Broadening the Curriculum: Toward Liberal Knowledge

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Fifty-four years ago the Ministry of Education in England published a White Paper on Technical Education that had profound consequences for subsequent developments in higher education in the UK and indirectly in Ireland. In that paper it proposed that nine technical colleges, three of them famous Polytechnics in London were to be given advanced status for the purpose of offering full-time sandwich courses of four years duration for a new Diploma in Technology (Dip.Tech.). This Diploma was to be equivalent to a degree and was to be validated by a newly created National Council for Technological Awards (NCTA). Its purpose was to increase the supply of technologists, in particular engineers to industry. University graduates were intended for research and development. Ironically many diplomates wanted to go into R & D (see Heward, Mash and Heywood 1968; Heywood and Mash 1968). The success and quality of the Diploma led to these institutions being granted university status ten years later. Then some 30 Regional Technical Colleges in amalgamation with other institutions in the public sector were given Polytechnic Status. The NCTA was replaced by the Council for National Academic Awards (CNAA) that had the power to offer degrees in any subject it chose.[1] On both occasions some deserving institutions of higher education were omitted from the promotions. Events in Ireland have mirrored what happened in England. My purpose is not to dwell on these developments but simply to empathise with DIT and in the first instance to discuss an activity that was compulsory in all these diploma courses and was in effect a broadening of the curriculum – namely liberal studies.

In 1957 the Ministry of Education issued a Circular 323A to technical colleges that required them to make provision in all courses for a component of liberal education. By 1963 the term had been replaced by 'General Education'. The term liberal education had been lost. Be that as it may the NCTA decided that all courses for the Diploma in Technology should have a liberal study component, and this was to be of the order of three hours per week throughout the programme. This was in keeping with the long-held view that vocational courses were narrow and for training rather than for education. What was understood by 'training' and by 'education' was not always clear. Perhaps liberal was accompanied by an image of ancient buildings, green playing fields, aesthetic quads, river punts, and relaxed intellectual discussion. An image of 'Oxbridge'. In Mark Pattison's words it was that it teaches 'the art to live; it instructs a man how to live and move in the world and look upon it as befits a civilised being.' And earlier 'a vocational education is a training for work'. So quoted the Warden of All Souls in 1967 (Sparrow 1967). Since the courses for the Diploma in Technology were deliberately established to meet the needs of industry it was logical in these circumstances to assume that they did not meet the requirements of a

liberal education. So we have the irony that a degree awarded by a university, even if it was 'red brick' was a guarantee of liberal education whereas a diploma that was equivalent to a degree awarded in a technical college was not.[2] A cynic might say that it was a typical illustration of the English devotion to social class. Similar issues have dogged the system of higher education in England to this day. Back then the question that ought to have been put is Why do technology students in the universities not require some formal liberal education when equally qualified students in Diploma in Technology courses do. So what was the value of liberal studies the Diploma in Technology students received?

At the time research in higher education was just beginning in earnest and the issue of liberal studies received some attention through several surveys of attitude and opinion of students in both technical colleges and universities.[3] One survey, the results of which will be considered here obtained information from 383 of the first 1000 diplomates, and some of their teachers in five Colleges of Advanced Technology (see Silver 1990). There is no doubt that these courses engendered controversy among some students because they took the focus away from what they had come to college to do – namely study to become a technologist. Others were very positive about the programmes, while some wanted changes in the syllabus and a better organisation of the courses. In some cases both the system of examination and the methods of teaching came in for criticism.[4] There was no evidence that the majority of diplomates wanted these programmes to be discontinued. But what did their teachers think?

It would seem from this enquiry that there was no consensus of opinion about the aims of liberal studies among teachers. Their opinions were likely to reflect the basic beliefs of the individuals concerned. Nevertheless the majority thought liberal studies were necessary but only half thought they should be compulsory. In another more substantial enquiry in one of these institutions by Lawrence Davies (1965) there were similar findings. Ninety per cent approved of the idea of liberal studies. I suspect that a caveat should have been attached to the effect that, yes they are a good idea so long as they do not effect my course or overload the programme even more than it is overloaded.

The purpose of this paper is to argue that specialisation has gone too far and that there is a need to return to the debate about liberal education and to broaden the curriculum to prepare students better for the world in which we live. It is to argue that the personal and social aims of higher education are as important as the economic.

I am not sure whether it is ironic or simply hypocritical that while many of us parents claim to want our children to be educated, the phrase '*educate the whole person*' comes to mind, in reality we do the opposite and put great pressure on them to gain as many points in the Leaving Certificate as possible. And, if we think a 'crammer' institution will do a better job than school then we pay for the children to cram. We know which jobs pay the most and what qualifications are required for those jobs. As long ago as 1939 T. H. Marshall wrote that there has been a 'transfer of individual competitiveness from the economic to the educational world, from the office and workshop to the school and university'.[5] Now a large proportion of school leavers seek a degree in higher education, and they are encouraged to enter higher education by governments in the belief that the higher the level of attainment of the population

the greater will be the economic benefit to the country. But as we see, particularly in a time of recession, employers respond by grade inflation, for selection by qualification is the most useful although not necessarily the best means of selection. So, whereas in the past a Junior Certificate would do for a particular job now a Leaving Certificate is required. Similarly some employers now demand a degree for tasks that would have been done in the past by a person with a Leaving Certificate. Of increasing significance is the fact that many graduates are disappointed to find that there are no vacancies in the fields for which they have been trained. Not only do they find it emotionally difficult to seek jobs in other spheres they often find themselves rejected by employers who erroneously believe that they do not have the generic skills they need.[6] In this respect it is worth noting that the State of Illinois expects that in the next decade 41 per cent of the jobs in the state will be at the middle level.[7]

A second point about specialisation arises from the desire of governments to increase the supply of qualified manpower in particular fields. The experience of the last 60 years is that manpower forecasting is both difficult and hazardous. During some of my research in the early 1960s I found that a factory in the English Electric Group that made turbines and the like for power stations wanted a local university to provide a high level master's qualification in welding. It required about eight such engineers but did not offer that university any other source of supply making the development of such a degree impracticable. Two years later that factory was closed. Shortly afterwards the North Sea Oil and Gas industry where such engineers would be needed began. Last week the British announced plans to build huge offshore wind farms and claimed to be the leaders of the technology in the field. But they also said that there was a shortage of appropriately qualified manpower that might inhibit the attainment of the project's goals. The question should be not whether there is a shortage and what to do about it but what generic skills are needed and who possesses them? Industry should look beyond the titles of qualifications. Market forces will then do the rest.

Experience of the problems of employment in response to socio-technological change seems to have convinced politicians and pundits that workers need to be more adaptable and flexible. At the same time they have offered very few thoughts on how to create a social system in which people can with confidence be adaptable and flexible. Clearly changes in attitude will be required by both employers and employees and these will not come about lightly nor in the short run. What then can higher education do to help the changes that are required?

In the first place policy toward higher education has to change. It has to be about the common good and not simply a device for producing economic prosperity. It has to be about social and personal well being. That can only come about from an education that is broad based, by this I mean one that has as one of its primary aims the enlargement of the mind. That I propose is done in two ways, the development of a knowledge base that runs hand in hand with the development of a skills base.

In *The Idea of a University* Newman proposed a theory of liberal education that had as one of its primary aims 'the enlargement of mind' with which he associates the terms 'philosophy' and 'wisdom'.[8] It seems to be coincident today with what many educators call 'the development of the whole person.' The argument presented here is that because knowledge has become increasingly fractionalised there is a need for an education beyond school that re-asserts the primacy of 'enlargement of mind' as a

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goal of education. Such an education is necessary in the sense that it should help the student to 'connect views of the old with the new;' indeed with the current explosion of knowledge one might add the new with the new. Its purpose is to give 'insight into the bearing and influence of each part upon every other, without which there could be no whole […] It is knowledge not only of things but of their mutual relations.' […] 'enlargement consists in the comparisons of the subjects of knowledge one with another. We feel ourselves to be ranging freely, when we not only learn something, but when we also refer it to what we know before.' This would seem to be consistent with that present-day view of learning that it is the process by which experience develops new and reorganises old responses. This is clearly what happens or should happen within courses. Without it there could be no development or movement within a course but demonstrating that knowledge has been acquired is no guarantee that there has been enlargement. Newman said

> it is not the mere addition to our knowledge which is the enlargement, but the change of place, the movement onwards, of that moral centre, to which what we know and what we have been acquiring, the whole mass of our knowledge, as it were, gravitates. And therefore a philosophical cast of thought, or a comprehensive mind, or wisdom in conduct of policy implies a connected view of the old with the new; an insight into the learning and influence of each part on every other; without which there is no whole, and could be no centre. It is the knowledge, not only of things, but of their mutual relations. It is organized, and therefore living knowledge.
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> (Sermon 14: Wisdom, as Contrasted with Faith and with Bigotry)

This insight is to be achieved through a comprehensive or universal knowledge.

The implications of Newman's thesis for the curriculum are profound. The relationships that he sees range across the spectrum of subjects.

> […] all the branches of knowledge are, at least implicitly the subject matter of its teaching; that these branches are not isolated and independent one of another, but form together a whole or a system; that they run into each other, and complete each other, and that in proportion to our view of them as a whole, is the exactness and trustworthiness of the knowledge which they separately convey; that the process of imparting knowledge to the intellect in the philosophical way is its true culture; that such a culture is a good in itself; that the knowledge which is both its instrument and result is called Liberal Knowledge.
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> (Discourse 9: Duties of the Church towards Knowledge)

At issue is the meaning of 'universal'. Today we take it to mean 'all inclusive' but as Culler (1955) points out this was not the case in Newman's time especially as it was used in the context of university education. At that time its usage derived from 'universum' and meant 'turned into one.' There was, Culler (1955) writes 'a desire to see things whole that forced men to look at the whole body of things, and therefore the true character of a university is not that it teaches all the sciences but that whatever sciences it does teach, it teaches in a spirit of universality'. But this does not mean that it can be done within a single specialism, for each subject has something of its own that is specific to itself to offer. Newman wrote:

> If we might venture to imitate […] Lord Bacon, in some of his concise illustrations of the comparative utility of the different studies, we should say that history would give fullness, moral philosophy strength, and poetry elevation to the understanding. […] the elements of good reason are not to be found fully and truly expressed in any one kind of study… [moreover,] if different studies are useful for aiding, they are still more useful for correcting each other.
>
> (Discourse 7: Knowledge Viewed in Relation to Professional Skill)

Each study has its own characteristic way of thinking.[9]

The significance of Newman's thesis can be illustrated from the consequences of his view of the practical end of university education which was that of 'training good members of society, its art is the art of social life, and its end fitness for the world', Necessarily 'man' who is at the centre of this aim has to be viewed in all his relationships.

What is true of man in general would also be true of any portion of reality however minute. If we wished to know a single material object–for example, Westminster Abbey–to know it thoroughly, we should have to make it the focus of universal science. For the science of architecture would speak only of its artistic form, engineering of its stresses and strains, geology of its stones, chemistry and physics of the ultimate constitution of its matter, history of its past and literature of the meaning which it had for the culture of a people. What each one of these sciences would say would be perfectly true to its own idea, but it would not give us a true picture of Westminster Abbey.

So wrote Culler in 1955 to further illustrate Newman's idea. To get a true picture the sciences would have to be recombined and this recombination is the object of university education. We might go further and add that it is through such recombinations that advances in thought and practicalities are made. But Newman did not think recombination was the same as all the subjects taken together. It 'is a science distinct from them all and yet in some sense embodying the materials of them all.' This activity is what Newman called liberal knowledge and at other times, as Culler notes, philosophy, *philosophia prima*, Architectonic science or Science of the Sciences. He did not pursue this in any great detail but in the today's jargon it would seem to be a reflective activity of synthesis. An ability to bring all the parts together in order to make a judgement for which reason the subjects of the curriculum cannot be taught as entities isolated from each other. To gain such a comprehensive view study of as wide a range of knowledge as is possible is necessary.[10] The consequences of this capability for the educated person so produced were set down by Newman in the oft-quoted statement about the ends of a university education in Appendix 1. This statement clearly shows the importance of development in the 'affective' as well as the 'cognitive domain'. Recent thinking in educational theory helps to clarify this point. I have not taken account of the significance that Newman attached to residence and the organisation of a university. Although of equal importance that must be a discussion for another day. In any case this argument stands or falls in its own right.[11]

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In 1964 Volume I of *The Taxonomy of Educational Objectives* was published on this side of the Atlantic (Bloom et al. 1964).[12] It made us think in terms of cognitive, affective and psychomotor skills and it gave a view of what these might be in the cognitive and affective domains. In the cognitive domain it defined six hierarchically ranked learning outcomes. These were knowledge, comprehension, application, analysis, synthesis and evaluation (judgement). It was the progenitor of the 'learning outcomes' movement. The point to be made here is that a subject is seen to be more than a syllabus, it is supposed to help develop key dimensions of learning. In particular, *The Taxonomy* has led us think about *Higher Order Thinking Skills* which we associate with problem finding, problem solving, critical thinking and creativity. Recently we have begun to understand that in spite of all this work a large number of students fail to develop these skills adequately. Moreover *The Taxonomy* has caused us to appreciate that learning influences and is influenced by attitudes and beliefs and the emotional response to that learning, and as such influences personal development and relationships. Clearly 'enlarging the mind' is not only about knowledge acquisition but about the development of high level skills in the cognitive and affective domains. It is now understood that any attempt to define the aims of education must be holistic in the sense that it has to take all these dimensions into account. And that is why Newman's oft-quoted purpose of university training is so apposite today. It is a statement of outcomes and it can be related to teaching and assessment practices that would bring about those outcomes.

By 1989 the authorities in the UK were beginning to think in terms of learning outcomes and some of this thinking was done in the Enterprise in Higher Education Initiative (EHEI). Its proposals certainly broadened the view of what higher education is about but only in respect of the skills in the cognitive and affective domains. Furthermore it focused on the transferability of learning.

The EHEI was undertaken by the Employment Department in the UK to respond to complaints about the quality of graduates made by some industrialists to the Thatcher government. These complaints suggested that new graduates lacked key skills particularly in what might loosely be called the affective domain that embraced such things as interpersonal relationships. A working group of the Initiative issued a statement of four broad areas of learning that should encompass the education of any undergraduate irrespective of subject (Appendix 2) [13]. Support for this view was found in a study of what came to be known as 'Personal Transferable Skills'. These skills were derived from a study of what industrialists wanted from graduates as portrayed in 10,000 job adverts that appeared in a two-month period. The analysis showed the items could be grouped together into four generic or core skills.[14] They were (1) Management and Organising; (2) Communication; (3) Teamwork; and (4) Problem Solving (Creativity). Two groups of sub- skills contribute to each of these core skills. Thus in respect of Management and Organising the sub-skills involved are (i) interviewing, consulting, negotiating, and (ii) reviewing, contracting, chairing, (2) Communication involves (iii) explaining, presenting, oral, written, and (iv) confronting, being assertive, telephoning. Teamwork involves (v) collaborating, facilitating, leading, and (vi) delegating, supervising, monitoring. Problem solving (Creativity) involves (vii) integrating, hypothesizing, integrating, and (viii) data handling, critical thinking, synthesising. (ii) and (iii) also involve non-verbal communication and listening. (iv) and (v) involve self-disclosure, empathising and clarifying. (viii) and (i) involve opening and closing, questioning and information

gathering. There are other taxonomies that embrace similar areas of skill. The Carter (1985) taxonomy following *The Taxonomy* in the affective domain highlights the importance of attitudes and values. However he includes a domain that takes into account personal characteristics. [15] The important points from the Sheffield study are that they embrace skills in both the cognitive and affective domains and are transferable.

The organisers of the initiative believed that the development of these skills could be achieved through the integration of action learning methods within each subject, as for example team project work in history. And the Sheffield Unit indicated how this might be done (Appendix 3). Notwithstanding the criticisms of industrialists if graduates are produced with these qualities there is the very real problem that many industrialists will not know what to do with such qualified people. Just as they are seeking changes in the products of the institutions of higher education so they will have to change attitudes and values otherwise there will be a dissatisfied professional workforce.

In the USA at about the same time (SCANS 1992), a committee of the Secretary of the Department of Labor listed the key competencies that were required for the workplace from high school graduates (Appendix 4). (See also Heywood 2008.) The committee argued that every subject in the curriculum could contribute to the development of these skills. In both cases it is the skills that are being integrated into the curriculum for the purpose of improving workplace performance. They gave an example which is shown in Appendix 5. In the case of the UK it was argued that the skills were generic, that is universally applicable and transferable to any life situation be it work or in society more generally. In the USA the skills were those specifically required in the workplace although it can be argued that they too are transferable. For example the skills required for systems thinking with which I associate the skill of synthesis are essential to the solving of complex problems, and very often those problems that persons face outside of work are more complex than those faced in work.

There are three objections to this approach. The first relates to the assumption that the ability to comprehend organisations and one's role in an organisation can be achieved through specific learning activities within existing subjects without any reference to a formal knowledge base. The second is that without a reflective element there will be little learning. The third is that too much attention to these particular goals could be to the detriment of the integrity of the subject that is being taught. Clearly the personal transferable skills focus on the so-called affective and as such go along way to meeting Newman's aims for university education and are a broadening of specialist study.

During my 56 years in further and higher education I have seen many changes. It is in the nature of individuals and communities to change things even when they work. We can safely predict that higher education will continue to change. My own prediction is that we shall soon be faced with two-year degree courses. But I would argue that these should be broad based and focused on the development of critical thought with the purpose of acquiring a liberal knowledge. Traditional subject arrangements would not suffice. Some form of carefully designed interdisciplinarity is likely to be necessary. Areas of study would have to be introduced but the relations between the areas of

knowledge will have to be clear. What is important is that the structures that arise should be the subject of in depth analysis based on the knowledge we have on learning, the ways of thinking in the different areas of knowledge. The aim is to prepare students for work, life and personal development – in short enlargement of the mind. A curriculum would necessarily have to be designed to take account of student development. The object is to design a whole curriculum and not a list of subjects or modules.[16]

I am conscious that I have not made practical suggestions as to how this might be achieved. I am also conscious of the fact that it has enormous implications for the way professional/vocational education and work is perceived and structured. However there is one possible starting point and that is within subjects. It is my experience in Teacher Education and Engineering that the subjects within them are fragmented, and that students do not see how they relate one with another. They are, therefore, deprived of an important enlarging process. I suspect that it is not much different in other subjects. Why not start in the 'home' base?

Notes

1   There is very little published on the NCTA. Silver (1990: Ch. 1) who explored the literature found two studies that are reported in theses by Davis (1979) and Heywood (1969). These paragraphs are based on a survey of teacher, diplomate and student attitudes to liberal studies in Heywood (1969).

2   'Red brick' a term very much in vogue at the time, refers to the Victorian universities – Birmingham, Liverpool, Manchester, Sheffield that had redbrick buildings. Bruce Truscott (1943) coined the term as the title of an influential book.

3   One study compared students from Northampton College of Advanced Technology (which subsequently became City University) with university students (see Marris 1964).

For a summary of research in technological education at the time see Heywood and Abel (1965).

4   "Difficulties in the way of formal liberal studies were summed up in the words of three diplomates: (1) It is only partly fulfilling a function. A university offers a liberal education in an informal manner. The deliberate attempt to teach liberal studies to make up for the loss of this education fails by the very fact that it is a formal attempt. The views of those receiving liberal studies are blamed by their technological and even scientific background. One tutor with a background in the arts cannot balance this, it takes more people (students) of the same age group in informal organisation before keen debate can be stimulated. (2) Having had experience of both university and CAT I am sure that the average student has a greater chance of receiving a 'liberal' education at a CAT. This is almost entirely due to the extra lectures there. At university there exists a large diversity of society meetings, some of high standard, but very few lectures which are an integral part of the course. The immense potential of a university in this field lies in its vastly better library. CAT libraries should be more exhaustive and include a balanced proportion on subjects not studied there. Access should also be improved. (3) For a student to participate in and interest himself in liberal studies, it appears the following should be present: (a) the student must feel he has the time to devote to them, i.e., he must not be hampered by his studies. (b) The subjects must be presented in a stimulating, attractive manner, and by a competent person. (c) The incentives for, and benefits of, taking liberal studies should be drawn to the student's attention. All too often, he is so more concerned with his formal studies, that he doesn't realise what benefits he will derive from them. (d) Needless to say adequate liberal studies should be available." These quotations concluded the chapter on liberal studies in Heywood 1969: 396/97.

5   T. H. Marshall's essay Professionalism in Relation to Social Structure and Policy is reprinted in Marshall (1963). The full quotation: 'An organised profession admits recruits by means of an impartial test of their knowledge and ability. In theory they are selected on merit, but it is merit of a particular kind which usually must be developed and displayed in a particular prescribed way. A narrow road leads into the profession through certain educational institutions. How far this favours social mobility depends on whether these institutions are open to the masses, so that merit can win recognition in all classes. Granted that broadening of the educational ladder typical of modern democracies, the system of official examination is more favourable to mobility than one of arbitrary appointment or casual promotion. But the chance to move comes early, during school days. Once it has been missed and a career has

been started at a non-professional level the whole system of formal qualifications makes movement at a later stage well nigh impossible. There is another point. In the church or the army, in law or medicine, a person at the top of the profession is on top of the world. He/she admits no superiors. But many of these new semi-professions are really subordinate grades placed in the middle of the hierarchy of modern business organisation. The educational ladder leads into them but there is no ladder leading out. The grade above is entered by a different road starting at a different level of the educational system. Social structure, insofar as it reflects occupational structure, is frozen as soon as it emerges from the fluid preparatory stage of schooling. Mobility between generations is increased, but mobility during the working life of one generation is diminished.[…]' Hence the increased demand to attend university and the search for points so that one gets as high up the hierarchy of programmes and colleges in the system as possible.

In the UK the current situation is very complex because there is evidence that many of the generation fostered by the baby boomers are downwardly mobile and are creating what has been called a sunken middle class (see Willetts 2010. See also article in *The Sunday Times*, Review section 17 January 2010.)

It is possible to infer that a similar situation exists in the USA and that the lower social classes in this respect become increasingly disadvantaged. See Report of an Education Trust study summarised in the *Washington Post*, 4 January 2010. See also in respect of the UK the first leader in *The Times*, 15 January 2010.

6   The comments on employment are based on material in Youngman et al. (1978) and some recent articles in the Irish press.

7   Barbara Oilschacher President of the Illinois Community College Trustees Association wrote this in the *Chicago Daily Herald*, 4 January 2010

8   Newman's theory of knowledge was originally stated in a University sermon no 14 on *Wisdom, as contrasted with Faith and with Bigotry* preached on Whit-Sunday 1841. The quotations are from this sermon and not *The Idea of a University*. There are other important aspects of this theory in other sermons in Newman (1890).

9   The quotation is from *The Idea of a University*. I offered an illustration of this point in respect of the Intermediate and leaving Certificate Curriculum (high school) in Heywood (1977).

10   I have argued elsewhere that a wide variety of teaching techniques will be necessary to achieve these goals. (See Heywood 2008.) Project-based learning goes some way to meeting these goals provided that it is designed to establish or develop a knowledge base within an interdisciplinary framework on which the future transfer of learning depends. Assessment needs to be made of what knowledge has been learnt and the student's understanding of how it fits into the general picture. Projects are enormously motivating for many students and can help them develop skills that other techniques cannot. (See pp. 324ff of Heywood 2000.)

11   Newman's point is supported by the first diplomate response recorded in Ref. 8. Some CATs had residence, the best known being Loughborough. Some research was done in that period on residence in both the CATs and universities. The Society for Research into Higher

Education published a monograph (no 1, 1966) on *Student Residence* in both universities and CATs.

12   See also Krathwohl (1964). Arising from criticisms a revised taxonomy was published in Anderson and Krathwohl (2001). For a discussion of the objectives movement in higher education see Heywood (2000).

13   The goals of enterprise learning are taken from Heywood (1994).

14   The report of the Sheffield Personal Skills Unit is summarised more recently in Heywood (2005).

15   Carter's categories were: mental skills; information skills; action skills; social skills; mental quality; attitudes and values; personal characteristics; spiritual knowledge; factual knowledge and experiential knowledge.

16   See Chapter 12 for remarks on interdisciplinary studies in Heywood (2008 note 23). Chapter 13 of the same reference for discussion of the Perry and King and Kitchener models of development. Meeting these goals is extremely difficult to achieve in modular systems. Some attempts have been made in engineering, as for example the EPICS programme at the Colorado School of Mines. The total modular structure would have to be designed specifically to meet these goals. See discussion in note 20.

References

Anderson, L.R. and Krathwohl, D.A. (eds) (2001) *A Taxonomy for Learning, Teaching and Assessing. A Revision of Bloom's Taxonomy of Educational Objectives*, New York: Pearson.

Bloom, B. et al. (eds) (1964) *The Taxonomy of Educational Objectives*. Vol. 1 *The Cognitive Domain*, London: Longmans Green.

Carter, R.G. (1985) 'Taxonomy of Objectives for Professional Education'. *Studies in Higher Education*, 10 (2): 135–149.

Circular 323A (1957) *Liberal Education in Technical Colleges*, London: Ministry of Education.

Culler, D. (1955) *The Imperial Intellect. A Study of Cardinal Newman's Educational Ideal*, New York: Yale University Press.

Davies, L. (1965) *Liberal Studies and Technology*, Cardiff: Wales University Press.

Davis, M. (1979) 'The Council for National Academic Awards. A Study of a Validating Agency', Thesis, University of Loughborough, Loughborough.

Heward, C., Mash, V. and Heywood, J. (1968) 'Student Reaction to Sandwich Courses for the Diploma in Technology', *Bulletin of Mechanical Engineering Education*, 7: 253–269.

Heywood, J. (1969) 'A Study of Certain Post-War Developments in Higher Technological Education', Vol 1. Thesis, University of Lancaster, Lancaster.

Heywood, J. (1977) *Examining in Second Level Education* Dublin: Association of Secondary Teachers.

Heywood, J. (1994) *Enterprise Learning and its Assessment in Higher Education* Technical Report No 20 Learning Methods Branch, Employment Department, Sheffield.

Heywood, J. (2000) *Assessment in Higher Education. Student Learning, Teaching, Programmes and Institutions*, London: Jessica Kingsley.

Heywood, J. (2005) *Engineering Education. Research and Development in Curriculum and Instruction*, New Jersey: IEEE/Wiley.

Heywood, J. (2008) *Instructional and Curriculum Leadership. Towards Inquiry Oriented Schools*, Dublin: National Association of Principals and Deputies/Original Writing.

Heywood, J. and Abel, R. Ann (1965) *Technical Education and Training. Research in Progress*, National Foundation for Educational Research. Occasional publication No 8.

Heywood, J. and Mash, V. (1968) 'Secondary Education and Occupational Choice of Students and Graduates on Sandwich Courses (Dip.Tech). Pre-entry factors', *International Journal of Electrical Engineering Education*, 6: 109–134.

Krathwohl, D. (ed.) (1964) *The Taxonomy of Educational Objectives Vol 2. The Affective Domain*, London: Longmans Green.

Marris, P. (1964) *The Experience of Higher Education*, London: Routledge and Kegan Paul.

Marshall, T.H. (1963) *Sociology at the Crossroads and other Essays*, London: Heinemann.

Newman, J.H. (1890) *Fifteen Sermons Preached before the University of Oxford*, London: Rivingtons. The edition of *The Idea of a University* consulted was

edited by C. F. Harrold and published in 1947 by Longmans Green, London.

SCANS Report (1992). *Learning a Living. A Blueprint for Higher Performance*, Washington, DC: US Department of Labor.

Silver, H. (1990) *A Higher Education. The Council for National Academic Awards and British Higher Education 1964–1989*, London: Falmer Press.

Sparrow, J. (1967) *Mark Pattison and the Idea of a University*, Cambridge: Cambridge University Press.

Truscott, B. (1943) *Red Brick University*, London.

Willetts, D (2010) *The Pinch. How the Baby Boomers Stole their Children's Futures and How they Can Give it Back*, London: Atlantic Books.

Youngman, M.B. Oxtoby, R. Monk, J.D. and Heywood, J. (1978) *Analysing Jobs*, Aldershot: Gower.

Appendix 1

From the *Idea of a University* (1852) as in the 1947 edition edited by C. F. Harrold, Longmans, Green, London. The seventh discourse on Knowledge and professional skill p. 157. The items in […] are changes from the third person masculine in the original

University training is a great ordinary means to a great ordinary end: it aims at raising the intellectual tone of society, at cultivating the public mind at purifying national taste, at supplying true principles to popular enthusiasm and fixed aims to popular aspiration at giving enlargement and sobriety to the ideas of the age, at facilitating the exercise of popular power, and refining the intercourse of private life. It is the education which gives [persons] a clear conscious view of [their] own opinions and judgements, a truth in developing them, an eloquence in expressing them; and a force in urging them. It teaches [them] to see things as they are, to go right to the point, to disentangle a skein of thought, to detect what is sophistical; and to discard what is irrelevant. It prepares [them] to fill any post with credit, and to master any subject with facility. It shows [them] how to accommodate himself to others, how to throw himself into their frame of mind, how to bring before them his own, how to influence them, how to come to an understanding with them, how to bear with them. [They] are at home in any society, [they] know when to speak and when to be silent, [they are] able to converse, [they are] able to listen, [they] can ask a question pertinently, and gain a lesson seasonably, when [they] have nothing important [themselves], [they are] ever ready, yet never in the way, [they are] a pleasant companion, and a comrade you can depend upon; [they know] when to be serious and when to trifle, and they have sure tract which enables [them] to trifle with gracefulness and to be serious with effect. [They] have the repose of mind which lives in itself, and which has resources for its happiness at home when it cannot go abroad. [They have] a gift which serves them in public and supports [them] in retirement, without which failure and disappointment have a charm. The art which tends to make a [person] all this, is the object which it pursues as useful as the art of wealth or the art of health, though it is less susceptible of method, and less tangible, less certain and complete in the result.

Appendix 2

The four broad areas of learning together with the elements they comprise that are important for equipping students for their working lives, as defined by the REAL working group of the Employment Department

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Cognitive knowledge and skills

Knowledge – Key concepts of enterprise learning (accounting, economics, organisational behaviour, inter and intra-personal behaviour).

Skills – The ability to handle information, evaluate evidence, think critically, think systemically (in terms of systems), solve problems, argue rationally, and think creatively.

Social skills – as for example the ability to communicate, and to work with others in a variety of roles both as leader and team member.

Managing one's self – as for example, to be able to take initiative, to act independently, to take reasoned risks, to want to achieve, to be willing to change, to be able to adapt, to be able to know one's self and one's values, and to be able to assess one's actions.

Learning to learn – To understand how one learns and solves problems in different contexts and to be able to apply the styles learnt appropriately in the solution of problems.

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Appendix 3

Active learning strategies to encourage the development of personal transferable skills suggested by the Sheffield Personal Skills Unit. Numbering as in the text. Other attempts have been made to show, how for example, different teaching strategies can be employed to obtain the categories in the Taxonomy of Educational Objectives. See for example Heywood (2000: 55).

	Communication	Teamwork	Problem solving	Managing and organizing
Personal tutorial	1,2,3 & 4 (iii) & (iv)		1,2,3 & 4 (vi) except data handling and (vii)	1,2,3 & 4 (ii)
Seminar tutor-led	1,2,3 & 4 explaining, confronting, being assertive		1,2,3 & 4 (vi) except data handling and (vii)	1,2,3 & 4
Seminar Student-led *individual*	1,2,3 & 4 (iii) and (iv) except telephoning		1,2,3 & 4 (vi) & (vii)	1,2,3 & 4 Consulting
Seminar Student-led *team*	1,2,3 & 4 (iii) & (iv) except telephoning	1,2,3 & 4 (v)	1,2,3 & 4 (vii) and (viii)	1,2,3 & 4 (ii) and chairing and negotiating
Project **Theoretical e.g. library project, artefact study** *individual*	1,2,3 & 4 (iii) and telephoning		1,2,3 & 4 (vii) and (viii)	1,2,3 & 4 Reviewing, interviewing
Project **Theoretical** **Experimental** **Practical** **Fieldwork** *team*	1,2,3 & 4 (iii) and being assertive, telephoning	1,2,3 & 4 (v) and delegating	1,2,3 & 4 (vii) and (viii)	1,2,3 & 4 (i) & (ii) and chairing
Project 'live' work-based, clinical placement, company based *team*	1,2,3 & 4 (iii) & (iv)	1,2,3 & 4 (v) & (vi) except monitoring	1,2,3 & 4 (vii) & (viii)	1,2,3 & 4 (i) & (ii)
Student profile **Negotiated with tutor**	1,2,3 & 4 Explaining being assertive		1,2,3 & 4 (vii) & (viii) except data handling and hypothesizing.	1,2,3 & 4 Reviewing

Appendix 4

The SCANS competencies

Work place competencies	Effective workers can productively use
1.　　Resources	They know how to allocate time, money, materials, space and staff.
2.　　Interpersonal skills	They can work in teams, teach others, serve customers, lead, negotiate and work well with people from culturally diverse backgrounds.
3.　　Information	They can acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.
4.　　Systems	They understand social, organizational, and technological systems; they can monitor and correct performance, and they can design or improve systems.
5.　　Technology	They can select equipment and tools, apply technology to specific tasks and maintain and troubleshoot equipment.
Foundation Skills	**Competent workers in a high performance workplace need**
1　Basic skills	Reading, writing, arithmetic and mathematics, speaking and listening
2. Thinking skills	The ability to learn, to reason, to think creatively, to make decisions, and to solve problems
3. Personal qualities	Individual responsibility, self-esteem and self-management, sociability and integrity

Appendix 5

The SCANS competencies integrated into the curriculum as illustrated in the report

Competency	English/Writing	Mathematics	Science	Social studies/Geography
Resources	Write a proposal for an after-school career lecture series that schedules speakers, coordinates audio-visual aids, and estimates costs.	Develop a monthly family budget, taking into account family expenses and revenues using information from the budget plan. Schedule a vacation trip that stays within the resources available.	Plan the material and time requirements for a chemistry experiment to be performed over a two- day period that demonstrates a natural growth process in terms of resource needs.	Design a chart of resource needs for a community of African Zulus. Analyze why three major cities grew to their current size.
Interpersonal	Discus the pros and cons of the argument that Shakespeare's *Merchant of Venice* is a 'racist' play and should be banned from the school curriculum.	Present the results of a survey to the class, and justify the use of specific statistics to analyze and represent the data.	Work in a group to design an experiment to analyze content in the schools water. Teach the results to an elementary class.	Debate the issue of withdrawing US military support from Japan in front of a peer panel. Engage in a mock urban planning exercise for Paris.
Information	Identify and abstract passages from a novel to support an assertion about the values of a key character.	Design and carry out a survey and analyze the data in a spread sheet using algebraic formulas. Develop a table and a graphic display to communicate results.	In an entrepreneurship project present statistical data pertaining to a high tech company's production and sales. Use a computer to develop statistical charts.	Using numerical data and charts, develop and present conclusions about the effects of economic conditions on the quality of life in several countries.
Systems	Develop a computer model that analyzes the motivation of Shakespeare's *Hamlet*. Plot the events that increase or decrease Hamlet's motivation to avenge the death of his father.	Develop a system to monitor and correct the heating/cooling process in a computer laboratory using principles of statistical process control.	Build a model of human population growth that includes the impact of the amount of food available, on birth and death rates etc. Do the same for a growth model for insects.	Analyze the accumulation of capital in industrialized nations in systems terms (as a reinforcing process with stocks and flows).

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