'. But even the second-year students were beginning to question. There had also been a change in teaching styles. *Is yours a vocational course?*

> The answer has to be yes. The inevitable follow-up is…what do you mean by vocational?…One of the things we're trying to do is to give students an awareness of the overall operation of business, both internally and externally, so that they can feel comfortable in any form of commercial activity—and by commercial activity I'm including things like charities which are not profit-making necessarily. I would say that was one of the ways we seek to be vocational…. They can actually understand the pressures…which affect the operation of any organization. Those pressures will obviously be environmental, they will be legal, they will be economic. Equally, they will be personal factors, because one of the things that I think students learn…is that internal politics in a company may actually have as much effect as external politics, that power sources are important.

You are not accepting that your students do none of the things that form part of the traditional defence of a liberal higher education?

> No, I'm not…. I wouldn't have said that the university degree that I undertook was particularly successful in producing these kinds of qualities in me…. My criticism of that kind 162 A Liberal

> Vocationalism of approach is that…I suspect it tends to produce in the student a rather theoretical view of life…also quite an egocentric view of life…. One of the things that is alleged to occur is that you get self-awareness. I suspect that the self-awareness is rather isolated. One of the things that we are trying to do is emphasize that people operate in a community…a business community, I make no apology for the fact.

Social psychologists and others might also be solving problems in the real world, but they did not set out explicitly to do that. *Are students on the course good at identifying and solving problems?* There was no doubt, he believed, that 'their facility for identifying problems and for realizing those factors in a problem that are crucial and those that are peripheral improves over time. Like anything else, you get better with experience'. The dissertation was a point at which students were particularly identifying problems and summoning evidence, and some became quite excited about it, and could produce systematic and original work, making very specific recommendations. A good dissertation was a 'more than adequate justification' of the degree.

Leicester Polytechnic

The BA Business Studies degree was launched in 1969, with an honours level added in 1973. It was resubmitted to the CNAA in 1979 and 1984. The broad aim of the course was described in 1979 as being to 'equip students with the basic knowledge and ability to analyse business problems and the approach to decision making. The course deals with activities related to the marketing, human, and financial aspects of business, within the public sector'. These general aims were amplified in 1984 to include the following goals:

(i) to create a critical awareness of alternative forms of analysis which are of use within the business environment;
(ii) to provide knowledge and skills which are relevant to problem-solving in business;
(iii) to provide studies which are of vocational relevance;
(iv) to ensure students encounter material and techniques on the course which reflect changes in business practice.

The course contains a number of 'core subjects' and options, the

core subjects including 'Reasoning and communication in business' in the first and second years, 'Functions of business' in the second year, and 'Business organization and decision-making' in the final year. The final-year project is described as 'a sustained piece of work on a specific topic', and through it 'students will develop and practise the ability to research, sift and evaluate evidence at a detailed level…the project encourages an integrative approach to problem-solving'.

THE HEAD OF THE SCHOOL OF ECONOMICS AND ACCOUNTING AND COURSE LEADER (PROFESSOR BARON) thought that there had been no intentional major change of aims in the previous five or so years, though there had been an attempt to make them somewhat more specific in terms of individual courses. There had been a renewed belief that the course was about 'doing business rather than about describing business'—something difficult to reflect in course descriptions. This did not necessarily mean a shift from the Crick model based on disciplines—economics, sociology, psychology, and law were still there: the course had moved about half way in the spectrum of business-studies degrees. Some areas had been linked, and an innovation was the 'Reasoning and communication' course. The course was not as 'Crickish' as some or as 'integrative' as others were trying to be.

The prospectus has always described the course as an 'advanced, general education for business'—how is that to be interpreted?

> At an advanced level, but not being industry-specific, not being functional-specific…. [Changes have involved taking on board] micro-computing…. It has had to reflect that there are significant changes in…the legal and political environment in which industry works, business works, the social structure in which it works.

'Reasoning and communication', he emphasized, was a rigorous course:

> We try and look at the basis of analysis that people have for the thought process…as well as being a communication course. . . .The driving light behind it is an accountant…supported by somebody in economics…[with a background in] the philosophy of economic thought.

Students were well motivated, though that was not ascertained by interview (there were at the time 3,500 applicants for eighty-five places). *Do students find it a bit bewildering at first, faced with seven subjects in the first year, including 'Reasoning and communication'?*

> Some do, yes. They find that course particularly bewildering because they're asked to do things that they've never been asked to do before…. On the whole they tend to enjoy it in the end…. They're willing to accept what's thrown at them a bit more than they used to be…. I suppose they might rationalize it saying 'this is what we've got to suffer to get a degree at the end of it…it doesn't make much sense to us at this stage, well, let's wait and see….' They're not docile, they're more motivated, they have a target.

Is there dialogue and debate as in some other subjects? They were to be found in a different way—less so in lectures because of the large groups, more so in seminars.

Has there been a change in status of business studies in the academic world?

> I would argue there has widely been a change of status, and there certainly has within this School…. It will add Business to the title next year…. Business studies, business-science degrees have a status that is higher than it used to be. That naturally follows when you use those crude indicators…like applicants for a place, employment rate, salary when they leave the institution.

The course was seen as a success story within the department, the majority of the work being with the degree, the part-time degree, and the diploma. Status with employers had not changed as much as 'people try to portray', in that they did not necessarily look for business studies graduates:

> Employers tend to want people who win out at interview in terms of personality, presence, and ability to communicate, and have demonstrated by a degree…they've got some ability, can put some hard work in. If they want that kind of person, all well and good. Business-studies students on those grounds compete just as much with, say, an economics or a history graduate. But when it comes to interviews they've got the great

> advantage that they've worked for a year, they have studied in relation to the environment in which they're probably applying for a job…. [A 1983 study shows] business-studies graduates start at about a thousand a year more than an economics graduate.

Have there had to be any changes in teaching styles, methods, responsiveness to changed situations…? The credibility of the staff was also important, and staff development, he felt, had become more important. Part of the problem was that staff were 'beaten down by the resource pressures on us', a high staff-student ratio, larger classes, lecture and seminar groups. The strategy was to ensure that enough resources could still be deployed for the supervision of sandwich placements and projects, with individual attention. There was an increased problem of keeping up to date. Staff discussed the problems of teaching methods, in course teams, in specially arranged seminars.

Is the business-studies degree a vocational course, and if so what does that mean ?

> What is a vocational course?…I don't think I have a satisfactory answer to that. My personal predilection would be that a vocational course is one that has some element of training in it and is a total area of study leading to some kind of specific employment. Before I came here I ran a course in agricultural and food marketing, now that was industry-specific in other words and it was easier to argue that it was vocational than with a business studies degree which is not industry-specific. I think it is still vocational though because its focus is actually on doing something when a person goes out from here…. In that sense it is vocational very broadly described, because business is not a profession and is a long way off becoming a profession.

Defenders of a 'liberal' higher education in the nineteenth century would describe it as an education in which people learned to be aware, critical, and self-critical. *You're not saying that your students don't acquire such characteristics?*

> In no way…. I made the point that they would be able to do something [on graduation] at the starting level. Our real aim, in addition to that, and why we call it a *higher* education, is that we believe that for many of them this will be the last opportunity when they do get time to sit down and to develop

> those self-critical faculties, the ability not just to be self-critical but to be critical of the system in a positive sense of generating questions that should be asked of it and finding answers to them. …If they hadn't had a higher education they would be more likely to accept the everyday and commonly accepted practice. …My challenge to the old liberal-studies approach in this country—and until very recently to things like economics degrees—is that it taught them to be critical, but an aspect of being critical is to be able to implement the positive remedies and alternatives. But what British liberal education did was produce…very critical individuals, very descriptive individuals, with absolutely no answers.

THE DEPUTY COURSE-LEADER (MRS GORE), discussing the supervised work experience in the third year, explained that placement supervisory staff conducted small groups seminars in the second year in preparation for the industrial placement. There was also a one-day session on interview techniques, and following examinations at the end of the second year there was a week of pre-placement activity, with speakers from industry, and others. There had been an effort to ensure that the experience of the placement was drawn on in the final year. A recent development had been to require that one-third of the report they produced on their placement had to be a case study of a decision or a decision-process within the firm. The core course for all students in the final year was concerned with decision-making, so that students could draw on their experience to the benefit of that course, and tutorials in the first term of the final year related to the placement experience. *Do students actually contribute?*

> Oh yes. It depends on their analysis. The core course heavily links into it. We have had a staff seminar the year before last…a discussion of the work experience year…. All staff agreed that it was very important to try and ensure that the wealth of experience gathered in that year was utilized in the course.

Problem-solving and decision-making are referred to in submissions—is this a thread through the course? This had been successful in the previous course, she pointed out, and it had been retained in the current course. The course tried to achieve a balance between 'general issues in management' and 'functional areas'—the latter in the final year, after the work experience.

Is there a problem about creating 'critical awareness', in the words of the course submission, at the same time as handling the range of courses and materials?

> Yes…. In the previous scheme teachers in the final year sometimes felt that that was the main weakness—not so much the problem-solving because that can be dealt with by a method of teaching in tutorials…presenting them with case studies and problems…critical awareness was more of a problem. To try and build up this approach throughout the degree and not just leave it to the final-year tutors we incorporated in the new scheme a course called 'Reasoning and communications'…. [Students'] reaction is very good. They like to think that there is a course there that pays particular attention to thought…and the industrialists that we've talked to have been very keen on that. …It's early days yet, and in honesty I don't think it's proving to be quite as popular as we had hoped.

How did it work? It varied, she explained. The first year included things like the elementary skills of report writing, and there were some more philosophical aspects to it. In the second year, it was very much a question of students communicating. *How much dialogue is there, in that or other classes?*

> You'd find it in the classes I teach, particularly in the final year. …Our students are orientated to making sure that there are applications, and if they can think up something that doesn't suit what you've been saying you'll hear about it…not quite the same sort of atmosphere perhaps that you'd find in a university. Particularly after work experience, students have a rather different approach…. On the old course there had been a feeling that the parts, particularly of the second year, were too separate. 'Functions of business' on the new course had been quite successful in the second year in pulling the course together. There was still a worry about the first year, when they did a lot of courses and topics—these would probably be reduced in the future.

The project was where the students worked individually and exercised independent judgement but 'like students everywhere they start off with enthusiasm, read for too long, are reluctant to actually start putting pen to paper, then panic at the end, but get it straight eventually'.

Is there anything distinctive about business-studies students, are they different in any way from other students?

> Different from other students in the polytechnic, yes. They have, by the time they're leaving anyway, a particular set of values, partly because of the work experience. They've been working in management and they've tended to pick up the management ethos. We also as staff, I think, take a fairly tight approach—we regard ourselves in a sense as their bosses… and expect them to be on time, hand their work in on time, and take a business-like approach to their work, whereas in other academic disciplines one might say, 'well, it's the idea that's important…'[Some other courses] are not as general as our business-studies degree is…. Although we're 'general' we have a fairly academic approach to our studies, and that comes over in the type of student we produce.

Some people might argue that your course distorts the purpose of higher education, is too restrictive, too geared to the market place—how do you respond?

> You mean it's too much of a training, and not enough of an education…that might be true in some business-studies approaches, but I feel that ours is very much an education, very much training people to think, and use high-order skills—critical evaluation, logical presentation.

Those would be characteristics of many other students—is there something special about your students? 'Yes, they will have been taught them within the business environment…they will already have developed those skills within the appropriate framework'. *Is yours a vocational course of study?*

> In a very narrow sense of a vocational *training*, no, we're not orientated to vocational training. What we provide is an education with vocational relevance and usefulness. I do believe that the things we teach are usable and relevant and provide the general-education high-order skills…. If you think that industry wants high-order skills, then it becomes vocational. If that is what industry wants, then you're providing what industry wants…and I think that is what industry does want. It wants people to think clearly and argue clearly, as well as… the business methodology and so on.

Napier College, Edinburgh

The BA in business studies was approved by the CNAA in 1975, and the honours extension was introduced in 1980. A revised course was approved for a 1982 start. The overall aim defined in 1975 was

> to give students a general education relevant to a career in industry, commerce or public service through an academic study of business. It will produce graduates who will have developed the ability to identify and evaluate issues and who will be able to meet the rapidly changing demands of industrial society.

The aims and purposes of each of the four years were: to provide a foundation course in the basic disciplines and to introduce the student to the nature of the business environment; to introduce the student to some of the functional areas of business; to develop an analytical approach to business problems; to enable the student (on industrial attachment) to recognize that practical knowledge and understanding of industry and commerce is a learning process reflecting academic studies; and to consolidate and integrate previous studies through activities in which the complexities of business problems are analysed and solutions proposed, and to make a choice when a number of decisions are possible. The five-year honours course outlined in 1980 also emphasized a general education relevant to careers in industry, commerce, or public service, and the need for students to be prepared to meet rapidly changing demands during their working life. The honours course specifically aimed to develop 'the greater capacity to recognize the existence of a problem, define it and propose solutions, more ability to integrate the subject areas of the courses, conceptual abilities of a higher order'. In the final years courses were included in 'business policy' and 'behaviour in organizations'. In 1981 the submission proposed major changes in aim and content, underlining that the course reflected the background of the Scottish educational system, 'where entrants have a broadly based education at school covering both arts and science subjects'. Emphasis was on the management of 'financial, human and physical resources', a 'generalist' degree combining theoretical and practical aspects, a sound academic foundation linked with an emphasis on problem-solving, reaching decisions and analysing their effects, and operating effectively as a member

of an interdisciplinary team. The study of 'the academic and applied aspects of business and its environment' would enable the student to develop the qualities needed for business:

(i) a command of the basic business disciplines and a knowledge of the factors influencing the social, economic, and political environment of business;
(ii) analytical, problem-solving, and decision-making skills;
(iii) social skills and a critical personal awareness which will encourage a creative and positive response to dynamic situations.

These characteristics were included in the 1983 'Guidance notes for students'. The submission emphasized synthesis and an interdisciplinary approach, movement away from the Crick structure and the focus on 'functional areas' of business. A variant of the degree on a part-time basis (not discussed here) aimed in 1982 to 'provide a balance between the educational and vocational aspects of the course'.

THE HEAD OF THE DEPARTMENT OF BUSINESS STUDIES AND FORMERLY COURSE CO-ORDINATOR (MR MCINTOSH), AND THE COURSE CO-ORDINATOR OF THE PART-TIME DEGREE (MR VETTESE) were interviewed together.

> *M.* In the last submission we endeavoured to reduce the number of discrete disciplines…. One of our objectives was to make it an interdisciplinary course rather than a multidisciplinary course…. We tried to break down some of the stark distinctions between the likes of economics and accounting, maths and information technology, and to make the focus of the course—the core of the course—business studies, business organization.

This was an attempt to escape from the Crick model. The course was becoming less broad, the number of discrete subjects had been reduced, contact hours had been reduced, and the number of options increased (some functional areas, some 'almost discipline based'). *How long does it take the student to get a feel of the connectedness you are trying to establish ?*

> *v.* It takes in some ways right to the end of the course…. Pious notions about interdisciplinarity and catch-all connections

between the disciplines are not available in the early stages of the course…. The course is built so that tutors know where the links are, but integration is an event that happens in the mind of the student towards the end of the course, and virtually cannot be planned for.

M. I think the very existence of a strong subject area…in business studies, business organization, really helps to integrate the other subjects…. The strength of the previous course was the strength of other departments…economics…accounting…behavioural science. No one was telling them anything about business studies, business organization, business at large. [Now] they are at least aware from day one what sort of a subject it is they are are going to study.

The ability to analyse and synthesize built up after the initial concern with knowledge and comprehension. 'Business policy' encouraged integration through the use of case studies, which appeared in some form in some subjects from the first year:

v.…within 'business organization'…a somewhat shorter form of real world business histories, for example…where the firm came from, so you're not teaching economic history but the history of business, of real businesses they can identify with. In the first year they can set off to do their own little business histories and bring them back to tutorials, so that this approach to individualizing the learning process starts in the beginning.

M. 'Business organization and information systems', 'behavioural science' as well in the second year, is highly analytical, relying on case studies. That's not to say that the other subjects aren't using case studies.

How do you promote creativity in students, as emphasized in the 1981 submission?

M. Along with critical self-awareness I think maybe over the last twenty-four months or so this has given us more food for thought than anything else. I think we would have accepted two years ago that we weren't achieving it particulary well, that we weren't introducing the whole idea of problem-solving in a dynamic world. …we designed an outdoor development programme…and we take students

> away to Glenmore Lodge near Aviemore in the first half of their second year, and we do a bit of role playing…problem-solving, through management games…to emphasize the importance of group dynamics in decision-making, to expose students to each other.

Communication skills were approached through seminars and essay writing, and preparation (in the second year) for industrial attachments—including interview practice and the writing of reports: there was no formal assessment. *Are all the students employment-oriented?*

> *M.* Five years ago a large percentage of students coming on the course would state explicitly that they wanted to go into education or the public sector. A further large minority would say they didn't know what they wanted to do…[leaving] their options open as long as possible. Another large majority would simply say it was an alternative to unemployment…. Perhaps increasing numbers now have an attraction for industry. We don't have the same number who want to teach…[or] go into the public sector. I think students are more business motivated…many come on the course because it is a sandwich course, and they get the opportunity to taste the job before going in…. Some of the students do come on the course because they perceive the subjects involved to be interesting and exciting…yet have some reward at the end of the day.

Questioning and discussion took place in tutorials, in the treatment of case studies, always with some more keen to participate than others.

How defensive does one have to be about business studies as ah igher education? They believed this not to be necessary at Napier. One problem was the association of 'business studies' at school level with shorthand and typing and the use of the word processor. The course had established a 'business-studies philosophy', and the subject was becoming more involved with other areas—notably engineering. Whereas in the past technology-related areas would have been 'topped up' with 'liberal' or 'general' studies, they were now turning to business studies for that sort of input.

There was a senior lecturer in the department with the responsibility for teaching and learning methods:

M. It's a faculty cost but it's within the department, and that's a demonstration of the seriousness with which we have approached [teaching methods]—perhaps that was lacking, lacking new learning methods four or five years ago—to break down some of the traditional views of teaching and learning in the college, to make learning more effective.

V. And I think as a disseminator of modern thinking on teaching and learning methods…scan educational journals, look at new methods that use audio-visuals, and so on.

Projects were an opportunity for students to demonstrate skill in business evaluation, integration, and other things. Topics were selected in consultation with tutors, mainly whilst on industrial placement. Students often became obsessed with the project late in the day, during the second half of the fourth year—it was difficult to stimulate interest in an academic project while they were on attachment. Students were prepared for the placementemployers and students currently on placement were invited in, and students were told what employers and the college expected. Students were also encouraged to find their own placements. However,

V.…there's virtually no way of compensating for an effect that will always be there, that they've been in an academic, college environment for two years, and there's quite a few myths that they may have collected along the road that will be exploded by the shock…. That's part of the exercise, they're going to learn from that.

The choice of honours or unclassified route lay with the student, after much counselling and guidance. Some students disappointingly opted for the unclassified when they would have made good honours students:

V.…their track record shows that, they know that. They already have…a very strong vocational bias, and they say: 'I don't perceive taking an honours degree as helping me with my work. I want to get out there as soon as possible and get into management'.

Is yours a vocational degree course?

M. Yes, all students won't perceive it that way…not all students

> come on the course with a clear vocation in mind, that they're going to be marketing managers, or personnel managers…none the less, within the degree we have fairly clear career paths…. There are areas the students can choose to study which are not purely vocational. The degree itself is designed for a vocation in business management.
>
> *V.* Because it's vocational, a BA degree in business studies, ordinary or honours, is an excellent passport to interviews… it's vocational in the sense that its graduates are employable. …If that was the only element of Vocationally'…that was built into the course I would be disappointed, because I think that would be denying the rigour of the course. But we know that graduates…change jobs…three or four times in their first five or six years…and I would hope that then, after five or six years, the educational content of the business studies degree scores, that is, I hope it is vocational in the sense that it will make them good managers.

Do the students share some of the characteristics of higher education in general, perhaps described as a liberal education ?

> *V.* Scotland in particular does have a profound tradition of liberal education, and if I thought we were releasing graduates who… had not during the course seen the spirit of criticism in that liberal sense then I would be quite disappointed. I wouldn't say that the degree is overly vocational or anything like that.
>
> *M.* At times I've actually been accused of doing an anti-business-studies degree. We seem to spend a lot of time criticizing what's going on in business, doing critiques of marketing and personnel relations…. I do get concerned at times that as part of what I would perceive to be a wider trend we have backed off from some political issues. The students themselves are to some extent politically neutered when they come on the course…I think at times we've got to give ourselves a shake and say: 'right, what's in the course that's reflecting wider society?'

That did happen, they indicated, in specific cases—the study of multinational organizations, for example, raising international and social responsibility issues: 'I wouldn't underestimate the impact of moving away from the old Crick formula in this' (M).

Oxford Polytechnic

An honours degree in business studies began in 1974, was replanned and reapproved in 1979, and was re-presented for a progress review visit in 1982. The 1974 submission contained as options finance and accounting, and manpower studies, and marketing was added the following year. It is a four-year sandwich course. The aims of the course as described in 1974, and not subsequently changed, were to produce graduates 'with an understanding of business and business problems and activities'; to develop the ability to 'think logically and communicate clearly, whether in numerical or verbal form, and to learn from situations met during and after formal education'; to provide an 'intellectually satisfying and coherent education through the integration of disciplines', enabling students to 'appreciate the interdependence of technological and socio-economic factors in society'; to 'extend students in the exercise of their critical and analytical faculties, judgement and creativity', and to equip them for a 'wide range of careers', to make a contribution 'to society and to the business world'. Also added in 1974, and later dropped, was the expressed belief 'that these differing aims can be achieved together by providing a broad vocational education'.

In 1979 an emphasis on 'business systems' and 'marketing' was intended to integrate other studies, and other changes in the course were designed to 'aid student motivation, prepare better for the industrial year, and produce more rounded business graduates'. Problem-solving and decision-making were features of some of the courses, including for example 'business systems' in the first year, which aimed 'to develop problem-solving skills in business contexts'. Emphasis was placed on the value of the industrial year, and on project work. The 1982 review explained how the balance between disciplines and practical materials and contexts was seen:

> Our method of avoiding discontinuity between disciplines and business functions is to include some of the functional studies with disciplines in the first year and to gradually increase the proportion of functions. Even in the final year some discipline studies remain.

THE COURSE TUTOR (MR PENDLEBURY) described the course as intentionally broad: even in the final year—when students

specialized —the common core still accounted for half the course. The course was both general and sufficiently specialized for students to obtain exemption from various professional bodies-a subsidiary, but important objective. Pejorative attitudes towards business studies were no longer in evidence: 'that sort of criticism was around more before there were many business graduates about. Now that industry has seen business graduates, you don't hear much of that'.

Humanities courses may argue that they produce students with 'critical intelligence'. Does that apply to business students? 'Certainly, and I think the fact that they have to integrate to a large extent the different studies they do during the course of the degree emphasizes this. Certainly there is very little spoon-feeding.' *Does the course as a whole, or do particular parts of it, 'extend…critical and analytical faculties, judgement and creativity'?*

> I don't think it's so much special parts as the fact that students come here from a variety of academic backgrounds, and in the first year this is to some extent conversion to get them into the business-studies subjects, so there is not so much of [that aim] in the first year, but as the course develops there is more and more of it.

Students did take part in discussion in tutorials—though this would vary from subject to subject (generally a tutorial had no more than four students). A common pattern for tutorials was for students to submit essays for discussion with the tutor and fellow students. Students did have a significant amount of information to master: 'I think the fact that they are dealing with six subjects is a big factor here, and typically four would be new to them when they come on the course'. *How difficult is that for students?*

> It is very difficult to generalize. We have particularly geared the course so that the first year is not as hard work as the succeeding years, because a lot of people are starting subjects from scratch, and it may be we have gone a bit too far in that direction.

Problem-solving and decision-making were in fact firm threads through the course:

> It's important to remember that the third year of the course is

> the year out in industry, and they are then going to be faced with real problems. Therefore we need by various techniques to get them used to problem-solving in the first two years of the course, so that they are ready to make a good contribution in year 3. We feel that we want to give students to industry who will be worthwhile to them in this third year.

Across the course there were some common approaches to problem-solving, but accountancy, for example, was different from behavioural sciences, 'so we can't expect too much commonality between them'. Case study was probably the most common strategy, but in problem-solving and decision-making 'we don't have a special Oxford Poly approach'.

The final-year project was not compulsory but most students opted to produce one (they were at risk in final assessment if they did not), and its educational value was seen as being very high. Students came into college during the industrial year for briefing on the project.

> [An advisory note to students whilst on their placement explains: The student is responsible for the project, not the tutor…the tutor's role is sometimes misunderstood. The tutor should aim to give equal help to those who ask. But specific advice of what to do is limited to ideas for projects, suggestions of sources/comparisons to look at, and advice on lay-out and on the structuring of the argument being presented. (June 1985).]

Most students were enthusiastic and saw the project as an important part of the course. Students were viva'd on their projects.

He felt that the course was still in the Crick mould, but in replanning for a 1987 review 'we are looking to a degree that is much more skills and functions oriented'. *Are projects and such strategies a means of escaping from the discipline-based structure?*

> That's not unusual. We were doing that right from the start. I think most people were doing it, in the early 70s anyway…. We'll be looking not so much at economics, behavioural science, law, but business context and business operations, and so on…. We'll be making more use of the sandwich… and bring it more into the final year.

There was already a weekly session throughout the second year

with the industrial-year supervisor, discussing applications to firms and bringing in specialists to talk about jobs in industry.

Does a course like this come out of the traditions of the universities and out of those of the colleges from which institutions like Oxford Polytechnic emerged? 'Yes, and I think we are an amalgam, hopefully, of the best of both'.

Commentary

The business-studies courses share many of the same or similar aims in the student qualities they aim to develop, the kinds of knowledge, understanding, and skills they seek to promote, and the interpretations of an appropriate higher education they put upon the courses and their outcomes. With an extremely high demand for places they are able to recruit good-quality, highly motivated students, committed to the courses and to future employment in industry, commerce, or the public services. Some of the interpretation of the course aims and vocational implicaions is therefore conditioned by the commitment and intentions of the students, with fewer of them entering employment outside commerce and industry, even where they did so a few years ago. Course teams do not, therefore, have to concern themselves with those students who might be treating the course purely as an end in itself. Even though 'business' is a disparate field and students' *precise* job intentions may not be clear at the beginning, courses can be defined on the basis of certain coherent assumptions.

The aims of the courses, none of which goes back beyond the mid-1970s, point uniformly to the habits of mind they hope to develop in students, with emphasis on critical analysis, critical self-awareness, logical thought, and ability to identify and solve problems, and to relate constructively to dynamically changing conditions. Students are expected to be, and apparently are, responsive to the challenges of active teaching and learning situations, and are prepared for the most part to question and discuss (or in some cases to 'suffer' puzzlement for the sake of the degree to which they are motivated), and confront problems of the match between theory and experience.

Staff are often preoccupied with the problems or weaknesses of teaching strategies, have often made major changes in course structures, and are critical of their own courses. The particular,

discipline-based ('Crick') structure of the courses established under CNAA auspices has provoked constant anxiety about the nature, balance, and future shape of business-studies degrees. There is constant definition and redefinition of courses on an axis between completely discipline-based and completely functionbased, with a sense of movement away from the Crick mould, from description to doing—although the disciplines remain in place to one extent or another. One of the problems of the discipline-based (multidisciplinary) course has been the difficulty of pursuing 'integration', with the earlier techniques of project and integrative topics being supplemented by new courses, role playing, case studies, and residential programmes. A number of strategies emerge as of central importance. The industrial placement is one of these, with constant reference to its importance, the ways in which preparation for it takes place, the ways in which it feeds into the final year (or in the case of Napier two years) of the course-with some self-criticism about successes in doing this. The dissertation or project is another crucial integrative experience, and often related to the industrial placement. Emphasis throughout is on the acquisition of knowledge and skills in a business environment, in course units concerned with the (interdisciplinary) issues of 'business policy' or 'business organization', or in the days or weeks set aside for major case explorations. Although the strategies for improving communication skills differ from course to course, these are of constant concern, both as preparation for the continuing demands of the course itself, or as preparation for the entry into employment—including the interview, when 'personality, presence, and ability to communicate' are often being sought.

In all cases the courses are seen as vocational, with a positive connotation though not always with the same interpretation. Courses are seen as offering a rigorous form of higher education, but one which related to employment in a 'wide range' of jobs *in* commerce and industry. Although courses are seen as containing various training elements, the courses are not held to be vocational training. The vocational outcomes of the courses include critical, responsive roles in the business community and in society, and not only the obtaining of employment but also being valuable in employment. Some of the educational outcomes may not become apparent until career points some years after graduation. Neither the course nor future employers want students who have merely

learned routines; students are expected to be 'businesslike', but also to be able to generate questions and suggest answers. Whatever the differences between a business-studies degree and other degrees, there are skills and qualities involved that business studies shares with higher education widely. The courses are defended as appropriately vocational—that is, as the right vehicle for learning the operations of business in its wider contexts—and as a legitimate and good higher education.

We described in chapter 3 the employment opportunities for business-studies graduates as constituting an 'open market' for which their courses provided an 'employment-relevant educational base'. Unlike engineering, a business-studies degree does not regulate entry into a specific profession or set of professions. Consequently it does not have its curriculum constrained by the requirements of professional bodies.

A business-studies degree is not industry-specific and it is not functionally-specific. We have seen it described as the study of 'business in a broad sense', as 'vocational, very broadly described', as a qualification which would help graduates to obtain employment and which would be valuable in it. The interviews produced little discussion of the *content* of the curriculum as distinct from its broad structural features. Unlike engineering there is not a large knowledge base that must be transmitted. This enables the business educator to place his emphasis on 'doing' rather than on 'describing'. This gives rise to concerns about the development of skills, about the relationship between different parts of the curriculum (integration), about the establishment of values (a management 'ethos', or the capacity for judgement amidst dynamic change). No less than the 'liberal educator', the business educator is concerned to develop the 'whole person', but development is in a different direction. For some it was described as 'skills in frameworks', for others as 'a business-like approach'; others talked of a 'particular set of values', and others spoke of 'critical people' who can produce 'answers'.

Business-studies degrees have undergone considerable changes since their inception in the early 1970s and the widespread adoption of the formula of the Crick Report. Changes have been mainly in the direction of a greater emphasis on skills, on problem-solving, on making courses in some sense 'more vocational'. The focus on 'doing' has led to the construction of course units in areas such as 'reasoning and communication'. Goals which would be familiar

in the 'hidden curriculum' of the liberal educator increasingly achieve explicit curriculum attention from the business educator.

The pressures for these developments in the business-studies curriculum have not come from employers or from professional bodies. The picture here is not one of pressure but of relative indifference. What then has been the impetus for change? Two contributory factors should be noted. One that has been referred to earlier is the carry-over effect of the philosophy of course developments promoted by the Business and Technician Education Council. Another might lie with the students. The demand for places on business-studies degrees is high. All of the staff interviewed appeared satisfied with the ability and motivation of their students. Developments which have required a more participatory involvement of students have been possible because of the quality of students recruited. Moreover the quality of intakes may have assisted the improvement in status of business studies within institutions. This in turn may have given staff greater confidence to move away from conventional academic norms.

Business-studies degrees of the kind described in this chapter are very much the property of public-sector higher education. They have not developed on the same scale or in the same form in the universities. Their success in recruiting good-quality students and in building on their motivation for careers in business has ensured that business-studies graduates have been well-equipped to compete in an 'open' labour market. As we were reminded, 'business is not a profession and is a long way off becoming a profession'. Thus, the courses are not training professionals in the sense that engineers are trained. Business-studies courses appear to be geared to the production of a 'type of person', characterized by a set of skills, values, and aspirations that are largely transferable across the business community but which are intended to ensure success within it.

An extended American comparison in the case of business studies—in the US more commonly called 'business administration'—would indicate some of the features we have previously noted in relation to engineering, including the role of the liberal arts in an undergraduate business course. The longer American experience of commerce and business programmes has, again, presented some of the same underlying issues as in Britain, though similar reservations about the educational system, curriculum assumptions, and institutional requirements have to

be made as in the case of engineering. In the United States there have been similar discussions of what business leadership requires—such as an analytical mind, problem-solving ability, imagination (Jones 1985)—and the available strategies for achieving these and similar characteristics, including the importance of a broad culture and the combination of theoretical understanding with specific skills (including those of measurement). Some universities and colleges-the University of Maryland, for example-have experimented with liberal-arts courses directed specifically at business careers (not liberal studies additives to business-administration courses). The Maryland course, entitled 'Liberal arts in business', was a response to an awareness that business was beginning to hire liberal-arts graduates in the early 1980s, and that these could benefit from a curriculum which combined the aims of a humanistic vision with the skills and analytical abilities required for business. The course is explicitly a combination of the traditional values of a liberal-arts education, and the preparation of students for a career in business (Kenny 1984; University of Maryland 1984). Those institutions with a more traditional programme in business administration—such as those state universities (until recently colleges) in Pennsylvania where we had discussions—are bound (and feel themselves bound) by accreditation requirements, which are intended to ensure that curricula are not too vocational, and include a proportion of liberal-arts courses to provide an appropriate balance. The American Assembly of Collegiate Schools of Business lays down that the 'professional' courses should be concentrated in the last two years of the four-year programme; so as to provide in the first two years a foundation 'in those academic areas necessary for an appropriate combination of descriptive and analytical approaches to the study of business administration. Such foundation work would normally include courses in mathematics, social sciences, humanities, and the natural sciences', and across the whole programme the target is 40–60 per cent of time spent on business administration and economics (Slippery Rock University, *Requirements for BSBA Degree,* undated). The 'distribution requirements' for business administration as for other programmes at Bloomsburg University of Pennsylvania, for instance, feature lists of courses in humanities, social sciences, and natural sciences and mathematics, the aims of which are presented to students in terms of effective communication, analytical, and quantitative thinking, the ability

to make independent and responsible value judgements, an appreciation of the arts, the physical and biological environments and society, and other explicit goals (Bloomsburg University, *Undergraduate Catalogue*, 1983/4). Slippery Rock University (or State College, as it was at the time), also in the Pennsylvania state system, defined the objectives of its business administration programme in 1974 as supported by a curriculum designed to enable 'a successful business person…[to] possess an understanding of all aspects of life. The…program continues to place emphasis on liberal arts, sciences and humanities as well as requiring a thorough understanding of economics' (Slippery Rock State College, *A Proposal to Establish an Undergraduate Program*, 1974).

An essential ingredient of these American examples is their assertion of a broad preparation for active and understanding roles in business. With different emphases this is true of the British counterparts. The explanations and justifications in the British course descriptions and interviews are in no way defensive. They suggest that the courses are aiming to provide an important new contribution to higher education and to the employment market, and are not merely responsive to it but are creatively determined to meet needs not always understood even by employers themselves. Course leaders therefore do not feel 'constrained' by the labour market, but have the benefit of buoyant student demand, and shape courses which foster many of the qualities and characteristics which they conceive to be common to higher education in general. As in the discussions of engineering, a binding theme is preparation for and involvement with the 'real world', its problems and needs. In British terms, therefore, interpretation of the vocational in such courses indicates an attempt to balance an awareness of the possible employment outcomes with the traditions and interpretations of a quality higher education. Here again, the process has been highly explicit, constantly open to review and amendment, always aware of the role of the CNAA and peer judgement, and permanently sensitive to the basis on which courses operate, the goals they seek to attain, and the contexts to which they relate.

11

Business studies: a note on Europe

A feature which undergraduate business education in the United Kingdom shares with its counterparts in several other European countries is its location mainly outside the universities. In West Germany, the *Fachhochschulen* have developed business studies as one of the main planks of their exclusively vocational curricula over a period that roughly parallels the growth of business-studies degrees in the English polytechnics. In France, business education has formed a part of the élite *grandes écoles* sector of higher education for a much longer period of time, and French business schools with their close links with the *chambres de commerce* provide a privileged route into employment with top companies. More recent developments in France have seen the introduction of courses in business as part of the two-year short-cycle education provided by the *Instituts universitaires de technologie (IUT).* Once again, the universities were bypassed: Viewed as too preoccupied with theoretical studies in the arts and sciences, too divorced from job markets outside secondary education, and too dominated by the Left to provide such technical training' (Cerych and Sabatier 1986:163).

Reflecting the opportunities for mobility of labour within the EEC, a number of business courses have been designed to equip students to operate effectively in a European rather than a national employment context. The courses are offered collaboratively by institutions in two or more countries. They recruit students from the participating countries, and they divide their studies between two institutions and in several cases receive two national qualifications. We visited several of these joint courses in England, France, and West Germany in order to gain first-hand knowledge of European experiences of providing courses with explicitly

vocational objectives, and to draw out similarities and contrasts in relations between institutions and employment in the achievement of a 'practical' curriculum and in the opportunities for graduates.

There was no doubting the popularity of the courses with students. The prestige of the French *grandes écoles* is a major attraction to students in its own right. However, in Britain and Germany staff reported that the 'European' courses attracted more well-qualified applications than did equivalent national courses. We spoke to students from all three countries, and they emphasized the attractiveness of the courses in terms of the 'use and extension of languages', the 'year abroad', and the improvement of job prospects. In respect of the last, the German students in particular spoke of the considerable demand for and recognition of business-studies qualifications by German employers. These perceptions, which were supported by the lecturers in the *Fachhochschulen*, suggested a more explicit labour market currency for the German *Diplom-Betriebswirt* or *Diplom-Kaufmann* than exists for the English BA Business Studies. The French students were confident of the standing of the DESCAF and of the employment opportunities which it would open up for them.

All of the institutions visited made claims for the practical nature of their courses, of service to business, and of meeting industrial needs, and frequently contrasted their approach with what was regarded as the more theoretical and academic nature of the universities. That said, the differences between the institutions were large and are summarized in Table 1.

The distinctiveness and prestige of the French *grandes écoles* is widely recognized. They recruit the best qualified students mainly from professional middle- and upper-class backgrounds. In so far as employers use higher education as a screening mechanism—to identify potential employees with highly desired attributes—French employers make use of the *grandes écoles* in much the same way as English employers make use of the universities of Oxford and Cambridge.

Business graduates from the English polytechnics and the German *Fachhochschulen* are not destined for the same levels of seniority in employment or positions in society as the *grande école* graduate. Consequently, preparation is for a rather different kind of occupational role. Although the distinctiveness of the *grandes écoles* is clear, several commentators have pointed to the considerable similarities which exist between the polytechnics and

Table 1 *Comparison of polytechnics, Fachhochschulen, and grandes écoles*

	Polytechnics	*Fachhochschulen*	*Grandes écoles*
1 Course provision	Comprehensive	Limited subject range and levels	Monotechnic
2 Site	Large	Medium–large	Small
3 National prestige	Low	Low	Very high
4 Staffing	(a) Appointment mainly on academic criteria, not regulated by statute	(a) Appointments: new staff must have doctorates or equivalent, and at least five years of industrial experience	(a) Appointments: dual criteria of academic and business experience
	(b) Staff on full-time teaching contracts, emphasis on research and consultancy variable	(b) Staff on full-time teaching contracts, emphasis on research and consultancy variable. Some part-time teaching by industrialists	(b) Majority of staff on part-time contracts: consultancy required but research optional
	(c) Mainly university educated	(c) Must be university educated	(c) Mainly *grandes écoles* educated

5 Student admissions	Identical formal requirements for university and polytechnic	Different (lower) formal academic entry requirements from universities plus work experience requirements (although this varies between the *Länder*)	Different (higher) academic entry requirements from universities
6 Qualifications	Terminal qualifications identical for university and polytechnic	Different terminal qualifications	Different terminal qualifications
7 Length of course	Same as university	Shorter than university	Non-comparable
8 Finance and control	Public	Public	Private (Chamber of Commerce)

Fachhochschulen. There are certainly similarities in terms of institutional ideology and in status relative to universities. But the differences are also important. To summarize them, the work-related practical ideology of the *Fachhochschulen* is reinforced by a range of statutory measures which have shaped the form of educational provisions to accord with that ideology. Measures related to staff appointments, student entry requirements, length of courses, terminal qualifications, and areas of study have achieved a clear differentiation between *Fachhochschulen* and universities. The differences between universities and polytechnics in England are nothing like as clear-cut on any of these factors. Differences in curricula were not marked between the three countries, with all courses moving from disciplinary foundations at the beginning of the course to greater emphases on functional specialism. There were differences, but these were institutional as much as national, a function of the approaches of different lecturers. Students identified the most practical elements of the curriculum as computing, languages, and functional specialisms in areas such as finance and marketing.

All courses pursued the practical and sought applicability to the real problems of industry and business. Yet national differences in approach were marked. Given the broadly common curriculum content, differences appeared to reflect pedagogic style and the role of work experience.

Almost all students found the German courses most 'academic', most discipline-based. Indeed, many German staff and students use the term 'economics' or 'business economics' when referring to the course. Student learning was essentially independent and passive, 'reading books in the library'. Although the German courses were described as 'academic', several students felt that the English courses were more theoretical. For example, the English treatment of accounting was described as 'more theoretical', and concerned to present 'a true and fair view'. The German approach was 'more practical', 'more legalistic', and more related to the operation of rules and procedures which once learned could be applied in a semi-automatic fashion. Both English and French staff criticized the German students for an over-concern with 'right' answers—with 'knowledge' rather than 'understanding'.

The French course was seen as being very practical and this was achieved through a predominantly case-study approach. The students were heavily taught and heavily dependent on lecture

notes for the acquisition of information. Foreign students found the academic level very high but the teaching approach 'more like secondary school'. Contact hours were high and attendance compulsory. Assessment was frequent and by a wide range of methods. The style of teaching is very strict, it is like the school system. You have to do homework and the teachers control you closely. [In Germany] you have more freedom. They have more tests, every few weeks, the control is harder' (German student studying in France). The students did not read, their institutions hardly possessed libraries. Apart from the lectures (the essential lecture notes are frequently journal articles) the students often worked in small groups of four or five. Case studies taught a 'system of approach' (as opposed to general theoretical principles). The case studies had a 'general relevance'; 'you learn how to think about a problem', but the focus was on 'the solution' rather than on the problem. This was what the course was about, not the acquisition of information: 'teachers sum up all the information. There is no need to read'. The essence of the French approach was that the teachers provided students with the information as economically and efficiently as possible. The student's job was to *use* the information in exercises and case studies to find solutions to practical business problems. It was the confrontation with practice which provided the intellectual challenge rather than the mastery of a body of knowledge.

The main contrast between the English and French approaches to the use of work experience lay in the degree of integration with the college-based part of the course. In Britain, the placement was frequently described as 'useful but separate' from the academic part of the course. The final-year placement was described by one French graduate as 'clearly the most intellectually demanding part of the whole programme'. It lasted eight weeks and was closely integrated with antecedent and subsequent academic study. A French lecturer described the final placement in this way:

> We ask them to go in a firm, they work in groups of two or three students, analyse and solve a problem pertaining to personnel or marketing. That's a lot of work and they invest a lot. They are most interested and the results are very good.

The French final-year placement was intended to be an executive traineeship with precise objectives. It had to serve the interests of

the students and the firm. Students were given specific tasks to achieve and their success in achieving them was closely evaluated.

Business education in the polytechnics and *Fachhochschulen* exhibits many of the features characteristic of higher education to be found in the university systems of the two countries. The emphasis is on the *acquisition* of knowledge, whether theoretical or practical, and on the student's own responsibility for that acquisition. Although there are clear differences in pedagogy between the two countries, the courses are part of conventional academic work and share its norms and values. French students must also acquire a body of knowledge, but for them the process of acquisition is something to be achieved as efficiently and economically as possible and this gives rise to methods of teaching and learning which would not be regarded as consistent with the conventions of higher education in other institutions. The real emphasis of the French approach is on *application*. Fifty per cent of a business-studies course at the École Supérieure de Commerce in Toulouse was devoted to case studies and exercises and the intellectual challenge of the course was seen to lie in these.

The Director of the École in Toulouse described the ways in which he attempted to achieve practical relevance in the work of the institution. First, in the appointment of staff particular emphasis was placed on professional experience. Secondly, the Director was himself an entrepreneur. Thirdly, many practising managers were involved in the teaching and examining of the courses as well as in placement supervision. Fourthly, the staff of the École were encouraged to engage in professional work and many were on part-time contracts.

It was estimated that approximately half of the Toulouse staff had significant amounts of work experience prior to appointment. However, French practice emphasized continuing relationships between business enterprises and the work of the École, and this was achieved in a number of ways. First, executives from local industry provided some of the teaching on the course (between 10 and 15 per cent of the curriculum in the first year rising to 40 per cent in the final year). Secondly, most of the 'full-time' staff were employed on part-time contracts (of between 40 and 80 per cent) to facilitate continuing business activity, often in the form of consultancy. Thus, most staff were engaged in consultancy or industry-based research. In addition, there was the inevitable

liaison with industry which arose from the organization of student placements and also from employers' recruitment practices.

In Britain, institutions attempt to appoint staff with business experience although most appointments are full-time and there are relatively few teaching inputs from the business community. Some staff, particularly in professional fields such as law and accountancy, may engage in consultancy although there does appear to be some difficulty in arranging industry-based secondments. There is considerable contact through placement organization and supervision. Industrial experience was a prerequisite for appointments to a post in a *Fachhochschule*. There was the possibility of study leave for staff to update their industrial experience, although the take-up of this was not great in the institutions visited.

In all countries, business graduates will possess practical experience of business activity although this will not necessarily have been obtained within the course. The timing of the work experience has implications for its function. The English sandwich placement appears to be designed to achieve a level of personal growth and maturity which is obtained through admission policies in Germany. In France, the final-year project/placement is designed to fulfil specific professional and academic objectives.

For all students the most important relationship with employment is obtaining a job at the end of the course. Most students were confident of their future employability and the statistics of graduate employment tend to support them. The English students would have to use their qualifications in a relatively open labour market. Lecturers at the British institutions regretted the relatively low recognition given to specific business qualifications by British employers. That the students were nevertheless successful in the labour market was to be attributed in large part to the attractiveness to employers of their personal qualities and the realism of their occupational aspirations.

German employers make much more sophisticated use of the structure of educational qualifications. Holders of the *DiplomBetriebsvirt/Kaufmann* could expect to apply for jobs which made specific demand for their particular qualification. Both British and German students appeared to use newspaper advertisements plus speculative writing to firms as the main sources of job applications.

In Toulouse, the jobs came looking for the graduates. At the time of the visit, the École had received requests from firms for personnel in the following fields: purchasing/sales (119 posts), export (20), finance (85), information technology (11), and general management (63). By graduation, it was expected that each student would have an average of four jobs on offer. The availability of such information and the publicity given to it illustrates the commercialism of the *grande école* enterprise. Detailed information on employment, including salaries, is collected and published, and constitutes, for the Toulouse Director, a prime means of course evaluation.

It is also evident that *grandes écoles* graduates are destined for top management jobs which will not be reached by the majority of polytechnic and *Fachhochschulen* graduates. The latter will face some competition from university graduates and are more likely to have to settle for middle-management positions in less prestigious companies.

Vocational higher education inevitably contains the potential for tension between business and academic values. One way of looking at business education in the three countries is as a playing out of these tensions.

A presupposition of vocational higher education is that there is a knowledge base to the related professional area. Questions are then raised as to defining what it is and deciding who shall provide it. The answers to both questions lead on to a consideration of the use made of educational qualifications by employers.

Adopting the terminology of the model of higher educationemployment relationships described in chapter 3, a particular qualification may be necessary and/or sufficient to gain entry into a particular career. Looking at business education in France, Germany, and Britain in these terms, it would appear that possession of the Diplôme d'études supérieures commerciales, administrative et financières (DESCAF) is both necessary and sufficient to gain entry to élite business careers. This cannot be said either of the *Diplom-Betriebswirt/Kaufmann* or the BA Business Studies, but both have a currency at middle-management levels in business. In Germany, for many jobs the possession of the graduate business qualification is indeed necessary in so far as many employers specify its possession when advertising posts. This is very rarely true in Britain. In both Britain and Germany, the sufficiency of the qualifications to gain appropriate employment is very dependent on labour market fluctuations, given the absence

of effective manpower planning in both countries. The likelihood of sufficiency is much less in Britain because business graduates will be in competition for jobs with graduates from a large number of other fields. Given the emphasis placed by British employers on personal attributes, it is upon possession of these that the business graduate may be specially dependent.

With regard to training, courses in higher education can be distinguished in terms of the proportion of initial job training that is completed. In only loosely professional fields such as business this may be difficult to discern because there is no agreed consensus among employers of what constitutes basic competence in an employee. However, the heterogeneity of the graduate recruits into British business is such that employers are not able to assume that any pre-entry training has taken place. (This does not of course prevent larger companies from mounting differentiated in-company training schemes which can take account of variations in knowledge base.) By their more rigid use of specialist qualifications, French and German companies can, if they so wish, make assumptions about the knowledge and competences of the graduates they recruit. Thus, because of their greater use in selection, the DESCAF and the *Diplom-Betriebswirt/Kaufmann* are able to claim a larger role in training for their respective occupational outlets.

How much pre-entry training do employers want and expect? Even within the *grandes écoles* there was an acceptance that jobrelated skills are best learned on the job. If so, what is business education intended to achieve? It can aid selection by identifying candidates who have demonstrated some degree of commitment/interest to a business career. It can provide a basis for subsequent training by transmitting attitudes and values compatible with business activity and by providing knowledge and experience of basic business functions. It can also be used as a surrogate for other factors relevant to employers, including intellectual ability or social background. Each of these uses has rather different implications for the content and organization of courses. Employers' wants are conditioned by tradition, by prejudice, by personal experience as much as by a rational appraisal of employment needs, the same kinds of factors as determine student preferences in choosing their higher education.

Despite similarities in the content of curricula, the courses studied all revealed significant national differences in approach. Perhaps most noticeable were the differences in context. Differences in the background of student intakes and differences in the currency of the business qualification in the labour market are crucial to an appreciation of the characteristics of courses. There are also practical differences. The polytechnics and *Fachhochschulen* are relatively low-cost institutions recruiting students of average ability. It is by no means certain that the pedagogy of the *grandes écoles* could be implemented effectively in these institutions.

Entry into a career in business follows a different route in each of the three countries. The characteristics of courses reflect the social and cultural significance of these routes as well as differences in the broader educational traditions in which they are located. The meaning of the vocational is bounded by these contexts which heavily influence the character of particular courses.

12

Environments

In order to provide some additional points of reference and comparison, in three of the British institutions studied some attention was paid to one or more courses in some aspect of the 'built environment' or a similar area. (Napier was not included, not having undergraduate courses in this general area.) These courses offer further indicators of interpretations of the vocational in public-sector higher education, in subjects which point largely to specific professional outcomes.

Architecture

Humberside College of Higher Education

Humberside's degree in Architecture (1979, submission for honours approved 1985) is 'design-project-based', projects being carried out in 'workbases', 'charged with teaching design methods, theory and practice', each different in approach and all providing opportunity for student initiative. The aim is to provide students with 'a wide spectrum of the process of designing' in all its stages, an understanding of the 'interrelationships between many of the various facets of design', a degree of 'self reliance and responsibility for their own education', and an appreciation of the relevance of architectural design to the quality of people's lives.

THE BA COURSE LEADER (MR JONES) stressed the uniqueness of the project-based approach, its arts orientation, and the student choice of workbase to join at the beginning of the second year and at intervals thereafter (with staff and students 'contracting' their responsibilities). It was intended that the honours version of the degree, beginning in 1986, should dovetail the theory and technology courses into the project work better than had been the

case so far. A framework of progression enabled half of the history/theory work to relate to projects and at any given point in the course it was known roughly what area was being covered by projects. Some students, particularly in the second year, found the challenge to chart their own course and to adopt an exploratory mode difficult, but it was an essential element of being an architect, and they did get better at it. The final-year project was an opportunity to do things very well: some were doing exceptional things-but the demands of the third year were very heavy. A small number of students dropped out and returned for the third year, but it was not a sandwich course, and students were not encouraged to do that.

A case study (a technical project) was spread across the whole of the second year, involving the detailed study of an existing building. A large percentage of students stayed on after the degree to complete the diploma, and very few went into jobs other than architecture. Each student was selected carefully, including by interview, to ascertain that the student 'has some kind of initiative…. We're not at all interested in O and A level…we're more interested in how that student performs at interview…. We're looking for the creative side of architects'.

In the CNAA submission you never use the word 'vocational' about the course, but is it?

> Yes, I think it is…. This is a course for architecture, for people to become architects…. It's not a general arts degree…but it's not narrow…. The thing about the architecture profession is that it's as wide as anything. There are so many different ways of practising architecture…working in the community …on expensive Middle Eastern hotel blocks…. Wide arts degrees are in some ways, I think, a failure. We are, if you like, interested in products as well as process. At the end of the day we're interested in the person, his cognitive powers, his powers of initiative, reasoning…being developed…[but] we want to see the product, which is a sound and sensitive building, so it is vocational in the sense that that's what we want them to produce.

A workbase, with up to seventeen students, operated like a seminar with discussion, papers by students, argument, and debate—inevitable, given the crisis in architecture. *Is what you're*

doing adapting an old 'liberal' tradition—being critical, self-critical, situating oneself in 'the human condition'—to a new situation?

> I think it's a curious mixture. There's that element…but also there's the old element of the master-apprentice situation…. At the time the student is in your workbase you're saying, 'look, this is what *I* do, you've chosen to join me, so think along my lines for a bit'.

He thought it was a little like—in say, the 1890s—sitting at the feet of the master and learning that way. But students needed to get to the point where they were asking where it had come from, why there was this building, who these people were, who was going to live in it…. American architecture courses tended to look at aesthetics and objects, while this course tried to look at concepts. There were professional constraints: the professional institution in architecture (the Royal Institute of British Architects) was 'incredibly moribund', and one should at all costs 'as far as I'm concerned, avoid their inputs'. They had a particular role, to do 'with a particular type of practice', but it was not one that 'this School wants to be associated with', though at the moment the course had to be approved by the RIBA, on the basis of the same kind of documentation as that submitted to the CNAA. The RIBA were willing to approve the course, however, in their own present difficult situation.

> The main thing about the course is that we're trying to provide …a bespoke education…we're trying to make it fit the particular individual…let the individual develop at his own pace …we try and get rid of the peer-group comparison as much as possible…. We're very aware of the danger of imposing one stylistic view on students.

Oxford Polytechnic

Oxford Polytechnic's BA in Architecture was approved by the CNAA in 1972, approval was renewed in 1976, and it became a BA honours in Architectural Studies in 1981—a change of title responsive to a perceived CNAA 'steer' in an academic direction. The 1976 statement of aims was confirmed in 1981 as:

> to produce a graduate who can perform well as an intelligent, knowledgeable and creative designer…. It aims at completeness and self-sufficiency up to the threshold of a career in architecture

> in that it serves for the majority of students as a plateau of achievement for advancement to architectural and related studies after a break for professional training. For others who elect to enter industries or professions in which an understanding of architecture will be of value it provides a liberal education.

The core of these aims was reformulated 'more precisely' in 1981 as: to produce a broadly educated honours graduate who has an understanding of the human, environmental, and technological factors bearing upon the design of buildings, and of the nature of design itself; and who has developed the ability to participate in the design process. Greater attention has been paid in recent years to verbal expression, to 'investigative and discursive skills', and to the problem of students not oriented 'confidently on the vocational route to the architectural profession'. Consideration has been given to 'the possibility of non-vocational routes through the Course', but this was abandoned in favour of greater flexibility for the individual student.

THE ACTING HEAD OF THE DEPARTMENT OF ARCHITECTURE (MR BENNETT) emphasized the role of the design project in developing student skills and qualities, the project and inputs to it constantly changing as technological, social, and other changes took place. Since the majority of the students wanted to become architects, they wanted their minds trained 'through the vehicle of the professional subject in which they are hoping eventually to be employed'. *There is reference in the documentation to 'vocational' and 'non-vocational' elements—is that vocabulary acceptable?*

> I would want that word to be very carefully defined. If a vocational course is a course which is capable of being used as a basis for professional life, or even if it means a course which fulfils certain necessary requirements for entering into a professional field…that's one thing. But if by a vocational course one means a course whose educational potential is in some way limited as a result of its being those other things, then I would very much want to question the definition of the word. …I would question it in relation to our course. It does not seem to me that there is any correlation between the ability of the course to satisfy professional requirements and the ability of the course to satisfy general education.

Students entered the course enthusiastic about entering the profession, and their single-mindedness 'undoubtedly has an effect on the whole life and thinking of the department'. There was a range of separate courses for the student to package, but

> we have always believed that the main intellectual demand which is made upon the students is not in the understanding, still less in the actual absorption of facts and figures of those individual lecture courses, but in the application of them simultaneously to design projects. That is what it is difficult to achieve…necessarily we make our inputs as simple as possible, without losing the necessary rigour.

Students were not presented, as might be the case on many 'traditional academic courses, with a body of information which they were expected to understand and critically assess and use for tasks like writing essays'. A student was presented with a design problem 'in fairly broad terms', and had to define the problem more precisely and solve it within a large number of constraints. That was a considerable, and transferable, skill. *Is that not what people traditionally consider a 'liberal' education?*

> It probably is not…. I'm not absolutely sure…whether there is in fact somewhere stored up in heaven an authoritative definition of what a liberal education is. I rather suspect that a liberal education is anything that you happen to want it to be from time to time…. I don't know what the opposite of liberal is—I hope it's not 'illiberal'…. One of the things one notices about certain traditional, academic courses is that in order to introduce rigour they often introduce professionalism…they tend to train the classical scholar as if he or she was going to become a teacher of the classics or an editor of the classics.

If you take two traditions—liberal, nineteenth-century meanings, and twentieth-century accreted vocational meanings-do you reject both as simple descriptions of your course, but you might maintain you are drawing on both ?

> Yes, and I would want…to ask what all these words are about…. If 'liberal' means making you aware of great ideas and so on of your culture, or the history of western civilization, questions of ethics or politics, and so on, then…these matters also come into our course, because we see them as fundamental to the practice

> of architecture. The history of architecture comes in, we discuss the professional role of the architect, the function of a building, the way people use buildings, the symbolism of buildings, semiology…none of those things makes sense except in some understanding of the culture and civilization of the architect.

Does a simple liberal/vocational dichotomy not stand up?

> I don't think it does at all. There is another distinction which I think is worth making between ours and other courses…. We tend to be rather distinct from other 'vocational' courses, such as engineering…[which] has only fairly recently become project-based, and I think the project-based nature of architecture courses is always regarded with some suspicion, not to say contempt, as being a kind of apprenticeship, and the project system of teaching as opposed to the lecture and the textbook system of teaching to which I was subjected, is now regarded from the point of view of teaching techniques and so on as extremely OK, but at one time it was regarded as a kind of sitting next to Nellie experience.

Land management, estate management

Leicester Polytechnic

Leicester Polytechnic's BSc in land management took its first students in 1973 and for honours in 1979. The course was developed 'for the prime purpose of preparing graduates whose aim is corporate membership of the RICS (the Royal Institution of Chartered Surveyors)'. The aims were described in 1981 documentation for CNAA reapproval as being 'to assist undergraduates to become broadly educated individuals who have a significant understanding of the nature and philosophy of Land Management and the particular skills and ideologies appropriate to their selected areas of concern'. The honours programme was concerned particularly to achieve:

(i) the pursuit of excellence in terms of the development of intellectual, vocational, and communication skills;
(ii) the provision of an appropriate foundation to enable the honours graduate to proceed to post-graduate studies and/or research;

(iii) to prepare the honours graduate so that in due time he or she may take their place as leaders in the practice and government of his or her profession.

The course had 'both academic and vocational aims'. Land management seeks to explain the relationship between man, society, and land, particularly the social system by which interests in landed property and natural resources are 'allocated, managed, used or misused'. There are two routes through the course. Estate management is concerned with the 'management, appraisal, supervision and control of "interests" and "estates" in landed property'. Estate development is concerned with the social system by which ownerships and uses of land are developed, allocated, or controlled, including 'the evaluation of development schemes, the making of decisions…determining the most satisfactory means of achieving the implementation of development, redevelopment, conservation or rehabilitation of land'. Students are encouraged to acquire a 'rigorous systematic and scientific approach' and to use a 'goal seeking/problem solving approach'. Also encouraged are 'a healthy scepticism and the questioning of conventional wisdom'.

THE COURSE LEADER (MR LAND) explained that the course prepared students for only two of the seven divisions of the RICS, but even within one of those—the General Practical Division—the vocational opportunities were 'so wide that we couldn't hope to "train" anybody to go and practise in any one of those divisions'. The course was therefore preparing people for a wide variety of vocational opportunities (estate agent, professional department of bigger agencies, institutional investors…). The course had to 'properly educate' the student, so as to be able to go in any one of those directions. 'Training' took place in employment. Nearly all students were on entry to the course motivated to reach a professional outcome of that kind: 'we try to "stretch" them on the honours course, and only a small proportion opt off it: they have to face up to the educational objectives of the honours programme when they make the choice in the second year'. There a was substantial information content throughout, but the final, third year was more of a synthesizing year, with a problem-solving basis, applying and questioning previously acquired information. Students were encouraged to raise questions throughout the course.

They might expect to be spoonfed in the first year, but they would find that they were not: 'a very great deal of the work has to be done for themselves'. There was a plan to reduce the amount of teaching in the final year.

Will students, say halfway through the second year, be found arguing, debating, questioning? Certainly—'We rely fairly heavily on a tutorial system and in the tutorials it is the students who are expected to do most of the talking.' Students prepared papers, and these provoked discussion and criticism. In this, students were, he considered, operating like students elsewhere in higher education. The submission talks about a 'healthy scepticism' and at other points raises ethical and other issues. *Does this in fact run through the course?*

> Yes, because I suppose one could argue that the majority of the students come from a middle-class background with some fairly well pre-conceived ideas, hence the promotion of a healthy scepticism…. Chartered surveyors are perhaps not particularly well educated—historically they tend to do things because that's the way it's done…. We like to raise the question.

The documentation talks of honours students focusing more on problem-solving and the non-honours students having more of a vocational core—is that how it works out? He thought that distinction was not in fact clear. At one point, for example, the degree students did something as 'demandingly problem-solving' as anything the honours students did: since the course was tailored to honours the degree students were probably stretched more than was originally intended. Since the RICS was 'multivocational' there was a broad range of subject content to the course. It was 'multidisciplinary': the land manager 'has got to be a planner, he's got to be a lawyer, he's got to be a valuer, he's got to be an economist'. Subject titles would in future tend to disappear in the final year, in favour of a more 'cohesive' estate management context, though it would not be easy to do. The problem with the final-year project was the difficulty of finding more than fifty different titles each year, and there was a wide variation in the quality of the projects produced. There was no one point in the course where students were being encouraged to be independent, self-motivating: students matured, there was an accumulation of experience, they discovered in the first year that they had to become more independent, they had to demonstrate a capacity for self-researched work in the second year,

and the third-year project was intended to be a synthesis of all that. There was considerable discussion about teaching methods, and 'one of the things we want to achieve is a very much more integrated approach', so that students did not see topics in isolation.

How do you explain your course against the background of what people in the nineteenth and twentieth centuries have claimed a liberal higher education ought to be?

> I am not what most people would look upon as an academic. I am an ex-practising professional…having spent twenty-five years practising the profession about which I now talk…. I didn't go to university…. My professional qualification was earned…as an articled pupil in a professional office…. I would now designate that very much as training…. It's very much the master-apprentice situation…. Here we are preparing our 'apprentice' to be not aping his master, but to be better…he has time to think about what practice does rather than simply being tied to earning a living…. There wasn't time to think—is there a better way of doing this, you ruddy well did something as you were told. Here we've got to be vocationally orientated—the course wouldn't exist if it wasn't, if it was just broad education for the sake of education…. A large proportion of the people who teach on the course are expractitioners…students are educated to know that there are different approaches to a given problem.

Some people use 'vocational' pejoratively, meaning merely or narrowly vocational—are you using the term in a positive sense, to mean producing people who can think for themselves? 'Absolutely right. We think that our generation of chartered surveyors is going to be a very much more thinking generation of chartered surveyors than the generation that came before, pre-full time education.'

Oxford Polytechnic

Oxford Polytechnic's BSc in Estate Management admitted its first students in 1975, with its first honours programme beginning in 1986. Like the Leicester course, it prepares students for exemption from examinations of the RICS in the General Practical Division, and to a lesser extent the Planning and Development Division. The aim, described in a 1984 submission to the CNAA, is 'to produce graduates who have had a rigorous academic training in the

disciplines constituting Estate Management whose intellectual calibre, ability and education will enable them to apply principles in the resolution of problems arising in that field'. Honours graduates would need to demonstrate a higher level of academic attainment:

> analyse problems; propound solutions and demonstrate their ability by a high level of communicative skills. Students must understand that estate management is a coherent, integrated discipline which whilst having its origins in separate related studies can stand alone…graduates must be capable of devising new approaches to problems as they arise…. We aim to produce graduates who are aware of the limitations of their own knowledge and who are prepared to continue their education after graduation.

THE COURSE LEADER (MR BOOTH) thought that, although students were faced with an array of subjects,

> by the end of the three years what started as a series of quite distinct educational packages has been integrated into a single study…and all they wait for is the professional experience, the first few years of their practice experience, to make that a professional reality, so they are poised when they go from here to make a reality of the ideas.

Students had clear career intentions: 'that is what we look for… and that is bound to be so in 80 per cent of the cases'. It required a degree of commitment to cope with the course, and those without it often withdrew. *How much are the students acquiring information, and how much are they learning how to learn?*

> I would say that this course is not a highly 'academic' one, even with the new honours degree. The honours degree undoubtedly promotes the academic element, but one of the reasons why this course has proved over the years to be attractive to employers is because we have developed techniques of a fairly narrow professional focus, and we supply information that is related to that focus. I wouldn't say that we have hitherto, whatever our aspirations for the future, concentrated much on learning how to learn. That is a deficiency I think we have been aware of, and in the new honours course we go a considerable way to remedying that deficiency. The emphasis from now on is going to be considerably more on learning than on teaching…. Teaching techniques are going to have to change.

In some parts of the course new types of staff would be needed, for example in financial management and marketing, which the profession had not concentrated on in the past. Students' capacity 'to think and analyse is going to be far more attractive to us in reviewing applicants'.

Is yours a vocational course?

> Yes. What makes it vocational is that the staff here have a clear idea of where the students are going to go when they leave here. …The profession itself quite clearly recruits from courses such as this, and the students when they come in have a very clear idea as to what is going to happen to them when they go out—so there is a tripartite understanding about career…. The fact that such a course as this exists doesn't exclude the possibility of, for want of a better word, a more 'liberal' course being available elsewhere…. Because it is a narrow vocational course doesn't exclude the development of the personality and the development of ideas—it's just the matter, the substance of the course is different. We're playing with ideas surrounding the land and the way that it is utilized, often in a very broad way. People are invited to speculate, to cast about widely for new ideas…. I'm accepting that it is narrow, but I'm not accepting that in terms of intellectual development it is constraining. The narrowness relates to the commitment to the vocation. The subject area covered by the course is, however, wider than most other disciplines.

He described one of the exercises—a 'professional practice examination'—which took place in the final year, in a different location away from Oxford each year, requiring the involvement of surveyors in the town selected. Students carried out commissions presented as letters of instruction from 'clients' and related to real properties, providing an opportunity for students to apply their knowledge, and acting as a 'sort of bridge between the course and practice'. Students had to show that they had mastered the elements of law, evaluation, building construction, and so on, and could display certain personal qualities in negotiating successfully and in carrying the process through to completion. They produced a case file for each aspect of the work, made an oral presentation of the case, which would involve staff, external examiners, and people in the profession, and they produced a report.

Might some people not criticize a course like this for being too close to the professional bodies, too amenable to outside pressure?

> I am not aware of any particular anxiety or conflict…We have a number of people who come here as graduates in other disciplines…arts subjects…liberal degrees, and they have decided they want a professional qualification…they have had to submit to the disciplines imposed by the professional in trying to achieve the necessary competence.

The criteria applied by the CNAA could be different from those applied by the RICS, and those had had to be reconciled: 'at the end of the day we have to satisfy the CNAA'. Not that this was a problem because many of the CNAA Surveying Board were members of the RICS, so it was not really a juggling act 'because of the commonality'.

Planning studies

Oxford Polytechnic

Oxford Polytechnic's three-year BA honours course in planning studies was introduced in 1977 and reviewed and modified in 1981. The BA and the one-year diploma course which follows, taken together, qualify a student—after appropriate practical experience—to apply for membership of the Royal Town Planning Institute. A 1984 course handbook, based on the 1981 submission to the CNAA, presents the principal aims of the course:

(i) to produce a broadly educated honours graduate who has an understanding of the nature and philosophy of planning and the particular knowledge and skills appropriate to a selected area of planning;
(ii) to provide a sound basis of vocational education which can be continued after graduation to a full professional level in a fourth-year Diploma course.

The course has 'both academic and vocational aims', preparing students for a career in town planning, but also for further specialist courses, research, and a wide range of graduate employment. The course aims to increase the student's 'knowledge of society's environmental needs' and the problems of satisfying them, skill in formulating, presenting, and implementing solutions to

environmental problems, and 'sensitivity to the values and needs of different groups in society'. There are four main areas of study: a core (planning history, theory, and method); a foundation (basic methods of the contributory disciplines and their application to planning); concentrations (selected from six areas); and options (lasting one term, in the second and third years).

THE HEAD OF THE DEPARTMENT OF TOWN PLANNING (MR GLASSON) underlined that students had broad interests on admission, and the course itself was broadly based, becoming more specialist towards the third year, with the graduate diploma as the 'sharpest and most professional related' part of the package. The word 'studies' was important in the degree title, since although there was a strong vocational element in it the course was in itself not enough for students to be able to practise as chartered town planners. After three years,

> I'd hope students would say, 'I've been through a foundation period in this course and I've acquired a variety of foundation knowledge in the social sciences, in design, in planning theory and planning techniques and I've acquired relevant skills, and then for the last four terms I've been applying that knowledge and those skills to a specialist area'.

Skills, he explained, included technical skills (e.g. graphics and information technology), skills in communication, verbal and visual skills—all important, but taking no more than 20 per cent of the student's contact time. It was difficult to quantify the amount of time spent on conceptual knowledge, and to separate it from skills: project work—'learning through doing'—combined both.

Is what you are describing very different from what an arts student might experience?

> I think there's a fundamental difference, say, comparing a planning student with a geography student, and that is the problem-solving approach, actually producing solutions to problems. I did a degree in economics and geography. It was …analytical…but not particularly prescriptive. It did not evaluate alternatives, did not necessitate putting your head on the block and saying—this is my proposal…. One of the main points we would argue in favour of planning education is the problem-solving skill which students have when they come out

> and I think that is particularly attractive to employers…. You may pick that up with some other courses, but it's rarely the central part of the education, I would say, whereas here it is.

Students had to come up with solutions which worked for people, which made financial sense, and which could be politically acceptable. Planning education up to about five years ago had produced designs, now the accent was more on implementation—simulation exercises, negotiation techniques…

In the prospectus the course is described as one of a group of 'broadly based professional courses', and in the submission it is described as providing a 'sound basis of vocational education'—is it a vocational course?

> Yes, but it's also one with good academic standards. We want students to come out not just to do something mechanically but to think what they're doing, why they're doing it…. Planning education can…provide a student with many outlets, in that it produces students who can think for themselves, are well organized, independent, can put together reports well. …In particular, planning education equips students with knowledge and skills which they can apply in certain professions…. We find that our students are being called in to other professions because they offer particular skills and knowledge. …What planning education does in particular is put together various dimensions, various aspects, economics, sociology, politics, design management…. You only get partial coverage if you just do economics or just do sociology…. In our foundation years…we are focusing on those parts of those disciplines which are particularly relevant for planning education.

A variety of teaching techniques was used, including individual and group projects. Students were exposed to 'all types of planning theory' and a lot of it was controversial—which was inevitable, he thought, 'if you're planning in a pluralist society'. High academic standards, in such ways, reinforced 'good vocational education'. To explain its operation you 'almost need a hybrid phrase'.

In this field and others there are tensions between the 'academic' and the 'practical'. The broad and the specialized, generalists and specialists—and these debates take place in the professional arena outside. *How much do you have to listen to those resonances?*

> We do this a great deal, though we try to avoid the mistake of reacting to short-term trends. You've got to have a course which is robust for a number of years. You get over that by having courses which do have flexibility within them and can adjust…. We listen in many ways. We have a foot in practice, through consultant research. We have major research programmes in the department…. We're very much in tune with practice with our short-course unit…. We're in touch via the branch of the RTPI…. We meet planners on a regular basis there. We're involved in all kinds of other ways as well…. But the debate (about the shape of courses) mainly takes place in this department, with staff and students.

*THE DEAN OF THE FACULTY OF ARCHITECTURE, PLANNING AND ESTATE MANAGEMENT(DR HEALEY) i*s also associate head of the Department of Town Planning. She has written about polarities in the planning field between the professional and the academic, understanding and skills, vocational and academic, academic and practitioner. *How prominent are these tensions in designing courses?* Pretty prominent', she thought:

> Major course design work was done in the 1970s…. We're now confronting a new round of course design…how we're going to do that…I'm not quite sure where that's going to go…. Because planning has been trying to develop a kind of academic status from a very unacademic base, perhaps they have been more exposed than they might have been where it would have been recognized that there was more of an academic contribution.

Generalist/specialist tension had as much to do with 'a bid for control of particular sorts of work' as with academic concerns. Tensions between practitioners and course designers were not about course design. The professional institute went along with the idea that you needed a core, around which students could then specialize. British (more than American) planning education was linked into what the job market was interested in: 'They want people who've done economic development, industry and commerce…urban conservation and urban design…transport questions, and the range of specializations that gets selected reflects the world of work out there.'

Is planning different in these respects from other multidisciplinary courses, like social work or teacher education?

> Probably not…it's interesting what makes one multidisciplinary course different from another…. [In architecture] you do need a long time…the range of things that have to be brought together…a pretty robust technological understanding of structures and materials and construction, with a good grasp of the social and economic context of buildings, with a good idea and knowledge of management, how you actually manage a building project, with a good grasp of what all that means for the design of the project…. In planning it's not quite so much but it's still quite a lot.

Planning involved a mix of public-policy questions and spatial arrangements, development, and the physical environment. It entailed a knowledge of the social sciences, form and design, good verbal reasoning and quantitative reasoning, and the ability, when they had put all that package together, to go out 'and write coherent reports about things'. Courses therefore had to bring practice 'into the mainstream academic discussions…. The CNAA has been quite important in pushing that'. Public-sector higher education had been 'a more creative force for change, it has picked up new ideas' which had changed very rapidly since the early 1970s. New staff had been appointed to the polytechnics rather than the universities. The polytechnics had made the running. The debate in the academic community had changed, the universities were changing and 'coming along behind'.

Are courses like this at Oxford and elsewhere a 'vocational higher education'? Planning studies on the Oxford Polytechnic model was, she thought, 'on its way to being a vocational higher education'—the diploma was needed on top of it. The multidisciplinary course focused increasingly towards the end on applying knowledge in practical situations:

> We have always said that there was no fundamental incompatibility between the academic and the applied…intellectually challenging if we got the mix right…. We don't…claim that at the end of the three years people could go out and immediately have all that they needed as an initial training for a vocation.

Not until the diploma year were questions tackled regarding professional attitudes and ethics or the specificities of law.

> We are trying to produce people who have expertise which is useful, know what putting that to work means, know both the technical and the ethical questions in putting that to work, and if that means vocational then I'll have a vocational label.

The difference between that and a traditional 'liberal' education, she believed, was that 'it's putting knowledge to work in organizational situations, in relation to someone else's definition of the problem rather than your own'.

Would it be true that in this and similar courses you are drawing on two traditions—the 'liberal' tradition with an emphasis on independent thought and flexibility, and another tradition concerned with employment destinations and the application of knowledge? 'I would think that's very interesting, actually. The liberal tradition I recognize, the other tradition I am not sure that I have seen articulated…. I think that would be the case.' Students, she emphasized, were 'vocationally oriented' on entry. They came because they were 'interested in the environment', a lot came because they wanted 'a job at the end' and their parents had told them it was a professional education and 'a good thing'. That was less strong than in estate management, but was still very strong indeed. There was a problem:

> You have to show them that planning is a political and institutional process, as well as a set of concerns one might have about things, as well as a set of skills and techniques you can apply—and some students have great difficulty with that, and they get quite depressed because they think after a while that you can't do anything because of the institutional problems.

By the end of the third year most students had established a sense of coherence, appreciated 'the meaning of the range' of work, and there were 'sense-making devices'.

From the late 1960s the educational community had strongly influenced the professional body. Course designers had been 'forced because of the CNAA to be clear why we were proposing certain things, and why we thought that they met the objectives of the practice community, the proper objectives of the profession'.

Commentary

In all of these areas stress was laid on the pre-professional (or even pre-vocational) nature of the undergraduate courses, which

required further study and qualifications and/or experience for students to be eligible for membership of the appropriate professional body. In all cases the course had an eye to the requirements and role of the professional institution, with which relations varied but which, in estate or land management and planning studies, were almost an integral part of the professional lives of the tutors concerned. The professional body, being coterminous with the employment field or fields for which students were being prepared, was accepted in these two cases as a body of peers, and one which did not impose 'outside', unacceptable constraints: it was indeed amenable to dialogue and influence. The longer history of the architecture profession, and the nature of its established roles and recent internal controversies, perhaps explain the different perception of the RIBA in the one interview where it was discussed.

The aims of the courses as expressed in the documentation echo many of the elements apparent in engineering and business studies, including student qualities of independent thought and self-reliance, with understandably stronger emphasis on willingness to undertake further education, and with greater emphasis on the application of knowledge and skills at the expense of detailed reference to 'coherence' and integration. The relationship between the academic/vocational content of courses and their rigour was followed up in the interviews.

The interviews brought out in all cases the importance of the breadth of the course as an aspect, even though differently structured in the different courses, of the complex practice of the future professional, feeding—with different rhythms on different courses—into the student's own engagement with practice, with projects, and with problem-solving, goal-seeking, solutionproposing activities. Course structures, the previous experience of staff appointed to teach them, and the commitments of course planners indicated the importance attached to the incorporation of practice into the courses themselves, not as discrete elements but as pervasive contributions. The emphasis everywhere was on active student learning (or on movement in that direction in the one case where it was felt to have been inadequately achieved). In essentially design-based courses the project had a high profile, but in all of the courses there was an emphasis on case studies, simulation, or other interdisciplinary or self-motivating strategies. Even references to a master-apprentice

situation were intended to underline how quickly students were expected to take an independent stance, to develop at their own pace, and to question and challenge.

Courses were accepted as 'vocational', but with a range of explanations. In many instances there was the proviso that the course pointed to a variety of occupations or employments within the field, with students motivated, but not precisely motivated, towards such employment from the outset. The breadth of occupational opportunities in estate and land management and in planning was reflected in the breadth of the courses. The position in architecture was different, though the 'architectural studies' course was seen as a liberal education for those few students who did not opt for the 'vocational route'. Even where the narrowness of the vocational preparation was concerned, it was strongly denied that this implied any intellectual constraint. Courses were not only in general not educationally limiting, they were in fact seen as at least as challenging as traditional liberalarts courses, the difference lying in the organizational and professional contexts in which the knowledge and skills acquired were to be applied. It was not that 'liberal' (the meaning of which was strongly questioned) education was missing from these courses—it was being supplemented, a 'healthy scepticism' was being combined with positive proposals, and participation in dialogue and debate with induction into the processes of putting knowledge to work. The essential context was a tripartite (student-staff-employer) understanding of the range of likely employment outcomes, and in all cases the interviews emphasized the educational opportunities and aims the courses were designed to exploit within that broadly and positively conceived framework.

Such polarities as liberal/vocational, specialist/generalist and academic/professional were therefore not seen as having, expressed in these forms, meaning or relevance, and the courses were either drawing on or reconciling in practice the discrete threads that those polarities may have once represented.

All of the courses were located at the vocationally specific end of the typology set out in chapter 3. They offered a part-training or an educational base for training for occupations which, as with engineering, were characterized by regulation of entry by a professional body.

A division of labour between undergraduate education and postgraduate training, whether education-based or employment-based, was important for the educational purposes of all of the courses. We noted in chapter 3 that this could allow greater scope for the 'academicization' of the curriculum. Indeed, we did find a 'steer in an academic direction' in architecture and a movement towards 'academic status from a very unacademic base' in planning. But a greater visibility of the academic was not in opposition to but provided a redefinition of the vocational task, described for us in the case of estate management as producing 'the thinking generation of chartered surveyors'.

The specificity of employment outcomes and the clarity of the routes to achieving them seemed to have encouraged a confidence of purpose about the courses. All were multidisciplinary but the disciplines remained more in evidence than in business studies and disciplinary problems were not seen as necessarily distinct from professional problems. Attracting good students and without the professional pressures towards curriculum overload, the courses did not appear to be faced with the kinds of pedagogic problems evident in engineering. The educators seemed to have a secure role *within* the profession and were in many cases seen as providing a key impetus towards professional change and development.

13

Institutions

We have seen earlier some of the ways in which institutions in the public sector have, particularly in their prospectuses, indicated to some degree the philosophy on which they seek to operate. British colleges and polytechnics do not normally have publicly disseminated 'mission statements' on the US model, though documentation for CNAA validation purposes—particularly for institutional reviews-has always suggested institutional aims, as well as the kind of course aims which we have discussed. As Davies has pointed out mission statements can have a variety of purposes—inspirational, the assertion of institutional or sector differentiation, justification for autonomy… (Davies 1985), whereas prospectus statements are directed to students or constituencies which influence recruitment. They have to persuade.

The realities of institutions are not easily discernible in national policy statements which, whilst appearing to be prescriptive and in fact imposing constraints, nevertheless leave or create many of the ambiguities we have previously discussed. The 1966 *Plan for Polytechnics and Other Colleges* talked of

> a strong and distinctive sector of higher education which is complementary to the universities and colleges of education …the object will be to develop them as large and comprehensive institutions offering full-time, sandwich and part-time courses of higher education at all levels.
>
> (DES 1966:9)

Within that broad definition the polytechnics—and those subsequent colleges of higher education like Humberside with a similar range of courses and levels of provision—have tried to project a 'mission' which is 'vocational', 'applied', and employment- and community-orientated. The courses we have discussed, whether in long-established areas such as architecture

and engineering, or in more recently defined forms of professional preparation such as business studies, estate management, and town planning, have developed their identities within institutions themselves establishing identities. In the four institutions with which we have been mainly concerned it was important to have this wider context and perspective of the director or principal.

Humberside College of Higher Education

Director: Dr J.Earls

The college prospectus contains phrases common in public-sector prospectuses- 'relevant courses', many with 'a strong vocational bias'. Do those define what the college is about?

> Very much so. If you take courses like fishery studies or industrial food technology, then demonstrably these courses have fairly specific, industrial, career aims, which are reflected in the syllabuses and in the curriculum. Of course at the same time we wouldn't want to argue that vocationalism is necessarily a very narrow education, so that the curriculum does have other ingredients, hopefully which will have a wider applicability and make the students reasonably mobile.

How does that differ from what the universities do? Are their courses not designed in the same way?

> They're not designed in the same way. It's hard to compare any one institution with another, but generally I think it could be said that the courses at the colleges have a much more obvious and demonstrable industrial connection…. Quite a few of our courses, especially business studies, are sandwich…so that we would say that our courses have a more immediate articulation with industry, and they're much more responsive to the perceived needs of industry, whereas I think-in general for the university sector one might say they are…more concerned about their own institutional objectives.

Presumably some university courses do what you 're doing, and some of your courses don't do that?

> That's indeed true, and I think that the university sector and the public sector are overlapping sets, and I think if you went to Salford or Loughborough you would find that their courses would be very similar…if you went to possibly Exeter you would find that their engineering courses were very different from engineering courses at Humberside.

What is it that makes your courses vocational?

> I think it's three things. One, it's the content of the course. Also to some extent it reflects the aspirations of the students—clearly the students come in to do certain things and they believe that what they're going to do is going to be relevant and immediately helpful to them…. But thirdly, I think it's the attitude of the staff, and the things the staff do…. The staff in an institution like this are much more intimately involved with and understanding of industry…their research work is generally applied…and it's the consultancy and the applied research that inform the curriculum and the content.

How do you meet the objections of people who say that it isn 't what higher education is about-it ought not to be serving the needs of industry?

> I suppose the classical mode is to do PPE or Greek and Latin—and that's an education, and doing industrial food technology is not. I think again that's untrue, they are overlapping sets… if you do industrial food technology there can be as many intellectual demands and the student can develop in the context of a course like that as well as in PPE. [In] areas like design or business studies…some of the problems are just as intractable and intellectually demanding as they would be if you were translating a Latin text or writing a dissertation on Iranian architecture.

He explained that there had been debate in the college in recent months about 'learning to learn', based on a paper prepared by himself and the student counsellor, examining in the faculty boards the scope for more 'student-centred' learning, the need for staff development and a 'general change in the attitude of students to the way they learn'. [This discussion was preceded in 1984 by a director's paper on 'academic priorities', picking up some of the Leverhulme discussion on the aims of undergraduate courses, pointing towards breadth, balance and personal skills not

particularly knowledge-related. The director's paper underlined the wide range of subject specialisms in the college, with their different educational emphases—'creative, discursive, analytic, synthetic, professional, social, numerate, linguistic'. A central question was the possibility, through good teaching/ learning practice and other measures, of making 'what is taught' subordinate to 'how it is taught', of establishing a common purpose and process, a 'style', producing graduates with an 'educational "water mark"'.]

In addition, he thought, part of any academic structure reorganization under consideration should redefine courses so as to make students more mobile (perhaps through a modular structure), but also in order to help 'to bind the college together', give the student more choice, and enable 'people from outside the college to come in and take elements of the work of the institution, which…they can't do when the courses are defined in a monolithic fashion'. That constraint had in the past been partly due to 'CNAA's preoccupation in the early days with coherence and progression'—and these now had to be partly sacrificed in favour of continuing education and other advantages.

Is the antithesis between the liberal and the vocational breaking down ?

> I do think so…primarily for the reason that employers, especially over the last five or ten years, have become very much more interested in the affective qualities of the students, their attitudes, their enthusiasm, their commitment, and while they may want an electronics engineer or an industrial food technologist they also want a person who is enthusiastic, commited, flexible, responsive.

Arts students have traditionally had time to develop these qualities by doing other things, such as music or politics. A criticism of students on 'vocational' courses is that they don't have time to do that?

> I'm sure that's true. If you take a typical engineering course then probably the minimum number of hours in any one week is about twenty, compared to an arts student's twelve. I think you now have to look at what that twenty consists of…things like group projects, mini-projects, syndicate studies…. There's a drift

from one towards the other. The curriculum is still longer for the typical vocational student.

Some might argue that the public sector is too open to outside pressures?

That's fair. Employers will tend to think very much in terms of their short-term needs…whereas we've got to be minded that our graduates are to be in employment for the next thirty to forty years…. I think employers have to realize the imperatives that educational institutions have to face in terms of standard, content…. Any completely subservient role between the college and the employers would be wrong, but it's quite understandable and quite proper for students to feel that their course is informed by what industry believes to be important.

In relation to the 'mission' of the college how useful, finally, is the concept of 'vocationalism'?

My impression is that it's becoming less important to talk about being vocational. I'm not sure that it means too much to school leavers or…to school teachers for that matter, and certainly a lot less to parents by and large. I think what I would want to emphasize is that the college has courses of a kind that is related to the needs of industry, but which develop the student as an individual and create in him or her the qualities for good career progression. You could do these things, achieve these objectives by doing a course in Iranian architecture or by doing a course in industrial food technology, so I would say that vocationalism is something I am less wedded to now than I would have been ten or fifteen years ago.

Leicester Polytechnic

Director: Dr D.Bethel

You don't use the word 'vocational' in your prospectus, but if you look at all the courses that is the impact. Is that in your view what is distinctive about the polytechnic?

Certainly. The emphasis is on the application of knowledge, and I would say philosophically the emphasis is on the idea that people learn best when they understand how the courses can

> be applied to real life. So the difference is not just the aim—the application of knowledge—but the actual learning process must be different if that is your aim.

There are some courses in the polytechnic which might not fit that, and some courses in a university that might. Is it that the majority emphasis is different?

> I would argue this…. I believe one can draw up a model of a classical university and you will not find one of the universities in the UK which fits that model entirely…. A number of courses at Oxford and Cambridge are entirely vocational, for instance the architecture course…. However, the teaching of it is very different from the way we teach architecture here…. If you turn to the polytechnics, let me give you an example I love to quote—our degree in the history of art. There are only five degrees in the history of art in the public sector, and they're not all alike. I think the one at Leicester is unique in so far as its origins were in the police, insurance companies and banks, wanting to recruit…people who were probably graduates in art history, but who understood the valuation of artifacts, and who could tell the difference between a good copy, a fake, an original, a reproduction, and so on. So our history of art degree was formed on the basis that we would produce such people. The universities were not producing anyone capable of doing the job without further specialist training…. In addition to the normal scholarship [our graduates] will have a scientific training.

Such students, he believed, could use techniques to attribute, could watch the market value of art, make valuations for collateral purposes for banking, and for insurance purposes, and give accurate descriptions to the police and Interpol-all of which illustrated the difference between similar courses in a university and a polytechnic.

A spokesman for the liberal tradition of higher education might retort that such a person will do a good market job, but is that higher education ?

> I'm not in the business of defending [our approach]—the defence has to be on the other side…. The people to whom you refer lived in an entirely different world, where, for

> example, everyone was in a class and knew what that class was …whereas today everyone has expectations…of all kinds which can only be met by, I believe, a different kind of education…. I would argue that what is intellectual stimulating today is quite different from what was intellectually stimulating 150 years ago. There is no doubt in my mind that for a majority of the people…technology and its applications is intellectually stimulating…. Higher education cannot be graced by that term unless it is intellectually stimulating and a training of the mind.

Having a course with employment outcomes in view did not, he insisted, remove those stimuli and 'to some extent it ought to concentrate them…. With luck and good teaching you may even discover better stimuli', better ways of 'producing an enquiring mind'. This was the argument for sandwich courses and project work. How actively does the polytechnic engage with questions of teaching methods? Probably, he suggested, in three main ways:

> through our staff development programmes…detailed discussions between the individual and his head, the head and the assistant director in charge of staff development, working out what is best for the polytechnic, the school or department, and the individual…. The second one is, we have a Centre for Educational Technology and Development, and people are seconded there, particularly when they first come into teaching…to learn about the importance of how people learn…. When preparing resubmissions…of courses, staff invariably are seconded for a while to this Centre to be assisted in questioning what they are doing…. Thirdly, in our promotion strategies we rate development in teaching and learning strategies highly.

Is there a problem about students in the kind of courses we are discussing not having the same opportunities for extra-curricular activities, because of heavy contact hours? The students in the polytechnic with the longest curriculum hours, he pointed out, were in art and design, whose interests did go beyond art and design, but whose reading time was limited:

> The technology/science people have more time…art and design students do about twenty-nine hours a week, science and technology about sixteen, very few people do less than

> that…. When we have the kind of general interest lectures that we do put on for town and gown purposes, we get a very poor attendance from the polytechnic as a whole, staff and students…. When we have music, drama, dance, recitals, we don't get queues of polytechnic people…. I don't believe it's to do with the way they're taught or what they're taught, I do believe it's about the much much longer ingraining tradition.

Polytechnics had a stronger 9 to 5 tradition than universities, with their residence and stronger sense of community. Some countries might think we are producing rather narrow people, in the technologies and other areas: would they be right?

> I think we do. It doesn't start here, it starts in the sixth form, or even before that of course, with the narrowing down of the curriculum…. Uniquely in this country the professions can distort higher education, certainly limit it, by insisting on certain things being put in the curriculum…in any of those subjects with a professional body which, in our terms, validates along with CNAA or in addition to CNAA…does constrain what should be in the curriculum…. The Engineering Council now…are *insisting* that curricula be broadened both in univesities and in polytechnics, and in a sense going counter to the professional bodies who in the past dominated engineering education…. One can blame to some extent the influence of the professional bodies.

Polytechnics were more accountable than universities to other bodies in society, but:

> I don't object to this accountability…. We have a range of consultative committees, and voluntarily we put our curriculum and curriculum changes…to our consultative committees for their comments, advice. We don't *have* to take their advice, we don't necessarily take the advice, but…it gives an input from practising people to academic life, and it allows academics to argue with practising people about the practice of education.

Do you use the word 'vocational'?

> No. I don't, because I think it's misleading. It has connotations of narrowness, and of technician level, neither of which is what vocational education need be about. The traditional vocations

> of law and the church and medicine for example. …I leave [that vocabulary] aside…. I wouldn't want to use the word while it still had connotations which are not helpful.

Napier College, Edinburgh

Principal: Dr W.A.Turmeau

How do you interpret the strong 'mission' that Napier has, and affirms in its prospectus and documentation, of 'vocational relevance', as part of the tradition of this college, and given the way Scotland organizes its higher education?

In Scottish public-sector higher education,

> colleges such as this are, shall we say, advised by the Scottish Education Department to do vocational types of courses, and not to do social sciences and liberal arts, so to that extent I suppose we're directed. On the other hand, we have done the types of courses within that framework that we think are required by industry and commerce…a slightly limited framework, but we do what we think is right within that framework.

As CNAA, SCOTBEC, and SCOTVEC courses they clearly had 'positive career prospects'. A course could not be mounted without SED approval, and they needed to be sure that there was a demand for the course, and a need for graduates from the course. Within that framework courses were designed on the basis of the college's expertise.

The prospectus, academic plan, and other documents stress that courses are vocational and interdisciplinary. Is that a strong connection as perceived by the college?

> In the early days certainly interdisciplinarity had a very high profile—it still has a high profile. I think we feel that courses that are going to be vocational in nature must inevitably provide the student with a relatively broad band of disciplines, a broad band of education. A student in engineering obviously should know something about business and management…. We feel it's to the advantage of students to have a relatively wide range of knowledge…. It's not a case of interdisciplinarity…so the student has a well-rounded education which is going to be useful. We realize that we're not just educating people for a job

> this year, next year, or the year after…. We're trying to educate them for…a career…. We do feel it necessary or important to give the student a reasonable breadth, though we do have some relatively single-discipline courses…. Our BA Business Studies may sound like a BA Business Studies at a university, but in fact our business studies degree has a sandwich element, it does have options, it does have a wide base and vocational aspect. It's different from a traditional university degree. In some ways the universities have been copying us as far as business and management type courses are concerned.

An accusation from some people working in 'traditional' fields might be that courses of the kind you describe tend to become narrow, unquestioning, information-gathering?

> We wouldn't concede that at all. There are still disciplineoriented subjects within the courses…. [On] a single-discipline course you may learn a lot about that but not much about anything else…. It's important to know how one discipline impinges on other disciplines. An engineer may be a wonderful designer…but if he can't equate the impact of that design on society, and the cash flow concerned with that product, then there may not be much point in designing the marvellous product in the first place.

The implications of those types of courses for teaching methods were discussed in the institution, in boards of studies, and achieving integration was not easy. All boards of studies were concerned with how the different elements of courses interconnected. The staff teaching courses did get together—this was not a 'cafeteria system'; the courses were coherent, and that was their strength, and the strength of the students by comparison with those who might have done a 'pick 'n' mix' course. There was a staff development committee, and each faculty had a staff development responsibility, carrying out the policy of the staff development committee (or academic board). As much as possible was done to encourage staff to take higher degrees and attend seminars and conferences, and there was an 'inherent' staff appraisal system in the departmental structure.

Historically, in England 'vocational' has had a pejorative usage, and implied low status; has that been true in Scotland?

> I don't think so. It hasn't had the same connotation attached to it, I wouldn't have said. Scottish universities have turned out MAs and broad-based degree courses for a long time…. I suppose you could have called them vocational, so the word doesn't have the same 'dirty hands' concept it might have in England…it doesn't raise any eyebrows and suggest second-class quality.

The concentration of vocational courses in the central institutions (CIs) and colleges had not, he felt, been narrowly interpreted. What had happened in Scotland where the CIs had been under Scottish Office control had been a concentration of vocationally-oriented courses in the CIs

> to the extent that there aren't any arts courses, liberal arts, or anything like that in the central institutions, which *has* happened in the [English] polytechnics, but I think this has worked to their advantage…provided it's properly looked after and properly controlled…. At least we are seen as different-I think we are seen as something slightly lower than the universities currently…. That can be changed, and will be changed as a result of the STEAC report. Nevertheless, we are seen as different…providing a different function…career orientation…sandwich courses…different types of courses. Where the polytechnics in England, some of them, have been seen to be in competition with the universities. If they try and compete I don't think the polytechnic's going to win.

Napier was not competing with Edinburgh University and only peripherally with Heriot-Watt (the three principals had meetings, knowing the institutions were going 'down different lanes'), and

> I think that with the vocational orientation that we have, and with the background that we have, the sort of public recognition that we have, I would certainly see us coming up in the field…because we have gone along that road…the higher that profile the more funding we will get, and eventually I hope we will get equal funding.

There was nothing wrong with being interpreted as being 'a service station'. The basis of a community depended on industry and commerce and service industries:

There is…the counter argument that we should be allowed to do liberal arts and things of that type. I think maybe even the time will come when we might do that…the market right now is doing the things we're doing. When we've done well, even better, in that field…we would hope actually to get university status within five years or something like that…. There was a fairly strong faction within STEAC which was for a University of Scotland. I still think that is on the cards…we certainly don't rule out the possibility of doing liberal arts, but it would be ridiculous to do it now when we have something like eight applicants for every vacancy we've got on vocational-type courses…. I go along the line for example, that engineering is just as good an education for life as a course in the liberal arts. Education doesn't have to be through liberal arts or social sciences or something like that, it can be through any course, provided that it's the right type of course…. A scientist or an engineer is getting just as good an education, provided it has the wide base we're talking about, as the other types of education.

Oxford Polytechnic

Acting director: Mr V.T.Owen

The polytechnic prospectus talks about providing 'vocational, technical and traditional degree courses'. Is it easy to discriminate amongst courses described in that way?

Certainly if you look at my subject area which is history/international politics, you can argue that is totally non-vocational in the strict sense of the words—if you just think of engineering or business studies, let's say, as vocational. I would argue that correctly studied, in the sense that one's mind is flexible enough to move around various areas, I think that almost any subject can be vocational, in what I would term the *real* sense of the word 'vocational'. I think in many ways that probably is a bit out-dated, setting degrees out like that…distinguishing so rigidly between areas, especially since we offer as our major degree course the modular course, which does spread across virtually every discipline we have here, and which does combine

the 'vocational' courses with the 'non-vocational'—someone can read history with computer studies for example. I think everyone would say that computer studies was vocational, but perhaps not everyone would argue that history was, but I think that history combined with computer studies is most certainly vocational.

If the distinction is slippery within the institution, the prospectus also claims that the polytechnic sector is complementary to the universities. Do you think the distinction is slippery across the boundary as well?

Yes, I do…. That is certainly not a terminology I would wish to stick by…. I think in certain areas we are complementary, and in certain areas we overlap, and quite considerably actually.

Are most of the courses designed to direct people into fairly specific forms of employment?

No. Some most certainly are. If you look, for example, at the faculty of architecture, estate management and town planning, I think that the majority of students who go through that are directed most certainly into a definite line of work…they will probably work within the area of architecture, town planning, or estate management, whereas someone going through most of the other faculties could go into totally diverse kinds of work.

So what defines the content and quality of a course is not necessarily that there's a job at the end of it?

Not necessarily that there's a specific job at the end of it. I think there has to be a job at the end of it, otherwise we're really wasting our time and theirs. But I don't think we should say: 'right, when you complete your three years or however long it is you will go into business or profession X, Y, or Z'.

Some people out of traditional 'liberal' backgrounds would accuse courses like town planning, engineering, business studies, of narrowness, producing robots rather than thinking people. You 're not accepting that kind of argument? 'No, I'm not. I think that certain subjects obviously allow one to use one's mind in different and broader ways than others, naturally, but having said that I think any subject taught properly must allow an element of that.' *At your own two previous polytechnics and here at Oxford has there been much discussion about what 'being taught properly' means?*

> It's a subject that increasingly gets on to the agenda. I think in the early days one was much more concerned with getting courses approved, getting recognition, and lifting the institution away from being a technical college or whatever it was. I think as we perfect our courses and as we gain experience we do tend to look much more at the ways we teach and how we can improve that teaching. Certainly here at Oxford there is a great deal of emphasis placed on the teaching aspect and the way we teach.

Some subject areas are more information-oriented than others—engineering for example. Does that raise anxieties?

> Yes…but I'm pleased to say that…in the eighteen or nineteen years that I've been in the game the engineering subjects, for example, which, when I first came into this sector of higher education, were taking twenty-eight or twenty-nine hours a week teaching, class contact, have now reduced that to something like twenty. It's not marvellous, but it is going in the right direction. At the end of the day I think they will always argue that there is a certain amount of information which must be put over, but I would also argue that there is a certain amount of information which a student must absorb whether he is reading English, history, or mechanical engineering. The distinction is—how do you do it? Do you expect the student to learn and absorb information for himself under guidance, at home, or in his study, or must we insist on actually teaching him, lecturing to him, giving him notes? I would prefer the former approach, even in a subject like engineering.

There was still a difference between the amount of time arts students had for extra-curricular activities and, for example, engineering students with laboratory commitments. The distinction had diminished

> but it's still there. There is still a reluctance on the part of some institutions and, I think, the older style teacher, to abandon the need for this very close contact. It has improved, there is no doubt about that, and it is improving. And I think that it will also be forced to improve more rapidly as our resources diminish.

One of the things people say about 'vocational' courses is that they place institutions under pressure from outside sources—professions, industry, commerce—including on the content of courses. Have you, particularly during the last four years at Oxford, had any anxieties about such pressures?

> On the contrary, my anxiety is that we don't use the world outside enough. I think the world outside *should* be consulted, *should* be involved in the design and the furtherance of all our courses. I think that the days of producing a sort of 'ivory tower academic' are gone forever, and I am rather pleased that's happened…. I would argue that for all our courses. I think the greater the outside involvement we can find the better…. I wouldn't really call it interference, I'd call it assistance…. There's been quite a wind of change in the universities in this respect.

How useful is it to use this word 'vocational'?

> My view is that it is one of the most misused words in the English language. If it could disappear for ever I'd be terribly pleased, because it does confuse people. People's interpretation of the word 'vocational' varies to an incredible extent… from the very narrow definition of coming with blinkers in one channel tunnel, looking for one job at the end of the day, to the sort of vocationalism which I would expound, namely that if you are learning properly, in the sense that you are equipping yourself for a whole area and series of jobs…[that] is much more vocational in the long run, because the world is forever changing and will continue to change even more. How one gets away from [the word] I don't know: I really would like to see it totally removed.

Part Three

A LIBERAL VOCATIONALISM?

14

A liberal vocationalism?

Throughout our discussion it has been apparent that the concept of the 'vocational' is in a number of ways defensible as a legitimate and even central process of higher education, and that the concept of a 'liberal' education therefore requires reappraisal. One of our interviewees talked of the need for a 'hybrid phrase' to describe what has emerged in the public sector since the 1960s. Such a concept would straddle the older tradition of liberal values and the younger tradition of more explicitly employment-oriented courses, across a much wider range of employments, than would have been acceptable to spokesmen for the 'liberal tradition' in the nineteenth century. The concept would need to indicate the extent to which, in the conditions of the late twentieth century, these traditions as embodied in the profiles of sectors and institutions have been made to combine or to overlap. Our discussion suggests the need to recognize the importance of bringing the discussion of higher education away from extreme positions in defending liberal and vocational traditions, and towards a conception that, with many of the reservations and conditions we have discussed, comes into an academically, professionally and socially defensible central position.

An extensive discussion of these 'traditions' would necessarily involve a more sustained analysis of these sectorial and institutional characteristics and statuses than has been possible, as well as of their implications for the educational system more widely. It would involve an examination of what is changing in the universities, and across a much wider range of disciplines than we have addressed. It would entail an examination of the impact of modern technologies on higher education curricula, and the responses of higher education—internationally as well as in Britain—to the imperatives of economy-led policies. Although those directions have not been followed here in detail, it is clear that the voices of

those we have heard in 'vocational higher education' in no way echo the certainties and assumptions of national policy vocabulary and syntax of recent years.

The 'hybrid phrase' which seems to us most convincingly to reflect the discussions we have heard and our interpretation of the processes and intentions involved is a 'liberal vocationalism'. Some of our interviewees have looked to a 'broadly based' or some other generously defined form of the vocational, though breadth does not always seem to summarize what they are seeking to establish or to preserve. The concept of a liberal vocationalism arises not out of theory, or out of policy intention, but out of the historical realities of course development in the contexts and on the bases we have described. If we are concerned in this respect with change in the relationship between abstract 'values' and the impacts of politics, economics, and the labour market, we are concerned with courses, with the expressed aim and design of courses, with the delivery of courses in the shape of teaching methods and technologies, and with the evaluation of course effectiveness. We are concerned also with the mix of students to whom courses are delivered and who in return—by their own characteristics and activities—help to shape the courses. We are concerned with the nature of the institutions and profiles of higher education within which the courses are designed and implemented. We have therefore in this study focused on courses, and we do not believe that any other focus is possible for a serious analysis of vocationalism and its implications.

We have chosen to look at courses through the eyes mainly of those who are responsible for designing and running them. They have been anxious to defend or explicate what they are doing, while at the same time being realistic about the problems. As we have emphasized on a number of occasions, the reality of courses may be different from intentions, but this would be as true of the 'conventional' single honours degree in any institution as it is of the applied 'vocational' degree.

Everyone with whom we discussed these issues was hesitant about the label of 'vocational', unless it was clearly defined or its implications were made explicit. Most rejected dichotomies based on conceptions of 'liberal' and 'vocational', few were prepared to reject completely the applicability of 'liberal academic' values to their own courses. Yet everywhere there was a sense that we were talking about a distinctive kind of higher education, shaped by

diverse influences, but sharing common characteristics. The following features were present in virtually all of the courses we have been looking at:

(i) curricula selected from several disciplines;
(ii) curricula related to 'real world' problems;
(iii) an emphasis on breadth—of courses and of outcomes;
(iv) a concern with long-term employment needs;
(v) a concern to produce questioning and critical graduates (while conceding that this was not always successful);
(vi) an openness to external—'industrial'—influences.

Courses in many of the fields we examined were in the process of shifting their emphasis from 'knowing' to 'doing', and looking for new methods of teaching and learning through which to achieve it. Among the main differences which we detected in this process were, first, the volume of information to be transmitted and its implications for the achievement of other course objectives (in particular, in engineering); secondly, concerns about the quality of student intakes (again in engineering); thirdly, some indications of changes in the professions resulting from changes in their educational basis for recruitment (for example, chartered surveyors). The subject areas we looked at differed in the role performed by their qualifications in the labour market, and we considered some of the likely consequences of this in chapter 3. Where qualifications have the greatest power to regulate entry to jobs, educators are likely to face more explicit external constraints on the curriculum. This was most evident in engineering where the information load was great and in conflict with the achievement of other educational aims. In fields where there are alternative routes of entry and a structure of qualifications outside of first degrees, the constraints of information requirements are much less. So in planning, with a clear structure of postgraduate training, the approach to what a degree was about was held to be distinct from the more explicit vocational preparation of a professional course. The position was similar in business studies, where we saw a lessening of concern about what a business-studies graduate needs to *know* and increasing interest in what he or she needs to be able to *do*.

The role of educational qualifications in the labour market is continually changing. In some employment fields, a relevant first

degree may come to assume much greater importance in regulating entry than in others. In such cases, courses may come under pressure to do different things as employer expectations adapt and become more explicit. However, with the possible exception of engineering where there are conflicting signals from professional bodies and employers, external interference was not considered to be a problem. Indeed, the view was often expressed that more involvement by employers would be welcomed as an effective means of bringing the 'real world' into courses.

The map of higher education is gradually changing as more fields of employment become linked to relevant undergraduate degrees. We have not mentioned courses in catering, home economics and hotel management, nursing, health studies, and pharmacy, or recreation, sport, and human-movement studies. Courses in these and other fields are making a new kind of contribution to the labour market. They enable more and more students to select courses for career-related reasons and to use higher education as an explicit preparation for work. Whatever the precise set of educational and personal objectives achieved, these courses provide an educational experience which denies boundaries between academic and real-world knowledge as well as between knowing and doing.

And yet 'traditional' university courses continue to attract the best students and to draw the top employers. We do not know with any certainty how far the curriculum map in the universities is changing. As we have seen in our interviews with heads of institutions, there has been a clear attempt to make public-sector higher education distinctive from that found in the universities and to build on technical-college and further-education traditions. Notwithstanding the very considerable overlaps which exist, there seems to be little doubt that the two sectors have different educational profiles.

One consequence of the growth of more courses with specific employment links is that the size of the 'open' labour market for graduates might eventually be reduced. At present, careers in many fields are achievable by a variety of different routes, some involving higher education, some involving specialist degrees. In so far as the specialist degree route becomes the more favoured, or even obligatory, the career options open to the 'generalist' graduate are reduced.

New graduates with qualifications from the public sector are likely soon to exceed the numbers coming from the universities. But it will be twenty years or so before their full impact will have been made on the labour market. Most of the people we spoke to talked of long-term employment needs. Given that at least some of these graduates become the graduate recruiters of tomorrow, we may begin to see changes in the attitudes and expectations of employers, bringing further changes in the role of educational qualifications, further opportunities for course development, and further erosions in the boundary between 'academic' and 'real' worlds.

The issues reflected in our interviews and analyses are not, of course, a monopoly of the subject areas we have explored, nor of public-sector higher education associated with the CNAA. The discussion could have revolved similarly round courses in institutions whose work has been validated by universities, or courses in subject areas such as the performing arts. The self-explanations of those institutions and those courses can point in similar ways to preparation for a career or a variety of careers. Debates about a 'retreat into specialised uselessness' as against 'educating for capability' in architecture (Nuttgens 1986:1) are not confined to that area of professional preparation, or to the others we have discussed. The universities have also not been exempt. A consultant called in to investigate the policies and running of Stirling University in a crisis of the 1970s recommended the addition of some 'vocationally biased' subjects to the university's curriculum in order to contribute 'a sense of motivation and a certain down-to-earth common sense', and new areas of study at Stirling were in fact to include ecology, management science, business studies, and film and media studies (Young 1973:14).

In the institutions and the subject areas we have considered, and in these wider circles of institutions and subjects, there is a concern to understand and make explicit the implications of the pursuit of knowledge, not for its own sake but in relation to its applications. What we have found, as Barnett underlines, is a sustained, explicit justification, or at least explanation, of the roles of the polytechnics and other institutions in the public sector, a denial of past attempts by philosophers and others to establish clear or self-contained definitions of what constitutes 'education' and 'training' (Barnett 1978: ch. 4).

It is important in considering these issues to emphasize that the polytechnics and colleges have had the dual need to define their distinctive roles, and to establish themselves in public awareness. They have had to define, explain, and persuade—and convince themselves, and meet varying degrees of outside pressure and expectation. They have had to satisfy the CNAA and other professional and accrediting bodies. In any analysis of institutional or course statements, therefore, there is the difficulty of evaluating the balance of messages, those which express a core commitment, and those which are responsive—in reality or rhetoric—to outside signals. One of the virtues of the public sector's development in these decades, as we have underlined, has been the explicitness of its intentions, but part of that history of explicitness has to be understood in terms of the requirements of the CNAA and other bodies, including those which in the 1980s determined the priorities of higher education in the public sector-the Department of Education and Science and the National Advisory Body for Local Authority Higher Education. As the discussion has indicated, a major difficulty of the public sector has been the level of public acceptance of the universities but the need of the public sector constantly to explain and to justify its activities. There has been a fundamental difference in what becomes public and explicit in the two sectors.

In our earlier discussion of policy formulations we saw ways in which the CNAA and its related institutions had expressed their commitments to vocational or employment-related course contents, while at the same time confronting issues of breadth and balance. It is important in this respect to remember the scale of the growth of public-sector higher education since the mid-1960s, and in particular the scale of the CNAA's responsibilities for institutions, courses, and students across the following two decades. By the academic year 1983/4, the numbers enrolled on full-time advanced courses in the universities and in the public sector were almost equal at 268,000 and 266,000 respectively. The addition of part-time students swung the balance firmly in favour of the public sector. First-degree courses validated by the CNAA have accounted for by far the largest part of the student population in the public sector. Although the history of the sector can be traced back to the nineteenth century, its development to the point where it rivalled the universities in the scale and comprehensiveness of its undergraduate provision had been

accomplished in less than twenty years. By 1985 there were 1,335 CNAA first degrees with a total student population of 167, 926, of which 38 per cent were enrolled on courses in science and technology, 11 per cent in business and management, 11 per cent in art and design, and the remaining 40 per cent spread across arts, social studies, and education courses. These broad subject categories in fact disguise the character and distinctiveness of individual courses. Thus, for example, of the 45,915 students enrolled on arts and social studies courses, only 12,901 were taking what could be described as single-honours degrees in conventional academic disciplines.

The combination of the scale of the CNAA's provision and the explicitness of its concern over recent decades with what constitutes acceptable standards, and the processes of ensuring and evaluating them, placed the CNAA in a salient role in relation to the discussion of vocational education. Its validation processes involved detailed consideration of many of the components of vocationalism that we have addressed—course content and its justification, teaching methods and staff development, the employment needs and expectations of students, relationships with the employment market, the pressures and demands of other professional, accreditation, and examination bodies, the quality and nature of student experience, and the operation of institutions. The CNAA and its institutions have also had to respond increasingly to the vagaries of the graduate employment market and to the statuses of subjects (and the resources allocated to them) in the pecking orders established outside higher education itself. Those we interviewed, particularly in engineering, also raised sharply the particular pressures on thinking about the curriculum from the quality of student recruitment (unimportant in business studies, with its buoyant recruitment and lack of real university competition). One element in determining the shape and character of curricula is the way in which those who design courses perceive the quality of students at entry and their expectations of the learning process and the characteristics considered appropriate for employment.

The educational goals pursued in the courses which we have considered were without exception ambitious ones, though there were some doubts expressed about the extent to which they were achieved. However, in the main there is very considerable demand for these courses and in some cases students with very

high entry qualifications are being recruited. Courses which provide students with sustained challenges clearly have major impact upon their personal growth. Interesting and exciting courses recruit the most able students who are stretched and developed into the kinds of people employers want to hire. Thus the liberal goal of the education of the whole person is expressed as part of rather than in opposition to the pursuit of the vocational. As some of those interviewed suggested to us, staff take part in the wider debates in the profession or the industry, and are sensitive to the representations of employers or professionals, but the decisions are made 'in the department'. The CNAA, the public sector in general, the directors of institutions and leaders of courses that we have considered and encountered have not been resistant to these outside pressures—indeed have in many cases been explicit in welcoming them, in describing the mechanisms for recruiting their experience, and would wish to strengthen them.

We have seen how conscious course leaders are of the prior school experience of their students. Differences between British and American or European higher education also relate, as we have seen, to differences in school structures and curricula. Similarly, any discussion of the nature of vocationalism in higher education must take account of the changes in schools and in further education (from both of which the courses we have considered recruit students) that have taken place in recent years. In the 1970s and 1980s considerable attention has been given to the relationships between school and work, bringing schools closer to industrial as well as to other community processes, and to the nature of work-related further education—all of which have been the subject of national policy debate. One of the diffuse concerns is about when, at what age levels, for what groups of pupils or students, the vocational should become explicit. This is in fact two sets of questions.

First, how is the educational system structured for different constituencies and, at different stages, sub-constituencies? At what point, within compulsory or post-compulsory education, do choices occur? How are choices differentially distributed according to educational and social criteria—academic ability, social class, gender, race, culture, geographical location, or physical handicap? How does the curriculum at a given stage reflect these differentials and anticipate the relationship between

that phase of formal education and the needs and expectations of the labour market? The vocational as an issue of debate has to be located within those structures, that phasing, and those relationships with or perceptions of social differentiation and the labour market.

Secondly, no less complex are related questions of what becomes explicit. While all education necessarily serves as preparation for something, or more accurately in advanced societies, tangles of somethings, at what point does or should education not only serve but also aim to serve as preparation for specific, notably occupational, outcomes? How responsive, and at what stages, should educational processes be to the overt, but often contradictory, requirements and pressures of the wider society? At what points should education itself take part in defining common or diverse civic and other roles for its clienteles? How do relationships between the different stages of education (and their priorities and statuses) dictate the acceptance of vocational targets at any one of them? Within what power structures—systemic, professional, community, economic—are public decisions about the vocational made at different stages of educational provision?

The complexity and difficulty of such questions correlate with the degree of pluralism operating in the society, and answers will depend on national traditions, level and type of economic development and change, cultural norms, assumptions about the processes of human growth, the detailed structures of the educational system, and the operation of the labour market. The history of 'liberal education' in national and international contexts has depended in the past on the stabilities and continuities seen to be at work and to be protected, and vulnerable to the sorts of change these questions reflect—especially since the late eighteenth century in Europe and the mid-nineteenth century in the United States. What is understood by and acceptable as vocational in secondary education, for example, therefore differs between countries and across time, and varies according to the availability of higher education, access to it, and its component institutions and sectors. It differs, similarly, according to the priorities and statuses allocated in the society to the occupations to which it points, and the definition of competencies, skills, and credentials required not only for entry to those occupations, but also for access to different levels of within-occupation status and

authority. Assumptions and decisions about the vocational at any stage in the system are therefore a point of intersection between complex educational structures on the one hand, and complex political, economic, and social realities on the other.

We have seen ways in which different national responses at these points of intersection have been heavily influenced by strong historical pressures in given directions. Traditions of gentrification or the relative statuses of knowledge differ and have in recent decades operated differently on national educational policies. Throughout the nineteenth century there was in the conditions and concerns of the United States a considerably more explicit attention than in Britain to the public service purposes of the university: the Rockfish Gap report of 1818 defined for the University of Virginia what it considered the essential aim of higher education: to form statesmen, legislators, and judges (Commissioners for the University of Virginia 1818:4). That explicitness runs through the state and institutional attempts to define and redefine purposes throughout the nineteenth and twentieth centuries, from the University of Virginia at one stage for instance, to the West Virginia Institute of Technology at another—where 'virtually every degree field is career oriented either by design or opportunity' (West Virginia Board of Regents 1979:33). That tradition, as we have seen, has not gone uncontested, but as a sector or tradition in higher education it has produced a constant discussion of the meanings of technology and engineering, business and the professions or semi- or minor professions, within definitions of culture and higher learning. It is of supreme importance in the American case to note that within those different constraints and lack of constraints the discussion of engineering and technology in particular has had quite a different resonance from its British counterpart. From the 1940s there has been a mounting public assertiveness of the 'cultural', 'humanistic', or 'liberal' connotations of engineering and technology. In the 1940s and 1950s it was the 'cultural value' of engineering subjects (Sanders 1954a: 18–19), or the possibility of teaching 'professional or specialized subjects in a liberal manner' (Hancher 1954:359). In the 1960s it was technology and science as integral to the human adventure and as part of the democratization of culture, and the engineers as the 'chief revolutionaries of our time' (White 1967; 1968:149). In the 1970s it was enthusiasm for Eric Ashby's conception (probably more influential in the United States than in

Britain) of the 'technological humanist' (Hazzard 1971:6), and for technology and its history as a 'clear humanistic study' (Friedman 1979:32). In the 1980s it was the development of such emphases as the Sloan Foundation's 'new liberal arts program', based on quantitative reasoning and technology, and technology as a lever for changing institutional culture (Morison 1986), as a way of thinking to enable all students to 'feel in control' (Edgerton 1986:5), and as a branch of moral philosophy (Murchland 1982:301, citing Paul Goodman).

Views of this kind have neither totally refashioned American culture nor produced the widespread curricular and learning outcomes often hoped for, but there has been a continuous exploration of the nature of specialization and a general education within the historical and structural frameworks we have indicated. There has been a longer concern with these issues and the nature of work-oriented education as a reality to be addressed than has been the case in Britain, both in broad terms and in relation to specific areas of study such as architecture or medicine. It has been easier to argue the case in the United States for dispelling the false dichotomy of the useful and the liberal, given that there was clearer and more consistent evidence in the United States that 'liberal studies were from the beginning eminently useful even if they were not specific in their focus'. The difference between a liberal subject and another was more visibly a difference in emphasis—on 'cognitive skills, rational analysis, the stuff it took to be communicative', as against the 'liberal' emphasis on contemplation, and the assessment and reassessment of self and society (Rudolph 1984:15–16). Out of this tradition came Schön's interpretation of 'the reflective practitioner' and a form of professionalism based on 'reflection in action' (Schön 1983). The thread was not absent from British higher education and discussions of the meaning of culture in modern terms, but it was never as pronounced as in the American case.

The result in Britain, throughout this century and particularly in the 1980s, has been a periodic lurch towards or away from a consideration of the 'service' or career-oriented or employment-oriented functions of education at different levels. One such lurch was the debate about vocational education at the secondary level which took place in the late 1970s and 1980s, compelling participants to consider how specific a definition they were willing to attach to the concept in terms of the school's curriculum and its

aims for all pupils or groups of pupils. The technical and vocational education initiative, whatever its other aims and effects, compelled this attention more than any other curriculum development since the first decade of the century. Education authorities and schools bidding—or declining to bid—for the first rounds of TVEI funding under this Manpower Services Commission scheme to promote vocational elements in the secondary curriculum had to define their own educational commitments and values in the light of political, social, and economic changes which could be seen to relate to the scheme. When the Society of Education Officers also pursued the notions of 'education for enterprise' and 'general vocational preparation', they were confronting the technological pressures of a decade, and the political expression of those pressures that had surfaced in Callaghan's Labour administration in 1976–8, and had become explicit and headlong under the Thatcher Conservative administration from 1979 (SEO 1983). In one form or another, concepts like 'general vocational preparation' were becoming prominent, most frequently for instrumental reasons, but also as a new humanism, or as a mix of both, for two main reasons: they were responsive to a society preoccupied with unemployment, and they were 'general'—including such concepts as human relations, imagination, and other skills and characteristics not unlike the traditional values and targets of the curriculum. In some respects what the move towards more explicit vocational content, general or otherwise, in the curriculum indicated was a failure to reconsider the validity of the 'liberal' secondary curriculum that had been in place since the ending of the 'higher grade school' experiments with the *Regulations for Secondary Schools* of 1904, and the failure of the debates of the 1920s to reconcile the 'liberal' and the 'technical' or 'Vocational' in terms of the school curriculum (Silver 1983: ch. 7). British educational policy across these decades had failed to confront the challenge to established values as embodied in school as well as higher education curricula, and had failed systematically, and much less systematically than in the United States, to explore the cultural and educational impacts and meanings of modern technology, industry, commerce, and other aspects of society subject to rapid change. The door was therefore left open for crude or panicky attempts to influence or direct the curriculum towards apparently immediate needs.

The uncertainties and ambiguities inherent in the concept of vocationalism therefore point discussion in a variety of directions,

both within and outside higher education itself. Throughout our interviews and analysis the focus of response to the concept of vocationalism and the vocational has been 'Yes, but…'. There has been a desire to accept the major implications of the concept, but on condition that it is defined in broad or generous or otherwise more acceptable terms than are implied in its common usage. Yes, but it depends what you mean. Yes, but we must be careful to define. Yes, but it is important to emphasize the positive virtues. Yes, but not *narrowly* vocational. Yes, but that does not mean the rejection of many of the traditional qualities of higher education. *Yes, but* could well have been the title of this book. What the reservations underline strongly is the 'hybrid' nature of the defence of the concept. A broadly-based or general vocationalism, incorporating all the different employment-related emphases visible in the interviews and in our typology, is one which seeks to escape from the vulgar and damaging versions often present in popular or policy usage. It is also one which attempts, in the public-sector context we have explored, to marry traditions and to preserve and to project forward new interpretations, often still bound by conceptual ambiguities and the limitations imposed on exploration by economic constraint, student recruitment, or lack of public understanding or recognition. The defence of the vocational in the terms most encountered in this study is one which opposes simplistic responses to the short-term and interpretations purely in relation to technology and industry-specific courses. The CNAA, in its response to the 1985 Green Paper, underlined that

> the flexibility that is needed in higher education is not constant change attempting to meet short-term needs for particular specialisms, but the creation of a flexible product—graduates who whatever their subject discipline have the ability to learn new skills, and who have developed the analytical, communication and interpersonal skills that all employers welcome.

Public-sector provision in the arts and humanities was seen as an essential part of this policy framework and government policy should

> recognise explicitly that it is not only science and technology courses which can contribute to the improvement of economic performance…that even courses in subjects which are studied

> primarily for their own sake can be a valuable form of vocational preparation.
>
> (CNAA 1985:3–4, 11)

A 'liberal vocationalism' seems to encompass much of what was presented in the subject areas, institutions, and wider discussions we have considered. Such a concept would have a distinguished, if—as we have suggested—not a dominant, British tradition. It would relate to some of the defined purposes of the late-nineteenth-century university colleges: the campaign for a university college in Liverpool, for example, in the late 1870s had the dual objective of providing an education of quality in the arts and sciences, and a technical institution serving ends 'of immediate value' (Fiddes 1937:82). Sir Michael Sadler's view of a liberal education in 1932 (offered in a lecture on 'liberal education and modern business') was one in which were blended 'freedom and strict discipline; drudgery and diligence; the education of the body and the education of the mind; training by others and self-training; science and letters; questioning and awe, preparation for livelihood and for leisure' (Sadler 1932a: 9).

Although in this study our concern has been with the vocational in higher education and the reinterpretation and extension of liberal traditions, any examination of recent developments in these liberal traditions, at least in the public sector, would have come across many other examples of their extension to incorporate, if not always the vocational, at least the applicable. In some cases this will have taken the form of extending the range of subject choice—for example, the arts 'major' who can take a science or business 'minor'. In other cases it will have involved bringing together new integrated subject combinations, for example in communications where a blend of literary, social science, and technology themes takes place. Even in what might be described as the conventional single honours degree, examples can be found of the curriculum being reshaped to emphasize application and relevance to employment. The blurred edges and distinct overlap of formerly discrete categories become apparent from whichever end of the spectrum one begins. The Leverhulme study of higher education found 'an infinite gradation between the most academic higher education and the most utilitarian further education' (Leverhulme 1983:2).

We have emphasized the central importance of the courses themselves in considering the nature of the vocational. The implications of that consideration reach out into policy and practice in many ways, and particularly for the roles and positions of the staff engaged in these kinds of courses in these kinds of institutions—the very people whose views we have reported. The concept of a liberal vocationalism has a bearing not only on curricular policy and provision at national and institutional levels, but also on interpretation in practice by teachers and students. The staff with whom we have discussed the issues have terms of reference, and work within opportunities and constraints, resulting from their position as 'vocational educators'. The vocational educator has emerged into more publicly recognized roles as pressures for altering the curriculum and recruitment balance of higher education have increased in recent years. Given the historical circumstances in which technological and professional education, and many of the institutions with which they are identified, have grown in Britain, it is obvious that there is a profound ambiguity in the position of the staff who teach in these areas in their institutions. The vocational educator is often caught between the demands and values of the academic community and those of the world of practice whose manpower and other needs there is a strong imperative to satisfy. The vocational educator is part of both worlds, and there is a danger at least in some areas of the academy that the duality will not be understood and will not be appropriately rewarded. In some established or economically and politically well-supported areas of study this may be less of a problem, especially where the status of the staff concerned is buttressed by traditions of research. The engineering and architecture educator will in these respects have somewhat different positions, and both will be different from the teacher educator or the health visitor educator.

The courses we have discussed and the polytechnics and colleges where they are taught do, however, present important common features for vocational educators. They are inevitably more concerned than 'academic educators' with the relevance of courses and experience to employment potential and characteristics. They relate closely to practitioners in the field, and see students as prospective practitioners also. They feel comfortable, as we were told in interviews, in the immediate and wider professional environments in which they work, and which form their

predominant points of professional reference. They share, however, the tensions and ambiguities of their position in traditional academe—that is, in the total community of higher education. Their territory is a focal point of internal and external influences, often considerable and powerful. Their legitimacy in the professional arena is not easily matched by academic status or, in many subject areas, financial rewards. While the public sector has done much to establish the importance of the teacher role, of successful student learning, of sound course planning and review, the vocational educator is still often constrained, in terms of advancement, by the traditional measures of staff competence. Surrounding both the vocational educator and the public-sector institution are suspicions that they are not involved in 'real' higher education, and those we interviewed understood and responded to those reservations. The gentry ideal that Wiener underlines in his interpretation of British traditions is strongly embedded in thinking about higher education, but there are inevitably changes occurring as patterns of economic and social activity change, and as the structures of higher education change. Many traditional areas of higher education have become the most vulnerable. Academe has had to learn how to respond not to the expansion of industrial society but to the implications of 'post-industrial society', the information society, the penetration of all aspects of academic life by new technologies, and the emergence of new hierarchies of power and prestige.

One feature of our interviews and the courses to which they related, one which we have not underlined in our previous discussion, is the always controversial area of assessment and standards. Within the area of the vocational educator there is a strong commitment to practice, to interdisciplinary assignments, to 'real-world problem-solving', to design-and-make, to establishing relevance together with practitioners in the field. The suspicions aroused from curriculum areas more wedded to the 'contemplative' liberal tradition may therefore be considerable. Here again, however, the traditions of the public-sector institutions, and the modes of assessment and review encouraged and supported by the National Council for Technological Awards and its successor, the CNAA, have been of major importance to the subject areas concerned in this sector. Questions of standards, however, have not related exclusively to the measurement of student performance and outcomes. They have also involved

considerations of the purposes and resources of institutions, the extent of external influence, the academic and professional profiles of academic staff, the research base and prowess, the quality of student recruitment, and other less tangible factors to do with élite knowledge and hierarchies of other kinds. Again, responses to many of these charges from outside the public sector were clearly articulated in our interviews, but the strength of the continuing suspicion and its cultural foundations should not be underestimated. As in many other cases historically, changes in the structure of the system or of institutions may simply remove the conflict from one level or arena to another. The uneasy position of many professionally-related subject areas in the universities of the late nineteenth and early twentieth century has been translated into institutional terms in the late twentieth. Some of these disputed territories—teacher education is a good example—continue to have an uneasy position in terms of national prestige and acceptance in both sectors. Some, like business studies, community nursing, or sport and leisure studies have been largely located in the polytechnics and colleges. Community-work educators position themselves in relation to their field and to their public-sector institution, not to the mores of the university. While questions of standards are therefore shared across sectors, and forms of examination, the roles of external examiners, and the implications of course approval and review may have strong parallel features, in this as in other respects many vocational educators have important contextual differences depending upon their sector, or upon institutional identities within their sector. Teacher educators, for example, will find the nature of their operation, and therefore the means of evaluating its quality and effectiveness, easier to portray and to defend in an institution with predominant or strong roots in teacher education than in amalgamated institutions where their form of operation is a minority, ill-understood one. Some arguments in this connection point towards the retention, as in Scotland, of monotechnic teacher-education colleges, and other arguments, as in England and Wales, have pointed towards 'polytechnic' solutions. The argument here is not about the wisdom of one or the other, but about the ways in which vocational educators in general operate and defend their standards differently in different circumstances. A question such as that of determining and maintaining standards is therefore not merely a set of technical questions but a reflection of the relative identities and statuses of

educators, and of the complex frameworks in which they operate and are differentially perceived.

If our discussion of vocationalism points towards implications for the educators, it also points to related policy implications. Throughout our discussions the emphasis has been strong on the withdrawing from positions at two ends of the spectrum—one of which might bear the label 'total utilitarian' and the other Patrick Nuttgens's label of 'specialised uselessness'. A liberal education which takes no account of the centrality of work, or expectations of work, or the crises of unemployment, evades the fact, as Ernest Boyer puts it for the United States, 'that our choice of work, our vocation, is overwhelmingly important in shaping our values and in determining the quality of our lives'. And yet, he continues:

> for some reason we have encouraged students to treat this fundamental choice as if it were a negligible concern. Many educators have suggested that collegiate traditions are demeaned if courses prepare students for finding jobs. Such a view not only distorts the present but also denies the past.
>
> (Boyer 1977:150)

To meet this challenge policy-making has to come in from the extremes towards the centre if it is to take account of the diversity of tradition and the complexity of individual and social needs. What this implies also is the need for policy directions in higher education and in education generally which distance them from panic measures and the search for short-term economic and social solutions through education which fail to take account of explanations of the past and the complexities of the present. Meeting the challenge also means inviting higher education itself to reappraise, and to have the conditions in which to reappraise, its purposes.

Discussions of the relationships between higher education, or sectors of higher education, and outside constituencies—notably industry—have often been manpower-oriented on a short-term basis, and either confrontational or directed towards objectives of which the longer-term implications are neither clear nor considered. For the benefit of the long-term adaptability of higher education, its sectors, or its institutions, considerably more attention has to be addressed to the issues of importance to people like those whom we interviewed, and to the issues which have the international resonance that we have explored. Doing so would place policy-

making more firmly in an explicit context of debate around the cultural meanings of technology or professional practice, the intentions and contributions of the vocational educator, the precise ways in which the landscape of higher education has been altered by the missions established by the new-institutions of recent decades, and realistic appraisals of the power relations within institutions and between them and their multiple outside frames of reference. Policy, rather than the zigzags of national planning, requires attention to the underlying relationships between these contexts, and the kinds of conflicts and dichotomies we have discussed, and the curricula and institutional identities and roles of all levels of education. It is not some superficially comprehensive approach to the 'educational system' or to a packaged set of values to be transmitted through it for the benefit of a pluralist society that is indicated, but a firmer commitment than has been available in British policy-making to promoting analysis and debate at a more basic level. The gap is therefore not the absence of an ideal, but a serious consideration of salient, recent, and current realities.

What has been most apparent in public policy-making (policy debate has rarely occurred around such issues) has been the level of unexamined assumption that has been pervasive. Ministers have assumed they know what industry wants or needs. Universities have assumed they know what their central purposes are, and what those of polytechnics are. From the establishment of the polytechnics in the late 1960s parliamentarians, local government, and other interested parties have assumed they know what polytechnics and colleges do, or should do. Polytechnics and colleges have assumed they know their primary roles and purposes. The level of assumption has been accompanied by a level of proclamation, often necessary in situations of self-defence or crises of planning, resources, or confidence, not by the basic reappraisals needed but difficult to achieve in those situations.

The policy messages from this concern with the concepts that are central to understanding, in late twentieth-century terms, what precisely has happened and is happening to higher education are therefore directed towards policy and practice at the most global and the most local levels. The discussion is about the nature of all courses, not just of those in engineering or business studies. It is about the expectations, experience, and accomplishments of all students, not just of those in estate management or social work. It is about the relationships between all educational institutions and

their labour markets, not just about polytechnics and their local industries. It is about putting educational traditions and ambiguities under sustained scrutiny. There is clearly, in the pursuit of such targets, the constant difficulty of balancing the desire for stability with the demands of change. None of those involved in designing and maintaining the courses we have examined, or in defining the missions of the institutions in which they take place, accepts either absolute values or total *ad hoc* responsiveness. The pressure of the argument is not for the abandonment of recognized values which underpin higher education—however strong some of the critiques of the universities are, or however firm a line is sometimes drawn between the intentions of the universities and those of the public-sector institutions. The pressure is for the re-examination of those values in changing circumstances, for the new meanings which emerge when old ways are juxtaposed with new needs and processes. Such a constant re-examination is often discussed in terms of the kinds of flexibilities, the range of graduate characteristics and skills, that carry forward essential change processes. The focus in some of our interviews on projects and problem-solving, and the explicit aims of courses to promote creativity and imagination and the capacity to take initiatives and decisions, point towards social and industrial needs as well as generous educational values. They argue that over-zealous pressure for responses to short-term needs are not only suspect educationally, they are also unproductive. The case, as is clear throughout, is for constant, understanding negotiation of positions—with the ultimate educational decisions being made within education. What policy-making can help to ensure in this connection is the process and the status of the negotiation. The partners in the exercise emerge very clearly in our interviews, as does their increasing willingness to participate. The essential message for that process is the centrality of the exploration of values in contexts of change. That is a long way from the politics of the rapid-swinging pendulum, and it suggests that the relationship between the profound changes visible over recent decades in society and the economy on the one hand, and public-sector and other higher education on the other hand, needs to be open to constant investigation.

A final message from this study, one which has been inherent in the discussions throughout, is the need for wider opportunities for those involved in the kind of higher education we have

considered to be heard. This is not a question of consultancy and committee roles, but of bringing into the centre of debate about pasts and futures those who are at the sensitive edges of the higher-education developments that we have investigated—those willing to accept the Vocationalism' label with conditions. Discussions around higher-education policy have heard very little of their voices in recent decades. The dimensions of vocationalism have occasionally surfaced, but the scale and explicitness of the changes, represented particularly but not solely by public-sector higher education, have not received the kind of sustained attention in public to which they have been subjected in the contexts of course planning, academic boards and validation relationships with the CNAA. New institutional statuses and definitions being developed in the late 1980s, new forms of accreditation, new national funding arrangements, will affect the contexts we have discussed, and in uncertain ways the roles of those who plan, teach, and review courses of the kind we have considered. Those changes will not of themselves, however, solve the problems we have discussed, or produce the kinds of incentives and platforms for prolonged public access to debate about the basic purposes outlined in the kinds of course descriptions and tutors' explanations we have assembled. Other pressing concerns have occupied, and will no doubt continue to occupy, the scene, and other voices may continue to be the ones primarily heard. Those who have had a platform, through the written word and the interview, in this study have had little opportunity in the conditions of recent years to discuss *these* issues. The commitment that we have found to what we have termed a 'liberal vocationalism', and the questions it poses for other, firmly established or vague and tenuous, views of the purposes of higher education, need to be more systematically debated, both within the system and with employers and wider publics, collectively and individually, and in the hearing of those who attempt to influence, formulate, and implement policy.

Appendix

The interviews reported in chapters 7, 10, 12, and 13 were conducted by Harold Silver as follows (designations are as at the time of the interviews):

Humberside College of Higher Education

Mr L.M.Cutts	BA Business Studies course leader (3 June 1986)
Dr J.Earls	Director (25 March 1984 and 2 June 1986)
Mr C.Jones BA	Architecture course leader (2 June 1986)
Dr T.Tate	BEng Engineering course leader (3 June 1986)

Leicester Polytechnic

Professor P.J.Baron	Head, School of Economics and Accounting (5 June 1986)
Dr D.Bethel	Director (4 June 1986)
Mrs C.Gore	BA Business Studies deputy course leader (5 June 1986)
Mr H.Land	BSc Land Management course leader (5 June 1986)
Mr R.Rue	BEng Engineering Technology course leader (5 June 1986)
Mr L.E.Willmore	BSc Textile and Knitwear Technology course leader (4 June 1986).

Napier College, Edinburgh

Mr W.S.Bannister	BEng Energy Engineering course coordinator (on secondment to SCOTVEC)

	(28 February 1986)
Mr J.M.Glen	BEng Technology with Industrial Studies course co-ordinator (27 February 1986)
Mr P.W.McIntosh	Head, Department of Business Studies (27 February 1986)
Mr G.Rae	BEng Communication and Electronic Engineering (26 February 1986)
Dr W.A.Turmeau	Principal (22 November 1983 and 26 February 1986)
Mr D.C.Vettese	BA Business Studies (part-time) course co-ordinator (27 February 1986)

Napier College was also visited by Pamela Silver in December 1984 and help was given by:

Mrs KJ.Anderson, deputy principal
Mr J.S.Gilliatt, Technology and Industrial Studies
Mr J.Govan, Communication and Electronic Engineering
Mr J.P.Lowe, Science with Industrial Studies

Oxford Polytechnic

Mr G.T.Bennett	Acting head, Department of Architecture (21 November 1985)
Mr R.D.B.Booth	BSc Estate Management course leader (21 November 1985)
Dr G.R.Bremble	Head, Engineering Department (27 November 1985)
Mr J.Glasson	Head, Department of Town Planning (21 November 1985)
Dr P.Healey	Dean, Faculty of Architecture, Planning, and Estate Management (21 November 1985)
Mr R.W.Morris	BEng Civil Engineering course leader, Head, Department of Construction (28 January 1986)
Mr V.T.Owen	Acting director (27 November 1985)
Mr A.P.L.Pendlebury	BA Business Studies course tutor (3 February 1986)
Mr A.Smith	BEng Civil Engineering Integrative Studies tutor (28 January 1986)

Discussions were also held at Oxford Polytechnic with Dr W.J. Rea, Dean, Faculty of Technology, and Mr J.M.Dennis, Department of Civil Engineering.

In connection with the study of European Business courses the following institutions were visited by John Brennan between January and June 1984:

Buckinghamshire College of Higher Education
École Superieure de Commerce, Toulouse
Fachhochschule Osnabruck
Hochschule Bremen
Leeds Polytechnic
Trent Polytechnic

In connection with the study of engineering and business studies the following institutions were visited by Pamela Silver in April 1984:

Bloomsburg University of Pennsylvania
Carnegie-Mellon University, Pittsburgh
Lock Haven University of Pennsylvania
Massachusetts Institute of Technology
Pennsylvania State University
Slippery Rock University of Pennsylvania
University of Pittsburgh

Interviews at the Departments of Mechanical and Electrical Engineering at Pennsylvania State University were conducted by Harold Silver in January 1986.

Other institutions visited in connection with this study included:

Edinburgh College of Art
Middlesex Polytechnic

Bibliography

NB Prospectuses and course documentation are not included.

(US) Accreditation Board for Engineering and Technology (1980) *Criteria for Accrediting Programs in Engineering in the United States,* New York: ABET.

Adams, Mollie (1963) '"Liberal studies" in technological education', *Universities Quarterly,* 17 (3).

Adelman, C. (1984) *Inside a College of Higher Education,* Uxbridge: Brunel University, Expectations of Higher Education Project.

Ahlström, Göran (1982) *Engineers and Industrial Growth,* London: Croom Helm.

Armstrong, P.J. *et al.* (1982) 'Undergraduate interdisciplinary projects', *European Journal of Engineering Education,* 7 (2).

Ashby, Eric (1958; edition of 1963) *Technology and the Academics,* London: Macmillan.

Au, Tung (1981) 'Some random thoughts on general education at CMU', *Focus* (Carnegie-Mellon University), 11 (3) (the first of five *Focus* articles by Au on The ideal of a liberal professional education').

Bailey, Roy (1983) 'Values in the curriculum', in Desmond Graves (ed.) *The Hidden Curriculum in Business Studies,* Chichester: Higher Education Foundation.

Bamford, T.W. (1967) *The Rise of the Public Schools,* London: Nelson.

Barnett, Ronald Anthony (1978) 'Knowledge and ideology in higher education', University of London Institute of Education MPhil thesis.

Battersby, G.A. (1983) 'New developments in engineering courses in UK polytechnics', *European Journal of Engineering Education,* 8 (1).

Ben-David, Joseph (1977) *Centers of Learning: Britain, France, Germany, United States,* New York: McGraw-Hill.

Berthoud, Richard and Smith, David J. (1980) *The Education, Training and Careers of Professional Engineers,* London: HMSO.

Beuret, Geoff and Webb, Anne (1983a) *Goals of Engineering Education: Final Report*, Leicester: Leicester Polytechnic.

Beuret, Geoff and Webb, Anne (1983b) *Goals of Engineering Education (GEEP). Engineers—Servants or Saviours?,* London: CNAA.

Birch, William (1981) *The Changing Relationship between Higher Education and Working Life,* Bristol: Bristol Polytechnic (mimeo).

Black, Joseph (1975) 'Allocation and assessment of project work in the final year of the engineering degree course at the University of Bath', *Assessment in Higher Education,* 1.

Bosworth, George (1971) 'The role of the polytechnics', *Further Education,* 3 (1).

Bosworth, G.S. (1964) 'Education and training of engineers' (three articles), *The Engineer,* 217: 5, 653–5.

Bosworth, G.S. (1963) 'Towards creative activity in engineering', *Universities Quarterly,* 17 (3).

Boyer, Ernest L. (1977) 'The core of learning', in Dyckman W.Vermilye (ed.) *Relating Work and Education,* San Francisco: Jossey-Bass.

Boys, C.J. (1984) *Inside a Polytechnic,* Uxbridge: Brunei University, Expectations of Higher Education Project.

Boys, C.J. and Kogan, M. (1984) *Commentary on Three Studies of Higher Education Institutions ('The Providers'),* Uxbridge: Brunel University, Expectations of Higher Education Project.

Brennan, John and McGeevor, Philip (1987) *Graduates at Work: Degree Courses and the Labour Market. Final Report of a Survey of CNAA Graduates,* London: Jessica Kingsley.

Brennan, John and Pieniazek, Jolanta (1984) 'Students of psychology in Poland and Britain', in Gerhild Framhein and Josef Langer (eds) *Student Worlds in Europe,* Klagenfurt: Karntner Druck-Und Verlags-gesellschaft MBH.

Brillhart, Lia V. (1981) 'The engineer as educator', in Lawrence P.Grayson and Joseph M.Biedenbach (eds) *Frontiers in Education,* New York: Institute of Electrical and Electronics Engineers.

British Association for the Advancement of Science (1977a) *Education, Engineers and Manufacturing Industry: A Report to the British Association Co-ordinating Group,* Birmingham: University of Aston.

British Association for the Advancement of Science (1977b) *Education, Engineers and Manufacturing Industry: Support Papers,* Birmingham: University of Aston.

Brown, David (1983) 'Interdisciplinarity—a burnt-out case?', in Desmond Graves (ed.) *The Hidden Curriculum in Business Studies,* Chichester: Higher Education Foundation.

BTEC (Business and Technician Education Council) (1983) *Discussion Document on Education Policy,* London: BTEC.

Bud, R.F. and Roberts, G.K. (1984) *Science Versus Practice: Chemistry in Victorian Britain,* Manchester: Manchester University Press.

Bull, R.J. (1983) *A Practical Philosophy ofBusiness Education,* Leeds: Leeds Polytechnic (mimeo).

Bull, R.J. (1985) *The Business Studies Degree—Towards a 'Core Curriculum'* (paper to the Undergraduate Courses Board of the CNAA Committee for Business and Management Studies), Leeds: Leeds Polytechnic (mimeo).

Burnhill, Peter and McPherson, Andrew (1983) 'The Scottish university and undergraduate expectations, 1971–1981', *Universities Quarterly,* 37(3).

Calderbank, P.H. (1973) 'The balance between engineering science and practical experience', in R.E.Bell and A.J.Youngson (eds) *Present and Future in Higher Education*, London: Tavistock.
Carnegie Institute of Technology (1954) *Professional Education in Engineering and Science*, Pittsburgh: CIT.
Central Services Unit for Graduate Careers and Appointments Services (1984a) *CSU Statistical Quarterly*, 20.
Central Services Unit for Graduate Careers and Appointments Services (1984b) *Twelfth Annual Report of the Management Committee.*
Cerych, Ladislav and Sabatier, Paul (1986) *Great Expectations and Mixed Performance: The Implementation of Higher Education Reforms in Europe*, Stoke-on-Trent: Trentham.
Cheit, Earl (1975) *The Useful Arts and the Liberal Tradition*, New York: McGraw-Hill.
Chilver Committee (1975) *Education and Training of Civil Engineers*, London: Institution of Civil Engineers.
Christopherson, D.G. (1967) *The Engineer in the University*, London: English Universities Press.
Cohen, David K. and Garet, Michael S. (1975) 'Reforming educational policy with applied social research', *Harvard Educational Review*, 45 (1).
Commissioners for the University of Virginia (1818) *Rock fish Gap Report*, Charlottesville: University of Virginia (facsimile).
(US) Committee for Economic Development (1985) *Investing in Our Children: Business and the Public Schools*, New York: CED.
Committee of Inquiry into the Engineering Profession (Finniston) (1980) *Engineering Our Future*, London: HMSO.
Committee on Higher Education (Robbins) (1963) *Higher Education, Evidence*, pt 1, vol. B (Institution of Chemical Engineers, Federation of British Industries, Institution of Production Engineers); pt 1, vol. D (Joint Advisory Committee on Engineering Education), London: HMSO.
Conference of Engineering Societies of Western Europe and the United States of America (EUSEC) (1960) *Report on Education and Training of Professional Engineers*, vol. 2, EUSEC.
Conservative Sub-Committee on Education (1942), in *Staples' 'Reconstruction' Digest*, London: Staples.
Cornwell, A. and Newman, B. (1971) *Vocationalism in Higher Education*, London: North-East London Polytechnic (mimeo).
Cotgrove, Stephen (1962) 'Education and occupation', *British Journal of Sociology*, 13 (1).
Council for National Academic Awards (1965) Business Studies Board, *Minutes*, 19 March, London: CNAA (mimeo).
Council for National Academic Awards (1967–8) *Report*, London: CNAA.
Council for National Academic Awards (1969), *Minutes*, 29 January, London: CNAA (mimeo).
Council for National Academic Awards (1979) *The Council: Its Place in British Higher Education*, London: CNAA.

Council for National Academic Awards (1980) *Council's Response to the Report of the Committee of Inquiry into the Engineering Profession*, London: CNAA.

Council for National Academic Awards (1981) Committee for Business and Management, *Report of a Working Party on Undergraduate Business Education*, London: CNAA (mimeo).

Council for National Academic Awards (1982) *Policy Statement: Development and Validation of Engineering Degree Courses*, London: CNAA (mimeo).

Council for National Academic Awards (1983a) *Policy Statement: Engineering First Degree Courses*, London: CNAA.

Council for National Academic Awards (1983b) Working Party on Longer Term Developments, *Second Report to Council*, London: CNAA (mimeo).

Council for National Academic Awards (1984) *Response to the Scottish Tertiary Education Advisory Council's letter of 20 August 1984 headed 'Review of Higher Education in Scotland'*, London: CNAA (mimeo).

Council for National Academic Awards (1985) *Letter Commenting on the Interim Report of the Working Group on the Review of Vocational Qualifications*, London: CNAA (mimeo).

Council for National Academic Awards (1986a) *'The Development of Higher Education into the 1990s': CNAA's Response to the Government Green Paper*, London: CNAA.

Council for National Academic Awards (1986b) *Response from the CNAA to the Report by the Scottish Tertiary Education Advisory Council on its Review of Higher Education in Scotland*, London: CNAA (mimeo).

Council for National Academic Awards (1986–7) *Report*, London: CNAA.

Council of Engineering Institutions (1969) *Education and Training 1969: The General Principles of the Training of Professional Engineers*, London: CEI.

Council of Engineering Institutions (1975) *Education and Training 1975: The General Requirements for the Training and Experience of Engineers for Chartered Status*, London: CEI.

Cowan, John and McConnell, S.G. (1970) 'Project work for undergraduate civil engineers', *Universities Quarterly*, 24 (4).

Crosland, Anthony (1974) 'Pluralism in higher education', in *Socialism Now and Other Essays*, London, Cape.

Davies, Duncan *et al.* (1976) *The Humane Technologist*, Oxford: Oxford University Press.

Davies, John L. (1985) *Mission and Strategy of the Higher Education Institution: Main Issues for Management*, Chelmsford: Danbury Park Management Centre (mimeo).

Department of Education and Science (1966) *A Plan for Polytechnics and Other Colleges*, London: HMSO.

Department of Education and Science (1982) Circular 5/82: *Approval of Advanced Further Education Courses in England.*

Dewey, John (1914) 'Liberal education', in Paul Monroe (ed.) *A Cyclopedia of Education*, 4, New York: Macmillan.

Dewey, John (1917) 'The modern trend toward vocational education in its effect upon the professional and non-professional studies of the university', reprinted in Jo Ann Boydston (ed.) (1980) *John Dewey: The Middle Works*, 10, Carbondale: Southern Illinois University Press.

Diamond, J. (1970) 'University engineering education 1960–1980', *Advancement of Science,* 27.
Dore, Ronald (1976) *The Diploma Disease,* London: Allen & Unwin.
Edgerton, Russell (1986) 'Feeling in control: or, why would a humanist envy an engineer?', *Change,* 18 (2).
Edinburgh, Duke of (1962) 'The engineer in Commonwealth development', *School Science Review,* 63 (150).
Edington, G.A. (1969) 'The education and training of civil engineers: introduction', in *The Education and Training of Civil Engineers and Town Planners,* pt 2, London: Planning and Transport Research and Computation (mimeo).
Edwards, E.G. (1977) *The Relevant University,* Bradford: University of Bradford.
Engel, Arthur (1983) 'The English universities and professional education', in Konrad H.Jarausch (ed.) *The Transformation of Higher Learning 1860–1930,* Chicago: University of Chicago Press.
Engineering Council (1983) *Statement on Enhanced and Extended Undergraduate Engineering Degree Courses,* London: Engineering Council.
Engineering Employers' Federation (1977) *Graduates in Engineering,* London: EEF (mimeo).
Engineering Employers' Federation (1980) *Submission to the Secretary of State for Industry on the Finniston Report…,* London: EEF (mimeo).
Engineering Industry Training Board (1983) *The Training of Graduates in Engineering,* London: EITB.
Engineering Industry Training Board (1984) EITB *Scheme of Grants for Courses of Study in Advanced Technology,* London: EITB (mimeo).
Engineering Professors' Conference, *Evidence to the Finniston Committee,* London: EPC.
Fairhurst, David (1982) 'Where to draw the line in business studies', *Education and Training,* 24 (4).
Fiddes, Edward (1937) *Chapters in the History of Owens College and of Manchester University 1851–1914,* Manchester: Manchester University Press.
Finniston, Monty (1984) 'Overview of issues in engineering education', in Sinclair Goodlad (ed.) *Education for the Professions: Quis custodiet…?,* Guildford: Society for Research into Higher Education.
Finniston, Monty (1985) 'Engineering the future', *International Journal of Applied Engineering Education,* 1 (1).
Fitzgerald, P. (1985), *An Alternative Model Business Studies Degree Scheme* (paper to the Undergraduate Course Board of the Committee for Business and Management Studies), London: CNAA (mimeo).
Fores, Michael (1972) 'University science and vocation', *Times Higher Education Supplement*, 7 July.
Friedman, Edward A. (1979) 'Technology as an academic discipline', in Lawrence P.Grayson and Joseph M.Biedenbach (eds) *Frontiers in Education,* New York: Institute of Electrical and Electronic Engineers.
Geiger, Roger L. (1980) 'The college curriculum and the market place: what place for disciplines in the trend towards vocationalism?', *Change,* 12 (8).

Gerstl, J.E. and Hutton, S.P. (1966) *Engineers: The Anatomy of a Profession. A Study of Mechanical Engineers in Britain,* London: Tavistock.
Glover, lan (1980) 'Social science, engineering and society', *Higher Education Review,* 12 (3).
Goldberg, A.S. (ed.) (1973) *Proceedings of a National Conference on Engineering Education,* London: Education and Awareness.
Goldman, A. (1984) *CNAA Business Studies Degrees: Their Development and the Role and Value of the Work Placement* (paper to a conference, Regional and Community Colleges as Agents of Social Change, Israel), London: CNAA (mimeo).
Goodlad, Sinclair (1977) *Socio-Technical Projects in Engineering Education,* Stirling: University of Stirling, General Education in Engineering Project.
Gordon, A. (1983) 'Attitudes of employers to the recruitment of graduates', *Educational Studies,* 9.
Graves, Desmond (ed.) (1983) *The Hidden Curriculum in Business Studies,* Chichester: Higher Education Foundation.
Griffith, Dean E. (1981) 'Engineering', in Arthur W.Chickering *et al., The Modern American College,* San Francisco: Jossey-Bass.
Haber, Samuel (1974) 'The professions and higher education in America: a historical view', in Margaret S.Gordon (ed.) *Higher Education and the Labor Market,* New York: McGraw-Hill.
Haines IV, George (1959) 'Technology and liberal education', in Philip Appleman *et al.* (eds) *1859: Entering an Age of Crisis,* Bloomington: Indiana University Press.
Hancher, Virgil M. (1954) 'Liberal education in professional curricula', *Journal of Engineering Education,* 44 (7).
Hanson, Norwood Russell (1957) 'Science as a liberal education', *Universities Quarterly,* 11 (2).
Harding, A.G. (1973) 'The objectives and structures of undergraduate projects, I', *British Journal of Educational Technology,* 4 (2).
Harland, John (1984) *The Diversified Colleges: The Graduate Perspective. Final Report,* York: Combined Colleges Research Group.
Harris, Robin (1955) 'General education in the British university', *Universities Review,* 27 (2).
Harrisberger, Lee (1984) 'Curricula and teaching methods in engineering education', in Sinclair Goodlad (ed.) *Education for the Professions: Quis custodiet…?,* Guildford: Society for Research into Higher Education.
Harvard Committee (1945) *General Education in a Free Society,* Cambridge, Mass.: Harvard University Press.
Hawkins, David (1973) 'Liberal education: a modest polemic', in Carl Kaysen (ed.) *Content and Context: Essays on College Education,* New York: McGraw-Hill.
Hazzard, George (1971) 'Engineering as a liberal education', *Liberal Education,* 59 (4).
Herbst, Jurgen (1980) 'The liberal arts: overcoming the legacy of the nineteenth century', *Liberal Education,* 66.

Heywood, J. *et al.* (1966) 'The education of professional mechanical engineers for design and manufacture', *Lancaster Studies in Higher Education,* 1.

Holloman, J.Herbert *et al.* (1975) *Future Directions for Engineering Education,* Washington, DC: American Society for Engineering Education.

Horner, David J. (1982) 'Expectations of the student', in Desmond Graves (ed.) *The Hidden Curriculum in Business Studies,* Chichester: Higher Education Foundation.

Huxley, Thomas H. (1899) 'Technical education', in *Science and Education: Essays,* London: Macmillan.

Institute of Civil Engineers (1980) *A Creative Career—Civil Engineering,* London: ICE.

Institution of Mechanical Engineers, Education and Training Group (1977) *The Education Debate and its Effect on the Future Supply of Mechanical Engineers,* London: IME (mimeo).

Isaac, P.C.G, (1982) 'The future of university education in civil engineering', in Institution of Civil Engineers, *Future Needs in Civil Engineering Education,* London: Telford.

Jahoda, Marie (1963) *The Education of Technologists,* London: Tavistock.

James of Rusholme, Lord (1971) 'York's attempt to balance vocational and general studies', *The Times,* 15 January.

Jarvis, Peter (1983) *Professional Education,* London: Croom Helm.

Jary, David W. (1969) 'General and vocational courses in polytechnics', *Universities Quarterly,* 24 (1).

Jenkins, D.E.P. (1983) 'Curriculum development', *European Journal of Engineering Education,* 8 (1).

Jobbins, David (1980) 'Employers want management status to follow job experience', *Times Higher Education Supplement,* 25 January.

Jones, Thomas B. (1985) 'Liberal learning and business study', *Liberal Education,* 71 (1).

Joseph, Sir Keith (1985) Speech to SRHE/THES conference, 9 July, in *Conference on the Green Paper on Development of HE into the 1990s,* Guildford: Society for Research into Higher Education.

Joseph, Sir Keith (1986) Reported in *Times Higher Education Supplement,* 14 March.

Kanigel, Robert (1986) 'Technology as a liberal art: scenes from a classroom', *Change,* 18 (2).

Kenny, Shirley Strumm (1984) 'Humanities and business: educational reform for corporate success', *Business and Society Review,* 48.

Kogan, M. and Boys, C.J. (1984) *Expectations of Higher Education: A Synopsis and Commentary on its Main Findings,* Uxbridge: Brunei University, Expectations of Higher Education Project.

Lane, Michael (1975) *Design for Degrees: New Degree Courses Under the CNAA—1964–1974,* London: Macmillan.

Laycock, Mike (1978) 'The polytechnics and industry: the importance of social skills', *Journal of Further and Higher Education,* 2 (3).

Leverhulme Report (1983) *Excellence in Diversity: Towards a New Strategy for Higher Education,* Guildford: Society for Research into Higher Education.

Lewin, Douglas (1981) 'Engineering philosophy—the third culture?', *Royal Society of Arts Journal,* 129 (5,302).
London School of Economics (1984) *Response to UGC Circular Letter 16/83: Development of a Strategy for Higher Education,* London: LSE (mimeo).
Lucas, F.L. (1933) 'English literature', in Harold Wright (ed.) *University Studies Cambridge 1933,* London: Nicholson & Watson.
McCinnes, William C. (1982) 'The integration of liberal and professional education', *Thought,* 57 (225).
McCulloch, Gary *et al.* (1985) *Technological Revolution? The Politics of School Science and Technology in England and Wales since 1945,* London: Falmer Press.
McKenna, Eugene (1983) *Undergraduate Business Education: A Reappraisal,* London: London Chamber of Commerce and Industry.
McKenna, Eugene (1985) *Undergraduate Business Education* (paper to the Undergraduate Courses Board of the CNAA Committee for Business and Management Studies) London: CNAA.
Marris, Peter (1964) *The Experience of Higher Education,* London: Routledge & Kegan Paul.
(Massachusetts) *An Act to Incorporate the Trustees of the Massachusetts Agricultural College* (1863).
Meyerson, Martin (1969) 'Play for mortal stakes: vocation and the liberal learning', *Liberal Education,* 55 (1).
Meyerson, Martin (1974) 'Civilizing education: uniting liberal and professional learning', *Daedalus,* 103 (4).
Mill, John Stuart (1867) *Inaugural Address Delivered to the University of St Andrews 1 February 1867,* London: Longmans, Green, Reader & Dyer.
Miller, Kenneth (1985) Letter to *The Times,* 5 July.
Ministry of Education (1957) *Liberal Education in Technical Colleges* (Circular 323), London: HMSO.
Ministry of Technology and Council of Engineering Institutions (1977) *The Survey of Professional Engineers,* London: HMSO.
Moberly, Walter (1949) *The Crisis in the University,* London: SCM Press.
Monroe, Paul (ed.) (1914) *A Cyclopedia of Education,* vol. 4: *Vocational Education,* New York: Macmillan.
Montrose, J.L. (1952) 'A specialist approach to general education', *Universities Quarterly,* 7 (1).
Morison, Elting E. (1986) 'The new liberal arts: creating novel combinations out of diverse learning', *Change,* 18 (2).
Morrison, J.L.M. (1970–1) 'Educating engineers', in *Proceedings of the Institution of Mechanical Engineers,* 185 pt I.
Mosely, Philip E. (1971) 'The universities and public policy: challenges and limits', in Stephen D.Kertesz (ed.) *The Task of Universities in a Changing World,* Indiana: University of Notre Dame Press.
Mumford, Lewis (1946) 'Synthesis in American universities', in D.M.E. Dymes (ed.) *Synthesis in Education,* Malvern: Le Play House.
Murchland, Bernard (1982) 'Technology, liberal learning, and civic purpose', *Liberal Education,* 68 (4).

NAB (National Advisory Board for Local Authority Higher Education) (1983) *Towards a Strategy for Local Authority Higher Education in the Late 1980s and Beyond,* London, NAB.

NAB (National Advisory Board for Local Authority Higher Education) (1984a) *A Strategy for Higher Education in the Late 1980s and Beyond,* London: NAB.

NAB (National Advisory Board for Local Authority Higher Education) (1984b) 'The conclusion of the 1984/85 planning exercise', *NAB Bulletin.*

National Advisory Council on Education for Industry and Commerce (1964) *A Higher Award in Business Studies* (Crick Report), London: HMSO.

National Council for Technological Awards (1964) *Report of the Council's Industrial Training Panel on the Training of Engineering Students Following Courses Leading to the Diploma in Technology,* London: NCTA.

Newman, B. and Cornwell, A. (1971) *The Concept of Vocationalism,* London: North East London Polytechnic (mimeo).

Newman, Frank (1979) 'The traditional university in the United States' (editorial summary of remarks), in Daniel Heyduk (ed.) *Education and Work: A Symposium,* New York: Institute of International Education.

Newman, John Henry (1852) *On the Scope and Nature of University Education,* London: Everyman edn 1943.

Nuttgens, Patrick (1972) 'The new polytechnics: their principles and potential', in John Lawlor (ed.) *Higher Education: Patterns of Change in the 1970s,* London: Routledge & Kegan Paul.

Nuttgens, Patrick (1978) 'Learning to some purpose', *Higher Education Review,* 10 (3).

Nuttgens, Patrick (1986) Reported in European Association for Architectural Education, *News Sheet,* 16.

Oakley, D.J. (1973) 'Meeting conflicting demands', *Times Higher Education Supplement,* 5 October.

O'Flaherty, C.A. (1969) 'Education and training of engineers', in *The Education and Training of Civil Engineers and Town Planners,* pt 2, London: Planning and Transport Research and Computation (mimeo).

Oxtoby, Robert (1972) 'Complementary studies and undergraduate degree courses in applied science and technology: an evaluation of developments in the polytechnics', *Journal of Curriculum Studies,* 4 (1).

Parkes, E.W. (1962) *The Education of an Engineer,* Leicester: Leicester University Press.

Pearson, Richard (1984) 'Graduates and employment', in CRAC, *GET '85:2000 Employers.*

Pearson, Roland (1972) 'Education and industry', *Further Education,* 3 (5).

Percy, Lord Eustace (1950) Contribution to discussion of 'Industry's requirements of scientists and technologists and their education and training', in Association of Universities of the British Commonwealth, *Report of Proceedings,* 1950.

Petty, Evan R. (1983) 'Engineering curricula for encouraging creativity and innovation', *European Journal of Engineering Education,* 8 (1).

Porrer, Robert (1984a) 'Degrees of relevance', *Guardian,* 8 March.

Porrer, Robert (1984b) *Higher Education and Employment,* Leicester: Association of Graduate Careers Advisory Services (AGCAS) (mimeo).
Redwood, David (1951) 'The philosophy of university education in England from the reforms at Oxford and Cambridge (1877) to 1914', University of Manchester PhD thesis, 2 vols.
Reid, S.A. and Farrar, R.A. (1985) *What Makes a BEng Course? A Report of a Symposium Held at the University of Southampton,* London: CNAA.
Robertson, A.B. (1980) 'Sir Joshua Girling Fitch; 1824–1903: a study in the formation of English educational opinion', Newcastle University PhD thesis.
Robinson, Eric E. (1968) *The New Polytechnics,* London: Cornmarket Press.
Roizen, Judith and Jepson, Mark (1984) *An Employers' Perspective,* Uxbridge: Brunel University, Expectations of Higher Education Project.
Roizen, Judith and Jepson, Mark (1985) *Degrees for Jobs: Employer Expectations of Higher Education,* Guildford: Society for Research into Higher Education.
Rooke, Denis (1982) 'Business skills for student engineers', *Education and Training,* 24 (4).
Rothblatt, Sheldon (1968) *The Revolution of the Dons: Cambridge and Society in Victorian England,* Cambridge: Cambridge University Press.
Rothblatt, Sheldon (1976) *Tradition and Change in English Liberal Education,* London: Faber & Faber.
Rothblatt, Sheldon (1983) 'The diversification of higher education in England', in Konrad H.Jarausch (ed.) *The Transformation of Higher Learning 1860–1930,* Chicago: University of Chicago Press.
Royal Aeronautical Society (1964) *The Diploma in Technology in Aeronautical Engineering,* London: RAS (mimeo).
Rudolph, Frederick (1984) 'The power of professors: the impact of specialization and professionalization on the curriculum'
, *Change*, 16 (4).
Runge, P.P. (1963) 'The menace of over-specialisation', *B.A.C.I.E. Journal,* 17 (3).
Sadler, Michael (1932a) *Liberal Education and Modern Business,* reprinted from *Journal of the Textile Institute,* 23 (5).
Sadler, Michael (1932b) *Liberal Education for Everybody,* London: Lindsey Press.
Saks, M. (1983) 'Removing the blinkers? A critique of recent contributions to the sociology of the professions', *Sociological Review,* 31.
Sanders, Jennings B. (1954a) *General and Liberal Educational Content of Professional Curricula: Engineering,* Washington, DC: US Department of Health, Education, and Welfare.
Sanders, Jennings B. (1954b) *General and Liberal Educational Content of Professional Curricula: Pharmacy,* Washington, DC: US Department of Health, Education, and Welfare.
Sanderson, Michael (1972) *The Universities and British Industry 1850– 1970,* London: Routledge & Kegan Paul.

Saul, Anthony (1983) 'Survey of business studies degrees validated by CNAA', in Desmond Graves (ed.) *The Hidden Curriculum in Business Studies,* Chichester: Higher Education Foundation.
Scally, John (1976) 'Transvaluing: the humanities in a technical-vocational curriculum', *Journal of Higher Education,* 47 (2).
Schön, Donald A. (1983) *The Reflective Practitioner: How Professionals Think in Action,* London: Temple Smith.
Schreter, Debra J. (1976) *The Content of First Degree Courses in Engineering in Relation to the Knowledge Required of Professional Engineers in Industry,* London: EITB.
Scott, Peter (1984) *The Crisis of the University,* London: Croom Helm.
Scottish Tertiary Education Advisory Council (1985) *Report: Future Strategy for Higher Education in Scotland,* Edinburgh: HMSO.
Seamans Jr, Robert C. and Hansen, Kent F. (1981) 'Engineering education for the future', *Technology Review,* 83 (4).
Secretary of State for Education and Science (1972) *Education: A Framework for Expansion,* London: HMSO.
Secretary of State for Education and Science *et al.,* (1985) *The Development of Higher Education into the 1990s* (Green Paper), London: HMSO.
Sills, Kenneth C.M. (1944) 'The useful and liberal arts and sciences', *The American Scholar,* 13 (4).
Silver, Harold (1983) *Education as History,* London: Methuen.
Silver, Harold and Silver, Pamela (1981) *Expectations of Higher Education: Some Historical Pointers,* Uxbridge: Brunel University, Expectations of Higher Education Project.
Simmons, Jack (1959) *New University,* Leicester: Leicester University Press.
Smith, Alex (1978) 'A sense of direction—some reflections on education and society', *Royal Society of Arts Journal,* 126 (5, 262).
Smith, Elliott Dunlap (1954) *The Development of Humanistic-Social Education at Carnegie Institute of Technology,* Pittsburgh: CIT.
Smith, Elliott Dunlap *et al.* (1957) *The Role of Humanistic-Social Education in Making Professional Education Liberal at Carnegie Institute of Technology,* Pittsburgh: CIT.
Snow, C.P. (1959) *The Two Cultures and the Scientific Revolution,* Cambridge: Cambridge University Press.
Snow, Lord (1965–6) 'The place of the engineer in society', *Proceedings of the Institution of Mechanical Engineers,* 180 pt I.
Society of Education Officers (1983) *Key Issues for Industry and Education,* SEO Occasional Paper No. 3.
Stoddart, John (1975) 'Advance needed in business education', *Higher Education Review,* 7 (3).
Stoddart, J. (1981) 'Business education—trends and development', *Business Education,* spring.
Tarr, Joel A. (1980) *The Carnegie-Mellon University Program in Technology Humanities: A Five-Year Review,* Pittsburgh: CMU (mimeo).
Teare Jr, B.Richard (1948) *The Use of Problems and Instances to Make Education Professional,* Pittsburgh: Carnegie Institute of Technology.
Thatcher, Margaret (1970) 'The role of the polytechnics', *Guardian,* 17 February.

Thomas, Russell (1962) *The Search for a Common Learning: General Education, 1800–1960,* New York: McGraw-Hill.
Thring, M.W. (1967) 'The chartered engineer of the future', in Institution of Mechanical Engineers, *Trends in the Education and Training of Professional Mechanical Engineers: Proceedings,* 181 pt 3M.
Tolley, George (1982) 'Some reflections on education and training', in Science and Engineering Research Council, *Future Patterns in Education, Training and* Work, London: SERC.
Trow, Martin (1974) 'Reflections on the relation between the occupational structure and higher educational systems', in International Council for Educational Development, *Higher Education: Crisis and Support,* New York: ICED.
Truxal, John G. (1986) 'Learning to think like an engineer: why, what, and how?', *Change,* 18 (2).
Turmeau, W.A. (1982) 'Engineering degree curricula for the future', *Higher Education,* 11.
Turmeau, W.A. *et al.* (1982) 'The profession's lead for education', *Chartered Mechanical Engineer,* 29 (7).
Tustin, A. (1950) 'Broader education in a department of applied science', *Universities Quarterly,* 4 (3).
UGC (University Grants Committee) (1964) *University Development 1957–1962,* London: HMSO.
UGC (University Grants Committee) (1984) *A Strategy for Higher Education into the 1990s: The University Grants Committee's Advice,* London: HMSO.
UGC (University Grants Committee) (1985) *Response to Green Paper on Higher Education,* London: UGC (mimeo).
University of Maryland (College Park) (1984) *Liberal Arts in Business Program. A New Curriculum Offering Career Options for Undergraduates in the Division of Arts and Humanities,* College Park: University of Maryland (mimeo).
Van Doren, Mark (1943) *Liberal Education,* Boston: Beacon Press.
Venables, P.F.R. (1959) *Sandwich Courses for Training Technologists and Technicians,* London: Max Parrish.
Walker, Eric A. (1971) 'The major problems facing engineering education', *Proceedings of the IEEE,* 59 (6).
Warren, J.W.L. and Reid, S.A. (1981) 'The implications of revised goals of engineering education for curricula and teaching', in Polytechnics and Engineering Conference (Department of Education and Science Invitation Conference), *Proceedings.*
Watson, J.Steven (1973) 'Educating statesmen: a retrospect', in Eric Ashby *et al., The University on Trial,* Christchurch, New Zealand: University of Canterbury.
West Virginia Board of Regents (1979) *Profile of Progress: Higher Education in West Virginia,* Charleston: Board of Regents.
White Jr., Lynn (1967) '"Civilizing" the engineer by "civilizing" the humanist', in William H.Davenport and Daniel Rosenthal (eds) *Engineering: Its Role and Function,* New York: Pergamon.
White Jr, Lynn (1968) *Machina ex Deo: Essays in the Dynamism of Western Culture,* Cambridge, Mass.: MIT Press.

White, W.H. (1906) 'The education and training of engineers—civil and naval', *Nineteenth Century,* 59.
Whitehead, A.N. (1932) *The Aims of Education and Other Essays,* London: Williams & Norgate; Benn edn 1962.
Wiener, Martin J. (1981) *English Culture and the Decline of the Industrial Spirit, 1850–1980,* Cambridge: Cambridge University Press.
Wilkinson, Rupert (1964) *The Prefects,* Oxford: Oxford University Press.
Williams, Gareth (1985) 'Graduate employment and vocationalism in higher education', *European Journal of Education,* 20 (2–3).
Young, Roger (1973) *Report on the Policies and Running of Stirling University 1966–1973,* Stirling: University of Stirling (mimeo).

Index