Moresby in 1970 by Professor Golson in which he drew upon prehistory, archaeology, linguistics, anthropology, ethnoscience, botany and geology. The great popularisers of science, such as Huxley and Bernal, have also usually worked in this mode. Many successful teachers are also transdisciplinary in style, drawing upon a wide range of knowledge and bringing it together into a meaningful whole.

Multidisciplinary: Several experts contribute conjointly from the standpoint of their own specialisms to the solution of a problem or to the exposition of an area of knowledge. This can often be highly productive of research results and there is an increasing tendency for people to work together in teams, especially in the sciences. It has become fashionable for some university courses to be taught in this manner, although they are usually misnamed as "interdisciplinary" or "integrated", but such courses are almost always failures, mainly because they lack coherence from the students' viewpoint. If it is considered desirable to present material from a variety of disciplines then this is almost always better done, although it may involve some sacrifice of rigour, by one person using the transdisciplinary mode. A group of experts may be a success in a television "think-in" but they are invariably a dismal flop in the lecture hall.

Integrated: This term is only employed in educational contexts and I am unable to distinguish it from the transdisciplinary mode of teaching. On the whole, I would prefer to adopt the latter term since "integrated" suggests a psychological ordering and grasp of discrete elements of knowledge on the part of the student, and this often may not be achieved. It is a success-word from our psychological vocabulary rather than an apt term for describing an approach to curriculum construction. It is also sometimes taken to mean the possession of some kind of superskill with which an individual can tackle a great variety of problems located within disciplines with which he has little acquaintance: this notion should have been abandoned years ago along with faculty psychology.

It will have been noted that all of the above definitions presuppose the existence of disciplines and the possibility of providing an account of their character. At present the latter remains little more than a possibility since there is still much disagreement concerning the criteria in terms of which disciplines are to be identified. For the sake of argument I have employed a primitive notion of "discipline" similar to that used in university catalogues and which permits us to classify physics, philosophy and history as disciplines.

Finally, to return to a point made at the beginning. I believe

that we should be much more sceptical about the value of expending large quantities of human and material resources on curriculum development projects at a time when we are still far from clear about what we are attempting to achieve in education. I doubt whether the content of the curriculum is as important as many people suppose and concentrating so much of our resources upon changing it only serves to divert attention away from far more significant educational issues. What matters educationally is not so much what students learn but *how* they learn and the *manner* in which they are taught. Until we succeed in making some quite radical changes to the character of teaching-learning transactions in schools and universities there is little point in changing the content of what is taught.

INTERDISCIPLINARY STUDIES—REVOLUTION OR REVISIONISM?

JOAN M. RITCHIE*

Introduction

THERE is a tendency in educational institutions in Australia to seize upon overseas trends, to hail them as brilliant innovations and to impose them on existing structures. There is a danger that "interdisciplinary studies" will fall into this category. The term is rarely defined and its assumptions need careful consideration. It raises important epistomological issues and, unless cautiously appraised, may obscure alternative educational innovations. The purpose of this article is to examine the background of "interdisciplinary studies", to look at some definitions of the term and to assess its usefulness in the educational structure of Australian universities.

Background of Term

Graham Wallas originated the idea of interdisciplinary studies in 1908.[1] His book "The Great Society" brought psychology into touch with contemporary problems. Charles Merriam of the University of Chicago used the term in the early twenties to describe the connection between politics and most of the social and behavioural sciences.[2]

A conference on Social Studies in America tried to develop a unity, instead of concentrating on subject disciplines.[3] Both the American Social Science Research Council, in 1923, and the London

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Goldsmith's College saw the need to reach beyond subject barriers to interdisciplinary education. In 1932 Ortega Y. Gasset denounced "the barbarism of specialisation"[4] and in the forties the term "interdisciplinary studies" appeared in education dictionaries. In the fifties the Massachusetts Institute of Technology developed its teaching and research around five interdisciplinary groups and, after intermittent usage, the term has become common in the seventies.

Assumptions

Exponents of interdisciplinary studies have held common assumptions. They share the view that existing education has a vacuum of purpose and that subjects are "barriers" to knowledge. They hold that universities are over-specialised, lacking focus on prime societal problems.[5] In particular, they assume a culture crisis and man's ability to shape the future. One only has to peruse library catalogues to see the spate of literature on these twin problems.[6] Gross has identified crises of survival, aspirations, knowledge—fragmentation and authority.[7] Those with an interdisciplinary focus further assume that the *laissez-faire* era of universities must give way to planning for education appropriate to a changing world. There must be issue confrontation with themes "located at the growing edge of society".[8] The University is seen as "problem-solving"[9] or promoting "the self-renewal of society".[10] These assumptions involve drastic reorganisation of both university structure and methodology, with horizontal rather than vertical diffusion of knowledge.

Definition

Nevertheless, the term "interdisciplinary studies" is seldom defined and something so confusingly vague is proposed as the *raison d'etre* for future change. A search of the literature reveals a multiplicity of terms used interchangeably. Those most commonly in use are "interdisciplinary", "multidisciplinary", "crossdisciplinary" or "transdisciplinary", "pluridisciplinary", "omnidisciplinary" and "supradisciplinary". Less frequently used are "core course education", "unitary education", "team-taught education", "interprofessional co-operation", "crossfertilisation" and "integratism". Loosely, the terms mean "non-disciplinary", reaching beyond subject barriers, but the numerous descriptions imply some disagreement both in content and form between their supporters.

Only Erich Jantsch of Vienna (recently Research Associate at the Massachusetts Institute of Technology) has come to grips with definitive analysis. He defines "disciplinarity" (specialisation in

isolation) as distinct from "multidisciplinarity" (a variety of disciplines without co-operation), "pluridisciplinarity" (co-operation of disciplines without co-ordination), "crossdisciplinarity" (rigid polarisation towards monodisciplinarity), "interdisciplinarity" (a co-ordinated step from the pragmatic to normative levels), "transdisciplinarity" (a multi-level, multi-goal hierarchical systems approach structured around systems design laboratories, function-oriented departments and discipline-oriented departments). He anticipates a focus on method and organisation in which the policy sciences have an important role, rather than on accumulated knowledge.[11]

Educational Philosophy

In terms of an educational philosophy, the supporters of "interdisciplinary studies" have completely rejected the universal categories of Essentialism and Perennialism, together with the "over-intellectualism" of Realism. Moving beyond Progressivism to Reconstructionism, they have much in common with Theodore Brameld. He regarded education as an agency of the culture, "a completely open and interactive field" which must reconstruct human relations in a period of great transformation.[12] But the interdisciplinarists owe even more to Mannheim's concept of planning[13] and the conscious selection of ideals according to the social function they have to perform. Democratisation, for Mannheim, involved closing the distance between intellectual elite groups and other sections of society.[14]

Educational Issues

Implicit in all interdisciplinary proposals is the fundamental epistomological issue of what constitutes a university. How is it different from other tertiary institutions? Perhaps the key to this lies in the traditional detachment of the university and, if so, the further question arises of how this can be preserved if the university becomes a cutting edge of the society. At stake is the critical function of the university. Moving from the university as an institution to the students, there is the question of whether universities are concerned with the maturation process. Mannheim implies that this is an important part of their function when he stipulates that change is only within the reach of people who feel secure, fearing neither loss of status nor individuality.[15] But how is this person to be created?

Interdisciplinary Answers

The Massachusetts Institute of Technology remains one of the foremost examples of "interdisciplinary studies", although not in

Jantsch's full sense of the term. Most examples one finds lie outside his "interdisciplinary" area. Thus an adult education course in London, "Violence and Revolution in the Twentieth Century", with sections interwoven from history, sociology and philosophy, would not qualify; nor would the common associations between Engineering and Architecture, Medicine or Town Planning. Jantsch, himself, points out that "an interdisciplinary link at the highest level has not yet found an expression in current university experiments".[16]

Non-disciplinarity, however, contains specific learning elements, particularly an interpretative concept of disciplines and the discovery of relationships. It is characterised by an activity pattern which includes individual or small group study, a variety of media, development of presentation skills both material and mental, growth of discovery skills, interpretation, expression and judgment.[17] What appears as new is that the common ground between disciplines is more visible, the specialties are designed with greater freedom and education is more responsive to contemporary issues. Students are permitted independent study and freedom to construct their own courses.[18] Few academics in Australia today would disagree with student involvement or the need for universities to be in genuine touch with the culture. The point at issue is whether "interdisciplinary studies", so loosely stated, are the only way, or even the desirable way, to meet these needs.

Alternative Answers

Although much analysis remains to be done on the essential forms of knowledge, the neo-Kantian approach allows for general education programmes through disciplines.[19] These involve discovery of the personal meaning and relevance of ideas in relation to the self and society. They should also lead to clear perceptions of the structures of thought and knowledge, the method and validity and the central principles of the disciplines; to what J. B. Conant called the "tactics of Science". History, for example, is concerned with clearing away the mass of irrelevant detail, discovering what is significant. Every creative scholar makes contact across disciplines, making his study horizontal as well as vertical. All great historians have been students of Literature.[20] The writer and literary critic are confronted with interplay between technical artistry and social forces.[21] Thus one might say that some subjects are interdisciplinary by their very nature. They are also relevant to the contemporary world. Literature is concerned with human thoughts and feelings, Philosophy raises pertinent questions and discusses them in disciplined fashion, Mathematics can be relevant

to current problems, and the idea that History must always be re-thought by each generation in the light of its own particular problems is now almost a truism. Thoughout, there should be a high degree of transference. It is important to keep continually in mind what is happening to the student,[22] and to put him in a position where he can learn for himself.

The Department of General Studies, the University of New South Wales, has come up against the challenge these educational answers pose, both in content and method, with what were initially servicing courses. It has sometimes wrongly been seen as a collection of disciplines leading some staff members and students to think that they are participating at "low level"; persuading others that they must go completely "interdisciplinary" (without defining their meaning of the term). I believe that an alternative is to make the disciplinary approach an integral part of the students' experience as individuals, as citizens and as professional persons. This would involve the members of the Department in making explicit their areas of agreement and disagreement, working towards common goals through co-operative discussion. It would be, in effect, an action-research programme allowing maximum diversity in both content and method, with continuous re-appraisals of aims and achievements by staff and students. Essentially, it would be gradualist rather than radical and could well run concurrently with "interdisciplinary" approaches within the Department. An analysis of existing courses shows that, in general, they are already committed to contemporary issues.[23] This calls for staff with peculiar generalist skill to guide students to the significant depths of their discipline without being immersed by too much content.

Related Research

Other areas of research, essential to the fulfilment of "traditional" university education, may be obscured if a too-concentrated emphasis is placed on "interdisciplinary studies". The slow, complicated process of defining aims and objectives in behavioural terms is just entering tertiary education.[24] The dynamics of group discussion, individual growth and maximum student participation are but superficially understood by most university teachers. Education of the emotions, the concern with feeling as well as thinking differently, has been but thinly investigated and the questions of what are intelligence and creativity only lightly touched. Such enquiry, I suggest, is as significant for "disciplinarity" as for "non-disciplinarity".

Dangers of "Interdisciplinary Studies"

The interdisciplinary view is basically encyclopaedic with its

belief in "the science of man's total living experience".[25] It perpetuates some of the fallacies of Social Darwinism by anticipating the structuring of future society. It may be superficial and a threat to excellence, or *ad hoc* learning, subject to the neuroses and vagaries of pressure groups inside or outside the universities. It may fail to achieve a deeper understanding of human life and society or detachment and insight, already threatened in Australian universities by self-centredness and lack of mobility.

Most solid knowledge has come from specialism, with strenuous training in one line and method of conceptual thought. The concept of limit is basic. It is possible to study only a limited amount in a limited way at one time. To make these limits appropriate and to find significant interconnections within a closed area is the challenge of the discipline. The scholar carefully feels where one discipline runs into another. He looks at the findings of relevant disciplines but he does not trespass beyond the areas of his own competence.

"Interdisciplinary studies" have been connected with "crisis" from Wallas in 1909 to the present day. I am not persuaded that the contemporary "crisis" is any worse than that of the Persian Wars for ancient Greece or the Black Death for the Middle Ages. There is also a polarising of issues into alternatives of choice between supposedly mutually exclusive opposites. Thus Brameld saw the world at a perilous juncture between world-wide democracy or tyranny. In this sense "interdisciplinary studies" are the playthings of fashion. Both now and in the twenties the link was Environmental Studies; with Brameld, Philosophy; with Mannheim, Sociology; with Jantsch, the Policy Sciences.

Conclusion

This paper does not discredit "interdisciplinary studies" as an educational experiment. It attempts to place them in proper perspective as revisionism of a tendency in the twenties and not as "the inevitable revolution" which they have been called. They are, I suggest, ONE answer to the educational problems in Australia, but not necessarily THE answer. There is, I believe, a strong case for strengthening existing disciplines, as recommended at the University of Wisconsin-Madison, while at the same time looking towards "interdisciplinary studies".[26] These seem to me to be particularly relevant to group-oriented postgraduate scholarship relating research more closely to society. In either case, I would like to see working experience in the community made a prerequisite for both students and university staff.

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BOUNDARIES BETWEEN DISCIPLINES OR BETWEEN DEPARTMENTS OR BETWEEN THINGS?

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ONE part of the difficulty in defining a discipline lies in the fact that its subject matter does not belong to it alone, but also to other disciplines. Three research students engaged in work on semi-conductors in three different Australian universities found

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