EVALUATION OF DEPARTMENTAL RESOURCE

CENTRES IN HIGHER EDUCATION

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This thesis reports on the evaluation of departmental resource centres in higher education in Great Britain. The aims of the project were to:
(a) evaluate the educational significance of departmental resource centres,
(b) help in the establishment of a resource centre,
(c) assess the effectiveness of Six Category Intervention Analysis applied to interviewing,
(d) synthesise the concept of educational evaluation, and
(e) conceptualise departmental resource centres.

The literature review considers educational technology, educational innovations with particular reference to departmental resource centres and evaluation itself.

The evaluation results are reported through accounts of two case studies and a national survey of departmental resource centres. In the main these showed that departmental resource centres are a means of augmenting the departments' teaching and learning as well as of creating opportunities for further growth of individuals and of departments: they contribute to students becoming more self-directed learners and to staff becoming more competent professionals.

The development of a preliminary scheme for a departmental resource centre is documented; this showed that for a department which makes extensive use of resources someone in a fulltime capacity is desirable and that for the volume of resources involved the best way to approach the cataloguing is through automated means.

The application of Six Category Intervention Analysis suggests that researches who use the interview technique should be trained in this powerful skill.

A synthesis of evaluation, which is within the framework of the illuminative approach, is developed to resolve some of the contradictions between the traditional and innovative approaches.

Finally the concept of "departmental resource centre" is formulated in terms of the functions of evaluation as set out in the synthesis. It proposes a new definition to overcome the shortcomings of previous work and places equal emphasis on the provision of physical resources and the involvement of the human resources. The general tendencies, functionings and particularities of departmental resource centres are also presented.
ACKNOWLEDGMENTS

The author wishes to convey his gratitude to the following academics for their comments and suggestions on the whole or part of this thesis: Mr. Bernard Buttle, Dr. Alan Chadwick, Dr. Roger Downie, Mr. Peter Groves, Professor David James, Dr. James Kilty, Professor Malcolm Parlett, and Dr. Peter Reason.
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INTRODUCTORY REMARKS

This thesis reports on the evaluation of departmental resource centres in higher education institutions in the United Kingdom. These introductory remarks aim at explaining the history of the project, its aims, the way in which the material is presented in the thesis and ends with a few explanatory notes.

THE HISTORY OF THE PROJECT

The evaluation study was conducted at the Department of Educational Studies of the University of Surrey. In the early days of reading the relevant literature, it became fairly clear that although there was a considerably amount of literature on resource centres developed at the institutional level, including centres in schools, colleges of education, polytechnics and universities, research workers had not given much attention to the subject of resource centres developed within subject departments in higher education.

Moreover, departmental centres were initially developed in the early 1970s and there was little tangible evidence as to whether the services rendered by these centres were being recognised by participating staff and students.

The project began by examining the available literature both on resource centres and on programme evaluation. It was decided to concentrate the evaluation study on a number of case studies and on a national survey.

Work was then begun in negotiating arrangements for the evaluation of two departmental resource centres making use of personal contacts. At the same time information was sought on the existence of departmental resource centres
in higher education throughout the country. Throughout this time studies of the relevant literature continued.

A third case study was developed within the Department of Educational Studies at the University of Surrey, with the intention of developing a resource centre for the Department.

The work was evenly distributed among all these activities. There were, however, periods of time when one or other activity demanded total concentration, for example, the two case studies outside the university were conducted through several week long visits to the centres.

As the review of literature continued and the case studies progressed, sufficient material was gathered for the preparation of a questionnaire for the purposes of the national survey. A draft of the questionnaire was discussed with a number of people in charge of centres before the final version was sent out. This went to ninety three departmental centres which had been identified via the literature, personal contacts and correspondence.

RESEARCH AIMS

As the research progressed the aims of the project developed and 'matured' to the extent that additional aims were incorporated into it. For example, and although this project followed the Illuminative approach, the study of the literature on educational evaluation highlighted the fact that there were at least two contrasting approaches. Therefore there appeared a need for the writer to clarify for himself the meaning of the concept. A similar situation arose in regard to the literature on educational technology, from which there appeared to be three distinct approaches. Here again there was a need to look in more detail at the meaning of the concept. The analysis of the relevant literature as well as the information gathered in the three case studies and the national survey provided sufficient information for the formulation of the concept of a resource centre at departmental level.
The methodology employed during the project and particularly in carrying out the case studies relied considerably on the technique of personal interviews for the gathering of opinions, although an extensive consultation of the specialist literature gave little evidence on the manner of conducting interviews. Here there appeared another aim for the project, that of applying to interviewing the theoretical framework for interpersonal communication provided by the Six Category Intervention Analysis developed by the Human Potential Research Project at the University of Surrey.

In summary the general and 'matured' aims of the research project were as follows:

- to evaluate the educational significance of departmental resource centres through case studies and a national survey.

- to help in the establishment of a resource centre at the Department of Educational Studies, University of Surrey.

- to assess the effectiveness of Six Category Intervention Analysis applied to case study research interviewing.

- to synthesise, on the basis of the information gathered, the concept of educational evaluation.

- to conceptualise, on the basis of both the evaluation synthesis and the information gathered, the services rendered by departmental resource centres.

ORGANISATION OF THESIS CONTENTS

Organising the materials for presentation was no easy task. Several flow charts were attempted in order to reflect as clearly as possible the and re-feeding as well as the influence of each distinct section of the research upon the others. After careful consideration it was decided to approach the presentation of the material was as indicated in the chart overleaf.
FIGURE 0.1: Organisation of material in thesis.

INTRODUCTORY
REMARKS

CHAPTER 1
EDUCATIONAL
DEVELOPMENT

CHAPTER 2
EDUCATIONAL
INNOVATIONS

CHAPTER 3
EDUCATIONAL
EVALUATION

CHAPTER 4
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CHAPTER 5
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CHAPTER 6
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SURVEY

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CHAPTER 10
EVALUATION
SYNTHESIS

CHAPTER 11
CONCEPT OF
RESOURCE CENTRE

CONCLUDING
REMARKS

N.B. The lines and arrows indicate how the particular work reported in each of the chapters influenced the reporting in other chapters.

As can be seen from the chart, the way in which the research is reported does not necessarily follow the sequence in which it was carried out. This reflects the complexities of the work conducted. Rather than presenting the material chronologically, the thesis presents each section as an end product, taking into consideration the interrelations between chapters.
After this general introduction the thesis is divided into four major parts under the following headings:

**PART I: EXISTING KNOWLEDGE:** The literature review.

**PART II: RESEARCH METHODOLOGY:** How the research was conducted.

**PART III: RESEARCH RESULTS:** What research was conducted.

**PART IV: RESEARCH CONCLUSIONS:** The formulation of concepts.

The thesis is concluded with a summary of the main conclusions presented in each chapter, together with subsidiary material in the form of appendices, including the references.

**PREVIEW OF THESIS CONTENTS**

Part I, which concentrates on the literature review, comprises three chapters each of which reviews a particular aspect of education. The first chapter considers the meaning of educational technology. A large amount of the literature concerning resource centres was found in various journals of educational technology and there appeared a need for personal clarification of the concept. After reviewing the development of educational technology it is concluded that there are three major trends. The author favoured the most recent development—the problem centred approach.

In chapter 2, the literature review moves on to consider educational innovation in a wide context so as to place the particular innovation of resource centres within departments into its proper context. After considering the various innovations it is concluded that departmental resource centres have received little attention from educational researchers and that such centres are a particular type of innovation which has gained a significant degree of institutionalisation in the departments where they have been developed.
In chapter 3, the literature review considers the subject of educational evaluation, which is classified into three major periods, but with two opposing poles — the traditional and the innovative approaches. The chapter also reviews the several attempts made by various authors to classify several types of evaluation and to compromise between the two poles. The chapter concludes that, although the innovative approach provides the theoretical framework for the evaluation study reported in this thesis, it does not resolve the contradiction with its opposing traditional approach. This motivated the writer to produce his own synthesis of the concept of educational evaluation in order to clarify, or resolve, for himself that contradiction.

Part II begins (chapter 4) with a description of the methodology employed during the research study. This followed the basic ideas developed by the innovative approach and in particular by the illuminative approach to evaluation. It describes the rationale behind the project as well as the techniques used. One of those more extensively used was that of interviewing, and the following chapter (chapter 5) reports on the application of a particular theory for interpersonal communication skills to the conduct of interviews. The chapter concentrates on presenting the kind of situations encountered in interviews in which the theoretical framework is particularly useful. After reviewing the main premises of Six Category Intervention Analysis, there is an assessment of the effectiveness of the approach as applied in interviewing.

Part III concentrates on the reporting of the evaluation study of departmental resource centres. It begins (chapter 6) by presenting the results of the evaluation of the first centre, which was developed in a Biology Department. Chapter 7 reports on the second case study, a centre in a Chemistry Department. The structures of both reports are similar and each includes a brief background description of the centres, their organisation, the extent of student use, and the perceptions of those participating — staff and students.

On the basis of the information gathered through the case studies and the review of the literature, a questionnaire for a national survey was prepared, piloted and distributed to ninety three departmental centres. Chapter 8 contains an analysis of the responses. It also considers four major areas of the centres' activities: their organisation, the sort of materials kept in them, the extent of support
from various quarters within and without the department they enjoy and the extent of feedback and evaluation activities performed in the centres. Further sections in the chapter include relevant information concerning personnel in charge of centres, and general comments on the nature of the questionnaire-survey.

Chapter 9 describes what was done to set up a resource centre at the Department of Educational Studies, University of Surrey. One of the objectives of this case study was to test the emerging model of what a departmental centre should be, including its stages of development. The report covers the period until a preliminary scheme had been evolved for the centre and was ready to be followed by a major project. The report includes the background to the scheme; the main body of proposals for setting up the departmental centre; the provision of details about the preliminary scheme; and a summary of the main conclusions and recommendations.

Part IV presents the major conclusions of the evaluation study on the two areas of major concern: on evaluation itself and on the subjects of the evaluation. Regarding evaluation, chapter 10 presents the author's synthesis which resolved, in his mind, the major contradictions concerning the polarity of conceptualisations about evaluation. So far as the resource centres are concerned, chapter 11 present a conceptualisation in terms of its aims, functions, components, organisation and interrelations with other systems.

EXPLANATORY NOTES

The expression 'learning resources' is frequently used in this thesis and resources and materials are used as synonyms. By 'resources' is meant anything which, under certain circumstances, is made available for consultation or use.

The style of writing employs two grammatical forms, one for the majority of chapters which report on interrelations and facts in the passive voice; while when describing personal experiential situations, the first person is employed.

Another matter is the use of masculine gender all the time. This is avoided by the use of the plural which, although strictly ungrammatical, is the most common device. The author hopes that its extensive use will make it acceptable.
PART I: LITERATURE REVIEW

CHAPTER 1: THE DEVELOPMENT OF EDUCATIONAL INNOVATIONS

CHAPTER 2: EDUCATIONAL INNOVATIONS AND THE DEPARTMENTAL RESOURCE CENTRE

CHAPTER 3: PROGRAMME EVALUATION

Part I examines the existing knowledge in the field of educational innovations in general and departmental resource centres in particular: chapter 1 traces the origins and emergence of educational development; chapter 2 analyses educational innovations starting with a review of the international scene and then it moves to the British context, developments in schools and higher education, next it considers educational innovations with particular reference to the departmental resource centre; chapter 3 reviews the literature on programme evaluation beginning with an analysis of three periods in the development of evaluation and then presenting several classifications of evaluation.
CHAPTER 1
THE DEVELOPMENT OF EDUCATIONAL INNOVATIONS

INTRODUCTION

For the last few decades the use of new learning resources has been on the increase; for example, tape-recorded military instruction in the 1940s; 'T groups' in Management Education in the 1950s, systematic Curriculum Development since the 1960s; growth of group teaching methods and of individualised learning in the 1960s, 1970s and onwards; development of distance learning in the 1980s; etc. The increase in such learning resources has been so extensive that teaching and learning methods have had to be modified and developed so that "a given course is not longer adequately described by its syllabus but also by the methods employed" (Servant and Norton 1976:17).

The resources are employed in a variety of situations such as in the lecture room, in specially set up rooms, in the central library, in a portable form so that students can take them home, etc. The majority of these uses represent a trend which is changing the emphasis from direct teacher instruction towards more individualised and participative learning.

There is considerable literature which reports on the developments, applications of and research into learning resources; for example, Percival (1978) alone reports on 141 experimental studies in the period from 1964 to 1976. There are authors who argue that all this work and research has not provided general conclusions. To this effect Forman and Chapman (1979:37) have argued that so
far as research into teaching and learning is concerned "there has been a lot of activity, many dead ends and, as yet, little pay off".

The major part of the literature appears in journals, books, proceedings of conferences related to educational technology, and in education subject journals such as Physics Education, Chemistry in Britain, Medical Education, The Psychologist, and the Journal of Biological Education. This suggested a need to examine the meaning of educational technology and its relationships with what practitioners had reported in the subject periodicals. Accordingly, the reporting of the published literature is divided into two chapters. This chapter attempts to examine the meaning of educational technology. Chapter 2 reports on innovations, with particular reference to those developed at the departmental level.

The review is presented in the order researched for two reasons. The first is that some authors expound the view that the term 'educational technology' is confusing, has not properly been defined, and is misunderstood by the majority of practitioners. Hence, the first section of the chapter reports on these views. The second reason is that some authors appear to insinuate that 'educational technology' is a sort of magic wand which can solve almost any problem in education. The second section therefore concentrates on the expectations created by 'educational technology'.

The differing views expressed in the literature tended to confuse and a search for definitions did not lead to clarification. It became clear that there was a need to examine the concept in more detail. Hence the following section traces the development of educational technology in order to introduce an historical perspective including its relationships with developments within society in general and with other aspects of education in particular.

The chapter continues with a review of recent attempts to conceptualise educational technology. Some of the implications of the application of educational technology are presented and, finally, a discussion of the material presented is introduced together with some tentative conclusions.
EDUCATIONAL TECHNOLOGY: a confusing term?

The elements of confusion about educational technology fall into four categories: the specialised vocabulary used (and some people call this jargon), the complexity of the subject as seen by educational technologists, misunderstandings as perceived by practitioners, and the limited impact that educational technology has had in educational practice. There are several instances to illustrate the elements of confusion, the following are only a few examples.

In the first category — use of specialised vocabulary — authors attribute to staff in higher education suspicion about educational technologists; for example, Hall (1975:327) writes that: "the word 'education' brings memories of the esoteric nonsense which is all too prevalent in some educational journals, where the writer is seeking to impress his peers rather than bring about necessary changes; 'technology' is interpreted as expensive gadgetry which breaks down. Bring the two terms together and the completely erroneous picture which is formed is hard to destroy". And instead of clarifying the meaning of the term employed, Hall goes along with the misconception and entitles his article "Pretending not to be an educational technologist" and names his educational technology unit an "Advisory Centre for University Education". Another interesting quotation comes from MacKenzie (1976:5) who in the introduction to an issue of the British Journal for Educational Technology dedicated to educational technology in the Open University, wrote: "Is it a mystery, an art or a science? Is it merely a cluster of ideas and activities drawn eclectically from the social sciences, management theory and a heterogeneity of educational situations, sheltering for protection under a somewhat pretentious title, or is it developing a reasonably coherent set of intellectual constructs and practical skills which give it a distinctive identity — or at least the prospects of finding one as generalisations emerge and experience increases?".

A third and final example in this first category is given by Hurst (1974:14) who in a few lines uses seven expressions which are likely to confuse any practitioner not initiated in the specialised vocabulary. He wrote that "The 'Systems Approach' — like 'educational technology' — is one of those catch phrases which means different things in different contexts. It can be associated with various forms of cost/benefit analysis, or trade studies. In other manifestations the
cybernetic principles of biochemistry and information theory may be applied to social organisms".

A second aspect which contributes to the existence of confusion about educational technology is the complexity of the area, or areas, it intends to cover. For example Mitchell (1971:481) has argued that "'educational technology' does not appear to designate a unified field of activity or profession but it is a vague term which refers to a variety of concepts and activities related to the work of virtually all educators and many non-educators". Some years later he addressed himself again to the topic of complexity, saying that "just as science can refer to an activity (controlled enquiry) or to the knowledge which this process produces, so educational technology can refer to an area of study and practice or to specific objects used in learning. And because one term (or a few similar terms) must now serve several functions, considerable ambiguity still exists" (Mitchell 1975a:242). (The emphasis is Mitchell's). Confusion in these two quotes comes from the fact that educational technology is seen as a science whose applications are valid for every educational activity and beyond. This would seem to support the impression that educational technology is a sort of magic wand.

The third element of confusion comes from educational technologists who attribute misconceptions about the meaning of educational technology to teachers, but no evidence for this is given and the claim comes as no more than a perception held by the people who class themselves educational technologists. For example Sayer (1973:130) has stated that: "Perhaps one of the difficulties of gaining widespread approval and active use of educational technology lies in the fact that it is still often seen as expensive and difficult gimmickry — not perceived as a 'felt need' by the large run of teachers and lecturers". In much the same vein Farrugia (1975:23) wrote that "to many educators the term educational technology creates visions of sophisticated and wondrous machines supported by necessarily expensive and highly complex organisations, the penance of all educational ills. Many other educators regard educational technology as an inhuman, mechanical placebo that relegates teaching and learning to a series of impersonal and educationally suspect manipulations of switches and gadgets". He then dismisses both versions as wrong for they only stress the mechanical side of educational technology.
Pickfords (1975:68) argues that educationalists in general oppose the application of educational technology and points out two major causes. The first one is a natural conservatism within a profession where the form of so much teaching is influenced by custom and tradition. The second is a genuine fear that the quality of the education given to students may be impaired.

The misconceptions are not only attributed to teachers but also to people who have for years been involved in the field. In the early days of educational technology in Great Britain, Mr Anthony Crosland, the then Secretary of State for Education and Science, decided to establish the National Council for Educational Technology as one of the results of the recommendations made in the report by the Committee on Audio Visual Aids in Higher Scientific Education, chaired by Sir Brynmor Jones (1965). That was a very positive step, but because educational technology was in its infancy the report identified it with programmed learning. This has contributed somewhat to the misunderstanding of the meaning of educational technology.

The fourth category in the elements of confusion about educational technology is concerned with the fact that although there has been much activity, research and development in the field, educational technologists report that its impact on people has been small. For example, "it is ironic that perhaps the biggest problem in the selling of edtech to the ordinary teacher is that of communication. Like educational researchers, educational technologists are prone to talk to each other via esoteric journals and use a restricted code that is rapidly becoming incomprehensible to most teachers, many of whom fear that educational technology will reduce their involvement in the teaching of their students" (Mansell, 1972:182). Mansell has also criticised educational technologists on the grounds of their practice. He states: "There is without doubt a credibility gap in the realm of educational technology. People who lecture about it do not actually appear to employ it. Teachers who use it do not appear to be necessarily superior or to get better results. And at times the jargon is frightening".

If the four categories are considered together (and it must be so since they are closely related and overlapping) it becomes clear that there exists considerable confusion and ambiguity about educational technology. It becomes more so if
the expectations created by educational technology are examined, and this is the subject of the following section.

EXPECTATIONS CREATED BY EDUCATIONAL TECHNOLOGY

The introduction of the concept of educational technology into educational practice has created at least two areas of expectations about what it can or could do. The first concerns the consequences of its applications; and the second arises from the identification of a role, or roles, for educational technologists.

In the first instance educational technology is seen as capable of meeting the challenges of a world crisis in education. In this respect Chadwick (1973:94) has pointed out the following: "The arena in which one may expect to see the broadest number of changes and the highest potential for dramatic demonstration of the effectiveness of educational technology will be in the developing nations of the world. The primary reasons for this suggestion are that the severity of educational problems—a severity of crisis proportions—and the hypothesis that these nations are not as strongly committed to the old fashioned paradigm as are the more developed nations". Mitchell (1975a:254) does not expect to solve the crisis of developing countries, but he does expect to solve the problems of lifelong education. He argues that educational technology—as he sees it—"makes the prospects of lifelong education less a hope than a reality; the problem remains of improving the systems—micro and macro—which provide educational opportunities now and of designing new systems, materials, procedures and opportunities to promote a more vigorous intellectual and cultural life to meet the educational and cultural aspirations of mankind. There are few technical problems to overcome, the skills exist, what we need is the decision to go ahead".

A couple of years earlier Mitchell had argued that it was educational technology's role to devise the means of education. His argument: "A pattern begins to emerge if one considers technology (and therefore educational technology) as an intellectual and practical pursuit concerned with all aspects of the design and control of systems, for the purpose of achieving a potentially reproducible effect. And since education is the intentional organisation of opportunities to enhance
personal and cultural development, it falls to practitioners and theoreticians of educational technology to devise the means of education" (Mitchell 1973:320).

Another example on the possible effects on educational technology can be taken from Holroyde (1971:137-141). He argues that the fundamental assumption underlying the introduction of educational technology is its ability to produce quantitative gains, especially in terms of national balance sheets of education, of its productivity and degree of rationalisation of effort, cost/effectiveness and efficiency. Holroyde also argues that educational technology does and will make possible a radical rethinking of curricula; that it does and should increase the range of accessibility of student self learning opportunities; that it can and will in time help with the problem of decreasing large group teaching by enabling more small group direct teacher/student contact; that it should in time produce a better equation between the resources of manpower and the less costly and less exhaustive uses of equipment; and that it should be made to add to the value of the teacher rather than detract from his role.

In brief: educational technology has been thought of as providing the basis for solving the developing countries' crisis in education, developing a scheme for lifelong education, radically changing curricula and balancing the educational budgets. However, evidence provided by other authors falls very short of supporting these claims. For example, "educational technology has contributed little to the search for economies in universities" (Pickfords, 1975:69). And Harris expressed disappointment about the fact that the Institute for Educational Technology of the Open University had failed to achieve the radical role he had seen for it and argued that the practice of educational technology had not provided any new answers to the questions involved in designing meaningful curricula and pedagogies. He stressed that "the progressiveness of the O. U.—including the progressive educational technologists—have succeeded in creating only a progressive appearance for what is the old educational domination" (Harris, 1976:51,63).

The second area of expectations created by educational technology concerns the identification of its roles. For example, "the idea of a modern technology for education, if not revolutionary in itself, has at least profound revolutionary implications" (Goodman, 1972:56). Farrugia (1975:29) compares the work of an
educational technologist with that of a natural scientist and thus implies that educational technologists will tend to find solutions for any problem.

Mac-Donald Ross (1976:65-68) identified four different roles for educational technologists and dismissed them either for being unsatisfactory or too pretentious. The educational technologist as applied scientist tries to select teaching strategies scientifically, but this cannot be true because less is known in the field than is claimed. The educational technologist as a systematic technician identifies objectives precisely, so as to determine the way materials are designed: this is dismissed on the basis that the specification of behavioural objectives is an empirical matter not open to comparisons with experience, but a matter of faith. The educational technologist as a student advocate asks questions such as 'If I were a student, this is the kind of difficulty I would face', or 'If I were a student I wouldn't understand a word of that': this is dismissed in terms that it is not enough for the technologist to advance his personal opinion nor merely to have good intent. The fourth is the educational technologist as a problem solver: but this is not enough because it is extremely difficult to replicate problem solving skills.

Mitchell (1975b:310-315) argues that the present role of the educational technologist is not clearly defined. He therefore attempts to clarify the role by identifying five areas of activity: The first one is the educational technologist as a learning consultant consulting with clients regarding clarification of instructional objectives, prescription of appropriate learning activities or materials and assessment of learning resources and outcomes. The second is the educational technologist as a material producer developing and evaluating materials for learning. The third is the educational technologist as a learning resources manager who administers educational technology services within an institution, assuming that educational technologists and technical and clerical assistants accomplish institutional objectives within a temporal and fiscal budget. The fourth is the educational technologist who as a systems developer, analyses, plans or manages an instructional system, education information system or educational communications. The final one is the educational technologist as an educational planner who analyses, plans or manages large educational systems or major components to implement educational needs. After identifying thirty roles (not job descriptions, as Mitchell emphasises) under these five main headings, Mitchell
concludes that "it seems that a hierarchical arrangement of roles has been identified. This is not the case. One person or group may perform all or most of these roles. Perhaps more frequently, several different professionals will be involved. ... The practitioner of educational technology therefore must be capable of functioning under a wide variety of working conditions and cognisant of relevant information from many academic and professional areas" (p315).

Mitchell's conclusion does give the impression that educational technologists are little less than perfect educationalists and such statements are likely to confuse anyone who is not already initiated into the subject. On reading this conclusion the writer could not resist writing the following note: 'So, an educational technologist is a sort of superman, and would an E. Technologist fly as well?'

By now it may be clear that educational technology is a vast subject, but not what it is. Therefore, the next task was to have a first approximation to the concept through the identification of definitions in the literature.

DEFINITIONS OF EDUCATIONAL TECHNOLOGY

Although some authors avoid defining educational technology and there are many expressions such as 'educational technology, whatever is taken to mean', several authors have attempted to define the term or to provide a meaning of what they understand it to be. Nearly thirty definitions were found in the literature consulted, of these eleven were discarded because of overlap with others and in the remainder there are still some which differ only slightly, but they have been kept because the stress is different. For the purposes of analysis the definitions are grouped into three categories:

GROUP 1:

"the use of tools and equipment (the products of technology) to improve learning" (MacKenzie et al 1970),

"the media born from the communications revolution which can be used for instructional purposes alongside the teacher, textbook and blackboard". (Trickton 1970),

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"arrangement of the various educational media in concord with other resources of education to achieve or contribute to a higher quality and/or quantity of output from the educational system". (Chadwick 1973),

GROUP 2A:
"development of a set of systematic techniques and accompanying practical knowledge for designing, testing and operating schools as educational systems". (Gagne 1968),

"the technology of education and in training refers primarily to the creation and use of learning systems". Jones (1968),

"the application of procedures and techniques for the systematic design of a learning experience". (Atkins and Cliff 1975),

GROUP 2B:
"the practical art of using scientific knowledge about education". (Saettler 1968),

"a systematic way of designing, carrying out and evaluating the total process of teaching and learning in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and non human resources, to bring about more effective instruction". (Trickton 1970),

"a systems approach to the teaching and learning process, centring around the optimal design, implementation and evaluation of teaching and learning". (CERI 1971),

"chiefly concerned with the rational means whereby valued educational outcomes are, or could be, achieved". (Heather 1971),

"a field of study and practice within education concerned with the instructional and systematic organisation of ideas, activities and environments ... to accomplish a specific and potentially reproducible outcome". (Mitchell 1971).
GROUP 2C:
"would seem to compose the process of applying available knowledge in a systematic way, to problems in education and training". (NCET 1969),

"systematic approach to the development of teaching-learning situations and exploiting the available reprographic and distributive technologies". (Hubbard 1976).

GROUP 3:
"the actual approach is problem centred, it is concerned with determining and selecting the most appropriate strategies for dealing with particular ranges of problems". (Davies 1970)

"development, application and evaluation of systems, techniques and aids to improve the process of human learning". (CET 1967),

"a rational, problem solving approach to education, a way of thinking sceptically and systematically about teaching and learning". (Rowntree 1974).

These definitions, from the very fact of their being definitions, are very general in character and may not reflect very well their authors' intentions; however, some general tendencies can be identified. For example, definitions in group 1 correspond to a view of the use of technology in education; that is, the incorporation into the educational practice of equipment and related materials. On the other hand definitions in group 2 are directly or indirectly influenced by behavioural psychology. The influence is direct in the cases where specific mention is made of, for example, reproducible outcomes; research in human learning; or pre-specified objectives, and indirect in the cases where there are references to systems and/or objectives, since: "We know that by the term system analysts mean the sum of separate parts acting both independently and on one another to achieve pre-determined objectives" (Dieuzeide, 1971:176). Definitions in group 2A and 2C, although influenced by behavioural psychology, also stress aspects of the use of equipment (those in group 2A) or aspects of teaching and learning as a complex process (those in group 2C). Definitions in group 3 seem to be responding to the existence of particular problems and are
more flexible in strategy to solve those problems and, therefore, more realistic in that the strategy is not determined by any single view.

The first approximation to the concept of educational technology has been useful in identifying a few general tendencies but has not succeeded in clarifying the broad subject identified in earlier sections; therefore, a more thorough examination of educational technology becomes necessary. This is so in order not only to answer the open questions left by the analysis of definitions but also to identify other general tendencies as well as the relationships with the development of society in general and with other aspects of the educational enterprise in particular.

THE DEVELOPMENT OF EDUCATIONAL TECHNOLOGY

In the literature three major works were found which provide a historical perspective of the development of educational technology; namely:

Saettler (1968), "A History of Instructional Technology".
Hawkridge (1976), "Next Year Jerusalem! The Rise of Educational Technology".
Saettler (1978), "The Roots of Educational Technology".

There are of course other minor contributions to the historical perspective of the development of educational technology.

Saettler presents three major periods: The early forerunners (until 1700); the later forerunners (up to 1900) and, finally, the beginnings of a science and technology of instruction. For his part, Hawkridge also divides his analysis into three, but different, periods: The pre-history (up to the mid-1950s), the infancy (up to around 1966), and the adolescence (up to 1976).

For the purposes of the analysis presented here it would also seem appropriate to divide the development of educational technology into three periods, but connected with major events in society as a whole, which necessarily includes education. The periods identified are:
1. The precursors of educational technology, from ancient civilisations to the end of World War II.

2. The emergence of educational technology, from the end of World War II to the beginnings of the technological revolution (late 1960s).

3. The present stage of educational technology, from around 1970.

Each of these periods is examined below. For obvious reasons, major emphasis is placed on the present.

THE PRECURSORS OF EDUCATIONAL TECHNOLOGY.

It is hardly possible to speak of formal education for the time when human beings wandered naked and their only concerns were hunting and the gathering of roots and plants. However the basic skills to cope with these survival needs were passed on from generation to generation (use of human resource in primitive form). As human beings began to use bones and stones as tools (the first resources), they also began to transform nature for their own benefit. A complex process of development was under way, which has taken civilisation to what it is today, still in a process of evolution. An early result of this development was that more food became available than the daily needs. This made it possible for some members of the tribes (usually the heads of families) to dedicate their time to perfecting agriculture, to priesthood, etc., instead of hunting and searching for food. As time passed these also became the owners of cattle and implements. They also became the masters of defeated tribes. All this happened around the LXX century B.C.

It is in that period that education as such had its origins. It is the time when there appeared a more developed use of human resources — the personal tutor for the children of the heads of families as well as for the training of future priests. It must be emphasised that this process was very slow. For example, the earliest writing surface dates from the XV century B.C. and is a small, flat, rectangular piece of stone found in Thera. The papyrus was invented some ten centuries later by the Egyptians.
It was during the Greek civilisation, V century B.C., that educational technology had its early ancestors. It was the time when more systematic teaching was developed. Athens had become a leading trading and maritime society and, therefore, there was a greater need for the children of merchants and of government officials to be educated in order that they should be better prepared for business and politics. In the IV century B.C. this demand was met by the Elder Sophists, who developed a technique known as 'sophistry', which consisted of a deliberate application of arguments and laws in disputes and proofs.

By the II century B.C. the Romans had conquered the whole of the Mediterranean region and incorporated into their society not only the Greek gods and goddesses but also some of their principles and practices of education. Education, in Roman times, produced, as Boyd (1975:100) has put it, "men well versed in literature and masters of the rational arts which enabled them to play their parts in the law courts".

When the barbarian tribes from the south of the Rhine invaded Rome, V century A.D., they nearly destroyed the cultural heritage accumulated by the Romans. In the new peasantry-based society that evolved, the Christian Church (officialised by the last Roman Emperor, Justinian) emerged with great power. The educational responsibility was transferred from the Roman State to the Church, and this resulted in a change of character and purpose in the studies of schools. The aim was in the main 'other-worldly'. By the X century A.D. trading had re-emerged and the first free towns were founded. It was not very long before education, and the use of educational resources, became more systematised — there were no towns of any size without a school of their own. About the beginning of the XII century, some of the towns and their schools had acquired a good reputation and students converged upon them from other lands and towns. These schools were to become universities — organising "themselves as permanent institutions with forms of government that afforded security to masters and students, and won definite recognition from the ecclesiastic and civil authorities. Such, among other more obscure, were Bologna, Paris and Oxford, the great 'mother' universities which served as models for the universities which sprang up in every part of Europe in the course of the next few centuries" (Boyd 1975:128).
Important advances had taken place by the XV century, the most important being the flourishing of trade and the establishment of schools and universities in the new towns. From this time also dates the ancestor of the resource centre as early collections of relics and specimens of natural history, which were organised by secret scientific societies. Later this led to private collections of ancient statuary, inscriptions, gems, coins, medals, manuscripts, plants and minerals as well as religious relics, magical objects and paintings. All this was to be the ancestor of the modern museum. It was also the time when printing was invented and book production facilitated (but rarely above 1,000 copies). This led to a change from entire dependence on a single educational resource—the teacher—to as many resources as there were available.

The views put into practice by the Reformation in Germany and by the works of the monks in Ireland led to easier and broader education. More specific views were expressed by philosophers such as Locke in England and Rousseau in France, who inspired the English Civil War and the French revolution and paved the way for what became known as the Industrial Revolution. Philosophers influenced social sciences in general and education in particular; in this connection, Saettler (1978:9) has said that "according to Locke, child nature was respected and accepted, but something that had to be moulded and shaped by an adult. With Rousseau, child nature was enthroned; the child could do no wrong as long as he remained his true natural self".

From the XVIII century and throughout the Industrial Revolution (late XVIII and early XIX centuries) instruction and/or education was essentially based on recitation. By the mid-XIX century education began to lead learners towards generalisations by working with natural objects and studying practical things. Lancaster in England and Pestalozi in Switzerland introduced new systems based on mass instruction with monitors and psychological considerations respectively. Also in the XIX century Froebel advocated socialisation in schools and Herbert introduced a highly systematised education.

In England, Acts of Parliament of 1876 and 1880 "had the effect of making elementary education compulsory, and by 1899 the school-leaving age was raised to 12" (Jarman 1963:266), which with the increased number of students produced a greater interest in education.

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Throughout this period there was fairly extensive use of resources, at least in a primitive form, for example, pictures, lantern slides which were "powerful tools of propaganda eagerly sized upon by moral evangelists" (Tucker 1979:17), photographs and books. In the later years of the XIX century the motion picture was invented which was to become a stimulus for delight and wonder as well as a means of teaching the masses.

Thus, the XX century arrived which, because of the conditions which grew out of the Industrial Revolution, has seen rapid developments in all aspects of society, including education. In the early years of the century films began to be used as an educational resource, which "were a form of salvage for the old theatrical, industrial, government or welfare purposes" (Saettler 1968:21-22). In the 1910s films were used in schools and by the 1920s in universities. In these early years of the century philosophers looked in more detail at the development of education. Among these were Thorndike and Dewey, who set the basis for the behavioural sciences. In particular, Thorndike introduced the empirical inductive means to education and Dewey developed a theoretical framework of learning which stressed the acquisition of individual skills, initiative and enterprise. Maria Montessori, in Italy, and Sydney Presley, in the U.S.A., began the development of programmed learning through the application of psychological theory.

With the outbreak of World War I there was an intensification of the use of films, which became a major carrier of messages to the people. Another important carrier of messages was the commercial advertisement poster, adapted to the purposes and needs of the war. Both resources were used in conjunction in the sense that dramatised action in films reinforced some of the messages of the posters. During World War I the testing movement developed very quickly. This was based upon the published scales of Binet's and was the predecessor of the contemporary intelligence tests.

The interwar period (1918 - 1939) saw a number of important developments, despite the recession of the 1930s. For example, Saettler (1968:121) places between 1918 and 1924 the emergence of visual instruction as such; he identified five major events which justify this emergence:

1. There began the first credit courses in visual instruction.
2. The first professional organisation of visual instructors was formed.
3. The first journals of visual education appeared.
4. The first researches in the matter were reported.
5. The first institutional units for visual education were established.

By and large, the visual education movement was largely concerned with the development and use of films for educational purposes.

Another development of the interwar period was the publication in 1924 of Franklin Bobbit's book "How to make a Curriculum", which interpreted a demand for specific objectives and established the groundwork for contemporary curriculum research and development. In the 1920s also, the psychological conception known as 'Gestalt' was developed in opposition to behaviourism and led to a period (1920s and 1930s) of controversy between the two conceptions.

In the 1930s radio broadcasts began to be used as an educational resource. Research into the use of films and radio was intensified. However, one of the most important impetuses for the development of increased levels of use of the various resources for education, came from the military in the form of training programmes during World War II. It is worthwhile quoting at length what Hitchens has said in this respect:

"The establishment of a Division of Visual Aids for War Training in the United States Office of Education at the beginning of 1941 presaged an unparallel development of the use of instructional media of all kinds for training in the Armed Forces and in American industry during World War II. While that office promoted the use of motion picture for training, primarily, the instructional media used in the armed services training programmes during World War II included projected, graphic, sound, three dimensional and realistic aids, supplemented by manuals, guides, handbooks, bulletins and other training literature. A great variety of graphic materials and devices in demonstrations, along with synthetic trainers were developed and used during World War II. The use of training films for the United States Armed Forces in World War II was endorsed at the highest levels, including President Franklin Roosevelt, and
contributed significantly to the effectiveness of the 1,300,000 men under arms".

(Hitchens 1979:7)

Alongside the developments described above, during the first half of the XX century a number of other developments took place such as the beginnings of educational research into the classroom, the development of assessment techniques, and the initiation of educational evaluation, especially during World War II.

THE EMERGENCE OF EDUCATIONAL TECHNOLOGY

The period from 1946 to 1970 saw a great intensification in the developments related to education, some of which led, in the closing years of the period, to the emergence of educational technology. The very first development to be mentioned was the introduction of compulsory secondary education in 1947, which brought increasing numbers of students, first to the schools and later to universities. This had the implication that more educationalists were needed and the search for both new resources and new methods of teaching increased. Simultaneously, it was felt that during World War II and later years "almost every industry introduced new and more effective methods of production, while the technology used in teaching has remained unchanged" (Pickfords, 1975:68), and that "The time has come to ask whether education must remain the only human activity in which technology may not increase man's potential, and to denounce the strange and pernicious paradox whereby education is required to change the world without conceding that it must itself be transformed for good and all" (Dieuzeide, 1971:169). A second development was the growing production and use of various media since the 1950s but almost never for education. "Each time, some teachers have questioned the contribution that it can bring to education, pedagogy following techniques rather than the contrary" (Lefranc, 1978:6). Among the reasons for the growing use of media resources were the commercialisation of the invented hardware and their subsequent introduction into education; the demographic explosion after World War II; the increasing amount of knowledge necessary in modern times; and the technological revolution which generated so much innovation. In addition to these general reasons, there
were others dependent upon particular conditions; for example, the large number of innovations developed during World War II had become available for civilian use.

Five major periods in the development of resources were identified, as follows.

a) Audio visual aids as a supplement, from the beginning of the use of media, and mainly used for illustrations; thus, education is modernised but not upset.

b) Audio visual methods which facilitated the introduction of individualisation of learning, especially through the development of the language laboratory in the early 1950s, and later for many other fields.

c) The golden age of school radio and television broadcasts during the 1950s and 1960s, which came about through the shortage of teachers.

d) The advent of integrated audio visual material with the appearance of closed circuit television, teaching machines, computers, etc. In other words with the use of technology in education.

e) The multimedia systems of teaching at a distance through which telescuolas, open universities, etc. were conceived.

The third development that requires comment is the revival and development of programmed learning by Skinner (1954) who developed linear programming and Crowder (1960) who developed branched programming. Skinner based his programmes on the principles of operant conditioning of behaviour, while Crowder based his on an attempt to automate the behaviour of instructors in the armed forces and industry. The programmed learning movement became very popular in this country, along the lines advocated both by Skinner and Crowder. One result was the formation of the Association for Programmed Learning which launched the Journal "Programmed Learning" in 1964. Four years later it was to become "Programmed Learning and Educational Technology" so that it could, as Annett (1967:1) put it, "bring together fields such as Programmed Learning and audio visual aids which had co-existed without much cross fertilisation".

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Other developments which contributed to the emergence of educational technology were cybernetics and communications theory. Cybernetics principles began to be applied in education in the 1950s and led to the development of computer assisted learning. Communications theory contributions stem from its efforts to maximise the expression 'who says what through what channels' and its application to teaching and learning.

Yet another development was the adaptation into education of the systems engineering in existence since the Industrial Revolution. This consists of the invention, design and integration of an entire assembly of equipment. By 1960 the system designer, system analyst and programmer had emerged and the expression 'systems approach' was coined, and carried strong influences from the behavioural sciences in that it attempted to design, implement, evaluate and improve educational systems seeking the achievement of pre-determined behavioural objectives.

Developments in curriculum studies, educational evaluation and measurement also contributed, among many others, to the more general use of the term 'educational technology'.

Educational technology as a concept was used for the first time in the official literature of this country in the Report by the Committee on Audio Visual Aids (1965), chaired by Sir Brynmor Jones. The report recommended the establishment of a national organisation for educational technology and in 1967 the Secretary of State for Education and Science set up the National Council for Educational Technology. The Council aimed at expounding to the educational public the concepts, methods and reasons for educational technology, to develop examples of prototypes of educational technology in action, to diffuse towards the potential innovator the knowledge accumulated, and to assist the innovators in applying educational technology to their own situations. In 1970 the Council launched the Journal of Educational Technology, which a year later was renamed the British Journal of Educational Technology. At about the same time the Open University expanded the Applied Educational Sciences Unit into the Institute of Educational Technology. Other universities followed suit in establishing institutes (Surrey) or centres (Sussex, Cardiff College).
In his inaugural address to the 1970 conference of the Association for Programmed Learning and Educational Technology, G Hubbard argued that there were five conditions which would create a technology, as follows:

"1. The emergence and recognition of needs, either social or economic which the technology could satisfy.

2. The availability of techniques and materials from which the technology could be constructed.

3. The availability of appropriate skilled or trainable personnel.

4. The entrepreneur and the conditions conducive to change in which he could be effective.

5. An addition to basic scientific knowledge" (Hubbard 1970:44)

Hubbard then moved on to show that the first condition had began to be recognised. This stemmed from growing educational aspirations, technological requirements for higher level of skills and social and economic needs. He saw a very encouraging situation for the second condition: electronics, operational techniques of system analysts, and the creative techniques of the television and film studio. The situation was more difficult for the third condition — availability of skilled personnel — but he argued that this was common to all new fields. The function of the entrepreneur was to bring about a marriage of ideas and resources. The fifth condition was not seen as very important in the early stages of the technology, since "many technologies have got off the ground without a sound understanding of the fundamental laws governing the process" (p 47).

Educational technology thus emerged around 1970: institutes, centres and a national council were established; two journals founded, and a number of educationalists gave it their support. However, as Hubbard said in 1970, there were at that time no systematic attempts to formulate a theory of educational technology. Educational technologists were, perhaps, too busy applying their new technology to think in theoretical terms. It was clear though, that educational technology had been born under the influence of the behavioural
"Without question, the behavioural science branch appears to be increasingly dominant and to have excellent prospects for further growth" (Saettler, 1978:14). Attempts to theorise on educational technology came after 1970 and that is the concern of the next section.

THE PRESENT OF EDUCATIONAL TECHNOLOGY

In the earlier sections of this chapter it was shown that educational technology is a broad subject, that definitions fall into three major categories, i.e. the use of technology, based on behaviourism, and problem centred. It was also shown that, although rooted in the past, educational technology emerged in the late 1960s primarily as an application of the behavioural sciences as well as of systems engineering. During the 1970s and early 1980s, there have been a number of attempts to theorise about educational technology. The development of conceptualisations of educational technology tends to confirm the grouping of definitions into three categories and it is interesting to note that enthusiastic defenders of each conception are by and large published in different journals: Educational Media International for the uses of technology in education, Programmed Learning and Educational Technology for the behaviourist approach and the British Journal of Educational Technology for the problem centred strategy.

It is also hoped that the section on the development showed that the conception of the audio visual approach began with the use of films in education, had its major development during the second World War; and developed towards a multi media approach. The behaviorist approach began in the 1950s and was well established by the late 1960s. The problem centred approach is a product of the 1970s. The conceptualisations to be presented below are in this same order.

The Audiovisual Approach

Lefranc (1978:10-13) has written about the intensive use of media in education. He starts by considering the present educative needs, one of which is democratisation of education. For him, this means access to education for everyone "no matter from what social category they come from, their financial
possibilities, age or sex". This would guarantee a better access to knowledge which is expected "to be distributed in the quickest way possible in order to accelerate it so that it is constantly kept updated". He goes on to add: "The speed of the transferring of information has become an essential factor of its usefulness and its efficiency". Having established the need for media, Lefranc argues that each year there appear new innovations regarding existing and new media and, quoting from him, "the more the panoply of media is diversified, the more the chance it has to answer the many educational needs, to answer various expectations of individuals". Because of the wide range of machinery and because their prices tend to go down permanently, the use of media permits educationalists to provide answers at micro and macro levels "from continental or even intercontinental systems, for example by using satellites, all the way to domestic systems which are within the reach of the individual".

Finally, Lefranc considers the dependence of modern pedagogical methods upon the use of media. To best illustrate his arguments it is useful to quote him at length:

"Modern education requires a diversification of the media of communication. The technique and media provide the vectors which are used the most for this diversification, whether it be for mass communication, for a class or a group.

"More and more insistence is put on the necessity to diversify the relationship between teacher and student. Direct contacts are of never ending value and they should be preserved, but media give enrichment by providing constantly alternatives of contacts from a distance, of different contacts and at the same time they can give colour to direct contacts. The transfer of responsibility leads from self-instruction to total or partial self training, which is a new sort of relationship.

"Likewise, training methods can, thanks to media, vary in such a way as to avoid boredom and the losing of interest. The more angles of approach there are, the more the mode of action changes, the more the educational action tends to be efficient and lasting" (Lefranc 1978:13)
It is interesting to note that Lefranc does not use the expression educational technology to denote or describe the uses of media in education. Furthermore, other authors, when using it, do so separately from educational technology; they speak, on the one hand of audio visual media and, on the other, of educational technology. For example Tucker (1979:20) has said: "Audio visual and educational technology can be found throughout the system but they have not made the teacher's job easier". However, other authors do use it to denote the use of technology in education, see e.g. MacKenzie (1970).

The Behaviourist Approach

According to authors within and without the behaviourist approach, this has been, and still is, the predominant conception. For example, Saettler (1978:14) has stated that the behaviourist science branch appears to be increasingly dominant and Davies (1978:13), not a behaviourist, has argued that the behavioural science "concept tends to dominate most of the current writings on educational technology".

Based on this conception Ma (1974:310-316) proposed theoretical foundations for a science of educational technology. Ma made an application of the Set Theory to the process of learning, through the stipulation that "the ultimate dependent variable in learning is outcome", which is a function of a number of factors and which could be modelled as

\[ L = f(t/l, k, g) \]

where \( L \) is learning outcome.
\( f \) denotes the function.
\( t/l \) is the teaching and learning process.
\( k \) is the structure of the curriculum.
\( g \) is the learners academic given (previous state of knowledge).
Ma goes on to conclude that "It is apt here to redefine the science of educational technology as mainly the study of the effects of technology systems on learning outcomes".

Mitchell has attempted to conceptualise educational technology. He starts by stating that: "Education as a whole is an exceedingly complex organisation of systems which can contribute to individual and cultural development. Hierarchically arranged, such systems fall on a continuum ranging from the single student to the national level" (Mitchell 1973:36). He then argues that there are five manifestations of educational technology which cover the whole continuum and which are:

Educational technology I which relies upon psychotechnical intervention to change a student's capability, e.g. manipulating the sensory input. Since the student is the focal point, learner controlled self instruction is often important for educational technology I.

Educational technology II is seen as designing, producing and evaluating instructional materials and communications.

Educational technology III focusses upon the management of resources, including such related activities as planning, budgeting, management decision making, operation research and system analysis.

Educational technology IV covers educational systems engineering, focussing on planning design, construction and evaluation of instructional systems.

Educational technology V concentrates on educational planning, is a manifestation of educational systems engineering at a higher level; and is a field occupied by non-educators whose considerations of alternative educational opportunities is dwarfed by economic considerations.

Mitchell proposed to base the educational system on his educational technology, which has as a starting point the 'manipulation' of the student behaviour. He also proposed that educational technology should be orthomatic that is, considering
the person's interplay with an environment which supports that person's development. Based on these proposals, Mitchell (1971 and 1975a) builds up a model for education. In it education has four major contributors. The first is schooling in all its levels: primary, secondary and tertiary. The second is the occupational system which provides the needs for various trainings. The third is social life which includes the family, community organisations, recreation, etc. The fourth are the community resources which are open to everyone such as media, museums, etc. Mitchell's point is that in each of these areas, and in the whole system, educational technologists ought to be involved.

The Problem Centred Approach

The problem centred approach has mainly been articulated by I. K. Davies (1972 and 1978) in the introductions of his co-edited "Contributions to an Educational Technology". He begins by identifying three types of conflicting conceptualisations of educational technology, which roughly coincide with the three approaches presented in this review. He speaks of an 'educational technology one' which is essentially a hardware approach, stressing the importance of aids for teaching. 'Educational technology two' which is essentially a software approach, stressing the importance of aids to learning and whose origin lies on the application of behavioural sciences to the problems of education. His 'educational technology three' combines the hardware and software approaches: "it rejects systematic development (i.e. step by step rigidly mechanical or mechanistic procedures) as the only way of proceeding, in favour of a systemic (i.e. organic rather than mechanistic) set of procedures focussing rather more deeply on the processes as well as on the products of teaching and learning" (Davies, 1978:14).

In contrast with the other technologies, technology 'three' for Davies, is warmly human in approach and fundamentally a problem solving approach. Technologies 'one' and 'two' can be used, as appropriate, but the orientation and reasons for their use are wider and broader than might otherwise be provided.

Davies argues that a number of essential skills are necessary for the effectiveness of technology 'three' and these include:
"sensitivity, so that the needs of the total situation, both people and task, can be sensed,

diagnostic ability, so that the nature of the problem or difficulty can be identified and communicated,

decision making, so that appropriate actions can be selected from a wide range of possible alternatives,

flexibility, so that it is possible to implement whatever the situation demands or requires,

action skills, so that routine and mechanistic tasks of implementation are efficiently carried out".

(Davies 1978:15)

After clarifying the meaning of archetype, paradigm and model, Davies argues that the hardware archetype can be described by the metaphor of a gum-ball machine: 'You put in your money and you are given something to chew on'; that the software archetype can be described by a slot-car race, in which one car is raced against the other in order to see who wins. In educational technology a representation of the design normally takes the form of a series of boxes and arrows, usually with a feedback loop, indicating a step by step approach to development work. Almost always there is a clear beginning (definition of objectives), and almost always a terminal step (evaluation). In contrast, the metaphor for the problem centred approach is that of a chess game in which there is no one step of appropriate moves. In educational technology this takes the form of resolving the contradiction between dissatisfaction and satisfaction in favour of satisfaction and, in Davies words: "In order to accomplish this, an educational technologist brings to the situation a range of skills (observation, analysis, synthesis, etc.). The order, and manner, in which they are then used depends upon the character of the problem and aim in mind. There is no one best way of proceeding. Neither is there one optimal solution. Everything depends upon the situation, and the skills available" (p 23). The application of 'educational technology three' "provides opportunities for people to function as human beings rather as resources in a task-orientated process. Such a view
enables the educational technologist to create learning environments and opportunities in which learning becomes an exciting, challenging, creative activity" (Davies, 1975:13).

More recently, Hawkridge has further developed this approach when, after reviewing the literature of the 1970s, he proposes an educational technology map which, he hopes, is not influenced only by behaviourism, but has widened the boundaries. Six major groups of sciences, technologies and practices are identified in the map: environments, selection of methods, media and environments, evaluation of teaching and learning, objectives for curricula, methods of learning, and media for learning. His conclusion is that: "Means and ends have been brought together within our field of enquiry. Recognition of our interdisciplinary origins has freed us from the limits of behaviourism" (Hawkridge 1981:16). This optimism is not, however, shared by the bulk of the literature which, as said earlier, is predominantly behaviourist.

SOME IMPLICATIONS OF IMPLEMENTATION

First of all, whatever the conception of educational technology, its practitioners perceived a number of strengths in its application. A first reported strength is that educational technology has been a stimulus for educational research: "a great deal of fundamental thinking has still to go on . . . the existence of educational technology, however inadequate, is a spur to research and is a way of making us to face up to some fundamental problems which might otherwise be dormant for a very long time" (Annett 1973:12). Moreover, because it uses the principles of communication theory, the application of educational technology implies the need, for the sender of communication, to become aware whether the receivers—in this case students, teachers, administrators, etc.—have received, understood and accepted the message. In other words: educational technology has contributed to the development of new and innovative educational evaluation strategies.

A second strength comes from the fact its introduction of a new tendency into educational practices, one of attempting to do things differently, to innovate
the so called traditional system as well as introducing new and improved methods and resources. Commenting on the James Report (1972), Hubbard (1972:104) has developed the case for improved methods of teaching which "rests very largely, in my view, not on economics or economies but on their potential contribution to this situation; that by the intelligent deployment of the range of resources we possess we can in fact combine a rising crude student/teacher ratio with increased student/teacher contact and it is student/teacher contact which is at the heart of the educational process". This tendency towards the improvement of methods has made it possible that, at present, some now traditional audio visual media are almost universally available as a matter of routine.

The third strength is the number of progresses resulting from the implementation of educational technology. For example, Chadwick identified five major areas in which educational technology has made progress; these are:

"1. Making the teaching-learning process more visible.
2. Increasing labour intensification in teaching.
3. Improving concepts of measurement and evaluation of aspects of the educational process.
4. Objectifying goals and clarifying intentions of instruction.
5. Shifting the factors of production towards less labour and more instructional materials and equipment".

(Chadwick 1973:12)

From another angle, Hubbard (1976:57) has pointed out that in the past, progress in educational technology was measured according to the amount of money put into the installation of large projects but, in the present, progress is measured from the re-distribution of financial resources, with the spread of resource based learning, and with the growth of local services and specialist advisers. Another example of progress is given by Sawyer and Hooley (1972:71) who report that, after the systems approach was introduced into the training courses of the R.A.F., there were three areas of positive results: a marked increased in the use of pre-structured materials, syllabuses re-written in behavioural terms, and new projects were undertaken under the pre-structuring system."
To stay with the armed forces, it is interesting to quote Hitchens in reference to the U.S. armed forces: they "are still providing leadership in the audio visual education movement — and are moving toward a more systematic management of instruction in consonance with the general trend". And in a survey conducted throughout the U.S. armed forces, he found that the status of educational technology in the services was higher than in civilian education. His seven major conclusions were:

"1. More careful specification of learning objectives and training procedures.
2. More deliberate design of the instructional process than in civilian education.
3. Complete media support of the instructional process is traditional.
5. The individualisation of learning is being implemented.
6. Simulation is used widely, and
7. Information exchange with civilians is high."

(Hitchens 1979:9)

The implementation of educational technology has not however been without problems. A major one has been that, although practised for more than twenty years, it has, in comparative terms, reached only a minority of educationalists. Pickfords (1975:68) has attributed this slowness in the spread of educational technology to three fundamental factors: The first is the capital cost of its introduction. The second is that finances have to come from new monies, which are not available, and the third is a natural resistance by academics to the use of educational technology.

Another problem is that faced by educational technologists themselves who, in applying educational technology, change their roles as teachers. For example: "The teacher's place in a learning environment that wishes to capitalise on this technology is critical. In order to realise the potential of these learning resources a change in emphasis will be necessary from the traditional fountain of knowledge to that of a more dynamic classroom manager or learning supervisor" (Hurst, 1977:76). This new role, in turn, creates new problems in the implementation of educational technology, which are "problems of course design
and of role of educational technology departments in handling the problems" (Colliers, 1977:8).

The review of these additional problems concludes the review of the literature on educational technology. It remains to discuss the material presented and to draw some tentative conclusions.

DISCUSSION

In this section it is intended to discuss and comment upon some of the material presented in the earlier sections. There are, at least, seven matters which need consideration.

A first and necessary comment concerns the sources of information for this literature review. The four major British sources of educational technology have been consulted; that is, 'British Journal of Educational Technology', 'Programmed Learning and Educational Technology', 'Aspects of Educational Technology', and 'Contributions to an Educational Technology'. It might be argued that this reflects a degree of isolation, or lack of completeness of the review. However, the counterargument is that (as stated in the introduction) the whole report attempts to concentrate on the British scene. Nevertheless, this danger is overcome by the fact that the most frequent quotations in most articles in the journals are references to American sources. A large number of these were followed up and consulted. Thus, the wider context of the development and practice of educational technology is covered, although sometimes indirectly. A third element of this argument is that the British sources do publish papers from other nationalities and, therefore, American and other authors have indeed been consulted. Finally, a number of books on educational technology, irrespective of the nationality of the authors, were also consulted.

A second aspect to be considered and discussed is that a number of authors give the impression that educational technology spreads throughout the educational system and that this will benefit from its introduction. It would seem that, for some, education's main and perhaps only concern is in the transmission of
existing knowledge and that this needs improvement and change. But education is much more than that. As Dieuzeide (1971:87) has clearly spelled it out: "Education has a great many other functions besides transmitting acquired knowledge and turning out lucid and effective future citizens. Educational institutions, according to their various levels, function as places for child minding and protection, as centres in which national unity may be forged and in which a civic education or a pre-military training may be given, but also as places where the individual learns to find his place in society and as a ritual instrument by means of which the individual is initiated into adult life". Thus, education, as a system, cannot be considered in isolation from and should be seen as in active interaction with other aspects of society's activities.

The third aspect to be commented upon, and related to the above, is that the failure to observe the interactions of the educational system with other systems has produced a certain disenchantment with educational technology. For example, Harris (1976) noted that educational technology failed to bring about changes to the Open University. But the sort of changes he was expecting will not come from within the educational system, but from a complex interaction and cross influencing of various systems, namely, as Saettler (1978:7) has pointed out: "Most important changes in educational aims and instructional practice can be attributed to particular, social, political and economic influences". A possible explanation for this failure to consider the wider interactions of the educational system, is that the whole systems conception has been based upon the work of L von Bertalanffy, one of the founders of the systems theory, who defined a system as a set of elements which are interacting (Bertalanffy 1965). It seems that this definition does not distinguish between the different qualities of the elements which make up a system nor does it consider their interrelations with other systems. It is not surprising that applications of systems theory do not consider the external interactions, since itself was conceived in a restricted manner.

A fourth matter to be discussed arises from a lack of agreement, amongst authors, about the relationship between educational technology and curriculum development. For some, educational technology is part of curriculum development, for others it is the other way round. This is illustrated by the following two quotations:
"... the increasing acceptance of educational technology as part of curriculum development ... "

(Hubbard 1976:57)

"... educational technology, especially in the areas of curriculum, course and instructional development ..."

(Davies 1978:9)

This contradiction may not seem too surprising if Wilkes' findings are considered. He conducted a survey in order to identify how often cross-referencing is made between the fields of educational technology and curriculum development. For this he selected a number of books and periodicals and his conclusions are quite astonishing: "Curriculum theorists do not read the work of educational technologists" and "there has been nothing like an adoption of the current trends in curriculum theory into the literature of educational technology. Nor has there been any rebuttal of the criticisms made of what is still the dominant mode of thought and production among educational technologists". Wilkes goes on to make the recommendation that "each side could at least begin by reading what the others have to say, and drawing out its implications for its own work" (Wilkes, 1978:80-81).

Within the business of cross-referencing and motivated by (a) the Wilkes' survey; (b) the earlier identification that the behavioural conception of educational technology tends to be presented in the journal Programmed Learning and Educational Technology, and (c) that a more problem centred approach tends to be presented in the British Journal of Educational Technology; this writer checked works published in the journals to see how often there was cross-referencing from the one journal to the other. The results were as follows.

In total, 44 articles in both journals were studied. Of these, six authors made reference to the other journal (one of whom quoted his own work). It is clear, then, that even within the field of educational technology there is little recognition of what others do. This was also noted by Hawkridge (1978:390-391) since he remarked that "educational technologists have tied themselves into a nutshell, protected from the rest of education, indeed from the rest of society".
The fifth element of the material presented that needs to be discussed comes from the fact that, as has been shown, the predominant conception of educational technology is based upon behaviourism, but that this has been widely criticised. For example, Popham (1970:115-124) summarised eleven general criticisms; these are reviewed in chapter 3. Stenhouse (1975:79-83) presents two fundamental objections to the universal application of the objectives model as well as identifying areas in which they serve reasonably well. The objections are that the model mistakes the nature of knowledge, and mistakes the nature of the process of improving practice. As far as the first objection is concerned Stenhouse points out that "education as induction into knowledge is successful to the extent that it makes the behavioural outcome of the students unpredictable". And in relation to the second objection Stenhouse points out that "Even if it were logically justifiable in terms of knowledge —and it is not— there is a good case for claiming that it is not the way to improve practice. We do not teach people to jump higher by setting the bar higher, but by enabling them to criticise their present performance".

The behaviourist approach also has the systems engineering as one of its foundations; however, this has also been contended. For example, Cowan (1980:16-17) (himself an engineer) has argued that: "Either I have missed something or the systems approach cannot be applied in innovatory work until the overall aims, strategies and structures have first been examined intuitively and subjectively. Creativity and innovation cannot yet be reduced to systematic procedure; only subsequent development and refinement can be approached in this way".

However strong the above criticisms are considered to be, it seems to this writer that the strongest one —and perhaps strong enough to dismiss the approach— comes from theoretical and practical considerations. From a theoretical point of view an approach to education based in behaviourism is weak because it leaves out of consideration all other branches of psychology or other social or humanistic sciences. It should at least consider some aspects of cognitive psychology (see e.g. Neisser 1967) or humanistic psychology (see e.g. Maslow 1970, Rogers 1970). Some of the points about human unpredictability, self-assessment consciousness and creativity have been subsumed in a humanistic standpoint by Heron's work on educational philosophy, theory and practice (see e.g. Heron 1977a and 1977b). From a practical point of view behaviourism is weak because it conceives what a person does —eats, drinks, rides, talks, cries, etc.— without relation to the conscious experiences of that person. Yet the human being is a conscious being...
'par excellence', at least that is what makes humanity different from the animal kingdom.

The sixth element to be considered is that a few authors have intended to equate educational technology with science, which stems from the idea that a science is an application of the scientific method only. However, the more universally held view of science is the application of the method which produces a general set of knowledge or laws, which can be expressed in simple mathematical form in the case of natural sciences; or as reflecting general tendencies and relations in the case of the social sciences, or reflecting singularities in the case of applied sciences. The fact that there are at least three conceptions of educational technology shows that it has not reached the stage in which to reflect general tendencies.

The last aspect to be commented upon concerns the fact that the educational process takes places right in the heart of modern society, which is primarily concerned with the production of consumer goods. This has led some people to consider the educational process as a production process and to try to measure the output. However, education is not a productive process i.e. it does not create new wealth by transforming nature. It is a service given by the state and/or privately in order to transmit, enhance, change, transform and develop the human condition of life.

Another factor related to the production of consumer goods is the role played by commercial firms in the development of educational technology. In this connection it may be worthwhile to quote Tucker at length:

"The role of commercial agencies cannot be easily quantified but the part that this sector has played in the dissemination of both hardware and possible exceptions of the overhead projector and software should not be underestimated ... one must never scorn the educational market; a deal with a large metropolitan authority to supply equipment of one type to all schools must fill the saleman's eyes with dreams of retirement ... One must per force recognise the persuasive skills of the advertiser and sales representatives to
whom much of the success for penetration into the educational system must be given”.

(Tucker 1979:19)

CONCLUSIONS

It should firstly be remarked that everything develops, that the history of mankind, and that of society, has been the history of its development, which has gone from primitive stages to the present complex social organisation. Education, and educational technology in particular, have developed accordingly, as did other aspects of educational practice, such as research into the classroom, curriculum innovation, educational evaluation, etc., etc.

Secondly, the use of resources has also developed. Its initial forms were simple and used within the family, e.g. implements, personal tutor. As society developed the task of educating was partly shifted from the family to teachers, from the home to school, and from a single resource (the tutor) to as many as there were available. Later developments in electronics have produced an even greater availability of educational resources.

Thirdly, educational technology, although with some ancestry, is a phenomenon of this century, in particular since the second World War, and emerged as such in the late 1960s primarily as an application in education of the behavioural sciences and systems engineering.

Fourthly, there are at least three different conceptions of educational technology namely: the audio visual approach (developed during and after the second World War), then the behaviourist (in the 1960s) and lastly (in the 1970s) the problem-centred approach. These three conceptions, developed at different times, continue to co-exist up to the present day, with little interaction between them, and are represented in different journals.

Fifthly, the audio visual movement uses the expression educational technology in its restricted connotation of the uses of technology, and their products, in education. It can not therefore be considered as belonging to educational
technology. The same can be done with the behaviourist approach since, as shown earlier, it is a fairly weak conception. However the contradiction persists in the case of the problem centred approach which is the more adequate, but still calls itself educational technology — which is a weak name, "pretentious" (MacKenzie 1976:5) and "trendy" (Hawkridge 1978:372).

Sixthly, there are at least two ways of Revealing and solving this contradiction. On the one hand, the name is kept, but it is made clear that its meaning is the problem centred approach and nothing else, or, on the other hand, a search is made for a better name; this would reflect the facts that educational technology exists in the form of a behaviourist conception and that there is something else which has gone beyond it; is at a higher level; and includes the others as and when appropriate. This 'something else' is flexible, wider and more comprehensive because it looks at interrelationships between systems; that is, it does not conceive education in isolation, and it is more human in that it considers the learner as a person rather than as a subject or input-taker and output-provider. In other words: it considers the learner as having individual as well as social interests and who will participate actively in life and contribute to its continuous development, will satisfy the professional and cultural needs. It is, in short, a new form, an innovative way to conduct educational research and development. And perhaps this is the proper name for it: educational development.

Seventhly, because this wider conception co-exists with the narrower ones, some sort of strategy should be developed in order to advance it. Dieuzeide (1971:182) identified three possible strategies for innovation which are worthwhile quoting here: "The first is to change everything at the same time, but so far there has been no instance of this having been done anywhere. The second one involves modifying the existing state of affairs by introducing innovations at the highest level in the system and carrying them from there, the new system pushing the old one in front of it. The third strategy involves setting up and developing a new system parallel to the old one and capable of replacing it one day".

It would seem that the most appropriate and effective strategy identified by Dieuzeide is the third since the first has never worked and there is no reason why
it should in the future and the second would find strong opposition in the higher levels of the system, where the behaviourist approach is dominant. Therefore, demonstrating by example that things can be achieved differently in education could lead to a faster growth of the innovative way.

Finally, to recapitulate, the search of the literature began by looking at ways in which learning resources are used, especially within departmental settings, but it quickly moved on to theoretical considerations of what lay behind educational technology. Having done this, it is now time to return from theory to practice and to review what is being done in departments of higher education. This is the concern of the following chapter.
CHAPTER 2

EDUCATIONAL INNOVATIONS AND THE DEPARTMENTAL
RESOURCE CENTRE

INTRODUCTION

In the last decades, and in particular since World War II, educational advance and innovations, including the use of resources, have increased considerably in number and scope. It is a phenomenon without frontiers: it is present in all countries, whatever their style of development. Within countries, innovations take place all across the educational system: in nursery, primary, secondary, tertiary and continuing education. In each of these, in turn, innovations are conducted in most, if not all, fields and at their different levels.

In addition to books, the most common source of information, there are three groups of British journals which provide information on innovations. There are journals dedicated to aspects of education in general irrespective of the particular subject, e.g. Studies in Higher Education, Cambridge Educational Review, British Journal of Educational Technology; secondly there are journals dedicated to a particular subject, e.g. Physics Education, Medical Education, and thirdly there are journals dedicated to a particular medium, e.g. Journal of Educational Television, Audio Visual. Appendix A lists the sources of information consulted.

In order to narrow the scope of the literature review adequately, the present chapter concentrates on a selection of reports published in the last fifteen years or so. The review begins with a short survey of the international scene, moves into developments in schools and then into higher education, which form the main subject of the chapter. Within higher education a distinction is made
between innovations developed by individual teachers for particular courses and innovations which have gained some degree of institutionalisation in their departments resulting in the development of some sort of departmental resource centre, which acts as the base for the innovations.

THE INTERNATIONAL SCENE

The following section provides examples of educational innovations which include the use of resources in a selection of countries of different styles of development: the Arab and Latin American countries; the U.S.A. and Europe.

El Araby (1977) reports that in many of the Arab countries there is a shortage of educational specialists and that, because educational media and resources are playing an increased role in the educational process, the Arab countries decided to establish the Arab States Educational Media Centre which aims at alleviating the problem of shortage of professionals, of equipment and materials. This Centre is also to encourage educational innovations which are based upon different media, for which the Centre provides consultants. To accomplish these aims the Centre was established with five functions: information, training, research, production and international, each to be performed by a specific section. The international division's function is to import "materials and equipment and collecting data on suitable software and hardware produced by foreign companies which are then edited to suit the Arab culture" (p 49).

Educational systems are more resistant to change and innovation than other systems (Romiszowsky and Chadwick, 1980:197). It is in this context that educational innovations need to be viewed in the Latin American countries, since the educational systems there are based on traditional and selective models which combine a curricular approach of subject matter emphasis and a traditional approach to teaching, where the primary source of information is the teacher. The constraints imposed by economic conditions and political authoritarian systems also hinder innovations.

The uses of learning resources in Latin American countries has also been reported in the British literature. For example, Escolet (1980) has analysed the large
scale developments such as Open Universities as resources for distant learning. He reports that The Institute of Technology and Higher Studies in Monterrey, Mexico, was the first organisation of higher education to introduce the Open High School, that Venezuela founded their National Open University in 1977 and Costa Rica in 1980. There are, however, many adverse factors for the successful development of these enterprises, e.g. excessive rural population and problems of an economic and political nature.

In Latin America there have been three stages in the development of television as an educational resource. The first stage of rapid growth is characterised by enthusiasm and high morale, which, "usually peaks between the first and second years of transmission ... The system then enters a period of decline which is longer and more gradual than the rapid growth" (Tiffin, 1980:257). The programmes which survive begin a third phase of slow recovery which is subject to frequent relapses. Tiffin also showed that educational television has taken three distinctive forms in Latin America. The first is the conventional schools educational television, which follows the pattern of E.T.V. in Europe and U.S.A., and provides broadcasts to supplement teaching in conventional schools, which has been developed in several countries, e.g. Argentina, Uruguay, Venezuela, Colombia. The second is the Telescola System, which is TV school, where the teaching is by means of television. The system relies entirely on group dynamics and peer tuition in which adults participate as coordinators only. The third form is the Telepost, which is similar to the Telescola, being for voluntary adult and continuing education, but takes the form of evening classes.

In the early 1960s Fred Keller and his Brazilian associates developed and tested a type of learning resource now known as the Keller plan at the then newly created University of Brazilia and in the early 1970s the Department of Biophysics of the Federal University of Rio de Janeiro launched a major project for the use of non-book educational materials for medical and health education at the college level (Oliveira 1980).

In Argentine in 1970 there were thirty mobile resource centres introduced in rural areas where "the population does not justify the construction of schools"(sic) (Ronchi, 1980:206). These centres were developed as an alternative to the use
of broadcast radio because the commercial control of the radio stations did not permit sufficient air time.

Developments of resources in the U.S.A. have been widely reported; for example, McAleese (1977) searched the topic of cost-effectiveness of educational media through E.R.I.C. The search provided ninety references on cost-effectiveness of various media in the period from 1970 to 1976. Cambre (1981) conducted a historical overview of reports about formative evaluation of instructional media products and argued that evaluation procedures enjoy a relatively long and respectable history in the audio visual tradition (p 22).

In contrast, Hawkridge (1980) questioned some of the United States practices in the use of media in post-compulsory education. He did this in comparison with U.K. practices and covered three aspects: curriculum planning for media based post-compulsory education, access to broadcasting and other media, and relationship between media-based and conventional post-compulsory institutions. His main criticism concerned the very nature of American society: "media using academic institutions are put at the mercy of the marketplace", which neglects the general need for qualified people as well as their social concerns (p 8).

Reports about developments in Europe also abound. Regarding innovations in Holland, Buter has said: "The overall situation in our society indicates that we must use all the means we have to find ways of allocating students to a range of alternative teaching/learning situations. If this cannot be done we end up with a very inflexible teaching system based on traditional patterns or, in trying to lay down the burden of individualisation on traditional teaching systems, we create a very unfortunate condition for teaching" (Buter 1977:66).

Ilyina (1977:18) has extensively reported developments in the U.S.S.R. with particular reference to programmed learning, but including the use of media in education as well as the application of educational technology, and concluded that their "evaluation of programmed instruction as a new means of education is rather moderate: we think that it should be used along with other means and aids which can activise the teaching and learning process and help the pupils to acquire a firm and lasting knowledge" (p 18). Talyzina (1976) supported this but made clear that the socialist countries have always doubted the efficacy of
behaviourism, on which programmed learning was originally based. Instead, they based their programming on a psychological theory that stresses the activity function of study because too specific a subject content can inhibit cognitive activity, whereas more generalised content aids cognitive activity (Leedham 1977:58).

Weltner (1977) has reported an increasing development of innovations in West Germany, which grew from a concern that in a ten year period starting around 1977 West Germany would have limitations of staff and financial resources. He examined one particular way of improving the efficiency of autonomous study, which he called 'integrated master programmes'. These are study guides developed for a particular textbook; the guide usually exceeds the textbook in length and contains instructions for the study of specific parts of the textbook, questions, exercises and worked examples of applications. The application of 'integrated master programmes' proved successful, since in comparison with a control group (lectures plus personal tuition) it showed that the final achievement of those who took the master programme was 68% while those in the lecture control group had an average final achievement of 59%.

DEVELOPMENTS IN SCHOOLS

The literature concerning developments, organisation and examples of resource centres in schools is quite large. Some of these studies have relevance for developments in higher education. For example Dyer et al (1970) address themselves to the first stage (planning) of the development of a school resource centre. Allan (1974) describes a variety of methods for organising and running a school library resource centre. Beswick (1972) considers the problems of storage, physical arrangement and indexing for retrieval of the materials kept in a school resource centre. Briault (1974) reports on the organisation and use of learning resources in schools. Davis (1974) answers several questions likely to be asked by those engaged in the development of school resource centres. Edwards (1973) provides guidelines to the type of learning resources and associated equipment likely to be used in schools. Hanson (1975) considers the arguments and criteria for the selection and design of learning resources in schools. MacKenzie (1971) provides guidelines to the schools who are in the business of
getting sophisticated equipment for their centres as well as guidelines for their most effective use, and Malcolm (1973) edited six articles written by schoolmasters who explain the philosophy behind the development and use of the resource centres in use in each of their schools.

Because of his involvement with the Schools Council Resource Centre Project, Beswick has been able to write about the development of such centres in schools. In "Organising Resources" he wrote: "The book intends to answer questions like: What type of organisation was required within a school so that teachers and pupils alike had ready access to all the learning resources they might need, in whatever way they framed or conceptualised that need? What type of organisation was required so that teachers could produce their supporting materials, and have access to the raw data from which the new resources were created?" (1975:3). His book considered at length the merits and disadvantages of various methods of retrieval, O.C.C.I., the dictionary catalogue and the classified catalogue. He favoured O.C.C.I. because it allows good retrieval, provides thematic references in context of index, can be used by several enquirers at the same time, allows long index searches and is used with ease and pleasure. His main conclusions about resource centres in schools were:

"1. The organisation of resources is desirable and possible to increase resource usage.
2. The L.R.C. —learning resource centre— was most effective when its existence arose from curriculum need.
3. Close link of resource production with library aspect of L.R.C. was often very advantageous.
4. No one indexing was sufficiently advantageous.
5. Close physical continuity of resources library and resources production was often valued.
6. Variety of makes and equipment was in evidence in schools.
7. Appointment of a very senior Head of Resources was found valuable.
8. An L.R.C. was initially a more organised way of making use of available materials, staff and funds; and
9. Expensive production equipment was often usefully sited at teachers centres"

(Beswick 1975:79-81)
Two years later he wrote that: "We collect books, pamphlets, periodicals, audiovisual materials, models, educational games, maps and charts, artefacts and museum items for a variety of purposes, and some items will be serviceable for more than one of them (Beswick 1977:125). Eleven fundamental purposes were provided:

1. To convey a concept or a simple succession of facts.
2. To give a broad overview and include a variety of concepts and factual accounts.
3. To stimulate intent and activity.
4. To give pre-determined activities or exercises for the student to follow.
5. To reinforce and supplement what has already been learnt or presented in other ways.
6. To provide practical examples of things already discussed.
7. To present information and stimulus in a variety of different ways.
8. To give experience in handling different media formats.
9. To give experience in basic research tools.
10. To provide basic information for teachers and others in the manufacture of their own resources and the planning of the lesson; and
11. To give pleasure and delight.

The impact of resource centres in schools has been clearly illustrated by Gibbon (1981:64) who stated that: "For a number of Scottish schools, a resource centre has been viewed as a way of increasing effectiveness, not only in terms of its physical provision, but also in its contribution to communications". Gibbon also found that most schools in Scotland have some sort of resource organisation, although only a few have developed a resource centre in the strictest sense. In this last connection Hamilton and Tucker (1981) have argued that there is now a growing recognition of the need to coordinate resource provision rather than pursue its total centralisation.
The provision of facilities and staff for educational innovations in higher education

A number of research workers have examined into the provision of facilities and staff to support individual academics in their efforts to improve their teaching and learning practices. The Hale Committee (1964) pioneered staff development by recommending the study of teaching and the training of university lecturers in teaching skills. A second report suggested that the establishment of central units to support educational innovations could help improve teaching and could save in costs in the long run (Jones 1965).

Ten years later there were three major reports which provided accounts of research into the provision of facilities. Gibbs (1975) provided a review of audio visual staff in universities, C.E.T. (1975) studied through a survey the provision of learning resources in teacher education, and the Nuffield Group for Research into Higher Education (1975) concluded two years of research into the facilities for supporting teaching.

The Nuffield Group reported in five areas: the services available, consultancy provided by the services, teachers' attitudes on teaching, the existing rewards for involvement in educational development, and the finances of the support services. It reported that the services available, "can only be fully exploited when the whole academic community acknowledges them as a collective responsibility, and recognises them as a means for the general improvement of the teaching and learning" (p 14). Regarding the training of university teachers, the Group found that for many teachers who attended courses the most useful outcome of the exercise was social rather than academic, that they are well aware that to improve their practices time and energy would be needed, which can only be found at the expense of their research activities. The conclusion was that most academics do not improve their teaching for lack of time. The Group went on to suggest that "training is more likely to succeed if it gives the teachers greater responsibility for developing their own competence, with a minimum of dependence on outside expertise. Cooperation between a central
body, the departments themselves and their staff seems to be a useful formula for progress". (p30).

Regarding rewards the Group discovered that many academics think that promotion should take into consideration outstanding contributions towards teaching as well as competence in research. However, the large majority of academics reckoned that at present this is not the case. The Group also found out that for many teachers promotion is not the only form of reward since a great many teachers place a high value on job satisfaction obtained through the respect accorded to them by students and colleagues.

The Group's research showed that the universities' commitment to the study of teaching and learning was relatively low. Most universities have set up some sort of committee but have not given it any real power or financial resources. Of those institutions studies, the Group reported that the budget of the support units varies between 1% and 1.5% for universities with less than 6,000 students.

The Nuffield Group concluded that although there are signs of change, there are still many defences against change. What follows is a summary of the defences and of the signs of progress.

The Defences:

1. Teaching is not important.
2. Students should not be spoon-fed.
3. The status quo is alright.
4. All changes have already been tried.
5. Gimmicks are ineffective.
6. Curriculum development is for schools.
7. Academic freedom allows lecturers to do as they wish.

The Indications for progress:

1. Support services function properly when recognised to be a part of the community.
2. It is important to create an institutional awareness about the changes.
3. The reactions of students are important.
4. Reward is crucial but need not to be limited to promotion.
5. It has been proved successful when central units are created on a small scale and grow according to demand and consultancy is inexpensive to run.

6. Support is unlikely to be effective unless it is carefully planned and coordinated.

7. A committee should have control of a budget and be responsible for staff development.

8. Departments should create their own means to review their courses on a regular basis.

9. The sharing of resources needs to be encouraged.

Harris (1977) conducted a survey of academic grades of people involved in staff development and made a generalisation in which he assigned the variable Y to the total number of staff and X to the full time equivalent students and came up with the following formula:

\[ 0.0012 \times Y \leq 0.0012 \times X \]

The conclusion was that "looking at the level of academic provision ... the onus is put on a few appointments to contact and work with a very large number of colleagues. It is hardly surprising that the impact of training on university teachers has been so small. Most universities spend 1% or less of their budget in their total provision" (p 60).

This information is supplemented by Cryer's (1981) survey, which investigated who were the staff developers in universities and polytechnics in the U.K. Her survey showed that in the responding universities developers were distributed as shown in table 2.1.
TABLE 2.1: Staff Developers I

<table>
<thead>
<tr>
<th></th>
<th>Universities</th>
<th>Polytechnics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Units</td>
<td>37%</td>
<td>64%</td>
</tr>
<tr>
<td>Departments of Education</td>
<td>20%</td>
<td>24%</td>
</tr>
<tr>
<td>Academic Departments</td>
<td>28%</td>
<td>20%</td>
</tr>
<tr>
<td>Miscellaneous others</td>
<td>14%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Another comparison presented by Cryer enquires whether these developers were full or part time; this is summarised in table 2.2 below which speaks for itself.

TABLE 2.2: Staff Developers II

<table>
<thead>
<tr>
<th></th>
<th>Universities</th>
<th>Polytechnics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full time</td>
<td>28%</td>
<td>52%</td>
</tr>
<tr>
<td>Part time</td>
<td>63%</td>
<td>48%</td>
</tr>
<tr>
<td>Spare time</td>
<td>8%</td>
<td>—</td>
</tr>
</tbody>
</table>

Cryer also argued that the development of training in polytechnics is a little older than in universities. Most polytechnics were designated between 1969 and 1973 and, because of the need to validate courses as well as their quinquennial reviews, polytechnics gave a high priority to satisfying C.N.A.A. requirements, which in turn led to the allocation of resources in time, funds and staffing in support of staff and curriculum development. The impetus that moved universities towards staff development was the 1974 agreement on probationers between the University Panel of U.G.C. and the Association of University Teachers, which had a much smaller effect.

According to Imrie (1975) staff development did not arise from official policy recommendations but grew more out of organisers' experiences and from the
responses of participating staff. For these experiences to be more fruitful Sayer (1977:262) offered a word of advice for the staff who, in central units, are concerned with staff development: "Staff development is seeking its way, and although intimately related to other services, must not be tied to their direct interests. In my view audio visual personnel must accept the same boundary conditions as other support groups, i.e. that this is essentially a service role in which they must endeavour to meet needs but may not reasonably certify problems, prescribe solutions, or impose themselves on individuals, groups, or even on staff development".

Institutional Resource Centres

Reports on developments of resource centres in higher education, particularly at the institutional level, are also numerous. For example, Fothergill (1973) provided descriptions of functions of institutional resource centres and identified 7 teacher's needs in resource based learning: the teacher needs to know of the existence of the materials and their content, he needs to be able to preview the materials and compare them, he may require the support of courses, or at least periods of discussion with other users of the materials, he needs to be able to obtain the selected materials for the courses that he wishes to present to his students, he needs the equipment to ensure that the materials that are available can be explored by and exposed to the student, he will also need to produce some materials himself, and he needs the advice of those who are experienced in research and validation techniques. Fothergill suggested that "it is the attempt to provide the organisation which is necessary to meet these expressed teaching needs which lies behind virtually all proposals for the establishment of resource centres in colleges" (p 8).

Harris and Kirkhope (1979) looked at the costs of learning resources in the institutional resource centre and offered a word of advice for staff concerned with the production of these resources: "it is clear that provision of these services involves a considerable investment in money and academic and Library staff. Although each individual pack may not appear to be very expensive, nevertheless with a buildup which is not monitored, the provision of self
Gilbert and Wright (1971) proposed an automated system for cataloguing audio visual materials in the U.K. Enright (1972) considered some of the implications of introducing non-book learning resources into the library. Harris (1979) addressed himself to the organisational problems of self instruction in the library-resource centre.

In order to illustrate both their development and their differences with departmental centres, two institutional resource centres are briefly reviewed below, the Dundee College of Education Resource Centre and the Plymouth Polytechnic Learning Resource Centre. These were chosen because they were among the first to be established and are typical of the developments of institutional resource centres in higher education.

The Dundee Centre: The idea of a resource centre at the Dundee College was triggered by the prospect, in 1968, of a new college building as well as by the presence of a large number of staff involved in programmed learning and remedial work. There was an opportunity to plan the provision of a limited number of study carrels in order to allow self instruction to take place within the College library. Gill (1975:153) has reported that once the plans were completed, the next step was to look into the implementation of the idea and "the only way to obtain suitable programmes for use in the resource centre was to make them". Therefore a production unit for teaching and learning materials was established and over a period of three years a department of thirty staff was built up with production facilities for print, film, sound and television.

Much effort was put into the design of carrels because none of the models commercially available offered the right combination of facilities. Hence the centre developed their own carrel which provides an uncluttered work area and houses interchangeable desk units to give synchronised type slide, hand operated slide or filmstrip, video cassette recorder and monitor, or television monitor with remote control. The final arrangements in the resource centre included 204 of these carrels, 96 reading spaces, a relaxation area and shelving for a collection of about 125,000 volumes.
Clarke (1976) has reported that the resource centre's main concern has been to promote individualised learning throughout the college's courses; procedures have been evolved to ease problems that have arisen in the process of change.

The Plymouth Centre: The Plymouth College of Technology was established as Plymouth Polytechnic in 1969, with about one thousand full time equivalent students. Although the staff wanted to expand the number of courses the C.N.A.A. decided in 1971 not to approve any new courses on the basis that the Polytechnic's Library had an inadequate provision (about 15,000 volumes). Priority was given to the library development, a new chief librarian appointed and the need for a new library building was placed at the top of the poly's building programme. At the same time the Polytechnic decided to shift its emphasis from the conventional mode of teaching towards a more learning orientated situation, in which independent study was to play a greater part. It was also felt that there was a need for support in the areas of reprographics, photography and educational services in order to be able to produce the new learning packages. Thus the planning for the new library emerged in the form of a learning resource centre.

The Plymouth Polytechnic Learning Resource Centre's aim of 'promoting effective learning in the polytechnic' has been split into four objectives, as follows:

"1. To increase the Polytechnic's available stock of effective learning materials through acquisition, indexing and physical maintenance.
2. To make learning materials available for use through appropriate library services.
3. To stimulate the innovation in teaching and learning in the Polytechnic through appropriate educational services. 
   a) to cause learners to use learning materials effectively, 
   b) to cause teachers to design effective learning situations.
4. To facilitate the design and production of effective learning materials through media production services and workshop facilities".

(Sidgreaves 1980:21)
Consequently, the centre was organised in 1973 with three main services:
(i) library, organised to include a bibliographical service and a readers service.
(ii) educational services organised to provide library instruction and professional
development. (iii) production services consisted of the production facilities as
such and a workshop area was used as a training base and for maintenance of
equipment.

INNOVATIONS BY SUBJECT

Reports of innovations by subject are much more frequent in the natural sciences
and mathematics than in the social sciences. Below is a selection of these
reports, which cover physics, engineering, chemistry and psychology.

An overview of innovations in Physics was provided by Elton (1975) who said that
a number of these have stood the test of time and have become a sort of 'bag
of tools' from which to select the most appropriate for a given purpose. Nine
of these innovations are listed and relevant references given.

1. The audio tutorial method in which a student is provided weekly with
study materials and written or taped instructions (Dietrich 1972),
(Baez 1973).
2. Programmed textbooks, particularly in the teaching of ancillary subjects
such as mathematics (Stroud 1970).
3. The provision of self tests, for students to assess their own progress
(Davis and Hills 1972).
4. Self paced systems of instruction (Keller 1968), (Green 1971).
5. Self service laboratories (Brandt and Price 1973).
7. Project work (Hewton 1975).
8. Association with research work (MacVitar 1973), (Anderson 1974), (Breslim
1974).
9. Methods and teaching materials for stimulating co-operation in groups.
(Black et al 1968 and 1974).
Fisher (1977), reported on mechanical engineering undergraduate teaching. The student need for acquiring a high standard for experimentation as well as for the analysis of results and their presentation in writing have triggered the development of subjects within mechanical engineering, namely Engineering Experimentation and Communication Studies. The approach was in two parts: The first followed a work booklet in which the objectives and aims were given and which students completed in the laboratory. The second part were laboratory projects in which students were given a statement of the particular problem to be investigated and then encouraged to work independently to solve it. Communication Studies placed particular emphasis on improving basic communication skills especially technical writing and speaking, needed in both the academic and industrial part of the mechanical engineering course.

Apter (1978) reviewed some innovations in undergraduate psychology teaching, with particular reference to the use of video cassettes, where he saw three major advantages. The first is variety because the "more media and techniques used in teaching the easier we may expect it to be for the student to maintain attention and interest" (p25). The second advantage is that television can do things that can only be done with difficulty in a lecture, for example, interviewing people whose work is being discussed. The third advantage is that a programme available in video cassette may be seen as many times as desired. However, Apter was not arguing that "television should replace the lecture, but simply that television is a medium which can be used to add variety, improve presentation and perhaps even supplement the normal lecture course at the higher education level" (p25).

Johnstone and Sharp (1979) reviewed three innovations in chemistry teaching in universities. The first is diagnostic testing and individual tuition, which has been developed to avoid students being hopelessly and even irretrievably lost at the time of the examination. Once a week the class is divided into four smaller units for revision and question and answer sessions or for a computerised diagnosis test, for those students with problems tutors are available daily at pre-advertised times. The second area of innovation is self instruction where self paced materials are available for undergraduate and postgraduate students. The third concerns the learning of new laboratory techniques and gaining experimental expertise at the required level. To achieve this a first laboratory practical is
highly structured and closely supervised, while the next one is an application employing the new technique with no formal instruction.

PARTICULAR INNOVATIONS

There are reports which concentrate on innovations but the specific subject comes to a secondary level. These are usually carried out in association with departmental resource centres. Several of these are reviewed below.

Innovating the lecture
A first set of innovations to be reviewed concerns the lecture, which is regarded by most authors as the conventional or traditional mode of teaching. Hills (1975:515) has argued that the lecture is administratively convenient, that it assembles staff and students in one place at one time so that during the lecture period a certain amount of material can be covered, that staff like the lecture because it gives them a sense of involvement with their students, and that students also like lectures and regard them as the real stuff of education which will give them knowledge if they are regularly immersed.

Davis (1976) disagreed stating that "students are remarkable: they sit busily through hundreds of hours of diligently prepared and carefully presented lectures and they learn lamentably little" (p33). During a two year period he supplied his students with carbon and copy paper at the beginning of the lectures and at the end they were asked to hand in the carbon copy of the notes they had taken. One of Davis conclusions was that there is a gross mismatch of the lecturer's own objectives in any lecture and the objectives as interpreted by students within the context of their own priorities and expectations.

According to Bligh the lecture method may be used for three main objectives: the acquisition of information, the promotion of thought and changes in attitudes and there are five situations in which the introduction of alternatives to the lecture is justified:

"1. When negative transfer is to be avoided.
2. If self pacing is desirable."
3. If active participation is needed.
4. To present better and varied stimuli.
5. Because involvement fosters motivation."

(Bligh 1972:18)

Allen (1975) introduced in his lectures a two channel slide presentation. One channel comprised a pair of projectors coupled with a fade unit which was used to present step by step diagrams or analysis line by line; once the sequence was completed the slide was transferred to the second channel where it continued to be displayed and channel one was free to start a new sequence. In student reactions ascertained by means of a questionnaire, the two channel slide presentation was rated more highly than the average blackboard presentation. Allen concluded that "this study has established the initial premise that by improving the visual side of a lecture programme substantial benefits can be obtained in the area of student study efficiency. In addition these benefits are shown to be greater in number if a two channel presentation is adopted as the improvement, rather than pre-prepared material on a single overhead projector" (p 55).

Programmed Learning
Programmed learning is perhaps one of the earliest moves away from the lecture and the book. The Association for Programmed Learning and Educational Technology has disseminated the principles of programmed learning through three main means, the journal Programmed Learning and Educational Technology, the The Yearbook of Educational and Instructional Technology, and the Proceedings of its Annual Conference — Aspects of Educational Technology. Calder and McFarlane (1976) considered that programmed learning was still evolving, that over the years the quality of programmes had improved noticeable and that programmes tended to be more imaginative and more interesting, being based on a richer theory of learning" (p 2).

The Keller Plan
Another well reported innovation is the Keller plan (Keller 1968) which was designed for students to work on their own and at their own pace. A large number of advantages have been claimed for the Keller plan, in particular when
compared with the conventional lecture. Freemantle has summarised these as follows:

"The student is able to work at his own rate, that is when he wants to. The student learns to study independently. The student knows what he has to achieve. The student is able to receive personal help and guidance. The help is geared to the needs of the student; thus the weak student has more opportunities of receiving more attention than a stronger or more independent student. The student is not rushed passed difficult parts nor is he back on materials already mastered. The student and the teacher both receive regular feedback on the student progress. The student is actively involved in learning. As each student passes a unit test the teacher is assured that the student has achieved something. The course is defined on paper and therefore accessible to both teachers and students.

(Freemantle 1976:52)

Bridge (1976) conducted a survey of 37 self study courses based on the Keller plan in the U.K. and Ireland and found that higher education teachers had two major reasons for introducing this sort of innovation, dissatisfaction with the conventional lecture and attraction to the potential advantages of self study courses. One of his conclusions was that "some of the outcomes of self study courses are predictable. They produce examination results which are as good, or slightly better, than the results of traditional courses, yet teachers are satisfied that the student is learning more. They are popular with students who appreciate the high degree of staff/student contact, and the way in which self study units can cater for different ways and speeds of learning" (Bridge 1976:223).

Melton (1981) reported on a number of variations of the Keller plan. One variation which he calls 'Refined Linear', consists of defining a core element of the course on which slower students can concentrate with the additional advantage of reducing anxiety in students. A second variation is called 'Variable Route', which is similar to the above, but offers choices of route. The third variation called 'Modular Learning' makes units theoretically independent from each other.
The final variation, 'Independent Study', offers students the opportunity of self-directed pursuit of goals.

**Audio Tapes**

Another widely reported innovation in higher education is the use of audio cassettes. For example Hough (1976) indicated that one of the major problems in teaching certain topics is guiding students through heavy mathematical proofs and as a solution introduced the audio-booklet method, which consists of an audio tape, of about ten to twenty minutes, to be used with a printed booklet providing only the skeleton mathematics and diagrams. The advantages claimed for this method are "simplicity in preparation, cheapness, the fact that the student has a permanent correct set of notes and finally that this new form seems especially suitable for mathematical proofs" (p 324).

Spencer (1977) developed a multiple choice questionnaire to assess student learning from audio and video tapes; it included questions both on the theory and application of the information presented and on student preferences. The results indicated that "a majority of the subjects (54%) preferred the high cost V.T.R. compared with booklet tape (16%). However, although the booklet tape was preferred by a comparatively small number of students, a high percentage (65%) found the booklet tape suitable for presentation of the concepts involved in the topics chosen and the same proportion also felt that booklet tape had definite advantages over the more traditional printed material used to supplement lectures" (p 76).

Tomlinson (1979) showed that three tape/pamphlet independent learning packages were at least as effective as three conventional lectures in physiology in generating both short and long term attainment of the same learning objectives. He argues that the novelty of the experience may safely be assumed to have guaranteed the students' best efforts. "It is, however, possible that long term recall of learning from the packages may have been superior to that from the lectures" (p 261).

**Video Tapes**

The introduction of video recordings is another innovation in higher education teaching. Moss and McLachlan (1976) developed a series of six video recordings which described some aspects of the radiology of the chest. After viewing,
final year medical students were given questionnaires to complete anonymously and without supervision. Although some discussions occurred during questionnaire filling in, the authors claim that the results in factual questions were sufficiently varied to suggest little or no collaboration. Also that student attitudes to the experience were varied, which implied that no dominant student was influencing the group. The authors assigned high weight to students' favourable comments in concluding that: "In general students have commented very favourably on the capacity of video tapes to present fine radiographic material and we conclude that it is an appropriate method for this purpose" (p 398).

Vaugham and Marks (1976) developed video taped materials out of concern for the lack of interviewing skills training in their psychiatry students and because traditionally medical students "have been left to develop interviewing skills through untutored observation of senior staff at wards rounds or out door patient clinics, and repeated practice with neither surveillance nor constructive criticism" (p 170). They were concerned that failure to teach explicitly what sort of things to say, and when, may limit the efficacy of student interviewing. Vaugham and Marks made extensive use of video taped material, especially for providing examples of both experienced and novice interviewers with emphasis on appropriate interview behaviour as well as on the history being elicited. They concluded that in comparison with the traditional training, although the video training placed more emphasis on the mode of acquisition than on the end product it was "significant that the video training students gained and reported about the same amount of information as the traditional training students. This result seems sufficient to indicate the use of an economical videofeedback package in preference to the troublesome and time consuming traditional approach" (p 174).

Summerfield (1978) studied the uses of video in teaching psychology in undergraduate courses and found that educational videos are used in three main ways: to condense a lengthy experiment into a series of pictures; to allow demonstration procedures which could not be carried out in front of a class and to teach a specific technique. She suggested two other situations in which videos can be used: for the analysis of complex behaviour patterns in both people and animals and to enable people to become more aware of their own interactional behaviour through the watching of videos of themselves. Her conclusion was that "video is fast expanding and presents psychologists with
powerful new opportunities for communication. A full understanding of how it can be used to teach psychology is far from being reached yet" (p 23).

Sturgeon (1979) experimented with the uses of videos to assess effectiveness in teaching mental state examination. In order to compare students' proficiency in accurate observation, two groups were formed: one who received the video taped teaching and the other not exposed to video. Accuracy of observation was measured by the student's ability to shift from an incorrect opinion about a patient towards a more accurate assessment following the live interview. The conclusion was that "students who had received videotaped teaching were able to make more accurate judgements than those who had not. This ability was not related to certain personality attitudes measured, nor to an ability to detect subjective elements in the interview, nor is it reflected in their examination results. The only significant variable found to influence their ability was whether or not the student had received video taped training" (p 204).

THE DEPARTMENTAL RESOURCE CENTRE

Reports seem to indicate that the development of departmental resource centres is due, in the first instance, to the concern, interest and enthusiasm of one or two members of the academic staff who have had the sympathetic support of the head of the department. It is claimed that, by and large, academics do not devote the necessary time to teaching for various reasons. For example Garland et al have described this situation thus:

"A scientist wishing to undertake a research project would for a start usually read the relevant literature, formulate the aims of the project, and identify and acquire such resources as are needed, including new skills ... Curiously the same scientist given a teaching project would probably not read any literature on educational methods, would not formulate learning objectives for the students, would not attempt to identify the most appropriate teaching methods nor consider acquiring expertise in them, would teach within the limits of whatever resources are made available to him, and would be content to be constrained in his teaching by the timetable, the
curriculum, and by the uncritical attitudes of his colleagues and his
departmental head ..."

(Garland et al 1977:169).

Downie and Maden (1981) provided further evidence from their assessment of
the views of the academic staff in their department on teaching in general and
on their self instructional unit in particular. They found the paradox that
academics are interested in innovations, but little effort is devoted to finding
new methods because "most of the innovation in modern science teaching is in
content, not method. A conscientious biology lecturer finds it hard enough
keeping up with the flood of new information in his or her teaching and research
areas, and most regard this as a higher priority than an interest in teaching
methods" (pp 48-49).

The need for the departmental resource centre has clearly been spelled out by
Groves (1975) who pioneered the establishment of such centres. He argues that
there are several indicators that show that interest in educational innovations is
growing as a result of a combination of factors, among which are the increased
availability of audio visual media, the work of educationalists and psychologists,
the increasing number of conferences which deal with the matter, and the
emergence of departmental centres. Groves goes further "to seriously suggest
that some sort of departmental resource centre ... is essential if educational
development is to be seriously pursued. You cannot do research without a
research laboratory — you cannot undertake educational development without a
departmental resource centre" (p 37).

Although innovators claim that the academic establishment does not yet provide
the material base and career rewards for their commitment to innovations, they
report that one of the results is greater job satisfaction. In this connection,
November (1978:95) stated: "As to my own enjoyment, I no longer spend time
giving routine lectures which I have heard many times before. Instead I now
devote my time to the creation of learning experiences and to tutorial work
which concentrates on the individual rather than a group".
Following this description of the general context in which departmental centres have been set up, this section moves on to consider some publications which report on particular centres.

**The Aston Learning Aids Laboratory**

This was the first to be established, in 1970. Groves (1971) reported that his laboratory had been opened with the intention of providing access for students to a variety of audio visual material which up to then had been used in lectures as well as to provide other materials especially made for the laboratory. His argument was that in this way the teaching aids became learning aids. The laboratory keeps a quantity of self instructional material in the form of films, overhead projector transparencies, slides and models. There are also a large number of tape players and audio cassettes, which are mainly produced in the laboratory, and a collection of books and reprints. The laboratory is also equipped with a computer and television production facilities. One of the major uses of the laboratory is the replacing of two lecture courses. For one of these courses an appreciable amount of the lectures was put into pre-recorded cassettes which were available in the laboratory and the 15 weekly lectures were reduced to 9. An extensive description of the laboratory is provided in Groves (1972).

**The Heriot Watt Learning Unit**

One of the departmental centres which has reported thoroughly upon its activities is the Heriot Watt Learning Unit. Some of the staff were interested in finding new and better ways of dealing with tutorials, and they were prepared to cooperate in the process of development (Cowan, 1973 and 1974). The strengths of the Unit which resulted are. "The centralisation of resources, effort, expertise and equipment, within the context of an efficient administration, makes it possible for the learning of the individual student to be more purposeful, more effective and more enjoyable, because of the vastly increased scope of the available materials" (Cowan 1975a:8-9).

There are two contrasting approaches to innovations in the Unit. One is open ended learning and the other is structured teaching, which are combined so as to "ensure that an amalgam of both types can gain strength from their complementary nature" (Cowan et al 1974b:5). Another approach is the offering
to undergraduates of freedom to select the course content in one subject of early study. One of the conclusions was that: "The evidence of this experiment, then, suggests that offering freedom of course content can nurture questioning minds, encourage independence in the selection of study methods and problem solving and generate an interest in topics and issues outside the predetermined course structure" (Cowan, 1978:146).

One of the characteristics of the innovations in the Learning Unit has been the emphasis to evaluate the innovations as well as the work of the Unit in general. An intermediate assessment (Cowan et al 1973) and an appraisal (Cowan 1975b:72) of the work of the developing Unit showed that "The failure rates for courses run in the Unit have been markedly reduced, student reaction is warmly favourable, the cost of operation has proved to be slightly less than the norm in a far from overstaffed department, and the staff who are involved have found that the methods which have been described have released them to play a more effective role in remedial teaching on a one to one basis, and in enrichment of teaching with better students who would otherwise have been left very much on their own, because they had reported no particular difficulties".

The Cardiff Self Instructional Laboratory
Moss et al (1977) and Hammond and Roach (1978) reported that at the Department of Zoology of the University College Cardiff, the necessity to accommodate more students in a limited space motivated the authors to run their course as self instructional, and a self instructional laboratory was developed from scratch. It covers an area of 127 square meters containing 37 study carrels each with an audio visual machine (cassettescope) and a microscope. There is also a central experimental area and storage areas. At the end of the laboratory there is a student study room with easy chairs, low tables, a colour TV monitor and tape slide machine.

The course and the laboratory have been regularly monitored and evaluated and the general opinion of both staff and students is that it is a great improvement on the former conventional course for four major reasons;
"1. The information contained in the carefully prepared texts and audio visual programmes is presented far more clearly and accurately than it could be in a lecture.
2. Practical exercises are no longer separated from theory, as they are completely integrated into the study programme.
3. The students are able to work at their own pace and at their preferred time of day. There are tutors always on hand to give individual and immediate attention.
4. Because the informational content of the course is in permanent form (text and audio visual programme), instructors in higher level courses can develop teaching programmes efficiently from a solid foundation".

(Roach and Hammond 1981:5)

The Queen Elizabeth Learning Aids Laboratory
Poller (1977) reported on the establishment of a centre in the Chemistry Department of the Queen Elizabeth College (London) in 1972. Before then their learning aids were scattered throughout the department, were difficult for staff to locate and were virtually unavailable to students. One problem thought to be alleviated by the centre was that of very large classes with different subject preferences. A room centrally placed within the Department was appropriately refurnished, and the initial outlay on equipment (i.e. tape recorders and players, film and slide projectors) was surprisingly modest. A pilot survey showed that the centre attracted a large proportion of the more committed students and that the value a student places on a particular learning aid depends on a number of factors such as the content, the quality and, not least, the precise relevance to his course (Poller and Seeley, 1977a). In the initial stages of the centre the student interest was low and a full time graduate supervisor was appointed to conduct an advertising campaign because: "When setting up a learning aids laboratory a determined effort has to be made to sell the new facility to students. Besides the obvious methods of posters and announcements in lectures, cooperation of colleagues is essential. The most reliable method is to place in the laboratory items such as tapes, programmed texts, etc. which are essential to the course taught, and to make it clear that the student has not completed the course until he has worked through these items. Students soon accept the laboratory as one of the normal departmental facilities" (Poller and Seeley, 1977b:51).
Macqueen et al (1976) have described how they were dissatisfied with the format of one of their courses and were looking for its improvement. Based on the audio tutorial approach to learning (Postlethwait et al 1971) they developed their resource centre. It is divided into four areas. The first is a series of eighteen study carrels, each of which contains a cassette tape recorder and headset, a slide projector, a screen, a desk area and a flexible lamp. The second is the experimental area which is small and used to performed the short experiments which are part of the various units. The third is a library area with a capacity for twenty students which keeps books, magazines and reprints relevant to the course, and is also available to any student in the class throughout the day for private study. The fourth is the assessment area which consists of a table and two chairs where individual assessment is conducted.

The basic concept behind their centre is that the student learns by listening, which is based on self paced taped commentary (since the student controls it at any point) and which leads students through a series of ideas and concepts, illustrated by slides, displays and book references. Students' responses are written down in the worksheet accompanying the unit, which provides space for answers to conceptual questions, problem solving and calculations as well as room for entering observations, measurements and calculations relating to simple experiments. Although there is an element of novelty in this approach, the authors have found that this acts as an encouragement to learning. The student reactions to the laboratory are reported to be be very favourable.

A Language Laboratory as a Resource Centre
Miller et al (1979) reported on an interesting variation from the conventional resource centre. They used two language laboratories in order to gain access to 36 individual booths. The scheme consisted of a complement to lectures in the form of audio tape and booklet packages which covered the 'must know' material. It was found that 30 minutes was required to include time for students to go over parts of the tape again (playing time was 15 minutes). Sessions were held in the tutorial hour allowing students to take two packages. The authors tell that "prior to the tapes workbook session this — the tape — was rapidly copied from the central console to the student booths. Each student then had control of his own tape recorder, with excellent sound quality, and the possibility of
two way communication with the lecturer at the central console should he require further explanation of any points in the package" (p109). Comparisons of test results after the lecture with those after the tape workbook session showed that the latter produced a considerable improvement in the students' performances. They concluded that although it would be wrong to read too much into a single experiment, the experience suggests that it is possible to provide this type of support without major alterations to the curriculum.

The Resource Centre and the Teaching Laboratory
Another variation of the departmental centre is associated with practical laboratory work. For example, Noble et al (1979) found that microbiological techniques are difficult to demonstrate to more than a few students at a time and introduced film loop and tape slide presentations. The slide/tape presentation was viewed by the whole class and the film loop left running to provide reinforcement. The authors compared them to find out which one was more effective. Their results did not show any differences between the two techniques and concluded that "the choice of film loop or tape/slide seems therefore to rest solely on the cost and ease with which a particular system can be set up in the teaching laboratory" (p205).

Gaunt (1978) provided another example of the teaching laboratory as a resource centre. He was motivated by the fact that it could be about 40 minutes of talk and explanations before a practical had been started on the right lines. He produced a set of instructions in the form of tape/slide and colour prints. The general intention was to reduce demonstration time and to increase the effectiveness of the learning process. The results of the corresponding study showed that in seven experiments in which the system was introduced, supervision had been done comfortably, "so that one might say productivity has been increased in 40% in quantity and with a slightly improved product" (p178). Students reactions were favourable, about half thinking that it helped them in learning and that it helped them to finish more quickly.

Sheridan (1978) reported on a similar scheme where a lecture course was put into recorded lectures accompanied by notes, film loop, self test, an experimental assignment and some of its data. These packages were made available during practical periods. Students could use up to four periods and still have time to
complete the practical assignment. It was also possible for students to borrow tapes overnight. Two surveys were conducted to assess the students reactions to the scheme, at the beginning and end of the course. The results indicated that "students learnt the materials well and most agreed that it made a change from conventional lectures and was especially useful for revision" (p109).

A Portable Resource Centre
Harden et al (1975) developed three types of resource centres in order to investigate student attitudes to audio tape slide programmes. One was a simple portable centre, the second similar to the traditional study booth and the third made use of automatic equipment to be viewed by a group of students simultaneously. In the first type students were provided with a case containing a cassette tape player, a hand viewer and a set of headphones. The case and programmes were borrowed by students and could be used within the department or taken home. For the second case each booth was equipped with a tape player and a built in synchroniser, slide projector and back projection screen. For the automatic presentation in groups two strategies were applied: one consisted of students answering to questions in tape track individually and in the other students arrived at an answer after group discussion. After a few weeks of the experiment students were asked to fill in a questionnaire concerning their attitudes to the different methods of presentation. The answers indicated that the automatic equipment in study booths appeared to be the most popular and the group without discussion the least popular.

Other Developments
Stephen (1978) reported on the development of another resource centre which was established because of an increase of 15% in student numbers which threw considerable strain on the resources available. A reappraisal indicated that the use of self instruction might be more appropriate as a teaching method and it was decided to set up a resource centre consisting of six booths for tape slide programmes. A suitable location for the six booths proved difficult to find because the teaching laboratories were to be used by other courses too. As there was no other room available, the centre was set up in a large foyer area adjacent to the teaching laboratories. The evaluation of the scheme was done through a questionnaire distributed to students and their responses, by and large, showed that the unit was comfortable, that noise coming from the foyer did not
interfere with working in the unit, that the equipment was easy to use and that
the use of headphones was adequate.

Hezel et al (1974) reported on their experiences with tape slide presentations,
for which they developed a self instructional laboratory. Initially there were
ten individual places, increased later to twenty, for the use of 125 students.
The self instructional programmes were used in conjunction with lectures and
practical classes and at the end of the course students were asked to complete
a questionnaire, which included space for open ended comments. Students'
comments were generally favourable and the only complaint strongly voiced was
that some of the lectures tended to repeat the material of the programmes.

Some developments of resource centres have not been reported in the literature.
Aspects of such developments are, however, described in internal documents such
as users' guides. For example, Blacker (1974) tells his students in the guide that
it is not the function of the learning aids laboratory to replace lectures but
rather to supplement them, that most information is available in lectures and
books but that not all students find these to their liking and that it is part of
higher education to encourage students to find a learning style which suits their
requirements. Similarly, Corfield (1975) has written that his centre allows
students to have access to the wide variety of material that is available in the
Department.

CONCLUSIONS

When reviewing the international literature there appeared to be two clear
characteristics. The first was that the most abundant reports came from the
U.S.A. and the second was that there was a marked difference between the sort
of innovations in developing and developed countries: In the developed countries
the innovations reported are predominantly of a small scale nature, while in the
developing countries there are more often projects organised on a much larger
scale, including national projects with direct governmental participation.

Developments of resource centres in British schools date from the late 1960s.
These centres were most effective both when they met a curriculum need and
when they had a close link with the library. Institutional resource centres in higher education began by 1970 and usually comprise the conventional library and facilities to produce learning resources as well as for maintaining equipment, displaying resources, and carrels for student work.

The literature gives powerful arguments to support the view that under specific circumstances the lecture needs at least to be complemented with resource based materials, and that these circumstances are dictated, by and large, by the students' needs. The literature also shows that in teaching and learning there is a place for a variety of stimuli in order to obtain the best response from the learners. Various resources have been shown to be effective and some of the innovations, especially those which make use of resources which is not easily available have developed some sort of base, in the form of a specially set up room usually labelled resource centre, but to which different people give different names (see chapter 8 for further details).

Developments of departmental resource centres also began in the 1970s. The overwhelming majority of these reports correspond to innovations carried out in departments of science subjects and very few indeed in the social sciences. The reports seem to be less concerned with comparisons of different methods but more with elucidating the merits of the innovation.

In some instances, the development of centres seeks an alternative to the conventional lecture and this is done for two reasons. One is that there are academics who regard the lecture as a poor communicator and look for innovations in order to improve their teaching. On the other hand there are other academics, especially in those subjects which have a higher prestige attached to them, e.g. medicine, who have a high regard for the lecture and consider it as the teaching method 'par excellence' and will justify an innovation only if it is shown to be as effective as lectures.

The reported appraisals and evaluations show that students' performance, mastery, conceptual apprehension and competence increase as a result of innovations in general and of self instruction in departmental centres in particular. The literature shows, and this is equally important, that students grow as individuals and are better able to communicate with their peers and staff; in a few instances,
students have been reported, by other staff members, as being willing to ask their other lecturers to introduce innovations into their traditional and conventional teaching.

Finally, most of the reports were written by subject teachers and were descriptive rather than evaluative. Most of the reported evaluations were written either by educational technologists or in collaboration between them and subject teachers and in most cases consisted of a questionnaire given to students. This, as will be shown later, is an inadequate way to carry out evaluation studies.
CHAPTER 3

THE LITERATURE ON PROGRAMME EVALUATION

INTRODUCTION

It would seem that systematic attempts to evaluate educational programmes go back to the later part of the XIX century and early part of the XX century. Regarding these early attempts, Rossi et al (1979:21) have pointed out that: "The commitment of various professors to evaluate systematically programmes in fields as education and public health goes back to early efforts at the turn of the century to provide literacy and occupational training by the most effective and economical means, and to reduce the mortality from infectious diseases".

The term evaluation means different things to different people. At one extreme are those who claim that evaluation involves ordinary every day activities and tasks and can be carried out by persons of modest expertise and experience. At the other end evaluation appears to be very complex, technically complicated and sophisticated requiring the participation of highly qualified experts. Cooper has reviewed the literature on evaluation with particular reference to the definitions provided by various authors. After classifying and analysing more than thirty definitions he concluded that a working definition of evaluation must retain flexibility and scope for the evaluator and decision maker, while at the same time helping those using it to come to grips straight away with the main problems. Cooper goes on to provide his own definition, as follows:
"Curriculum evaluation is the collection and provision of evidence, on the basis of which decisions can be taken about the feasibility, effectiveness and educational value of curricula". 

(Cooper 1976:10)

Earlier, Provus (1970) summarised the major distinction between educational evaluation and educational research and quoted Phi Delta Kappa (1970) for the concept of evaluation and Gagne (1969) to illustrate the concept of educational research. According to Phi Delta Kappa, evaluation is the process of gathering information for decision making. For Gagne research is the activity aimed at obtaining knowledge, either general or specific, which can be obtained by empirical or other systematic methods, may or may not have immediate application and which may result in theoretical models, functional relationships or descriptions. However Rowan (1981:96) considers evaluation research as one of 19 types of research.

Evaluation as an integral part of education developed speedily in the United States, especially in the years following World War II, and was firmly based on the behavioural objectives models. When evaluation took root in the United Kingdom in the decade from mid 1960s to mid 1970s it followed this tradition. Later disenchantment with, and strong criticisms of the behavioural objective model led to the emergence of a number of conceptualisations which, in the main, provided new ideas, but did not break away from the behavioural model. This development was marked in the early 1970s by the appearance, on either side of the Atlantic, of new, and alternative, conceptualisations about evaluation.

All three conceptions co-exist to day despite their differences in emphasis, theoretical background and methodologies. There have also been attempts to reconcile the different concepts of evaluation as well as efforts to classify the various types of evaluation. The present chapter, therefore, begins by reporting on the three periods of evaluation and then moves to consider some of the various attempts to classify it.

THE FIRST PERIOD OF EVALUATION

Most authors agree that educational evaluation saw its systematisation with the work of Ralph Tyler who produced a complete account of the use of objectives
in curriculum development. Objectives were initially stated in the works of Franklin Bobbit (1918 and 1924). Tyler defined behavioural objectives as follows: "One can define an objective with sufficient clarity if he can describe or illustrate the kind of behaviour the student is expected to acquire so that one could recognise such behaviour if he saw it" (1949:59-60). He envisaged evaluation as "essentially the process of determining to what extent the educational objectives are actually being realised by the programme of curriculum and instruction" (p105).

Taking the view that evaluation is the process of getting evidence about the degree of student behavioural change, Tyler divided this process into four distinctive stages. The initial stage concerns the setting of the objectives of the educational programme in behavioural terms. The second stage or step is the identification of situations which will give students the opportunity to express the behaviour implicit in the educational objectives. The third step is to devise the instruments for getting records of the behaviour of students. The final stage concerns the selection of scales or units to be used in appraising the record of behaviour obtained.

A significant contribution to the development of educational objectives expressed in behavioural terms was made by Benjamin Bloom and his co-workers, who over a period of ten years identified three domains of educational objectives, the cognitive, affective and psychomotor domains. Strongly influenced by the biological taxonomies, which classify, for example, plants or animals into a succession of ever narrower and specific groups, Bloom produced taxonomies on educational objectives and published these for the cognitive domain (Bloom 1956) and for the affective domain (Krathwohl et al 1964). In these, cognitive objectives are divided into six major classes: knowledge, comprehension, application, analysis, synthesis and evaluation. The affective objectives are divided into five major classes: receiving, responding, valuing, organisation and characterisation. Each of these classes is then divided into a large number of subclasses. In a "Handbook of Formative and Summative Evaluation, Bloom et al (1971:8) provided their view of evaluation as "the systematic collection of evidence to determine whether in fact certain changes are taking place in the learners as well as to determine the amount or degree of change in individual students".
Another American, James Popham, came to the defence of the use of behavioural objectives against ten major criticisms, which "educators employ to escape the practice of stating their objectives" (Popham 1969:46). To the criticism that behavioural objectives hinder the really important outcomes of education, Popham replied that by making the objectives explicit it is far easier for educators to attend to important instructional outcomes. To the criticism that behavioural objectives prevent being adaptable, he replied that specifying the ends does not imply that the means have also been specified. To the criticism that student behavioural change overlooks other important changes, such as those in parental attitudes or in the professional staff, etc., Popham responded that the school's primary responsibility is to students. To the objection that the approach is dehumanising because it intends to measure behaviour objectively or mechanistically, Popham counterattacked saying that much development work is under way in those areas where primitive ways of measurement persist. Against the criticism that it is undemocratic to plan in advance how the student will behave, Popham stated that instruction is by its very nature undemocratic and to imply that freewheeling democracy is always present in the classroom would be untruthful. To the objection that teachers do not specify goals in terms of behaviour, he simply replied that they should do so. The limitations that some subjects do not lend themselves to behaviour measurement, Popham said that those subject specialists should not escape their responsibility. To the criticism that if all objectives were to be spelled out, they would appear as innocuous, Popham argued that if what a school is achieving is innocuous, this should be known by educators and by those who support the educational institution. To the objection that excess of measurability would bring teacher accountability, Popham argued that teachers might properly be judged on their ability to bring about desirable changes in learners. To the final criticism that it is more difficult to generate objectives than to talk about them, Popham argued that it is time that the teaching load be reduced so that the teacher can spend more time in lesson preparation which should include the stating of precise goals so that he would become a professional decision maker rather than a custodian.

Several other authors have written from within the behavioural model. For example, Glaser (1970) stated the thesis that changing educational practices require changes in the theories and techniques of evaluation and developed a model in which he itemised six practices and suggested ways for evaluation and
measurement. The first is the specification of educational objectives stated in behavioural terms. The second practice is diagnosis of the initial state of student knowledge, including individual differences. The third practice is the design of educational alternatives. The fourth practice is continuous assessment to facilitate the prediction of the next instructional step. The fifth practice is adaptation and optimisation of the instructional model. The final practice identified by Glaser is an evolutionary operation in which a systematic theory of instruction is tested and improved.

Wittrock (1970:13-14) has argued that there are advantages in the use of the behavioural model, it implies the use of an absolute rather than relative standard for measuring learning, test items are written for their content validity and not for their ability to discriminate among learners and as a result the educationalist's interest shifts from individual differences to individuals. Wittrock also argued that evaluators, through the use of the behavioural model, are becoming less concerned about discriminating among learners and more concerned about the individual student and his change of behaviour and that teachers are freed to conceive of mastery learning for any number of students.

On his part, Gagne (1970:106) has emphasised that "nothing can take the place of the student's performance as an absolutely essential criterion of system or subsystem functioning. There may be many reasons to know how teachers are conducting their questioning, how administrators react to an innovation, or whether students enjoy going to class. But none of these can take the place of learning outcome as an essential part of any seriously purpose evaluation of educational systems or subsystems. By definition, the effecting of externally stimulated behavioural change in students is a major purpose of education, and this implies that behaviour assessment must be undertaken".

In what is regarded as the first British publication in the new field of evaluation, Wiseman and Pidgeon (1972) gave an endorsement by the British research establishment of the Tylerian prescriptions for curriculum evaluation. These authors concluded that: "The purpose has been to argue the case for evaluation as an essential and integral part of the whole process of curriculum reform and curriculum development ... Only by the evaluation of aim-achievement can we
ensure that curricula remain flexible and responsive to new demands and changed circumstances" (pp90-91).

Although this was the first conceptualisation to be developed, it is still the predominant conception. As recently as 1978 L. Morris edited a series of eight books under the general title of "Programme Evaluation Kit". The eight books follow the behavioural model and each deals with the following topics:

1. "The Evaluator's Handbook" provides the basis on which to organise an evaluation from the point of view of the behavioural objectives model.
2. "How to deal with Goals and Objectives" introduces the various methods of gathering information on their achievement.
3. "How to Design a Programme Evaluation" deals with the production and use of research/evaluation designs which includes the ubiquitous pre-test-post-test design and supplies step by step procedures for them.
4. "How to Measure a Programme Implementation" provides a step by step guide for designing and using measurement instruments.
5. "How to Measure Attitudes" gives step by step instruction for developing questionnaires, interviews, attitude rating scales, sociometric instruments and observation schedules.
6. "How to measure achievement" focusses on test administering.
8. "How to Present an Evaluation Report" is an outline of a standard evaluation report and presents model tables and graphs.

The initial period of evaluation which has become known as traditional can be summarised as follows:

1. Definition of aims in behavioural terms.
2. The selection and invention of learning situations designed to achieve those aims.
3. The design and development of assessment methods to measure the degree of success in achieving those aims.
THE SECOND PERIOD OF EVALUATION

Various factors contributed to the fact that in the late 1950s there began a general move away from the traditional behavioural approach to educational evaluation. In the U.S.A. new financial resources were put into education and training in the period immediately after the Sputnik achievement. This, in addition to bringing about increased activity in the field, brought new people into evaluation, in particular from non-behavioural disciplines and with varied backgrounds. All this led to the beginnings of a departure from the traditional approach.

Starting from the consideration that there should be a departure from the familiar doctrines and rituals of the testing game but without complaining about the inadequacies of such a game, Cronbach proceeded to provide a new purpose for evaluation, that of collecting and using information to make decisions about the educational programme. He identified three types of decisions for which evaluation can be used, as follows:

"1. Course improvement: deciding what instructional material and methods are satisfactory and where change is needed.

2. Decisions about individuals: identifying the needs of the pupils for the sake of planning his instruction, judging pupil merit for purposes of selection and grouping, acquainting the pupil with his own progresses and deficiencies.

3. Administrative regulations: judging how good the school system is, how good individual teachers are, etc.".

(Cronbach 1963:12)

Atkin and Eisner presented more open opposition and disagreement with the behavioural approach and suggested that the clarification of behavioural objectives was not as compelling as it appeared. Atkin (1963:132) stated that: "The standard practice is to identify the changes desired in students, then see if the course is effective in producing the changes. Instead we are observing classes for the purpose of identifying changes that are not predicted or recognised at the start ... Through such observation, though time consuming and sometimes
unproductive, we are succeeding in identifying post hoc some 'objectives' of the materials". Eisner (1967), on his part, summarised how the behaviourist approach is used and went on to argue that: "educational objectives clearly and specifically stated can hamper as well as help the ends of instruction" (p23). He then considered three limitations of the behavioural approach: that the outcomes are far more numerous and complex than educational objectives encompass, that educational objectives based on behavioural science fail to recognise the constraints that various subject matters such as the arts place upon objectives, and that behavioural objectives fail to distinguish between the application of a standard and the making of a judgment.

Scriven (1967), in the second curriculum theory paper ever, made a significant contribution when he identified two different roles assigned to evaluation. The first is as an important part of the process of curriculum development to which Scriven gives the name of 'formative evaluation'. The second role appears when an evaluator is called in to perform a final evaluation of a project, and receives the name of 'summative evaluation'.

In the British scene of evaluation, according to Hamilton et al (1977), Stenhouse was a lonely voice for quite a time in the provision of alternatives to the behavioural model. He dealt with the limitations of the approach and stated that the educationalists involved in curriculum planning should give particular attention to the following points:

1. To define the value positions embodied in the curriculum specification.
2. To specify a curriculum in terms of content, materials and methods.
3. To indicate necessary training procedures for teachers.
4. To define the contextual variables in schools, school systems and out of the school environments which make it likely or unlikely that the specifications will be realised in practice.
5. To list, and as far as practicable test, hypotheses regarding the effects of successfully realising the specification and perhaps failing to realise it in circumstances which are likely to arise in practice.
6. To attempt to relate differential effects to differential variables of the kind stated in 4. above."

(Stenhouse 1970:82)

By the late 1960s and early 1970s there developed a considerable body of disagreement, disenchantment and criticism of the traditional approach and many of the evaluators looking for, and proposing alternatives, published criticisms. For example, Stake (1967b) pointed out that despite much theorisation about the traditional approach there were few highly relevant and readable studies published and that psychometric tests were developed to differentiate amongst students rather than to assess the effects of instruction on acquisition of skills and understanding. Later, Stake (1971) showed reservations on what score tests can do and claimed that these tests provide correlates of achievement rather than evidence of achievement. Stake also pointed out that it was mistaken to claim that everything can be measured and stated that "neither quantity nor quality of impact can be measured" (Stake 1967a). Parlett (1972) considered that the traditional approach is useful in biology and he called it the 'agricultural botany' approach, because it is based on the testing of chemical fertilizers, but of no use for educational innovations for it fails to provide the basis for practical implementations.

The traditional approach has also been criticised for being inadequate (MacDonald and Parlett 1973); for being pre-ordinate and not allowing on-going issues to emerge (Parlett and Hamilton 1972); for being based upon a mistaken model (Stenhouse 1975, see page 42). Kliebard (1968) provided one of the strongest criticisms of the behavioural approach when he stated that "from a moral point of view, the emphasis on behavioural goals, despite all the protestations to the contrary, still boarders on brain-washing or at least indoctrination rather than education" (p246).

THE THIRD PERIOD OF EVALUATION

Various authors have provided new formulations for educational evaluation which have a number of common elements. For example, they use far fewer measurement procedures and give more predominance to techniques such as
observation and interviewing. Their research plan is less rigid and aims to be as responsive to the unpredictable as to the planned and typical. They intend to document the relevant audiences and interested groups with a full range of phenomena, perspectives and judgements that emerge in each study. Six of these new approaches are reviewed below, namely flexible approach, goal free evaluation, transactional evaluation, the holistic approach, responsive evaluation and illuminative evaluation. Of these, greater space is given to the illuminative approach for two reasons, firstly because the new evaluators themselves consider it a good articulation of their intentions and, secondly, because it is the one the writer favours and which was used as the main theoretical framework for his own evaluation studies.

**Flexible Approach**

Atkin (1963), one of the first authors to challenge the traditional approach, argued for evaluation for course improvement and for a more flexible approach to evaluation which should have been developed by the evaluators themselves in their specific studies. Atkin (1972) advanced a systems approach for an evaluation model, which has the educational system (or unit under examination) in its centre and which receives two types of input — students and finance— and provides two output — student outputs and non-student outputs. The whole system of inputs and outputs is under the influence of the external systems, such as government, community, educational institution, etc. whose relationships should receive the attention of the evaluators.

**Goal Free Evaluation**

Scriven (1967a) contributed to the new approaches with the recognition for the need for evaluators to interpret the information they gather, toanalyse the processes under study with a view to finding causal explanations. He also argued for the need to study the intended and unintended effects of programmes and proposed a 'goal free' evaluation which allows the external evaluator to hear less about the goals of the project, to have less 'tunnel vision' and to be more
open to noticing to actual effects rather than checking on alleged effects Scriven (1971).

**Transactional Evaluation**

Rippey (1973) developed the concept of 'transactional evaluation' which was triggered off by his perception that traditionally much effort was spent studying the consequences of new programmes on students, but little time was spent on studying what happens to teachers and other personnel. Rippey argued that the subject of transactional evaluation is the system, not the client or the services rendered by the system, that the variables in evaluation relate to the social, psychological and communication aspects of the system and not to the manifest objectives. In brief: "Transactional evaluation attempts to uncover the apprehensions of persons involved in the institutional change whether the change be an earthquake or a computer terminal in a classroom ... It involves introspection. Whenever someone asks 'how is this change affecting the feelings of the people either in or involved with this school?', he is interested in transactional evaluation" (Rippey, 1977:9).

**The Holistic Approach to Evaluation**

The emergence of Macdonald's holistic approach grew out of the Humanities Curriculum Project (1970). The Humanities Project did not make use of the objectives model and, therefore, the project's workers had to look elsewhere or develop their own alternative strategies. As MacDonald had become sceptical of confining evaluation to the measurement of outcomes, he decided for the latter alternative and argued for his holistic approach as follows:

"Education is a complex practical activity. Any effort to reduce that complexity to singularise perspectives tends to distort the reality, and may mislead those who seek to understand the reality. Least of all does it help those who live there. Perhaps bolder evaluation designs can give us a more adequate view of what it is we are trying to change, and of what is involved in changing it".  
(MacDonald 1971:167)
This bolder design consists of large samples where data is gathered from teachers and students, objective measurement of pupil and teacher change, monitoring institutional response, and of small samples where case studies are conducted to elucidate patterns of decision making, communication, training and support. The underlying concept of evaluation is as "the process of conceiving, obtaining and communicating information for the guidance of educational decision making with regard to a specific programme" (MacDonald 1973:1-2)

**Responsive Evaluation**

Robert Stake developed the concept of 'responsive evaluation' over a period of years. He expressed reservations about concentrating too much on outcome measurement and proposed that evaluators should commit themselves to more complete descriptions (Stake, 1967a). Later he argued that the obligation of an educational evaluator was not to discover the essence of human learning, but to discover the diversity of viewpoints and explanations of what goes on in the programme or institution being studied (Stake, 1969). Stake favoured an evaluation approach which portrays the merits and faults perceived by well identified groups, systematically gathered and processed. In this way judgement data and description data are essential to the evaluation study. The opinions gathered, which can be very subjective, are very useful and can be gathered objectively, independently of the evaluator's views. Stake's views on evaluation provided two major shifts, first moving emphasis from the outcomes of the programme to the programme itself and, secondly, shifting evaluation from being pre-ordinate to being responsive. In his opinion an educational evaluation is a 'responsive evaluation' "if it orients more directly to programme activities than to programme intents, if it responds to audience requirements for information and if the different value-perspectives present are referred to in reporting the success of the programme" (Stake 1972).
Illuminative Evaluation

The last approach to be reviewed is the illuminative, which has the great merit of not being a standard methodological package. It is meant to be a general research strategy which "is both adaptable and eclectic". This makes it an appropriate approach to evaluation, in particular for non-comparative studies. Illuminative evaluation was born in an occasional paper which has been reprinted in numerous books of readings and seems to have become one of the most thought-provoking papers on evaluation in the last decade (Parlett and Hamilton 1972).

Illuminative evaluation advocates a total re-appraisal of the methods and techniques of programme evaluation, but "it does not aspire to overthrow traditional evaluation; on the contrary it has different methodology, precepts, and intended benefits" (Dearden and Laurillard 1976:2). It is primarily concerned with description and interpretation rather than measurement and prediction and aims to discover and document the experience of those participating in the educational programme, to discern and discuss the programme's most important features and processes. Another characteristic of illuminative evaluation is that it does not study the programme in isolation; that is, it is not solely concerned with the measurement of educational outcomes, but in the context of what Parlett and Hamilton called the 'learning milieu', which is a central concept to the understanding of the approach and is defined as "the social psychological and material environment in which students and teachers work together ... a network or nexus of cultural, social, institutional, and psychological variables" (pp 14-15). The importance that illuminative evaluation places on the learning milieu lies in the fact that the introduction of programmes set off a chain of repercussions throughout the system which, in turn, are likely to affect the programme.

Another characteristic of illuminative evaluation is that it is client-centred and applied research that concentrates on the clients, e.g. innovators, project participants, advisers, local officials, related professional and interested groups, governmental policy makers and other constituencies within or related to the educational (Jamieson et al 1977).
CLASSIFICATIONS OF EVALUATION

Evaluation seems to show an important and distinctive division between the traditional approach which rests upon measurement and the innovative approach represented by evaluation as illumination. There are, however, authors who think that this distinction does not exist or that a middle position is needed. For example, Sheldrake and Berry (1975:3) argued that: "such a polarisation is quite mistaken. While we agree that those who are enthusiastic about the illuminative approach are right to point to the deficiencies of too early a closure on the salient variables that research needs to consider, equally we argue that demands for rigour and empirical justification are both apposite and needed".

As the field of evaluation is extensive and contains a variety of interpretations, there have been several reports dealing with classifying evaluation according to various criteria. Seven of these classifications are briefly reviewed below.

Harlen made a distinction between four types of evaluation, all within the behavioural model:

1. Evaluating the suitability of the objectives of an educational programme. To do with whether or not specific objectives are achieved.
2. On-going evaluation, which is conducted as part of the programme and helps with the production of the programme after the objectives have been accepted.
3. Evaluation of individual readiness and progress.
4. Terminal evaluation, which is the evaluation of a final draft of a project's material or approach.

The four types involve, according to Harden, the same four basic activities, which are: (i) clarifying objectives and analysing them to the point of expressing them in terms of behavioural change, (ii) developing and using appropriate ways of gathering evidence of these behaviour changes and other relevant observations or opinions, (iii) gathering together all relevant information and arriving at some interpretation of the evidence, and (iv) using the results of this to guide the
revision of trial materials and the future development of the project (Harlen 1971:128-129)

MacDonald classified evaluation according to its political nature and outlined three types:

1. Bureaucratic evaluation, which is an unconditional service to those government agencies which have major control over the allocation of educational resources. The evaluator accepts the values of those in office and offers information which will help them to accomplish their policy objectives.

2. Autocratic evaluation, which is a conditional service to those government agencies which have major control over the allocation of educational resources. It offers external validation of policy in exchange for compliance with its recommendations.

3. Democratic evaluation, which is an information service to the community about the characteristics of an educational programme. Sponsorship of the evaluation does not in itself confer a special claim upon this service.

   (MacDonald 1974:14-15).

Tennynson identified four types of evaluation in the development of learning environments:

1. Evaluation performed at the analysis phase which deals with problems of documenting procedures and validating of goals.

2. Formative evaluation to review contents and assess trials.

3. Summative evaluation performed at the production phase and concentrated on control group comparisons.

4. Maintenance evaluation which deals with issues such as selection criteria, cost benefits and technology review.

   (Tennynson 1976:19-22)

Steineker and Bell distinguished two major types of evaluation, or elements of evaluation as they call them, as follows:

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"The first of these elements is an overall sequence of activities, or mass evaluation, with attendant strategies to provide perspective, direction and feedback or necessary information as a basis for decision in educational policy; in effect an overall design. The second element is to provide a microevaluation, with a strategy or strategies to measure results of individual or singular classroom activity and experiences, or said in another way, a specific classroom oriented design".

(Steineker and Bell 1976:26)

Stake identified nine types of evaluation according to the purpose they serve:

1. Student achievement, which may or may not, have control group, or traditional approach.
2. Institutional self study by staff or the gathering of information by teachers in their own schools.
3. The prestige panel or blue-ribbon panel or institutional visiting panels to appraise the achievements or merits of particular programmes.
4. Illuminative approach to which Stake gives the name of 'transaction-observation'.
5. Instructional research, which emphasises the experimental nature of any evaluation.
7. Social analysis.
8. Goal free evaluation, which looks at actual effects of programmes and not their goals.
9. Adversary evaluation which is partly dedicated to show the shortcomings of a programme partly to show its merits.

Stake (1977:22-23)

Lawton classified evaluation along similar lines, but produced six categories only which are:

1. The classical model or 'agricultural-botany'.
2. The research and development model or industrial or factory model.
3. The illuminative, or anthropological, responsive model.
4. The political model or briefing decision makers.
5. The professional or teacher as researcher model.
6. The case study model or portrayal and eclectic.

Lawton (1980:120)

Ruddock looked at a number of the most commonly used models, which he designated as follows:

1. Experimental methods.
4. Statistical analysis.
5. A panel of respondents.
6. Sociometry.
7. Participant observation.
8. Evaluation as Illumination.
10. Role analysis.
11. Why not ask them?
12. Depth interview.
13. Life histories.
14. Documentary and content analysis.
15. Participatory research, and
16. Conflict of interest.

(Ruddock 1981:36-73).

CONCLUSIONS

Educational evaluation, like other aspects of education, has seen its most fruitful development after the second world war and especially as a result of the technological revolution which brought new tools to evaluation.

The first period of educational evaluation was firmly based on the assessment of previously stated educational objectives in behavioural terms. Although it has been classified as a first period of evaluation which started in the U.S.A. after the second world war and in the U.K. in the 1960s, it has not ended. On the contrary, it would seem that it is still the predominant approach to educational evaluation.

The explosion of the technological revolution brought new resources to the evaluator, such as computers, video tapes, easier recording of sound, to mention only the obvious. All this produced a movement which, without breaking away from the traditional model of evaluation, marked what Taylor and Cowley (1972:7)
called "the beginning of a new era"; that is, the beginning of the second period of evaluation as a movement which was critical of the traditional approach and made contributions to the development of the concept of evaluation.

Despite its initial popularity, evaluators grew more and more unhappy about the traditional approach and began looking for alternatives and by the late 1960s and early 1970s a break away from the traditional approach took place. Various conceptualisations were formulated, and one which gained widespread recognition was evaluation as illumination. The basic emphasis of this approach is on interpreting, in each study, a variety of educational practices, participants' experiences, institutional procedures and management problems in ways that are recognisable and useful for whom the study is made. Each illuminative evaluation has to be open-ended enough for the evaluator to detect not only the expected outcomes of a project but also, and as importantly, the unexpected.

The traditional and innovative approaches grew apart, and the illuminative was seen as a contrasting strategy to the traditional. This has motivated some authors to argue that there is no such polarisation and to attempt to classify evaluation, but none of the classifications has resolved the polarisation on the contrary, some of the classifications have produced so many types of evaluations, that the concept becomes confusing. Faced with this problem and, on the basis of the literature and his evaluative practices, this writer has attempted to resolve the contradiction; in a synthesis of evaluation which is presented in chapter 10.
Part II reports on the research methodology employed in the study: chapter 4 gives an account of how the research was conducted, the stages in which it was divided, the techniques used to gather information. As the interview was a technique extensively used, chapter 5 reports on the application of Six Category Intervention Analysis to interviewing and its strengths are examined.
CHAPTER 4

EVALUATION STRATEGY

INTRODUCTION

This chapter reports how the evaluation study was conducted. The implementation of the evaluation and the theoretical considerations took place almost simultaneously; that is to say, the synthesis was in broad outline when the study began and grew and developed as the study unfolded.

The description of 'how' the study was conducted starts with some general considerations about how it began, including the identification of a 'subject' for the evaluation. The stages of implementation of the evaluation study, with special reference to the case studies are then analysed. The various evaluation techniques used during the study are considered, including various forms of opinion gathering as well as documentary research. Then the stage of analysing the information gathered is reported.

THE INITIAL STAGES

One of the major reasons for concentrating on departmental resource centres in higher education was that whilst much attention had been given to the development of resource centres established at the institutional level, little attention had been given to the departmental settings. After familiarisation with the theme through the study of the literature and through visiting centres, it was decided to approach the study by the development of case studies and of a national survey of departmental centres in higher education.
The people in charge of two departmental centres agreed to have their centres studied and discussions took place to decide upon the aims of these studies. Although both are departmental centres (which make them similar), they are set up in very different specific circumstances and conditions with different assumptions and activities (which make them very different from each other). So it was necessary to work out a specific set of aims for each case study, which could reflect these peculiarities. These are described and discussed at length in part III.

THE GATHERING OF INFORMATION

For the same reasons that the aims for each case study had to be different, the execution of the evaluation of each case had also to be different and they are described separately.

The Execution of Case Study 1

Centre number one was in Scotland, which introduced another variable in that lengthy visits had to be made each time so as to make them worthwhile, since the project had little financial resources. A week long visit was decided on. In the early days of such a visit special attention was given to informal interviews with the centre's organisers in order to gain direct information of its activities. There was extensive observation and interviews with users.

Unfortunately, the week chosen was not the best one for student use of the centre, since it contained little material to support the topics being presented in lectures and practicals. Talking to students after their normal class hours proved a little complicated, because most of the students live at their parental homes and, as the university building including the centre closed at five in the afternoon, students tended to go home immediately after finishing their lectures. All this made it quite difficult to have access to students either users or non-users. Something had to be done. Discussions were held with the centre organiser as well as with the course tutors and permission was requested to attend the practical laboratories in order to hear from students as well as to
make arrangements for interviews. This was kindly agreed. A further complication arose because students worked in groups of four and to disturb one for discussions (on the centre) meant, in fact, to disturb the whole group. This was solved by developing the technique of group interviewing with an open ended structure and during three afternoons of practicals, it was possible to talk to 64 students.

One of the advantages of the method was that the sample developed itself as quite randomly selected, since the evaluator moved along the laboratory's benches where students were allocated to each group by alphabetical order. A slight disadvantage was that in some groups there tended to be a dominant personality, which was resolved by addressing direct questions to the other members of the group. Another interesting consequence of the method developed was that it enabled further interviews after the lectures or at lunch time.

In the mornings, interviews lasting about an hour were held with some of the staff members. Access was given to the centre's records and records of student exam results. The week long visit proved to be rather short for gathering all the information necessary and it was decided to pay another week long visit sometime later in the term. This visit concentrated mainly on staff attitudes as well as on the administration of a questionnaire to students, which was developed on the basis of information gathered during interviews and aimed at sustaining and validating some of the information obtained there. The questionnaire was developed because of the large number of potential users of the centre — about 450.

The Execution of Case Study 2

The different circumstances in which case study 2 was performed were reflected in a different execution. To start with, the centre was in a university in the midlands, which made visiting easier. The study began with one day visits during which events and activities were observed and informal talks held with organisers and participants — staff and students. However, as week long visits had worked out well for case 1, it was decided to incorporate a similar pattern in case 2 and rather than being spread over a whole term, the study took the
form of two weeks intensive investigation, plus a few other visits which were necessary to fill in some gaps in the information.

The number of students involved was relatively low especially when compared with those in case 1. There were 30 in the first year, 35 in the second and 25 in the third. In addition these students made frequent use of the centre. These two factors made it fairly easy to have access to students through formal talks in the centre. A large number of users were interviewed and arrangements were made, through their friends, to talk to non-users after lectures, at lunch time and in the evening in the Union bar. Interviewing students provided a good picture of their motivations, reactions and expectations about the centre and continued until the information being gathered began repeating itself, that is when no new light was thrown onto those issues that had emerged. In these circumstances it was felt that there was no need to prepare any questionnaire for students.

Access to staff, however, was not as easy as for students and methods for gathering information from staff had to be developed according to the specific circumstances. The person in charge of the centre had accepted voluntary early retirement and this seemed to restrain him from facilitating the evaluator's introduction to the general staff. As no formal introduction was made to the staff it was necessary to develop tactics to meet staff members informally, in the coffee lounge, for example, and start conversations which eventually moved into matters relating to the centre.

This situation changed considerably, half way through the study, when a meeting was held with the staff in charge and the staff who were to take over the centre. The need to get more formal information from staff became apparent and a letter was circulated which included a detachable slip where all staff could state where and when they could see and talk to the evaluator. Thus most of the staff were interviewed, including those who were not participating in the centre's activities.

There was intensive observation within the centre and there was access to its documentary files, for example, to the records kept in the laboratory on students' attendance. The analysis of these records uncovered the pattern of use of the
centre by term, week, day and hour. This is presented, together with the results of the analysis of the information gathered through the various other methods, in part III, chapter 7.

The Questionnaire Survey

A number of features of the centres identified in the case studies were correlated with information extracted from the literature and a survey was prepared. The number of centres reported in the literature was relatively small and the project made efforts to identify as many centres in departments as possible through consultation and correspondence. The result was a list of ninety three centres to which the survey was sent. The main aim of the survey was a quantification, with a large audience, of the information and tendencies obtained from the case studies and literature. The results of the analysis of the information from the survey are presented in chapter 8 while a later section of this chapter deals with questionnaires as a technique for gathering views.

TECHNIQUES USED

The three major techniques used were observation, survey of opinions and attitudes, and scrutiny of documents. In practice these were not used in isolation but in combination and sometimes as a way of cross-checking information from different sources. For stylistic reasons however they are described separately.

Observation

Unstructured observation was used in the early stages of the case studies to become familiar with the subject of the evaluation. It was also used throughout the studies, but to a much lesser extent to gain a more sensitive understanding of and to corroborate issues identified or suspected earlier. For example, in one of the centres, when observing the verbal interactions between users and the organiser it was noted that the latter rarely asked students for feedback. This was later followed up in an interview in which it became clear that feedback
from students was not one of the priorities for the centre's organiser. Another example was the following up of a student user complaint about lack of resources in one particular subject; after checking this in interviews with various other students, it became clear that there was a felt need for the inclusion of learning resources in that particular area. When the feedback was given to the organiser, he commented that students should have taken their petition to the staff-students committee, but he would anyway try to get some staff member to provide some material on the topic concerned.

Structured observation was also used, although to a much lesser extent. For instance when any prolonged period of time was spent in a centre an attempt was made to record the number of students present or using the facilities as well as their individual activities. The aim of this was to uncover any patterns regarding popularity of the materials available. In this particular instance it was noted that a large number of students showed a marked preference for the computer based sort of materials.

Interviews

Staff and students were interviewed, in the first instance, in an open ended format; there was, however, a general guideline in order not to miss any important issue. The conduct of interviews was, however, flexible in order to allow interviewees to develop their thoughts as well as to allow further enquiry when their remarks provided insight into issues. Table 4.1 includes the guidelines which were prepared for the initial student interviews in one of the centres studied.
TABLE 4.1: Student interview guideline

<table>
<thead>
<tr>
<th>Frequency of use</th>
<th>Reasons for use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of awareness about centre's materials</td>
<td>Relevance to lecture courses</td>
</tr>
<tr>
<td>Need for more materials</td>
<td>Lecturers' attitudes</td>
</tr>
<tr>
<td>Learning styles</td>
<td>Difficulties in the centre</td>
</tr>
<tr>
<td>Asked for help?</td>
<td>Suggested improvements</td>
</tr>
<tr>
<td>Views on aims of centre</td>
<td></td>
</tr>
</tbody>
</table>

Questions were not necessarily asked in the order listed, but included at the appropriate time according to how the interviews were developing.

Structured interviewing was used to a lesser extent and usually when the interviewee was interviewed for a second (or even third) time. This happened when more focussed enquiries were necessary on previously identified issues; but even in these circumstances there was always a place for an open ended attitude in order to be responsive. One particular instance of structured interviewing took place when students pointed out that there was a particularly difficult topic and that there were no relevant materials in the centre. Notes were taken of the points made by the students and a schedule for an interview (the second in this case) with the lecturer was drawn up. It included questions on how he had become involved in teaching the subject, the teaching methods, whether or not there was a place for learning resources in the centre for those methods and, in general, questions leading to the clarification of his non-participation in the activities of the centre. The open attitude mentioned earlier was maintained on this occasion since the lecturer made a quick remark, and in passing, to the effect that students in Scotland were very different to those in England; this
was followed up at an appropriate time — towards the end of the interview — and the lecturer explained himself in detail.

The method chosen for recording the interviews was note taking during the interview and although this was done in long hand, most, if not all of what was said was recorded. Whenever there was something which needed to be recorded verbatim, interviewees allowed time for this. As soon as possible and usually in the evening of the day of the interview the notes were expanded to include details talked about but not fully incorporated particularly those short notes which were marked with an asterisk for special attention later.

**Questionnaires**

Questionnaires were used in two instances as a means of gathering opinions. The first questionnaire, was used in case study one when the number of students involved was high, about 450, and aimed to quantify, with this larger audience, some of the tentative findings from processing information from interviews. Other questions aimed at gathering student views on a few matters related to the centre.

An example of the quantifying type of question was the second, which aimed at categorising students in three main groups: regular users, occasional users and non users. Other questions asked students about the materials they had used. There were also questions which asked students to assess the fulfilment of the centre's stated aims. For this, the three aims of the centre were listed and students asked to rate their fulfilment on a six point scale with the following meaning:

- 1 = not at all
- 2 = not very well
- 3 = about right
- 4 = fairly well
- 5 = very well
- 6 = no opinion

This questionnaire also included open ended questions such as one which asked students to suggest any improvements and those which allowed them to make comments on the questionnaire itself and/or particular questions. This
questionnaire was administered during student attendance at a laboratory practical, a time which guaranteed a high percentage of responses. The questionnaire was kept relatively short and easy to answer, which meant that students were not much distracted from their practical (see appendix B).

The second questionnaire was prepared in order to conduct the national survey of departmental resource centres. Ninety three names and addresses were collected during the course of the study and it was beyond the resources of the project to attempt to visit them all. So the case studies as well as the literature were used to draw up a questionnaire aimed at supplementing and validating information in five areas, each of which was dealt with in one section of the questionnaire. There was also a preliminary section, a final section for general comments and an introductory letter. A brief description of each follows below.

The introductory letter provided the reasons for and aims of the questionnaire together with a few simple instructions on how to complete it. It was emphasised that the questionnaire was to complement information acquired from other sources. The preliminary section was designed to encourage responses, especially from those who might consider the questionnaire as an incursion into their academic freedom or find that it did not allow them to provide full answers. It read as follows:

"If you do not approve of this enquiry please tick this box and return the questionnaire in the enveloped provided"

It would seem that this did encourage responses since there was a high percentage of responses (87%) and only one came back with the tick in the box.

The first section of the questionnaire aimed at quantifying a few facts about the centres such as number of students, size of centre, etc. It was structured so that respondents simply had to insert ticks or numbers into appropriate boxes as answers. The final question of the section was open ended: "Please state briefly the aims of your centre, (or enclose any documents where these are stated)".
Section two aimed at gathering information about the learning resources housed in the centres, whether they were catalogued, who had produced them, their numbers, etc. All questions in this section were of the fixed type, that is, ticks and numbers were only necessary for the answers. Section three aimed at indicating the relationships between the centres and the departmental staff or other departments and the financial support enjoyed by the centres. In this section there was one question of the rating type in which the support from various agencies had to be rated from being very good to no support whatsoever.

Section four was addressed to the feedback and evaluation activities of the centres. The questions in this section were mixed, open ended in the case of evaluation and of the rating type to indicate what the various people within the institution thought of the centres. The fifth section aimed at getting some information about the people who run the centres: their status, whether they were involved in staff development in their departments and/or institutions. The final section asked for anything else that the respondents might wish to add or comments on the nature of the questionnaire or particular questions. The questionnaire used for the survey is appended (appendix E) and the processed information is presented in chapter 8.

Study of Documents

The study of centres' documents also took place during the execution of the case studies. Personal documents such as letters and drafts were consulted as well as official documents such as proposals, committee minutes, handouts, documents, etc. In one centre, access to examination results was available, which made it possible to look for correlations between the use of the centre and exam performance. Since exam results are usually confidential information, this access to them was greatly appreciated. In the other centre the number of students was tallied hourly at the half hour. The computerised analysis of this information provided significant tendencies as to what days, hours or week of term the centre was more popular.
ANALYSIS OF INFORMATION GATHERED

It is important to point out at this stage that passing from the phase of obtaining information to its analysis was not a sharp operation. The two activities, in fact, overlapped quite a lot. For example, in order to prepare the survey questionnaire, analysis of information from other sources, visits, interviews, case studies, etc. had already begun and some tentative conclusions advanced. Also, when already engaged in analysis it was sometimes necessary to go back to the field in order to fill in any gap discovered in the data.

The process of analysis consisted of, in the first instance, classifying what was stored in numerous files. Each of these corresponded to information coming from individual sources, an interview, a day of note taken from observation, questionnaires, examination of documents. To achieve this, new files were opened, this time corresponding to particular issues with information coming from various sources. For example, in one of the case studies these took the form of fifty three individual files, each of which contained information from all sources. A selection of the headings of the files are provided in table 4.2 below:

<table>
<thead>
<tr>
<th>TABLE 4.2: Selection of File Headings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff views on students</td>
</tr>
<tr>
<td>Feedback and evaluation</td>
</tr>
<tr>
<td>Staff attitudes</td>
</tr>
<tr>
<td>Staff-student committee</td>
</tr>
<tr>
<td>Extent of use by students</td>
</tr>
<tr>
<td>Reasons for use</td>
</tr>
<tr>
<td>Student attitudes</td>
</tr>
<tr>
<td>Problems</td>
</tr>
<tr>
<td>Comments on aims</td>
</tr>
<tr>
<td>The future</td>
</tr>
<tr>
<td>Suggestions</td>
</tr>
<tr>
<td>Etc., etc.</td>
</tr>
</tbody>
</table>

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The horizontal examination of this information, now by particular issue, permitted the uncovering of general trends as well the discovery of relationships between them. It was possible, for example, to discover certain patterns, in a causal sense, in what concerned student learning/studying methods and the use of the centres. It was found that use of the centres came, to a larger extent, from those students who had a degree of regularity in their studying. In opposition to this non users were mainly from the the group of students who tended to leave their study until a couple of weeks before their exams. Similar patterns were found for various issues.

The results of the analysis of the information gathered during the execution of the case studies and survey are presented in part III (chapters 6, 7, 8 and 9).

SUMMARY

The methodology followed evaluation as illumination as the main theoretical framework. The study was conducted in three overlapping stages, preparation and familiarisation, gathering of information and analysis of the information gathered.

Techniques for gathering information were developed to suit the situations in which they were applied. Various methods for surveying views, opinions, attitudes and reactions were used, but preference was given to the use of interviews. Observation, questionnaires and scrutiny of documents were also used.

The main aim of observation was to develop knowledge about daily events and interactions; both main types of observation, unstructured and structured, were used. Semi-structured interviews were the most used, but structured and open ended forms of interviewing were also used. Questionnaires were used to quantify, validate and supplement information from other sources, e.g. interviews, observation, case studies, literature.
CHAPTER 5

INTERVIEW STRATEGY

INTRODUCTION

As argued in chapter 4, one of the major evaluation techniques for gathering information is the interview. But the interview is not only a research technique, it is also an art, the art of human communication, which in its semi-structured form favoured in this study falls between interrogation and a conversation piece.

As a tool of human communications, its most usual form involves two people who enter into a sort of transaction in which one, the interviewer, has the objective of 'extracting' information from the other, the interviewee. The style in which this is done is a major determinant of the 'success' of the interview in the sense of the amount of information gathered. In turn, the style in which an interview is conducted depends to a large degree upon the interviewer's skills.

It is useful for interviewers to present a range of responses to the various situations encountered in an interview, for example, being silent in certain circumstances or being persistent or insistent in others. It is also useful if interviewers can develop their own styles, but it is more helpful if they can back up these styles with a theoretical framework which allows them to be aware of a variety of styles with which to respond to the various possible situations.

This was the writer's experience since he had several years of interviewing experience and believed he that had evolved a fairly competent style. However, after the present study had begun, the writer had the opportunity of becoming acquainted with the 'Human Potential Movement', and in particular with the
Human Potential Research Project of the University of Surrey. One of the results of this project was the articulation of Six Category Intervention Analysis (Heron 1975) which can be applied "across the board to consultancy, tutoring, counselling, interviewing, therapy, training, individual or group facilitation, clinical and all professional interventions", (p 1).

As a consequence the writer decided to apply Six Category Intervention Analysis to his interviewing as well as in his role of facilitating the establishment of a resource centre in the Department of Educational Studies, University of Surrey.

The present chapter, therefore, is devoted to reporting the application of Six Category Intervention Analysis to the interview. It begins with an overview of the sorts of situations encountered in an interview. Secondly, it reviews the main premises of Six Category Intervention Analysis. Next, it provides the writer's monitoring and assessment of the strategy for intervention.
There are three distinctive stages in an interview. The first stage is the opening when a 'contract' is established between the two parties. The second stage is the question and answer or conversation and the final stage is the closing. There are also circumstances in which interviewers can intervene. Twenty 'situations' are briefly described below.

Situation 1:
At the very beginning of an interview a contract between the two parties is established. Here the interviewers need to be aware of the sort of contract being set up and intervene in order that the most useful and mutually agreeable is established.

Situation 2:
Once the contract is established, what follows is the establishment of a rapport, which should enable unfavourable attitudes to be expressed, and be based on principles of confidence and one of 'fellow workers'.

Situation 3:
As confidentiality is offered it becomes apparent that the interview is one of the most penetrating ways of gathering information from and about people so that the need for rules to control both the acquisition and subsequent use of the information has to be clearly established.

Situation 4:
The importance of the establishment of confidence comes next since it is one of the ways in which people can speak freely and also because interviewers are rarely in a position to influence the events being investigated and they have to show empathy with the interviewees' concerns.

Situation 5:
From the very beginning of an interview it is important to judge the significance of what is said by non-verbal means such as the tone of voice, how people dress, how they look, how and where they sit, or to infer the meaning of what is not said or what is denied.
Situation 6:
The interview, although a technique, cannot be technically or mechanically administered. It is a human interaction in which the personalities of the two individuals are critically significant to the success of the interview.

Situation 7:
It follows from the above that interviewers need to be aware of the various possible categories of interviewees such as those who are shy or bold, quick or slow, casual or formal, direct and concrete or subtle and abstract. Another aspect to bear in mind is that interviewees vary considerably in the degree of their commitment to their work.

Situation 8:
The preconceptions of both interviewee and interviewer also need to be considered since they can influence the interview to a large extent: what they say, hear and respond. How the interviewees perceive the interviewers is critical; whether the interviewers are perceived as sympathetic, critical or threatening, for example, influences what kind of information is offered. How interviewers perceive interviewees, as interested, indifferent or hostile also influences the type of questions to be asked.

Situation 9:
It is important, then, that the beginning of an interview develops along the appropriate track and one way to achieve this is to encourage interviewees to start talking about what interests them most as if they were in a social conversation.

Situation 10:
Another aspect to be aware of is that talking too much or listening too little or suggesting answers are real dangers if the interview is expected to reflect thoughts and feelings.

Situation 11:
As the interview develops there is a need to ask different questions each of which need different approaches. Some of the questions can be categorised in
the following groups: know how questions  
key questions  
supplementary questions  
leading questions  
open ended or closed questions  
filter questions, etc.

Situation 12:
The type of questions asked at the beginning is crucial for the success of the interview and the open ended type of the form what, how, why, help to elicit constructed responses rather short phrased responses.

Situation 13:
It may happen that the interviewer runs out of questions or simply forgets what comes next. One of the the more appropriate strategies in these cases is to keep silent. The 'mmhs' and 'yes' and 'aha' and 'yah' are of little help.

Situation 14:
The question of control of the interview is important. Ideally, control is shared. On the one hand the interviewees need to be given freedom to talk freely, and on the other, the interviewers need to go away, at the end of the interview, with the desired information. If the interviewer has the overall control the interviewee may be prevented from offering spontaneous information. While if the interviewee has the overall control the interview may produce nothing substantial.

Situation 15:
One of the skills that interviewers need to develop for successful interviewing is the genuine capacity to listen.

Situation 16:
Another skill is that of following up cues; asking interviewees to elaborate or explain how they adopted a particular view, introducing a theme for comments. These are all means of extending the level of information.
Situation 17:
At times interviewers may wish to interrupt in order to feed in some interpretation; at other times the interruption may be for taking up a point. But, when, how and how many interruptions can there be in an interview?

Situation 18:
On other occasions there may be a need to confront the interviewees either with their own previous remarks or with the arguments of opponents. Again, how, when and how much of this can there be in an interview?

Situation 19:
Because of the rules and conventions students may not feel as free as their teachers to express their attitudes and feelings; or they may be inarticulate.

Situation 20:
The interviewee may assume the role of interviewer.

This list, by no means exhaustive, illustrates that the range of skills interviewers require is very wide and common sense alone is not enough, an appropriate theoretical and practical framework is needed for the right sort of approach to the interview as well as for the use of the right sort of interventions during it for the success in terms of the amount of information to be gathered.

REVIEW OF SIX CATEGORY INTERVENTION ANALYSIS' MAIN PREMISES

The first aspect to be reviewed is the meaning of 'intervention' as understood by the developer of intervention strategies. Heron (1975) argues that although the word intervention unfortunately carries a connotation of interference, it is the term which best describes the strategy because it implies a clear differentiation of roles between the one who is practising the intervention, the interviewer, and its recipient, the interviewee. The term intervention also emphasises the voluntary contract between the parties; the interviewer is there to collect information and the interviewee to provide it and both enter into the contract voluntarily.
Heron (1977:2) argues that behaviour can be analysed at three different levels, where the later ones subsume and include the earlier, as follows:

1. **Movement**: the analysis gives simple descriptions of physical movements and the analysis is purely kinetic and geometric.

2. **Actions**: the analysis gives simple first order descriptions of pieces of behaviour which are included in a social context, such as walks, talks, and which includes actions of a verbal nature such as asking a question.

3. **Intentions**: the analysis states what the conscious purpose of the behaviour is, that is, it states why a person is walking, talking or asking questions.

Six Category Intervention Analysis categorises the behaviour of the practitioner, in this case interviewer, at the level of intentionality and, as the title suggests, picks up six basic types of behaviour as follows:

**Prescriptive**: give advice to, be judgmental / critical / evaluative. A prescriptive intervention is one that explicitly seeks to direct the behaviour of the client, especially though not exclusively behaviour that is outside or beyond the practitioner-client interaction.

**Informative**: Be didactic, instruct / inform, interpret. An informative intervention seeks to impart new knowledge and information to the client.

**Confronting**: Be challenging, give direct feedback. A confronting intervention directly challenges the restrictive attitude / belief / behaviour of the client.

**Cathartic**: Release tension in, encourage laughter / crying / trembling / storming. A cathartic intervention seeks to enable the client to abreact painful emotion.
Catalytic: Be reflective, encourage self directed problem-solving, elicit information from. A catalytic intervention seeks to enable the client to learn and develop by self direction and self discovery within the context of the practitioner-client situation, but also beyond it.

Supportive: Be approving / conforming / validating. A supportive intervention affirms the worth and value of the client."

(Heron 1975:3)

The first three categories are grouped as authoritative since the practitioner takes a more dominant role, while the last three are called facilitative because the role of the practitioner is more discreet.

Some interesting aspects to emphasise are that the categories are not exclusive of each other, are interdependent and, on occasions need to be used in conjunction. They are all of equal importance or significance. The categories, when properly used, constitute the best use of a practitioner's own resources.

There are, however, degenerative uses of the categories. Unsolicited interventions in fact become interferences: this is overcome by explicitly stating the sort of intervention to be used, by saying for example, "May I offer you some advice" before a prescriptive intervention. A second type of degeneration is the manipulation of the intervention for the purposes of the practitioner. A third type is the overdetermined or compulsive interventions, which happen when a practitioner, for whatever reason, only uses a reduced number of the interventions thus losing sight of the needs of the situation.

Each of the six categories of intervention has its corresponding effect in the behaviour of the client so that the practitioner is prescriptive in a way that enhances self determination in the client; informative in a way that enhances informed independent thinking in the client; confronting in a way that enhances intentional growth in the client; cathartic in a way that enhances aware release of feelings in the client; catalytic in a way that enhances self insight in the client; and supportive in a way that enhances celebration of self in the client.
The catalytic category is the most influential over all the client categories. The cathartic category, on its part has an influence on three of the client's states, while the confronting has it on two. Figure 5.1 (overleaf) illustrates these influences.

FIGURE 5.1: Category influences.

- prescriptive → self determining
- informative → informed independent thinking
- confronting → intentional growth
- cathartic → aware release of feeling
- catalytic → self insight
- supportive → celebration of self

As Heron (1977:5) has stated "the ideal practitioner client relationship is one in which the attitude of the practitioner is fundamentally supportive, the attitude of the client is basically celebratory, the practitioner's primary type of intervention is catalytic — facilitating, enabling, drawing out all the client states".

Further reading about the strategy can be found in Cooper (1976), Heron (1977b), Heron (1981a), Heron (1981b), Massarick (1981), Kilty (1981).
EXAMPLES OF THE APPLICATION
OF SIX CATEGORY INTERVENTION
ANALYSIS TO INTERVIEWING

The following examples are taken from two major sources, the interviews themselves and the three case studies. As these describe personal experience, the first person is employed.

I was prescriptive at the beginning of interviews with students in the sense that I specifically told them what I was expecting from them. I was also prescriptive at the end of each of the case studies when I provided some recommendations. In one of the case studies, for example, I was prescriptive in that I suggested that the centre update one of its aims to reflect the present circumstances in which it operates. In the case of the establishment of a resource centre at Surrey, I was prescriptive when I drew up the main body of proposals for the establishment of the centre. I was also prescriptive when I suggested that it was necessary to appoint a full time officer if a faster and smoother full development of the centre was desired.

The informative category was also used in many instances, including the interviews and the case studies. For example, I was informative at the beginning of the interviews with staff members in the sense that I provided them with a picture of what the study wanted to achieve as well as pointing out how their department could benefit from the study. I was also informative with the people in charge of the centres evaluated, since I provided them with interim feedback of the initial and tentative conclusions of the studies once the intensive periods of interviewing were completed. In another instance I brought a body of knowledge about resource centres to the Department of Educational Studies, and suggested that some of the organisational problems faced by the department could be overcome by the establishment of a resource centre.

The confronting category was used when staff remarked that students did not like any other teaching method but the lecture and I asked for concrete evidence on which they based their comments. It then came clear that this was an assumption which staff accepted might not be correct. On other occasions I had to resort to direct questioning. Once I was told something which appeared
to be outrageous and I intervened by saying "I do not believe that, please develop your argument". Another way in which I was confronting was when I had to interrupt certain patterns in the development of the interview, for example, after a staff member asserted he had little time for the interview but then went on and on describing aspects of research work which, given the limited time, was not directly relevant to the purpose of the interview, I then had to interrupt him and draw him towards a description of his teaching activities within the centre. Another example comes from the facilitating role in the D.E.S., where there was a need for direct feedback which was confronting. Because of the structure, or perhaps lack of structure, of the department there came a time when proposals for the establishment of the centre were agreed by the relevant departmental committee, but time passed and passed and there was no clear indication of when the proposals could be implemented. In a talk with one of the departmental administrators I had to be confronting in the sense that I remarked that "The impression I get is that there is no real interest in the development of the centre". This direct feedback produced the expected results: the Head of Department was given a copy of the proposals, and he gave the goahead.

Because of its nature the cathartic category had a limited use during the studies reported here. It was used, for example, with students in first year classes who appeared embarrassed at being interviewed. In these cases we agreed to talk about other things until we were more relaxed and cathartic interventions were applied in order to provoke laughter and to release embarrassment. This was done particularly with younger students in the case study in Scotland. The cathartic category was also used when the interviewees expressed feelings of dissatisfaction about the running of the centre and were asked to repeat as well as expand. It was also used when interviewees made slips of the tongue and as far as possible were asked to rationalise on the slip; I say as far as possible because in some instances the interviewee did not want to go into details and this desire was, obviously, respected.

The catalytic category was extensively used with students and staff in that they were always allowed to express themselves freely, questions of the open ended type being used for the purpose. I was catalytic in that I not only listened but also showed attention and interest in what the interviewee was saying.
There were some instances when the interviewee wanted to change the subject because of the possible breaking of confidentiality; I then resorted to a catalytic (and supportive) intervention by assuring the interviewee that anything said during the interview would remain confidential, in this way some more information was teased out. In other instances the intervention chosen in order to obtain further development of a topic was by echoing back something said by the interviewee, for example, the remark 'it is all matter of personalities, you know', after which the interviewee smiled and explained what he meant. This was a successful intervention since this particular staff member voiced several complaints about the person in charge of the centre, which were then followed up with other staff members to check on how general they were. In fact only a few of his views were shared by others, including the person to whom they referred.

Another instance of a catalytic intervention was the summarising of a long argument in order to make sure that what had been said was understood. This usually took the form of "am I right if I summarise what you said as follows ...?". Showing knowledge of the activities of the department in general and of the centres in particular was also catalytic and usually developed into more in-depth conversations about the topics and issues of interest for the study.

The supportive intervention was used permanently through being alert and attentive to what interviewees had to say and by sharing some of their concerns. For example, in the case study in Scotland, the staff were really concerned about the possible threat posed to the centre by the general cut-backs, a concern which I did not hesitate to share with them. I was also supportive in the sense that I acknowledged the time and information that the interviewees had provided. When some of the interviewees assumed an over modest position, stating that they had little to offer, it was necessary to say how valuable the information was and move to a catalytic intervention to get the interview going. Another example of a supportive intervention was when I shared with my interviewees the knowledge about centres that I had previously obtained, in particular those relating to how problems were being sorted out in other places.
ASSESSMENT OF THE APPLICATION

Assessment was conducted at the time of interviewing and with three main aims: to appraise whether the interviews were achieving the objectives they were set out to achieve; to review whether they had followed the semi-structured format prepared beforehand; and to analyse whether they were 'well' conducted, (in the sense of being 'right' according to the context in which they took place).

The assessment was mainly done through the review of the notes taken during the interviews and in order to:

a) observe when any intervention category was applied, that is, the timing factor of their application was analysed;

b) review whether the sort of intervention was appropriate to the circumstance;

c) observe the style used and whether there were any 'missed' opportunities for an intervention;

d) observe the effects of the interventions, whether they produced the desired result.

One of the major advantages of the process of reviewing the interviews was that self-awareness about the interventions and their applicability increased considerably. The review usually took place in the evening following the interview sessions with constant consultation of two manuals on the categories: Six Category Intervention Analysis and Dimensions of Facilitator Style.

At the early stages of case study two and when it appeared that access to staff interviews was a little difficult, special consideration was given to the confronting category, since the notes showed that it had not been applied and there had been plenty of proper opportunities for doing so. This in fact produced good results in that the staff in charge was finally confronted (through quoting opponents' views), which partly solved the problem of access to staff.
Another instance was the discovery, during case study one, that the supportive category was absent from the interview notes reviewed. I was then more alert to the situations in which it could be applied. This was particularly important because I did not want to give the impression that I was there only to receive things and not give anything. In later interviews I shared the experiences and knowledge accumulated and was more self disclosing regarding the problems encountered in interviewing.

Similarly the cathartic intervention was observed as being absent and it was also noted that the beginning of student interviews was not totally satisfactory because it took some time before students felt relaxed enough to ask questions or voice possible criticisms on the workings of the centres. The review of the methodological notes together with the analysis of the content of the interview and the consultation of the manual showed that encouraging laughter at the beginning of the interviews might be a way to solve this particular difficulty. In later interviews some remarks made by other students or staff were used to get the subject going. This happened when students were asked about their study habits, which is something they seemed taciturn and embarrassed about, I repeated a remark made by one student to the effect that he could only study in the evenings at home and wearing the headphones of his stereo equipment tuned loud in order to isolate himself from the street noise. This usually produced slight laughter or smiles of disbelief, but it also usually produced the desired effect, students began talking about their study habits.

The confirmation at review time that the semi-structured format for the interviews, which was based on catalytic interventions, was producing good results was reassuring, and stimulated the continuous application of the format.

Some months after the interviewing took place the writer attended a training course on the Six Category Intervention Analysis with the object of being more closely exposed to the theoretical and experiential exercises associated with the analysis. The course (Kilty 1982) included theoretical explanations, exercises of application and their review.
The aims of the course were to increase awareness of the range of interpersonal skills; to increase skill in the identified areas of weakness; and to train participants in the ability to monitor their performance. The course began with an introduction to the structure of the workshops followed by an introduction to the relevant theory.

The usual pattern of work was an introduction to a category followed by an exercise. Exercises were performed in pairs and small groups. Practise of single categories were done in pairs, e.g. two participants interviewing each other in turns. Practise of the use of more than one category was done in small groups, e.g. one acting as practitioner, another as client and the third observing and taking notes of the interventions used, then the roles were interchanged in order that each group member performed all three roles.

There was a review session after each of the exercises; these tried to answer questions such as the following.

How was my attention?
What qualities did I convey?
How aware of those was I?
Which intervention(s) did I use?
Did I really need any?
Did they seem to be effective?

Experiential exercises and their reviews highlighted areas of weakness and strength with the important consequence that my own list of strengths and weaknesses was confirmed in discussion with the other participants; this made it possible to conduct further exercises in these areas, i.e. prescriptive, cathartic and informative categories.
CONCLUSIONS AND ONE RECOMMENDATION

The writer's research training and practices included theoretical knowledge about the interview technique, knowledge articulated principally by Cicourel (1967), Schatzman and Strauss (1973), Simons (1978). This had provided a sort of 'box of tools' of what to do in interviews. Six Category Intervention Analysis enlarged this box in the sense that it provided categories to be used in different situations, including style, timing, content, form, etc. These two sources—interview content knowledge and interview responsiveness—constitute a powerful partnership, which improve the effectiveness of interviewing.

Secondly, the process of assessment performed during the weeks of interviewing highlighted those categories which although appropriate were not used because of the lack of alertness to them.

Thirdly, the process of assessment as well as the participation in a training course increased the writer's awareness in the categories to a very large extent. Feedback from interviews conducted after the course has shown that the writer's skill did indeed increase.

Finally, one recommendation derived from the first conclusion above is that any research training which includes interviewing as one of the techniques for gathering information should include a basic training in Six Category Intervention Analysis.
Part III: Research Results

Chapter 6: Case Study One

Chapter 7: Case Study Two

Chapter 8: National Survey

Chapter 9: Case Study Three

Part III presents the research results: chapters 6 and 7 report on two case studies, the evaluations of two departmental resource centres. The reports include a background description of the centres, their organisation, extent of use, participants' perceptions of advantages and disadvantages as well as the desired future for centres. Chapter 8 reports on a national survey of centres examining the audience and their response, details about the centres and learning resources they keep, the support they enjoy, their feedback and evaluation activities, the people responsible for running departmental centres. Chapter 9 reports on the third case study, the establishment of a departmental centre. It presents the stages of development, the proposals drawn and documents the preliminary scheme developed for the centre.
CHAPTER 6

CASE STUDY ONE: EVALUATION OF A DEPARTMENTAL RESOURCE CENTRE

INTRODUCTION

One of the general aims of the research project was to evaluate the educational significance of departmental resource centres through case studies and a national survey.

In order to negotiate the study of centre one, the academic in charge of a Biology departmental centre was contacted and it was agreed that the study would have two major purposes. The first was to gain an insight into the services provided by the centre, especially because it was under potential threat due to the cut-backs. The second purpose was to provide a basis for the application of the interview strategy as well as for the application of the writer's evaluation synthesis (still in those days in tentative form).

The present chapter is concerned with meeting the first purpose, (the second was reported in chapters 5 and 10), and summarises facts, reactions, opinions and statements of those involved in the centre — organisers, staff and students— in order to illuminate various aspects of the centre's activities and enable them to make sensitive decisions regarding the future of the centre.

The information summarised in this report was based primarily on formal and informal interviews with academics and students; these were supplemented by observation, analysis of documents and the administration of a questionnaire, (a
copy of the questionnaire was included in appendix B). There were interviews with 20 of the 24 staff whose students may use the centre lasting, on average, for about one hour. There were also informal talks with some of them. 79 students were interviewed out of the 424 for whom the centre is primarily available in the year the study took place (1981 - 1982); 15 when using the centre and 64 during practical laboratory classes. There were also many informal talks with students after their practicals and in between lectures. In order to quantify the information gathered in interviews and obtain some ratings a questionnaire was administered, which was an expanded version of a questionnaire designed by the writer in 1977. This latter had been administered every year by the centre's secretary, which allowed some comparisons of the preceding five years of the centre. Access was given to the centre's documents and to the Department's student records, including their examination results.

This chapter is written with various audiences in mind, the centre's organisers, the academics involved and academics elsewhere, and it is organised in five sections which can be read independently of each other. It begins by providing a general background to the centre's facilities, characteristics and aims. It then analyses what actually happened within the centre, the extent of use by students, their reasons for use, and what was used. Since many Scottish University students do no Biology before University first year, there are comparisons between the use of the centre and Biology done at school, and between use of the centre and exam results. The report summarises advantages and disadvantages perceived by the centre's users, their reservations and how they saw the aims of the centre were being fulfilled. The following section concentrates on reporting how the future of the centre was seen, and would like to be seen, by students and staff. Finally some conclusions are drawn and some recommendations are advanced.

CENTRE'S BACKGROUND

This departmental resource centre was set up in 1974 as part of an interUniversity project funded by the Nuffield Foundation. It was opened with the following aims, which have been maintained throughout this time.
a) To help students who have not done any Biology before to grasp the fundamental principles underlying the subject.

b) To fill in gaps in students' knowledge, and

c) To provide a new way of learning as some biological material is not easily learnt from books.

The centre occupied three rooms; two were on the 7th floor, one arranged for private study and the other for the centre's secretary and one was on the 9th and top floor and houses the self instructional material. There was a wide range of learning resources and associated equipment, including microscope slides, books, reprints, audio tapes, filmloops, workbooks, microscopes, film viewers, tape players, etc. These resources supplemented material presented in lectures and were available on an optional basis. The 7th floor room kept all the materials for quick reference (e.g. books, reprints, microscope slides) which were kept in closed shelves with access to them via the centre's secretary. The materials on the 9th floor were on open shelves with equipment chained to the desks. Both rooms were generally unsupervised. Displays on aspects of Biology were also organised in the foyer of the 9th floor room. A detailed list of all the resources available in the centre and the topics they cover are presented later in this chapter and a copy of the centre's catalogue is included in appendix C.

The centre also provided a base for student self instruction in Quantitative Biology which gave them knowledge of and practice at the Mathematics of Biology. Schedules of exercises on Statistical Methods were given out each week for 25 weeks in the year and a tutor was available in the centre to answer student questions on these exercises and other matters related to the first year course.

The facilities were primarily oriented for the first year students taking the Ordinary Biology Course, a basic Biology course from which students may continue to other special areas of Biology in later years, Genetics, Botany, etc. The facilities were also available to students in other courses such as the 40 students of the arts taking a first year Human Biology course and the 283 first year Medical and Dental Class, who also take a basic Biology course.
At the beginning of the year students are told about the facilities available and a leaflet is distributed to them. In addition, members of the staff are expected to draw students' attention to the materials relevant to their lectures. The schedules for the laboratory practicals make reference to the materials in the centre which are relevant to the particular practicals. Information about the centre is conveyed to students through several notice boards: within the centre, in the laboratories' foyer and in the laboratories themselves.

Members of the staff teaching the first year class came from five service departments: Zoology, which covers most of the teaching load, Cell Biology, Genetics and Botany with less than a third and Virology with only two lectures.

The running of the centre lies with two staff members of the Zoology Department, a lecturer and a part time secretary. The lecturer, who had the overall responsibility in addition to his teaching and research activities, maintained a general co-ordination with the three classes and their teachers; in particular he looked after the ordering of new materials, writing Biology material to support displays, preparing Quantitative Biology schedules and booklets to support laboratory work. The secretary looked after the day to day management by making sure that things were in the right place and that student queries were dealt with, and by lending materials kept in closed shelves; between 10 to 16 hours a week of her time were spent typing and duplicating the Quantitative Biology schedules. On her own initiative the secretary had done a Certificate on Educational Technology to give a better support to the centre.

Up to the previous session the centre had a budget of £350 for its expenses, but because of both the financial cut backs and the over spending of the Biology course, the centre's budget had been frozen. In the previous years the money had been allocated to the replacement of faulty equipment, the acquisition of recommended books, consumables and the like.

Originally, and as a means of obtaining feedback, students were expected to complete comments cards on materials they had used, but this was abandoned because the analysis of cards was cumbersome. There are now several ways through which this takes place. A comments box located from the start of the centre in the 9th floor is a two way system because all suggestions and
complaints left in the box receive an answer or report of the action taken. A record is kept of what workbooks (which accompany several self-instructional programmes) are taken by students and of what books and reprints are used. The centre's annual questionnaire permitted the identification of trends in usage as well as the collection of a number of suggestions. The staff-students committee deals with all sorts of matters on teaching, including comments on the resource centre.

A number of changes have been introduced in the centre as a result of this feedback including some physical rearrangement of the tables and chairs and the enforcement of silence in the 7th floor quiet room. On the other hand some of the suggestions proved impossible to implement such as the students' request for the centre to be opened after 5 p.m., since for economy reasons the whole building is shut down at 5.

Other changes introduced include the standardisation of equipment, the complete replacement of slide sets by filmstrips, and the participation of the centre in the Primary School Project run by the Zoology Department and the local Regional Council. This consists of students visiting schools to teach, alongside the school teacher, some biological material, which is usually backed up with audio visuals borrowed from the centre.

The centre has also produced a new self-instructional package on animal behaviour; under a Scottish Universities scheme a self-instructional programme on Genetics was developed; and three of the original programmes on developmental Biology had been revised in collaboration with staff members.

The secretary of the centre maintained a good relationship with the University library. The library personnel, in particular the Biology subject librarians, have shown enthusiasm in developing the library along similar lines to the centre, but the expense involved has prevented them from such a development. Materials are not transferred to the library because the library is not suited to tape slide materials.
THE USE OF THE CENTRE

The present section deals with what happened in the centre: the extent of its use by students, their reasons for doing or not doing so, what was used in the centre either the type of resources available or the topics they cover, including the student perceptions of their effectiveness. The section ends by analysing the extent of use of the tutor who sat several times a week in the centre to assist students with any problems arising from their studies, whether they are or not users of the centre. Whenever it has been possible and appropriate a comparison with previous years is introduced.

The Extent of Use

66% (42) of the Ordinary Biology students interviewed during the practicals indicated that they were users of the centre and the remaining 34% (22) students said that they would use the facility sometime in the term. The 15 student users interviewed while using the centre said that they were frequent users. The questionnaire which enlarged the question to the whole of the 1981 - 82 Ordinary Biology class provided the following answers: The facilities of the 9th floor were used by 58% (145 students) either on a regular basis or occasionally. The use of the facilities of the 7th floor was higher at 70% (179 students). Figure 6.1 gives the comparative use of the centre for the last five years and for the 7th and 9th floors.

FIGURE 6.1: Use of the Centre (in percentages)
From the figure it can be seen that the overall use of the centre, of either facility, is relatively high and did not go below 70% over the five years that records have been kept. They also show that there is a slightly higher use of the facilities in the 9th floor. In a voluntary sample of this kind, it might happen that only those keen on using the centre filled in the questionnaire. What is interesting about the data is that there is no evidence for an over-estimated use of this kind, since when a higher proportion of students answered—as in 1981-82—there is no obvious decline in the proportion of students claiming to use the facilities.

**Reasons for Use**

Students had a diversity of reasons for using the centre, which are categorised into four major groups. Firstly, the centre is used because students find it valuable and useful and as one student put it: "I have never done Biology before ... I need to use all the facilities to understand many of the basics that the lectures don't cover". Some students also found that listening to tapes is a quicker way of studying than using their own notes, since "things are presented in a simplified way, straight to the main points", as another student remarked. A second group of reasons is related to the lecture courses in that students use the centre's materials when they have problems which cannot be cleared up from the notes or books, to get extra bits of information, or simply because the lecturer recommended the use of a particular item. Several students mentioned that they use it to clear up topics half understood in the lectures or to catch up with missed lectures. In all these cases the common theme for the use of the centre was that it helped them in gaining a better understanding of the materials presented in lectures. The third group of reasons is related to the fact that students find the facilities very handy, as one student said "I can go to the Self Teach Lab in between lectures, which is good, unlike the library where you must stay for more than an hour to get any work done". A fourth miscellaneous group of reasons were diverse; for example, some students use it out of general interest, or because a friend uses it, or because there is nothing else to do between two lectures.
A selection of the most usually mentioned reasons was incorporated into the 1981-82 questionnaire and students were asked to tick those they agreed with and add any others they had. Table 6.1 presents the student rating of these reasons.

**TABLE 6.1: Reasons for use**

<table>
<thead>
<tr>
<th>REASONS</th>
<th>No of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>To clear up topics half understood in lectures</td>
<td>144</td>
</tr>
<tr>
<td>To supplement the lectures</td>
<td>112</td>
</tr>
<tr>
<td>To study own notes</td>
<td>83</td>
</tr>
<tr>
<td>To complete work for practicals</td>
<td>74</td>
</tr>
<tr>
<td>To get deeper insight into topics</td>
<td>63</td>
</tr>
<tr>
<td>To see the 9th floor displays</td>
<td>58</td>
</tr>
<tr>
<td>The 7th floor is a handy and quiet place</td>
<td>52</td>
</tr>
<tr>
<td>The 9th floor is a handy and quiet place</td>
<td>48</td>
</tr>
<tr>
<td>To consult textbooks and reprints</td>
<td>44</td>
</tr>
<tr>
<td>To catch up with missed lectures</td>
<td>40</td>
</tr>
<tr>
<td>To fill in gaps from school</td>
<td>20</td>
</tr>
</tbody>
</table>

Space was provided for 'any other reasons'. Eight answers were given and these complemented those in the list. Two students wrote "general interest", three that they use it in relation to their exams and the other three comments were related to time, handyness and warmth of the rooms.

**Reasons for no use**

Non users had a totally different set of reasons for their non-use of the centre and which can be categorised into three main groups. The first one concerns student study styles or methods: quite a number of students preferred to study in the evenings, at home or in the library. Other students found the use of self instructional materials ineffectent as a study method, claiming that their lecture notes were sufficient, and what the centre had was not incorporated into the exam questions at the end of the year. One student remarked, half seriously,
(but which illustrates the feelings of many others) that he went home soon after the lectures or practicals finished to look at his notes, that the centre would only be used as a second resort and that his last resort, after trying notes, books and the centre, would be to jump out of the window. For many students the use of books suffices for their study and, as one of them put it: "I work mainly at night when the building is closed but I have all the materials required for additional work in the course text book and on completing each lecture I try to read the relevant text ... if possible"

A second category of reasons is the students' commitment to other subjects. They are busy writing essays, solving problems for mathematics and chemistry, which they thought were the more difficult subjects, and in general, students found the whole first year course very demanding.

The third category was lack of time to go to the centre. These students found that the working day is full with lectures and practicals and that no time is left to use the centre. Some students also found that the little free time they can get is not enough to do any worthwhile work and that there were others things to do as well in that limited time, such as having a cup of coffee some time in the day or talking to friends, or other commitments.

Other reasons given included conservatism towards a new experience. As one student pointed out: "why try anything else if one is used to working from books". Some just said that they had forgotten the centre was there, or rarely climbed up to the 9th floor or that they were not always told what in particular to look for and for a few, the reason was just lazyness. Table 6.2 presents the 1981-82 student ratings of possible reasons for no use of the centre.
TABLE 6.2: Reasons for non use

<table>
<thead>
<tr>
<th>REASON</th>
<th>No of responses</th>
<th>7th floor</th>
<th>9th floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>You do not know what is available for particular subjects</td>
<td></td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>You do not have enough time</td>
<td></td>
<td>61</td>
<td>59</td>
</tr>
<tr>
<td>You prefer to work at home/library</td>
<td></td>
<td>125</td>
<td>124</td>
</tr>
<tr>
<td>You do not study until exams are near</td>
<td></td>
<td>32</td>
<td>23</td>
</tr>
<tr>
<td>You do not like the working conditions</td>
<td></td>
<td>24</td>
<td>20</td>
</tr>
</tbody>
</table>

In the space provided for any other reasons, eight students made comments to the effect that they do their studying elsew here, three that it was pure lazyness, three that the 9th floor can get quite noisy and two that the materials were outdated.

Use of Resources

In order to gain some indications of what is used in the centre, 1981-82 students were asked to tick those resources they had used and table 6.3 shows this. The resources are listed according to students' preferences and the location is indicated in brackets:
### TABLE 6.3: Resources Used

<table>
<thead>
<tr>
<th>RESOURCES</th>
<th>No of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiet study room (7th)</td>
<td>130</td>
</tr>
<tr>
<td>Displays (9th)</td>
<td>107</td>
</tr>
<tr>
<td>Filmstrips (9th)</td>
<td>82</td>
</tr>
<tr>
<td>Filmloops (9th)</td>
<td>78</td>
</tr>
<tr>
<td>Filmstrips-tapes-workbook (9th)</td>
<td>78</td>
</tr>
<tr>
<td>Books (7th)</td>
<td>69</td>
</tr>
<tr>
<td>Tape-workbook (9th)</td>
<td>52</td>
</tr>
<tr>
<td>Posters (7th)</td>
<td>51</td>
</tr>
<tr>
<td>Microscope slides (7th)</td>
<td>51</td>
</tr>
<tr>
<td>Electron micrographs (7th)</td>
<td>51</td>
</tr>
<tr>
<td>Slide programmes (9th)</td>
<td>47</td>
</tr>
<tr>
<td>Reprints (7th)</td>
<td>24</td>
</tr>
<tr>
<td>Bioset viewer (7th)</td>
<td>18</td>
</tr>
</tbody>
</table>

It becomes clear from the table that resources in the 9th floor were more popular. Another interesting point emerging from the table is that the room in the 7th floor is a quiet room and is the most popular resource; this is consistent with results from observation which showed that the room was used to a significant extent for student work on their own notes. It is also worth pointing out here the lack of such 'quiet' rooms generally.

1981-82 students were also asked to rate the teaching effectiveness of these resources according to a five point scale as follows:

1 = poor  
2 = not very effective  
3 = adequate  
4 = fairly effective  
5 = very effective  
6 = no opinion

The student ratings are presented in table 6.4 and are listed according to decreasing effectiveness, again the brackets indicates the location of the resource and the following abbreviations are used:
n = number of students responding the particular item.

\[ x = \text{mean of ratings} \]

\[ \$ = \text{standard deviation} \]

N/O = number of students who ticked the no opinion column

**TABLE 6.4: Effectiveness of resources**

<table>
<thead>
<tr>
<th>RESOURCES</th>
<th>X</th>
<th>$</th>
<th>N/O</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books (7th)</td>
<td>4.20</td>
<td>0.16</td>
<td>5</td>
<td>75</td>
</tr>
<tr>
<td>Fmstp-tape-workbook (9th)</td>
<td>4.10</td>
<td>0.80</td>
<td>5</td>
<td>55</td>
</tr>
<tr>
<td>Tape-workbook (9th)</td>
<td>4.10</td>
<td>1.13</td>
<td>8</td>
<td>62</td>
</tr>
<tr>
<td>Reprints (7th)</td>
<td>4.00</td>
<td>0.80</td>
<td>9</td>
<td>47</td>
</tr>
<tr>
<td>Electronmicrographs (7th)</td>
<td>3.96</td>
<td>0.78</td>
<td>8</td>
<td>61</td>
</tr>
<tr>
<td>Displays (9th)</td>
<td>3.91</td>
<td>0.60</td>
<td>10</td>
<td>105</td>
</tr>
<tr>
<td>Quiet room (7th)</td>
<td>3.89</td>
<td>0.93</td>
<td>10</td>
<td>128</td>
</tr>
<tr>
<td>Microscope slides (7th)</td>
<td>3.86</td>
<td>0.83</td>
<td>9</td>
<td>61</td>
</tr>
<tr>
<td>Slide programmes (9th)</td>
<td>3.82</td>
<td>0.90</td>
<td>5</td>
<td>55</td>
</tr>
<tr>
<td>Filmstrips (9th)</td>
<td>3.80</td>
<td>0.77</td>
<td>4</td>
<td>88</td>
</tr>
<tr>
<td>Posters (7th)</td>
<td>3.67</td>
<td>0.82</td>
<td>11</td>
<td>60</td>
</tr>
<tr>
<td>Bioset viewer (7th)</td>
<td>3.66</td>
<td>0.42</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>Filmloops (9th)</td>
<td>3.60</td>
<td>1.12</td>
<td>6</td>
<td>89</td>
</tr>
</tbody>
</table>

The questionnaire also asked 1981-82 students to tick the topics covered by the learning resources which they used most and to rate the usefulness of the programmes used for those particular topics. The ratings were done using a similar scale to that of table 6.4 and are presented in table 6.5. The programmes are listed according to decreasing usefulness and the number of users are indicated in brackets.
### TABLE 6.5: Usefulness of programmes used

<table>
<thead>
<tr>
<th>PROGRAMMES</th>
<th>x</th>
<th>$</th>
<th>N/O</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Biology (70)</td>
<td>3.93</td>
<td>0.47</td>
<td>4</td>
<td>66</td>
</tr>
<tr>
<td>Effective learning (19)</td>
<td>3.90</td>
<td>0.31</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Human Biology (41)</td>
<td>3.83</td>
<td>0.27</td>
<td>4</td>
<td>37</td>
</tr>
<tr>
<td>Plants (90)</td>
<td>3.80</td>
<td>1.02</td>
<td>5</td>
<td>85</td>
</tr>
<tr>
<td>Animal behaviour (25)</td>
<td>3.76</td>
<td>1.23</td>
<td>4</td>
<td>21</td>
</tr>
<tr>
<td>MicroBiology (50)</td>
<td>3.75</td>
<td>0.98</td>
<td>5</td>
<td>45</td>
</tr>
<tr>
<td>Micro organisms (42)</td>
<td>3.68</td>
<td>0.89</td>
<td>5</td>
<td>37</td>
</tr>
<tr>
<td>Evolution (33)</td>
<td>3.63</td>
<td>0.84</td>
<td>4</td>
<td>29</td>
</tr>
<tr>
<td>Animals (30)</td>
<td>3.62</td>
<td>0.88</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Genetics (69)</td>
<td>3.55</td>
<td>1.10</td>
<td>4</td>
<td>65</td>
</tr>
<tr>
<td>Animal psychology (38)</td>
<td>3.51</td>
<td>0.87</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td>Environment* (14)</td>
<td>3.00</td>
<td>0.00</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Social Biology* (14)</td>
<td>2.50</td>
<td>0.70</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

**N.B.** These are topics covered in the third term and the study took place on the second.

The figures show much of a muchness which is consistent with the fact that most of the materials were prepared at the same time and are uniformly presented.

**Use of the Tutor**

Another facility available to students in the centre is a human resource in the form of a staff tutor, who sits in the room in the 9th floor. The year before this study, the centre conducted a survey among the students in the Ordinary Biology Class to find out the extent of use of the tutor and the most suitable times for the tutor to be available. There were 350 replies of which about 10% were regular users of the tutor, 40% had used the tutor occasionally and half the students had not used her services at all. Table 6.6 below gives the percentages of 1981-82 students who responded yes and no to the use of the tutor in percentages.
TABLE 6.6: Use of the Tutor

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>133</td>
<td>294</td>
<td>160</td>
<td>170</td>
<td>177</td>
</tr>
<tr>
<td>YES</td>
<td>13</td>
<td>27</td>
<td>25</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>NO</td>
<td>86</td>
<td>73</td>
<td>75</td>
<td>90</td>
<td>87</td>
</tr>
</tbody>
</table>

It follows from table 6.6 that about one fifth of the students have consulted the tutor over the last five years, and this varies from students who have consulted her only once to a maximum of five times. Students had a variety of reasons for not consulting the tutor, the most frequent was that they did not feel the need to consult a tutor (101 students). Of these 40 students indicated that when they had problems they consulted the recommended books, 11 said that they went to the centre to clear up their difficulties and 7 mentioned that they preferred to consult their demonstrators, because it was easier during the practicals, while 3 mentioned that they put their questions to the lecturers. The following is a quote from a student interview which represents very well the views of this group of students: "I have not yet had a problem not solved by the use of books or self instructional facilities. But I think it is excellent to have a tutor available as a safety net".

A second group of reasons was concerned with lack of time (47 students). These found that the times were not the most suitable ones since they overlapped with lectures and practicals. Quite a large number of students said that they were unaware that it was possible to see the tutor at other times by arrangement. A remark from a student which illustrates those in this group: "I can only go up in a period of about half an hour per week, and this is not always convinient".

A third group of students gave assorted reasons; for example, 10 students said that they never got round to do it or that they were too lazy to go up to the 9th floor. Other students considered that the means of contact were insufficient, that the scheme encouraged students not not meet the tutor for the first time, in the words of one student: "If we don't go and see the tutor means we don't
know the tutor and she doesn't know us ... so it is more difficult to approach the tutor".

**COMPARISONS ON THE EFFECTS OF THE USE OF THE CENTRE**

It would be interesting to see whether there was any relationship between the use of the centre and student exam performance, but there was not much evidence on which to base any trends. Although some subjects were better covered in the centre than others, class (at the end of each term) and final exam questions were set without reference to the subjects covered by materials in the centre. Moreover, students who do reasonably well in their class examinations are exempted from taking the course exam. This implies that final results come from two different groups, those exempted (who have to achieve a good performance in three class exams) and those sitting the course exam. Table 6.7 tabulates general use of the centre and exam results over a period of four years. Results are grouped into three main categories which correspond, broadly, to the first class (marks above 70%), second class (between 60% and 70%) and ordinary pass (between 50% and 60%); the failure rate is also included:

**TABLE 6.7: Use of Centre and Student Exam Performances**

<table>
<thead>
<tr>
<th></th>
<th>USERS</th>
<th></th>
<th>NON USERS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>OVER 70</td>
<td>43</td>
<td>9.3</td>
<td>12</td>
<td>6.3</td>
</tr>
<tr>
<td>60 - 70</td>
<td>148</td>
<td>31.7</td>
<td>71</td>
<td>37.3</td>
</tr>
<tr>
<td>50 - 60</td>
<td>217</td>
<td>46.6</td>
<td>92</td>
<td>48.6</td>
</tr>
<tr>
<td>FAIL</td>
<td>58</td>
<td>12.4</td>
<td>15</td>
<td>7.8</td>
</tr>
</tbody>
</table>

\[ x^2 = 5.540 \] \hspace{1cm} \[ \text{d.f.} = 3 \] \hspace{1cm} \[ P = 0.14 \] non-significant
There was a slight higher percentage of users with exam results over 70 and a higher percentage of non users in the regions 60 to 70 and 50 to 60 but this is not significant. There was a higher rate of failure among users; this implies that use of the centre came from all sorts of students, good and not so good ones.

Another variable to be compared with the use of the centre is the taking of Biology courses before entering University (which is not a prerequisite for the first year Ordinary Biology Course). Table 6.8 summarises information which is given in percentages of users and non users over a period of four years.

**TABLE 6.8: Use of Centre and Biology at School**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>USE</td>
<td>N</td>
<td>U</td>
<td>N</td>
<td>U</td>
</tr>
<tr>
<td>BIOLOGY AT SCHOOL</td>
<td>37</td>
<td>46</td>
<td>40</td>
<td>14</td>
</tr>
<tr>
<td>NO BIOLOGY AT SCHOOL</td>
<td>10</td>
<td>7</td>
<td>31</td>
<td>15</td>
</tr>
</tbody>
</table>

The table shows that over the years there has been an increase in the percentage of users who have done Biology at school reaching two thirds in 1981 - 82. The figure for the intake of students to the course who have done Biology before has been increasing over the years and it also reached two thirds in 1981 - 82.

The use of the centre appears to be related to student study habits and styles. A minority of the students interviewed (38%) indicated that they do their exam preparation steadily throughout the year and for these the centre played a very important role. A larger proportion of students said that they leave their study until a few weeks before the exam. Some would leave it until the exam gets very near, or as one student put it: "If I study too far away from exams I may not remember". A significant number of these students pointed out that they use the centre occasionally depending on how much they took out from the lecture. This partly explains the high number of occasional users.
HOW THE CENTRE IS SEEN BY THOSE INVOLVED

The present section moves on to consider matters of a more subjective nature, the perceptions of those involved. It is divided into two subsections, the first reviewing student thoughts and the second the staff's.

Students' Views

It became clear from student interviews that the users of the centre found the services it provides valuable. This has been partially covered in the section about the reasons for use, which in the main were concerned with student increased understanding of the topics being studied.

As the aims of the centre are clearly spelled out in the handout which each student gets at the beginning of the year, these were included in the questionnaire and students asked to rate how well these aims were being fulfilled according to the following scale:

1 = not at all  
2 = not very well  
3 = about right  
4 = fairly well  
5 = very well  
6 = no opinion

Table 6.8 summarises student ratings which are given in terms of the mean of ratings ($x$), the standard deviation ($\sigma$) and the number of students responding to the particular question as well as the number who had no opinion. Only users of the centre were considered, although 21 non users also rated the fulfilment of aims.
### TABLE 6.8: Fulfillment of Aims

<table>
<thead>
<tr>
<th>AIM</th>
<th>x</th>
<th>$</th>
<th>n</th>
<th>N/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>To help people who have not done Biology before to grasp the fundamental principles underlying the subject</td>
<td>3.74</td>
<td>2.87</td>
<td>131</td>
<td>11</td>
</tr>
<tr>
<td>To fill in gaps in students knowledge</td>
<td>3.77</td>
<td>0.84</td>
<td>138</td>
<td>1</td>
</tr>
<tr>
<td>To provide a new mode of learning as some biological material is not easily learnt from books</td>
<td>3.82</td>
<td>1.11</td>
<td>138</td>
<td>7</td>
</tr>
</tbody>
</table>

The table shows that students viewed the centre fulfilling its aims to a good extent, their ratings are near the four mark, which means fairly well fulfilment; however, there is not a large agreement: standard deviations are near 1, which is high. The third aim was slightly higher rated, so that students thought that this is the aim the centre fulfils better, which is consistent with students' assertions that the centre was most useful for clearing up topics half understood in the lectures and as a supplement to them (see table 6.3.).

During interviews and later in comments to the questionnaire students remarked on the usefulness and value of the centre. One student user put it like this: "I would like to point out that the centre is very much appreciated by students and the resources the Biology Department supply require minimal improvements. When compared with other science departments they have achieved a high standard of additional material". An occasional user pointed out something similar, as follows: "I think it's really a good idea and it's a pity that Biology is the only department to provide such an accessible service, although I've not frequented it very often". Even non users thought it a good idea and a typical quote is as follows: "Having no personal experience of the centre, I cannot say anything about its effectiveness, but I do agree with it in principle and would like to see adequate facilities maintained". 

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In general, no student was against the provision of the facilities in the centre. The nearest that anyone got was a non user who felt that learning in the centre was inefficient and slow; however this student did think that the centre seemed suitable for basic understanding of some topics.

Most students had some sort of reservations about the services provided; these reservations can be categorised into three groups, related to the materials available, the staff involvement and the physical conditions.

As far as materials were concerned students voiced their reservations regarding the number of copies available. At times of high use, they were deprived of using wanted material because someone else was using it. Some students thought that some of the materials were too basic or that "they do not come anywhere near the depth of the lectures" as one student put it, while others said that some materials were difficult to follow. Students also thought that some materials were outdated; for example, "a lot of the stuff looks as if it has not been up-dated since it was put there". It was frequently mentioned by students that materials in the centre are not generally relevant to the topics treated in lectures, as one student put it: "there is not enough material available which relates directly to the lectures".

The second group of reservations concerned the involvement of the staff in the centre, which students thought rather low. Students said that although they were introduced to the centre at the beginning of the year, their lecturers did not refer them to the materials in the centre. In this connection one student remarked that "although the facilities are adequate, a better use could be made with more references to the available materials at lectures and practicals". Another student was stronger in his remarks: "I was merely told that self instructional facilities were available but I had no idea how effective they could be so I didn’t use them for quite a while. However, after using them once, I found they were quite useful and used them again". Students also complained that their staff not only did not refer them to the materials in the centre, but also that they had "hardly seen any lecturers about the place" as one student put it.

The third category of student reservations concerned various aspects of the physical arrangements of the rooms. These varied from students finding the
facilities too high up (9th floor) to problems of noise, crowdedness, opening times and so on. A more serious reservation was that students found it annoying that somehow a system of reserved seats had spontaneously developed in the room of the 7th floor, which they respected but did not like. A typical complaint of this sort was as follows: "... the only annoying thing is when people leave their books on the tables to go for lunch, coffee or lectures and then no places are available". And a complaint on the 9th floor indicated that a lot of fooling around takes places which is disturbing for those working.

**Staff's Views**

All staff members interviewed (20 out of the 24 who lecture to the first year) said that they knew and approved the services provided by the centre or found them valuable for their students. However eight (40%) were not involved in any way with the centre and seven (35%) had reservations on the original programmes. Only 25% participated in the centre either by producing materials for the centre or encouraging students to use it. Staff involvement in the centre was strictly related to their views on teaching and on the provision of self instructional material; and not to their teaching load which varied from two to fifteen lectures a year.

The reasons given by the 40% of staff for not participating in the centre divide into three main categories, general views on University teaching, which do not include the provision of self instructional facilities; staff's perceptions or assumptions about student perceptions of their teaching; and reservations on the use of self instructional materials.

Staff felt that the advancement of universities depended on research and, therefore, all effort should go in that direction but the fact that universities allocate resources according to students numbers encourages departments to be teaching orientated and have high first year intakes. Many of these staff reckoned that they spend over 60% of their time in research and something below 30% in teaching, not always on the subjects of their research expertise. The large student numbers makes it "more of a theatre performance rather than a lecture" as one academic put it.
Staff asserted that they enjoyed teaching by lecturing supported by practicals to back up and illustrate the subjects seen in lectures and that the ideal teaching situation was 15 to 18 students in a seminar type situation which facilitates the checking of student progress. They said that the human contact is of most importance, not only during the lecture but also before and after when the lecturer is available for student consultation as a human resource. It was also thought that the key to good teaching was the relevance of the material presented which could only be achieved in a face to face situation such as the lecture. Some of the staff mentioned that any support material for their lectures was prepared soon before the lectures and was of a simple type not worth putting in the centre.

Staff thought that students in general objected to any teaching done outside the lecture, that very few were prepared to do any reading or extra work beyond that presented in lectures. Even that "students would prefer a poor lecturer giving a poor lecture and get more out of it" as one put it. They also said that students were more interested in listening to a live lecture than watching anything and that they switched off from the subject if bombarded with different methods. Staff thought that the only way in which they could teach was through the lecture because students have been regimented into note taking at school and any other practice could be to the student's disadvantage.

Reservations about the use of the centre can be divided into general reservations and reservations about the materials available. By and large staff thought that self instruction was not important and that student development depended on the normal teaching, and if this was not adequate then self instruction might become desirable. Staff saw self instruction not as teaching, but as an approximation to teaching which can produce too many stereotypes and cannot accommodate the needs of fast and slow students. Also that students are given plenty to read and, therefore, self instruction from books has always been there and up to the students. Staff thought that the production of self instructional materials was difficult and complicated, one staff member pointed out typically that: "You have to produce something good, think every step in great detail, which is not done for every day teaching. To be satisfactory the details should be looked at and expertise in the design needed". In other words and as another staff put it "if you cannot compete with Bellamy ... you had better leave it".

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Reservations about the materials available were that academics not finding them suitable or lively enough to be recommended to their students or that they had become outdated. Some felt neutral about them or did not take them into consideration for their teaching and two felt embarrased because they had never gone to see what these materials were like.

There were other miscellaneous reasons for no involvement including lack of time, other commitments, and the unfavourable comparison with rewards from the production of books, etc.

In contrast, a quarter of the staff participated in one way or another in the workings of the centre, from offering simple recommendations for the use of materials to producing. Staff perceived merits of the centre can be grouped in the following three categories: benefit to students, to themselves and to the department. Regarding the benefits to students staff thought that the centre is valuable for students because it provides them with a supportive facility which is supplementary and remedial to their lecturing, gives reinforcement as well as new knowledge through guided instruction. In addition, staff thought that the centre gives students an opportunity to learn on their own when and as they wished, going through the materials as many times as necessary. The fact that the centre is used on an entirely optional basis was also mentioned as one of its strengths since it gives students an additional sense of responsibility. The centre was thought to be of particular advantage for students who had not done Biology at school.

Staff also considered the centre valuable for themselves because it allows them to produce materials without much effort and, by just being there, it makes a contribution to their teaching.

Staff thought that the centre could make a significant contribution to the first year class, the departments and the University because, as one of them put it, "teaching is becoming expensive and some subjects, especially those taught in labs., could be done in tape-slide presentations".

Seven of the twelve staff who found the centre valuable had, however, reservations about some of the original programmes kept in the centre. They held that
there were minor errors in the programmes, that they were not very successful, that they had become dated, and that some of the programmes were made against staff advice regarding content and style. These staff also thought that the Scottish school system did not prepare students for different teaching modes and neither did the centre nor did it encourage more scientific thinking; that teaching loads were on the increase and this left even less time to look for alternative methods; that the fact that the first year functions in a separate building makes it difficult to know their students well or to be aware of their difficulties; that staff had not been asked to contribute; and that there was no expertise to give a helping hand to those wishing to produce materials, (this was no longer the case since the centre's secretary had completed a qualification in Educational Technology).

THE DESIRED FUTURE FOR THE CENTRE

Staff and students made quite clear that despite the vulnerability of the centre because of the financial cut backs they would like to see it maintained. They believed the centre to be run very efficiently and cheaply, that sacrifices should be made elsewhere, that it should remain intact if not developed. The following quotations, one from a member of staff and the other from a student are representative of their views:

From a staff member:
"There is little money diverted to it ... we ought to fight to keep it at the present level, it is supplementing the lack in manpower ... there is less staff to cope with the teaching load. Perhaps there should be more use because of the lack of manpower. It should better be expanded, but at least not reduced".

From a student:
"Such a resource would be missed, as would the tutor and both must be maintained for future students or better lecture courses provided".

There was also agreement between students and staff in that certain subject matters were inherently difficult and that the centre must play a role in
facilitating their teaching and learning. The most frequently mentioned topic was Genetics, others were Developmental Biology, Cell Biology and Molecular Biology. It was mentioned that Virology was difficult to follow and that it appeared to be very advanced for the first year class. Amongst the topics less frequently mentioned was Immunology.

Student Preferences

Students, in particular, were asked in the questionnaire to tick what topics, of those available in the centre, for they would like more materials. Their answers are presented in table 6.9 in order of preference. Although the number of responses to this question was relatively low, its significance lies in the fact that students were making a positive suggestion. Moreover it coincides largely with what students expressed in interviews.

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>No of responding students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics</td>
<td>28</td>
</tr>
<tr>
<td>Cell Biology</td>
<td>19</td>
</tr>
<tr>
<td>Evolution</td>
<td>12</td>
</tr>
<tr>
<td>Micro Biology</td>
<td>12</td>
</tr>
<tr>
<td>Plants</td>
<td>10</td>
</tr>
<tr>
<td>Human Biology</td>
<td>9</td>
</tr>
<tr>
<td>Animal behaviour</td>
<td>8</td>
</tr>
<tr>
<td>Animals</td>
<td>6</td>
</tr>
<tr>
<td>Micro organisms</td>
<td>6</td>
</tr>
<tr>
<td>Animal physiology</td>
<td>5</td>
</tr>
<tr>
<td>Effective learning</td>
<td>2</td>
</tr>
<tr>
<td>Environment</td>
<td>1</td>
</tr>
<tr>
<td>Social Biology</td>
<td>1</td>
</tr>
</tbody>
</table>
There were plans to produce materials on the nervous system and a felt need for the production of programmes on Cell Biology and Molecular Biology. It was also thought that some of the practicals could be replaced by self instructinal material and that computer assisted learning could be used to facilitate problem solving. There were suggestions that the centre could keep past exam papers. Although staff recognised a number of areas in which they could contribute to the centre and although they also recognised that, in comparison with some ten years ago, people were now more motivated, they seem not to have the time for the production of materials. It was believed that the cut backs might mean a shortage of staff in the departments involved in the first year class and that this might be an extra encouragement for the production of self instructional materials.

Students were also asked to indicate what sorts of resources they would like to see more of in the centre; here again the number of responses was rather small but the significance lies in that they are making positive suggestions. Their answers are presented in table 6.10:

<table>
<thead>
<tr>
<th>RESOURCE</th>
<th>No of responding students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiet room (7th floor)</td>
<td>36</td>
</tr>
<tr>
<td>Displays</td>
<td>32</td>
</tr>
<tr>
<td>Filmstrips/slides + tapes + workbook</td>
<td>32</td>
</tr>
<tr>
<td>Filmstrip</td>
<td>25</td>
</tr>
<tr>
<td>Books</td>
<td>24</td>
</tr>
<tr>
<td>Filmloops</td>
<td>21</td>
</tr>
<tr>
<td>Tape + workbook</td>
<td>19</td>
</tr>
<tr>
<td>Microscope slides</td>
<td>18</td>
</tr>
<tr>
<td>Electron micrographs</td>
<td>14</td>
</tr>
<tr>
<td>Slide programmes</td>
<td>10</td>
</tr>
<tr>
<td>Reprints</td>
<td>8</td>
</tr>
<tr>
<td>Bioset viewer</td>
<td>2</td>
</tr>
</tbody>
</table>

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It is interesting to note from the table that student preferences for more learning resources are consistent with their views of the value and usefulness of the centre since the three more wanted resources are those which they said were the more useful in helping them to a better understanding of topics.

As all the materials housed in the centre are supplementary to the conventional lectures, students were asked if they would like to see the centre introducing materials which were an alternative to or replacement of their lectures. They were almost equally divided regarding the provision of alternative materials, but quite against the introduction of any replacement of their lectures. Table 6.11 presents their answers in percentages.

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>No of answers</th>
<th>% said YES</th>
<th>% said NOT SURE</th>
<th>% said NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative</td>
<td>241</td>
<td>37</td>
<td>27</td>
<td>35</td>
</tr>
<tr>
<td>Replacement</td>
<td>236</td>
<td>19</td>
<td>14</td>
<td>67</td>
</tr>
</tbody>
</table>

Finally, students made several suggestions during interviews and in comments to the questionnaire and the following is a summary of their suggestions categorised into three groups related to the learning resources, the centre's activities and to some physical arrangements.

**Student Suggestions**

Students felt that, because the rooms were sometimes crowded, more equipment (e.g. microscopes, tape players, viewers) might avoid frustration. Students also wanted additional materials for the existing resources, especially more written material to accompany the film loops. The introduction of self tests for more programmes was also suggested in order to assess progress and achievement as a result of their use of the programmes. Students suggested that more microscope slides could be helpful. They also wanted an increased variety of displays.
There were suggestions to improve the link between the centre and their lectures. Students also thought that as lecturers complete their lectures, they could supply the centre with materials linked to their course so that students could compile additional notes. They wanted to see extra copies of the course text books as well as articles from more recent journals. Students also thought it a good idea if lecturers summarised the content and objectives of their lectures as this would help them at revision time.

Regarding the activities of the centre students suggested that the practice of reserved places should be ended, that near exam-time particularly the centre could open for extended hours, especially earlier in the morning. Students also felt that near exams the centre should be supervised and that the tutor should be available for longer periods. Although all students were aware of the existence of the centre, they suggested that better information could be passed to them regarding what is available.

As far as suggestions regarding the physical arrangements were concerned, students mentioned that more tables and the introduction of a few booths could improve the study atmosphere, some students went further to suggest that the layout of the 9th floor could be improved and its use increased by the introduction of a coffee machine.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A number of staff members indicated that they had no knowledge of the extent of use of the centre; this report will provide the desired information. It will also help the centre staff in their decision making regarding the future of the centre.

The use of the centre was consistently high throughout the last five years. As an overall average three quarters of the students made use of the facilities either on a regular or occasional basis; this figure becomes more significant if it is borne in mind that its use was optional. The main reasons for student use of the centre were that it acted as a complement to their lectures and helped them to deeper insight into topics treated in lectures. The major reason for non-use
was that students preferred to study elsewhere or leave the bulk of their studies to be done near the exams.

The centre was used both by students who had and had not done Biology at school. There seemed to be greater use by students who worked steadily throughout the year and by those who wished to continue to take a Biology degree. Students who worked sporadically or left most of their study towards the end of the year only occasionally used the centre.

Staff also found the centre valuable to them and to their students, to them because it made a contribution to their teaching and to students because it allowed them to develop initiative and work on their own.

Staff and students were concerned about the number of copies of, the range of topics covered by, and the quick outdating of some of the materials. Students in particular, wanted to know more precisely what self instructional programmes were available for particular lectures and were very antagonistic towards the tacit form of reservation of seats which developed spontaneously in the 7th floor.

The majority of the teaching staff were involved in the centre in various ways: encouraging students' use, revising programmes, and some were embarrassed by their lack of time to produce materials for the centre. The three major reasons why staff did not participate were their views on University teaching which was based on the conventional lecture, assumptions as to how students like to be taught and dislike of student self-instruction.

The evidence shows that staff and students would like to see the services provided by the centre developed further. This and the newly acquired expertise in the field of self instruction by the centre's secretary make it commendable that a plan to cover several years be developed by the centre which could allow a steady growth as well as placing in a correct perspective the high expectation developed by some staff members regarding the 'marvellous new things' that the secretary could do.

Such a plan for expansion needs an appropriate economic base. Although the present financial climate may not be the most favourable, a great number of
staff and students would like to see the centre more closely related to their lectures and a known budget, however small, could only facilitate this process.

The plan should include the production or acquisition of materials in those areas mentioned by students and staff as being more difficult. The collaborative scheme developed by Scottish Universities Biology teachers can be of assistance as is exchange of materials with other institutions. It is also suggested that the centre introduces students more closely to the centre, for example by a brief tour of the facilities in small groups (to be taken out of the first practical for 10 to 15 minutes) and by ensuring that lecturers and practical schedules mention what is available in the centre.

It is suggested that the centre gives consideration to the student interest in the provision of self tests, which together with a monitoring of student reactions to the programmes can provide the basis for easier identification of what programmes need to be updated first.

Although it could be quite tricky, the centre could develop a system to avoid abuse of the right of seat in the 7th floor. Perhaps the posting up of a notice could suffice and a minimum of rules (silent room, no smoking, no drinking, no seat reservation) will not be inconvenient for anybody.

As suggested by one staff member, the centre could update the third of its aims which reads: "To provide a new mode of learning ..." This could have described the aim in the early 1970s, when the centre started, but now that students at school, or even at home, have frequently encountered these 'new' methods, the phrase could be replaced by 'alternative or supplementary audio visual learning methods'.

Finally, it is suggested that the report on the case study be made available to staff who, by and large, showed interest in knowing the results of the enquiry into the centre.
ACKNOWLEDGEMENTS

The author wishes to convey his thanks to all the staff and students who patiently talked to him. Special thanks to Mrs G. Maden for much help during the study and to Dr J R Downie for allowing the study to take place, for much help and thought provoking discussion as well as being, together with his family, such an excellent host.
CHAPTER 7

CASE STUDY TWO: EVALUATION OF A DEPARTMENTAL RESOURCE CENTRE

INTRODUCTION

This second case study concentrates on the evaluation of a departmental centre at a university in the Midlands. As with the other case study the staff member in charge of the centre was approached in order to negotiate the evaluation, after some correspondence and a visit it was agreed to conduct such a study with two major aims. In the first instance, the study was to provide information on the centre's impact on students in terms of the advantages and negative side effects perceived by them. The centre was about to change the academic in charge and the information gathered was to be used in any decision making regarding the future of the laboratory. The second aim was to use the evaluation as a case study for the writer's project.

Two preliminary visits were paid to the centre in order to define the details of the study, which were also used to observe activities in the centre. A one week long visit was agreed in order to observe the impact on students and events within the centre. Thirty eight student users were interviewed for about half an hour or more. Student interviewing was stopped once the bulk of the information began repeating itself; that is, the last three or four interviews did not throw any new light into the identified issues, nor did they produce new information. Contacts developed with student users allowed access to a few students who were known as non users and talks were held with five of them at their lunch time or in between their lectures.
At the end of this week there were some early and tentative conclusions that the facilities were used to a large degree, that they helped students in their learning in many ways, and that there was room for improvement. It also became clear that a second stage ought to concentrate on more closely identifying staff attitudes, interests and needs in the centre.

With the collaboration of the staff in charge a programme of interviews was prepared during a second week long visit and eighteen staff members were interviewed for about one hour on average. Ten of these were from one of the departments serviced by the centre, six from a second department and two from the education department. There were also informal talks with some staff members.

The present chapter, therefore, reports on the results of the evaluation study which begins with a brief background to the centre, summarising its history and aims. Secondly, it presents what the departments involved regard as the strengths of the centre. Next the extent of use is analysed from three different sources, the students themselves, their teachers and a computerised analysis of student attendance. Then the reasons for student use are analysed as well as their views on the materials held in the centre and on their impact on their study methods. Some of the problems encountered by staff and students are then presented together with their perceptions on the future.

BACKGROUND

This departmental centre was established in 1970 by the Department of Chemistry. It seemed that a number of factor contributed to its emergence: firstly, the enthusiasm and interest of its developer, who had sympathetic support from his Head of Department; secondly, the favourable climate for educational innovations that existed in the early 1970s and thirdly, the student unrest of the late 1960s which also included demands for improvements in teaching. Another, and decisive factor, was the existence in the department of various audio visual materials which were thought desirable to be made available to students on a more permanent basis. In 1972 the Pharmacy Department, which had developed
sympathy for the centre joined in and since then there has been joint responsibility for its running.

Most of the equipment in the centre was acquired in the early years of its operation and amounted to about £20,000. Since Pharmacy joined in there has been joint financing and, in principle, everything is paid half and half by the departments. For the last few years the centre has had £500 allocated for capital expenditure and £500 for consumables, but this does not preclude the centre's organiser asking his Head of Department for more capital. The centre's budget has been made to go further through the development of a centre's fund to which the proceedings from the sales of materials go. The fund is mainly used for the purchase of books since the centre cannot buy them from departmental funds as a result of a university policy which establishes that books are to be bought exclusively by the university library.

The aims of the centre were spelled out in the users' guide, published soon after the centre opened:

(a) To provide access for students to a variety of audio visual material.

(b) To enable students to supplement the more conventionally presented material.

(c) To assist students in learning and understanding their subject.

(d) To help students with any problems arising out of their work through tutorial assistance.

Under these aims a wide range of learning resources is available in the centre. One of the first developments in the centre was the production of audio tapes, some of which covered the topics presented in lectures, some supplemented the lectures, while others replaced the lectures. The basic idea behind the development of audio tapes was that these allowed students to work at their own pace and at a time when they felt the need.
For several years the centre accommodated the department's small computer which enabled students to run programmes for some of the practical experiments. Because it was out-dated it was eventually replaced by a computer terminal linked to the university's computer (HP 2000). This in turn permitted the development of computer assisted learning.

Television programmes have also been developed in the centre, especially of experimental techniques which show students, for example, how to make up a mole for the Infrared Spectrometer or how to calibrate NMR machines.

The centre also keeps a large number of books and reprints of articles from chemistry journals, lecturer's notes, handouts and OHP transparencies, tape slide presentations of both synchronised and unsynchronised forms, film loops, models and model kits. All these learning resources are available to students on an optional basis. No material in the centre is of compulsory use including those which actually replace lectures.

STAFF VIEWS

Staff views on the centre varied greatly from the very enthusiastic, via some who had mixed reactions to the almost antagonistic. There was also a small group (within the last one) who ignored the existence of the centre.

There was a division between research and teaching staff. The staff more active in research were appointed after the Robbins Report, while those more active in teaching were from the old College of Technology. However, antagonism to the centre did not necessarily come from those more active in research. It came in the main from staff who had different views on how to teach, or had other commitments or were not interested in innovatory teaching. There were staff who pointed out that 'chalk and talk' was the best way of teaching because the board gave students the opportunity to take note of what is really relevant; moreover use of the blackboard allows staff to personally interact with and get feedback from students, which in turn allows readjustment of the pace of the lecture.
Another group pointed out that providing resources and making learning easier lowered the educational standard, they felt that it was wrong to 'can' the lecture because this might lead to wrong conclusions, that their commitments lay elsewhere and they did not have time for further preparation of their lectures.

Reservations about the centre came from people who had doubts about its developments being in the right direction. There was a lot of criticism of the small use of the television equipment, opinions were expressed that the diversity of materials available would confuse the students rather than help them and that it was only useful because of the books it kept.

In contrast with the above, staff also saw many advantages and strengths in the operations of the centre. To start with, it was found to be cost-effective since none of the materials were very expensive, the general staff involvement was low and students' use was on the increase year by year and, as one staff put it: "You could go to the centre some time ago and see very few students there and now whenever you go you see lots".

It was thought to be useful because it provided students with a quiet place to study and access to molecular models; because it allowed replacement of routine teaching such as mathematical tools and experimental techniques and dedication of the extra time gained to more individualised tuition; because it facilitated the use of modern technology for educational purposes and provided a base to conduct educational research into teaching and learning.

It was appropriate that the centre was complementary to the library and did not attempt to replace it. The books provided in the centre were the recommended ones and any skilful student would look into the library for complementary information. One of the best uses of the centre, according to staff, was for revision purposes for both undergraduates and postgraduates.

Finally some of the staff considered the centre extremely valuable because it gave "the opportunity to do both jobs well, research and teaching, but in university life prestige and promotion is related to research and most of the teaching preparation has to be done in spare time" as one lecturer put it.
The centre organiser, for his part, complained that the support enjoyed by the centre was not sustained by staff participation in the scheme. Only a minority had provided materials for student use. Also, staff meetings and discussions about the philosophy of the centre and circulars about what could be done had produced little result from lecturers and almost none from the senior staff. A number of the staff interviewed were pressed on the point finding the scheme valuable but doing nothing about collaborating in it. The only significant answer provided by all but one was lack of time and the latter admitted a degree of laziness.

STUDENT USE OF THE CENTRE

In general, staff of the two departments were quite unaware of the extent of student use of the centre. Only four staff members (apart from those in charge) showed some knowledge of the use by students and to the extent that, as one of them put it, "some students do use it to check past exam papers".

A more reliable source to determine the extent of student use was the students themselves. From their interviews the following table was drawn up:

**TABLE 7.1: Student use of the centre**

<table>
<thead>
<tr>
<th>COURSE</th>
<th>No of regular users</th>
<th>occasional users</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year Chem.</td>
<td>30</td>
<td>20%</td>
</tr>
<tr>
<td>2nd year Chem.</td>
<td>35</td>
<td>30%</td>
</tr>
<tr>
<td>3rd year Chem.</td>
<td>25</td>
<td>65%</td>
</tr>
<tr>
<td>1st year Comb. Hon.</td>
<td>20</td>
<td>50%</td>
</tr>
<tr>
<td>2nd year Comb Hon</td>
<td>30</td>
<td>25%</td>
</tr>
</tbody>
</table>

It became clear from student interviews that the great majority of students doing either single honour or combined degrees in chemistry did use the centre. It is interesting to note from table 7.1 that the percentage of final year students
who use the laboratory on a regular basis is relatively high and that all of them use it at one time or another.

Unfortunately, there was no evidence to determine the extent of use by pharmacy students because they did not attend the centre during the time users were interviewed (already an indication of the low use from these students) and the two who were actually interviewed said that the centre did not have much material relevant to their courses (another indication for their low use).

A third source was the analysis of the records kept by the centre staff. Every hour at the half hour the number of students in attendance at the centre was entered into a form. A computer programme was devised to process the 2,000 entries accumulated over the period of five terms before the study. It provided the popularity of use for various variables. Table 7.2 presents a summary of the most popular periods and the whole result of the computerisation is appended (appendix D). Figures 7.1 and 7.2 summarise the student use of the centre.

<table>
<thead>
<tr>
<th>TERM</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOST POPULAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>10:30</td>
<td>10:30</td>
<td>10:30</td>
<td>10:30</td>
<td>10:30</td>
</tr>
<tr>
<td>Half day</td>
<td>morning</td>
<td>morning</td>
<td>morning</td>
<td>morning</td>
<td>morning</td>
</tr>
<tr>
<td>Day</td>
<td>Thursday</td>
<td>Wednesday</td>
<td>Tuesday</td>
<td>Tuesday</td>
<td>Tuesday</td>
</tr>
<tr>
<td>Week</td>
<td>6th</td>
<td>8th</td>
<td>4th</td>
<td>8th</td>
<td>9th</td>
</tr>
</tbody>
</table>

If, however, the three first terms are considered together as one academic year it appears that the most popular week was the fifth and the most popular day was Wednesday. For the fourth and fifth terms or 1st and 2nd of the following year the most popular week was the ninth, Thursday the most popular day. For each academic year mornings were more popular than afternoons and 10:30 the most popular time.
Several points can be noted from figures 7.1 and 7.2. To start with, the use of the centre is low at the beginning of the academic year and goes on increasing as the year goes by. Secondly, in each term the peak of usage is at mid-term; that is, between weeks 4 to 7. Thirdly, with the exception of term 3, the tendency is for student use to stay high for the second part of the terms. Finally the total number of students who were registered as attending was 8,543, which is high considering that courses are relatively small, 25 to 35 students each.

STUDENTS REASON FOR THE USE OF THE CENTRE

Reasons can be grouped into three major categories, the centre as a facilitator of student learning, as a convenient place and to use specific materials.

The Centre as Facilitator

Students pointed out that in the centre they can sort out problems by consulting the relevant books or tapes and/or by expanding on their lecture notes. Problems were also sorted out in the centre because, as one student put it "it allows talking to somebody else about things not understood in the lecture". Their lecturers are near and will help with student problems if they are not busy. Most students mentioned that valuable help from the centre organiser was always available while only a few students mentioned that they had consulted the demonstrators on duty in the centre.

Another way in which the centre helped students in their learning was that it allowed them to cover material missed in lectures. It also helped to supplement topics and study them more efficiently because it was easy to repeat what was not understood. The centre also gave them access to other things. It was mentioned, for example, that schooling is very formal where what is taught has to be learnt, while at university the approach to learning is more flexible and "lecturers give references which need to be read and the centre is the place to do that".

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For a large number of students the centre was most useful at test times or near their exams when it allowed them to do revision of the years work; as one student put it: "I come more towards the latter part of the year, towards the exams, to catch up with work left behind". Others preferred to attend the centre more regularly and with a view to their exams: "The exam papers are very useful, I go through the questions... I have learnt my lesson in that I don't leave the study until the last minute" were the remarks of another student.

Another reason often mentioned by students was that it allowed access to three dimensional models which were purpose built and could not be bought; as one student said, "I spend hours with different structures, because I hardly grasp models and structures in books and there are subjects which without models I couldn't understand".

The Centre as Convenient

Students found the centre a very convenient place to study. Most students thought that it was better than the university library not only because this was about half a mile away from their department but also because they were allowed to talk in the centre. Also the library lacked audio visual aids. One student summarised quite well the feelings of her fellow students when she said: "Books are always here and in the library they may be out and with the library with shelves and shelves of books, I spent hours looking, while here I get the specific books".

The fact that these students preferred the centre does not mean that they never used the library. On the contrary, they used it specifically for borrowing books, to consult professional journals and above all at times when the centre was closed, i.e. evenings.

The use of specific materials

The centre is used always with a purpose, to use a specific material. Most students mentioned that the more popular items in the centre were the books
and audio tapes, the latter were found particularly useful because they usually covered the material presented in lectures. The use of the computer terminal came next in student popularity, the models and then other audio visual aids (e.g. OHP transparencies, slides, videos). About half of the students interviewed pointed out that another reason to go to the centre was to make use of the past exam papers and to purchase photocopies of journal articles.

Students also mentioned that all the materials are highly relevant to their lecture course. Copies of lecturer's notes were found useful, but students were rather disappointed that there were so few.

Reasons for not using the centre were related to preferences as to place and time for study. Some of the non-users said that if they had half an hour or an hour free between lectures they would rather spend that time in the common room or in the coffee room. Others preferred to do their study at home, or in the evenings. A couple of students said that they found the centre too crowded especially at lunch time when they had a longer break. Going to the library was also mentioned as an alternative.

Whatever the reasons for using the centre, students considered that it has had a major impact on their study methods or styles, especially the way they approached their exams. Their comments on the centre's impact go from the simple "it's great it's there to be used when needed" to remarks like "I would not work as much if it wasn't there". In general, students mentioned that they could start revising much earlier. For some this meant regular expansion of the lecture notes, for others it meant starting revision up to three months in advance.

By complementing their normal study at home or in the library with work in the centre students felt more confident, better prepared for their exams and able to show knowledge outside the taught curriculum. These students emphasised that this confidence would not exist if they had not worked at the centre during the year. It was also mentioned that they felt less nervous for the chemistry exams than for any other. The fact that the centre had its impact on students for their exam preparation is also confirmed by figure 7.1, which showed an increased use near the exams.
SOME PROBLEMS (as seen by the participants)

The centre's organiser faced two major problems, the almost nil participation of the Pharmacy Department and the low support from the staff in his own department. Pharmacy staff mentioned three reasons for their lack of participation, they felt too remote from the centre, which was located in another floor of the same building, secondly, the facilities provided by the centre were seen as superceded since the library now had audio visual support (which was not the case in the early years of the centre) and thirdly, they wanted to develop their own facility, especially one which could provide video recordings.

As far as staff within the Chemistry Department were concerned the centre organiser felt that they had not responded to the initial requests for materials. Staff defended themselves by saying that they had no time or interest in the centre, that there was no need to provide such materials, that their promotion should be left to the Open University. A few staff members attributed this to a communications problem in that they expected more precise requests for help rather than general requests for more materials.

For the students the major problem was that there were not as many materials as they would have wished and that the postgraduate demonstrators were not as helpful as they originally thought. Another problem often mentioned by students was that no lending system had been developed to allow them to take things home. The centre organiser had given some thought to this but a pilot scheme to lend research theses had been disastrous. What represented a problem for staff was their lack of time, and their amateurish approach to production.

Despite the problems, everybody — staff and students — was particularly concerned not only with the possible effects of the financial cutbacks imposed by the UGC but also with the effects that these cuts were already having. First of all people were concerned that the centre organiser had decided to take early retirement, since he had been the major input for the centre.

Students concern for the centre is clearly illustrated by the following remark, which is typical of what students said: "It'd be a very sad day if they had to close it". Students were disappointed about the thought that the cuts could
mean that no more materials would be added to the centre's collection and hoped that at least nothing would be withdrawn.

The cuts were also producing concern regarding the situation in which staff could find themselves. On the one hand there would be less staff to teach (a reduction from 31 to 25 staff in one department), which meant a higher teaching load and the emergence of a greater need for student self-teaching. On the other a reduction in human and physical resources would make all this more difficult.

THE FUTURE

The future of the centre can be considered in two main aspects. Firstly, the plans that the centre's staff have for implementation and, secondly, the wishes of students regarding improvements for the centre.

The plans for the future

The department had purchased five Apple microcomputers, which were independent of the centre but links were being sought for two reasons: the computers were temporarily located in a teaching laboratory and would be better placed elsewhere — according to staff — probably in the centre, and the department was also looking for ways to reduce supervision time.

The department also wanted to take part in the university's development of a television system called 'TV eye' which it was hoped would produce materials which would eventually be marketed. As the centre is well equipped with TV hardware, the staff see it as a good opportunity for the centre to be incorporated into the university system.

Staff in the department also want to develop some more materials, especially to reduce their lecturing hours in order to allocate more time to tutorials with individual students. A number of videos are planned in the Pharmacy Department as a way of saving money. It is thought that buying or making videos on animal
experiments, although not totally satisfactory, could help to reduce the number of animals in teaching.

Students wishes for improvements

Students wishes for improvements are categorised into three main groups: more materials, physical improvements and improvements in communication. Request for more materials were based on the assumption that if staff put things in the centre it was because they are relevant to the courses, which —according to students— facilitates to a great extent the sorting out of what is and what is not relevant. Students mentioned in particular that more audio tapes would help. The updating of books was also very popular among student suggestions, in particular for those cases in which a newer edition was available or another text had outdated the ones in the centre.

Students also wanted all their lecturers to put their lecture notes in the centre; this was seen as a means of helping students when they, for whatever reason, missed a lecture and wanted to catch up, and rather than borrow notes, it would be matter of a couple of hours work in the centre. Students also wished for augmentation of the number of computer terminals (at present there is only one). This would put an end to the frequent frustration of having arrived at the centre to use the terminal, but not being able to because of it being used by another student. Another popular request from students was the provision of answers to some of the past exam papers in order to provide examples of what staff regard as 'correct' answers.

Students thought that the layout of the room could be improved in order to make better use of the space available. A couple of extra desks was thought necessary too. Others wanted the opening times from 10 a.m. to 4 or 5 p.m. to be made a regular feature of the centre and two students mentioned that they would like to see a coffee machine installed in the centre.

A significant proportion of students who said they were occasional users of the centre said that they would probably have made more use of it had they been better informed of what was available for particular topics and courses. More
frequent mentions by the lecturers and a more complete catalogue of what is available was also asked for.

SUMMARY

Staff and students, although with some reservations, found the services provided by the centre very valuable. It allowed staff to perform well their university job. Nearly all Chemistry students were users of the centre which had become a regular feature for them. It helped students in their learning; it made learning easier, it helped to identify the relevant topics within each subject and in particular it helped for their preparation of exams. It was found a convenient place by staff and students alike. The major impact reported by students was that the presence of the centre and the help it provided for study made them more confident for their exams.

Chemistry staff participation in the centre was relatively low and Pharmacy staff's almost nil. The major strengths of the centre were cost-effectiveness, facilitation of the use of modern technology in education, conduction of research into teaching and learning, allowing the replacement of routine teaching. The reservations and antagonisms of some staff in the departments came not from criticisms of the work of the centre but from their perceptions of their commitments to teaching.

Recommendations made here concern the centre's problem areas and are based on the experiences gained in this particular study and in the project as a whole.

Considering that (a) there was a change in the academic responsible for the centre and (b) that staff and students would like the services retained, an opportunity should be taken to look afresh at the centre and its services, in particular regarding the surveying of present needs of staff and students in both departments. This should produce a long-term plan of action including a review of Pharmacy's participation, meeting student desire for more materials (especially lecture notes), a scheme for departmental staff development to meet the reservations on production of materials. In general there is need for a plan to transform the financial cut-backs in a positive rationalisation of teaching and
learning to include a more extensive use of the centre, e.g. a plan to face a future with less academic staff in which student self-teaching can have a role in alleviating staff's teaching loads.

Postgraduate students are employed to supervise the centre, but as students do not generally consult them, the centre could make a better investment of the same money by employing, for example, a Chemistry graduate as a part time organiser who could not only be involved with supervision but also, and perhaps more importantly for the present needs of the centre, in surveying needs, helping in the production of material, up-dating the centre's catalogue, and facilitating co-ordination with computing and television developments.

Consideration should also be given to student requests for a couple of extra desks, regularising the opening times and improving on the way students are informed about what is available for their particular lecture courses.
ACKNOWLEDGEMENTS

The author wishes to convey his thanks to all the staff and students who patiently talked to him. Special thanks to Mr P D Groves for allowing the study to take place and for much help, to Dr S A Velastin for help with the computing and to the Lavin family for their hospitality.
INTRODUCTION

As a way of documenting the organisation of departmental resource centres it was decided to conduct a survey, via a postal questionnaire, of all those departments which had previously been identified as having their own resource centre. The survey aimed at quantifying, validating and supplementing the information gathered through visits, case studies and the literature.

The questionnaire was prepared on the basis of the information previously gathered and was constructed around six major areas: information about each centre; details of the learning resources housed in them; an assessment of their use; feedback and evaluation activities; information about the staff in charge of centres; and finally a section for general comments which allowed the respondents to add anything else they wished and to make comments on particular questions or on the nature of the questionnaire.

To facilitate the responses the form of the questionnaire was primarily of the fixed answer type, in which the respondents were asked to insert ticks or numbers in order to provide the information asked of them. To avoid, so far as possible, any prejudice by the questionnaire designer, the wording followed the usual vocabulary of the people involved in resource centres and, with the same purpose, spaces were provided for further and additional comments. The questionnaire also included a number of open ended questions aimed to allow the respondents to express themselves as freely as possible. This emphasis was clearly stated
in the covering letter to the questionnaire in the following manner: "Please feel at liberty to reword any of our questions if you think this necessary to enable you to answer them". A facsimile of the questionnaire and covering letter are appended (appendix E).

A draft of the questionnaire was piloted with three academics in charge of departmental centres and a few modifications included to accord with their comments. The main advantage of piloting the questionnaire was that the end product was shorter and more comprehensible to the specific audience. Comments to drop or drastically reduce question 2c were followed up to the point of making it easier to answer, but it was included, despite the advice, because it was felt that the information to be collected was relatively important.

The questionnaire also included a preliminary section which aimed at encouraging responses and read: "If you regard this enquiry as an unwarranted incursion into your academic freedom, please say so (there is space at the top of the questionnaire) and return it rather than dispose of it". The covering letter did not provide a definition of resource centre, which was left open to interpretation to allow easier filling in of the forms. The reminder, however, included a paragraph seeking to clarify what was understood to be, in their terms.

This chapter summarises the information collected through the questionnaire-survey and begins with a discussion of its audience and their responses. The results of the survey which follow are presented in the same order as the questionnaire. As respondents were assured that the information they provided would be treated in confidence, quotations are given without identifying the source. Expressions which are in inverted commas correspond to remarks made by respondents and are usually incorporated into the text.

**THE AUDIENCE AND THEIR RESPONSE**

The questionnaire was sent to 93 centres in departments in universities and polytechnics in the U.K. of which 47.3% (44 centres) were in departments of science (with chemistry at the top of the league with 17 centres, followed by physics and biology with seven centres each), 16.1% (15 centres) in various
engineering departments, 15.1% (14 centres) in medical and related departments and 21.5% (20 centres) in departments of the humanities (with education at the top with six centres).

The list of 93 centres was compiled from personal contacts and a search of the literature. The questionnaire enclosed a slip which listed the centres in other departments within the same institution and the centres in affinitive departments in other institutions. It also asked the respondents to add to the list. This venture produced no new hitherto unknown centres.

Within a month of sending out the questionnaire there was a 66% response (61 centres) and about a month and a half after its dispatch a reminder was sent to 32 centres. 20 of these returned completed forms. The total number of responses was 81 (87% of the total). Table 8.1 below presents a breakdown of the responses:

TABLE 8.1: Responses to survey

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed forms + enclosures</td>
<td>57</td>
</tr>
<tr>
<td>Answers through letter and enclosures</td>
<td>6</td>
</tr>
<tr>
<td>Completed forms, but from central units</td>
<td>6</td>
</tr>
<tr>
<td>Empty forms corresponding to central units</td>
<td>7</td>
</tr>
<tr>
<td>Discontinued centres</td>
<td>4</td>
</tr>
<tr>
<td>Did not approve of enquiry</td>
<td>1</td>
</tr>
<tr>
<td>No response</td>
<td>12</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>93</strong></td>
</tr>
</tbody>
</table>

Three things are notable from table 8.1. The first is that there was a total of 63 cases of 'hard evidence' for the survey and on this the rest of the chapter is based. Secondly, that there was only one case in which the box at the top of the questionnaire was ticked indicating that the enquiry was not approved; unfortunately no reasons were given. The third notable thing was that 4 centres
had shut down since the information had been collected. The four cases are worth quoting without further comment.

1. "I set up a departmental resource centre some years ago, but it is now closed. I suspect that like all other methods of education they depend for their success on the enthusiasm of the staff, the teachers. The method is not important, the enthusiasm is. As no one else in the Department was at all interested, the method failed, and as we had to reduce the space which the Department used the centre was closed".

2. "Our resource centre was closed some time ago to make way for the office suite of a new professor".

3. "Mrs X left the Department and her course has been re-arranged".

4. "Your letter concerning your Departmental Resource Centre Project has been forwarded to me by surface mail, hence the delay in my reply ... I am returning your questionnaire uncompleted because I imagine it relates only to centres in the U.K. ... I am not sure of the fate of my endeavours in England and not able to tell you if anything of my efforts there still survive". (And they do not).

THE CENTRES

The first section of the questionnaire aimed at compiling details about the departmental centres. It started by asking for the name given to the centre. The answers are presented in table 8.2, which classifies names under major categories.
TABLE 8.2: Name of centres

<table>
<thead>
<tr>
<th>NAME</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Aids Laboratory¹</td>
<td>17</td>
<td>27</td>
</tr>
<tr>
<td>Resource centre</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>Self study centre²</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Audio visual aids centre</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Learning unit³</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Courses</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>No name</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>63</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

NOTES:
1. includes learning/teaching centre/laboratory.
2. includes self instructional, self teaching.
3. includes learning resources unit.

It is evident from the table that there is little agreement on names for centres, which is a reflection on their diversity of aims. The most popular name is learning aids laboratory and the majority of these are in departments of chemistry.

Departmental resource centres began to appear in 1970 and, as shown in figure 8.1, there was a period of steady development in the early 1970s (4 to 6 centres established per year), a peak in 1975 and a marked decline in the number of centres established in the late 1970s with no evidence of any new centre so far in the 1980s. The centre established at the Department of Educational Studies, University of Surrey, and reported in chapter 9 was not open until after the survey was conducted.
The size of centres varied considerably: the smallest centre occupied eleven square meters while the largest occupied 400 square meters (not including a centre which functions within a lecture theatre). Table 8.3 presents a breakdown of the size of centres and includes the average number of student study places within each category.

**TABLE 8.3: Size of centres**

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>No of centres</th>
<th>Percentage</th>
<th>No of student study places</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (0 - 100 sq m)</td>
<td>28</td>
<td>67</td>
<td>15</td>
</tr>
<tr>
<td>Medium (101-200 sq m)</td>
<td>5</td>
<td>12</td>
<td>28</td>
</tr>
<tr>
<td>Large (over 201 sq m)</td>
<td>9</td>
<td>21</td>
<td>41</td>
</tr>
</tbody>
</table>
Table 8.3 shows that the great majority of centres were on the side of small centres, which on average accommodated 15 students. The size of the centres was not necessarily related to the number of students in the departments since the majority of centres (60%) were in departments with 100 to 300 students, while 24% of centres were in departments with less than 100 students and 12% in large departments with over 300 students.

Most of the centres (66%) were available for all students in the departments, but about a third were specifically developed for 1st year students. 14% of centres were only used by students of one particular course and 20% of centres were for various courses. Table 8.4 provides the numbers and percentages of centres which were available to students in the various years.

**TABLE 8.4: Availability of centres**

<table>
<thead>
<tr>
<th>CENTRE AVAILABLE FOR STUDENTS IN:</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year</td>
<td>46</td>
<td>73</td>
</tr>
<tr>
<td>Second year</td>
<td>43</td>
<td>68</td>
</tr>
<tr>
<td>Third year</td>
<td>39</td>
<td>61</td>
</tr>
<tr>
<td>Fourth year (if applicable)</td>
<td>24</td>
<td>38</td>
</tr>
</tbody>
</table>

As seen in table 8.4 the majority of centres were by and large available for first year students and the availability of centres is inversely related to the year of study; that is, the smallest number of centres available was for final year students (whether this was the third or fourth year).

Only 55 respondents answered the question which asked for the number of students who actually use the facilities. Table 8.5 shows their answers.
### TABLE 8.5: Estimated use of centres

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>All students</td>
<td>19</td>
<td>35</td>
</tr>
<tr>
<td>Above 50% of students</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Below 50% of students</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Do not know</td>
<td>18</td>
<td>33</td>
</tr>
</tbody>
</table>

The use of centres did not appear to be connected with their opening times since the overwhelming majority of centres were open during the working day for five days a week. However six centres only opened in the afternoons, three only in the mornings and three only 2 or 3 days a week. Five centres indicated that they opened at weekends when requested by students and thirteen opened in holiday periods. Three centres stated that they stayed open until 8 or 9 p.m.

The number of academic staff in the department varied considerably from centre to centre. The smallest department had 3 members and the largest just over one hundred. The mean of staff was 24. Table 8.6 shows the percentages of staff in departments who supplied materials to centres and those who helped to supervise them.

### TABLE 8.6: Staff participation

<table>
<thead>
<tr>
<th></th>
<th>SUPPLIED MATERIAL</th>
<th>HELPED SUPERVISE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>All staff</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Above 50%</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Below 50%</td>
<td>36</td>
<td>68</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 8.6 shows that the level of participation of staff is relatively low. In the majority of cases it was below 50% for the provision of material as well as for helping supervise centres. This supports the information accumulated in the case studies where the reasons for low staff participation were discussed.
The above is also related to the numbers of people responsible for running the centres. In most cases this was the sole responsibility of one academic. Table 8.7 shows the various bodies responsible for the centres.

### TABLE 8.7: Responsibility for running the centre

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>All staff</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>A committee</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>One academic + a committee</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>One academic only</td>
<td>41</td>
<td>66</td>
</tr>
<tr>
<td>Others: organiser</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

The supervision of centres depended heavily upon the person in charge of the centre and table 8.8 illustrates the various categories of staff who provide supervision in the centres.

### TABLE 8.8: Supervision of centres

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yourself</td>
<td>35</td>
<td>56</td>
</tr>
<tr>
<td>Staff</td>
<td>19</td>
<td>30</td>
</tr>
<tr>
<td>Technicians</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>Demonstrators</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Nobody</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Others: Research associate</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>PT Assistant</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Only 16 respondents answered the final question of the section on details about the centres. The question asked: "Please state briefly the aims of your centre (or enclose any documents where these are stated)". Aims collected are categorised in table 8.9.
TABLE 8.9: Categories of aims

- To provide information/access to learning.
- To provide a focal point for self study.
- To study learning in order to improve teaching.
- To provide support to teaching.
- To provide an alternative method of teaching and learning.
- To reduce the amount of tutorials.
- To reduce costs.

All seven groups of aims are concerned, obviously, with teaching and learning, but groups 1 and 2 give a major emphasis to the learning while groups 3, 4 and 5 give emphasis to the teaching side of the process. The other two groups are of a more general kind and concerned with the organisation of teaching and learning.

THE LEARNING RESOURCES

The second section of the survey was dedicated to gathering information about learning resources kept in the centres. The first question asked whether the centres were aware of the existence of other resource bases within their institutions and if so to indicate whether they kept catalogues of those resources. 48 completed this question and table 8.10 presents their answers.

TABLE 8.10: Learning resources elsewhere

<table>
<thead>
<tr>
<th>RESOURCES</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library</td>
<td>39</td>
<td>61</td>
</tr>
<tr>
<td>Other departments</td>
<td>31</td>
<td>49</td>
</tr>
<tr>
<td>Kept catalogues</td>
<td>8</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 8.10 shows that a significant proportion of centres do know about the presence of resources in other departments of their institutions, although a small
proportion of centres (8 of those surveyed) kept catalogues of resources in other departments or in the library.

Question 2b asked about how resources were indexed and/or catalogued. Table 8.11 summarises responses. The numbers and percentages are calculated for the whole sample (63 centres), since the wording of the question implied that no answer implied no system of cataloguing or indexing, the 10 who did not answer are counted in this way.

<table>
<thead>
<tr>
<th></th>
<th>INDEXED</th>
<th>CATALOGUED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>By medium</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>By lecture courses</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>By topic</td>
<td>27</td>
<td>43</td>
</tr>
<tr>
<td>Others: Handout</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>with equipment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8.11 shows that a relatively low percentage of centres have developed systems for cataloguing or indexing their resources. Within this the most popular system was the indexing of materials according to topics while cataloguing by medium was the second most popular systems.

Question 2c was designed to discover the sort of materials kept in centres which tells a lot about the philosophy behind their establishment. Although the question asked for numbers of the various materials many responded with percentages and table 8.12 presents the percentages as well as the whole wording of the question.
"Please indicate in the first column, the approximate percentage of learning resources available in your centre which fall into the categories below. In the second column, the approximate percentage produced by the agents listed".

<table>
<thead>
<tr>
<th></th>
<th>COL. 1 %</th>
<th>COLUMN 2</th>
<th>OWN DEP.</th>
<th>OTHER DEPS.</th>
<th>COMM FIRMS</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Background</td>
<td>68</td>
<td>34</td>
<td>22</td>
<td>22</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Supplementary (optional)</td>
<td>59</td>
<td>29</td>
<td>20</td>
<td>14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Built into courses</td>
<td>57</td>
<td>33</td>
<td>11</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Remedial</td>
<td>22</td>
<td>15</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

This was the question with the lowest rate of response (n = 51, representing 80%). What is to be noted from the table is that in the great majority of centres most materials were of the general background type. Another notable aspect is that the major agent for the production of learning resources were the departments themselves in any of the four categories. It should also be noted that nine centres had materials built into courses only. This represents one seventh of all centres surveyed.

It was satisfying to note that the four categories of learning resources appeared to be exhaustive since the space provided for any other was not used by any of the respondents.

The range of materials housed in centres was very large and table 8.13 summarises those which were more popular and indicates the number of centres with facilities for the production of such materials.
### TABLE 8.13: List of learning resources

<table>
<thead>
<tr>
<th>RESOURCES</th>
<th>HOUSED</th>
<th>PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>Tape slide (synchronised)</td>
<td>38 61</td>
<td>30 48</td>
</tr>
<tr>
<td>Video tapes</td>
<td>36 58</td>
<td>25 40</td>
</tr>
<tr>
<td>Audio tapes</td>
<td>35 56</td>
<td>33 53</td>
</tr>
<tr>
<td>Models</td>
<td>32 51</td>
<td>18 29</td>
</tr>
<tr>
<td>Audio tapes + booklets</td>
<td>32 51</td>
<td>24 59</td>
</tr>
<tr>
<td>Books</td>
<td>31 50</td>
<td>4  6</td>
</tr>
<tr>
<td>Programmed texts</td>
<td>28 45</td>
<td>22 35</td>
</tr>
<tr>
<td>Reprints</td>
<td>28 45</td>
<td>20 32</td>
</tr>
<tr>
<td>OHP transparencies</td>
<td>25 40</td>
<td>28 45</td>
</tr>
<tr>
<td>Film loops</td>
<td>25 40</td>
<td>2  3</td>
</tr>
<tr>
<td>Computer based materials</td>
<td>24 39</td>
<td>23 37</td>
</tr>
<tr>
<td>Tape slide (unsynchronised)</td>
<td>24 39</td>
<td>26 41</td>
</tr>
<tr>
<td>Sets of slides</td>
<td>23 37</td>
<td>19 31</td>
</tr>
<tr>
<td>Lecturer's notes</td>
<td>17 27</td>
<td>14 2</td>
</tr>
<tr>
<td>Booklets</td>
<td>15 24</td>
<td>8  12</td>
</tr>
<tr>
<td>Model kits</td>
<td>13 20</td>
<td>4  6</td>
</tr>
<tr>
<td>Handouts</td>
<td>12 19</td>
<td>11 18</td>
</tr>
<tr>
<td>Film strips</td>
<td>7  11</td>
<td>7  11</td>
</tr>
<tr>
<td>PIP materials</td>
<td>5  8</td>
<td>3  5</td>
</tr>
</tbody>
</table>

The category for other formats produced four other items as follows: exam papers, worked examples, questions and answers board, and games.

Although the majority of the resources involved either visual, aural and tactile senses, the two most popular items combine the audio and visual: synchronised tape slides and video tapes. A significant proportion of centres also included computer based materials.
SUPPORT ENJOYED BY CENTRES

The third section of the survey was concerned with the finances of the centres. Unfortunately this was an area in which not all the respondents were prepared to provide information. There were various reasons for this. Two respondents said that their figures were confidential, three did not know about them since they were not the initiators of the centres, one just said "prefer not to" while another pointed out "this is difficult to put together. Monies are given as a result of specific request rather than by right".

The first question of the section asked respondents to rate the support they were getting from various quarters, including financial support, and support from other units within the institution. The values for the scale of rating were

1 = none at all  
2 = unsatisfactory  
3 = adequate  
4 = good  
5 = very good

The following table summarises their ratings by presenting the number of respondents to the particular item (n), the mean of ratings (x) and the standard deviation (s).
TABLE 8.14: Support to centres

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>x</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FINANCIAL SUPPORT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>48</td>
<td>3.51</td>
<td>0.90</td>
</tr>
<tr>
<td>Consumable expenditure</td>
<td>56</td>
<td>3.59</td>
<td>0.90</td>
</tr>
<tr>
<td>For staffing the centre</td>
<td>55</td>
<td>2.69</td>
<td>1.15</td>
</tr>
<tr>
<td><strong>ACADEMIC SUPPORT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of Department</td>
<td>53</td>
<td>3.92</td>
<td>1.29</td>
</tr>
<tr>
<td>Senior staff</td>
<td>56</td>
<td>3.12</td>
<td>1.33</td>
</tr>
<tr>
<td>Provision of materials</td>
<td>51</td>
<td>3.11</td>
<td>0.99</td>
</tr>
<tr>
<td>Encouraging student use</td>
<td>50</td>
<td>3.20</td>
<td>1.24</td>
</tr>
<tr>
<td><strong>SUPPORT FROM UNITS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>43</td>
<td>2.41</td>
<td>1.63</td>
</tr>
<tr>
<td>Ed Tech Unit</td>
<td>40</td>
<td>2.10</td>
<td>1.42</td>
</tr>
<tr>
<td>A V Unit</td>
<td>43</td>
<td>2.41</td>
<td>1.29</td>
</tr>
</tbody>
</table>

The first striking thing from the table is the high rating of support from the heads of department although in contrast with this the relatively low rate of support from other units is notable, but disagreement is high. Financial support is also considered to be good. There was quite a bit of disagreement regarding the support from senior staff as well as from the heads of departments and a significant number of respondents ticked more than one box indicating that support varied from staff to staff.

The lower rate of support from other units also indicates that the level of independent working is relatively high, as anticipated by the low rate of exchange of information between departments and library and/or other departments.

The next question asked for approximate indications of the capital investment in centres. The answers are broken down into three main categories in table 8.15:
TABLE 8.15: Capital investment

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to £ 1,000</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>£ 1,001 to 10,000</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>Over £ 10,000</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>Do not know</td>
<td>11</td>
<td>27</td>
</tr>
</tbody>
</table>

The above table shows that although the majority of centres are physically small (see table 8.3) a significant number of centres have had a capital investment over £10,000. It is also significant that about one fifth of the centres have had a capital investment below £1,000.

Table 8.16 summarises the annual budgets for capital and consumable expenditures.

TABLE 8.16: Annual budgets

<table>
<thead>
<tr>
<th></th>
<th>CAPITAL</th>
<th>CONSUMABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>9</td>
<td>28</td>
</tr>
<tr>
<td>up to £ 1,000</td>
<td>9</td>
<td>28</td>
</tr>
<tr>
<td>over £ 1,000</td>
<td>14</td>
<td>44</td>
</tr>
</tbody>
</table>

The table shows that a little over a quarter of the centres had no budget for capital expenditure, which implies that they were no longer in a developing stage. In contrast, a large majority (72%) had some income for this purpose. Regarding monies for consumables the picture is less gloomy since only 18% of centres did not have a budget. Not surprisingly the respondents indicated that the prospects for future budgets were between unsatisfactory and adequate. They were asked to rate this on a four point scale as follows

1 = poor
2 = unsatisfactory
3 = adequate
4 = good
Table 8.17 presents the mean of ratings and their standard deviations.

**TABLE 8.17: Prospects for future budgets**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>x</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROSPECTS</td>
<td>43</td>
<td>2.51</td>
<td>0.88</td>
</tr>
</tbody>
</table>

About one quarter of the centres indicated that they had financial support from outside their own department, including the running of courses for outside bodies, sale of materials and research projects financed by funding agencies. The following quote illustrates one of the major uses of the income generated by the centres themselves. "The royalties of our published materials go into a central fund kept by the university which as a charitable concern is not subject to tax. The money is used to finance new ideas and materials in the centre. Very useful since funds from the university are unsatisfactory".

**FEEDBACK AND EVALUATION**

The fourth section of the survey questionnaire concerned self evaluation and the gathering of feedback in the centres. Firstly, they were asked to indicate whether they were getting any feedback from staff and/or students and if they had evaluated the services provided by the centre. Table 8.18 presents their answers.

**TABLE 8.18: Feedback and evaluation of centres**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback from students</td>
<td>39</td>
<td>61</td>
</tr>
<tr>
<td>Feedback from staff</td>
<td>27</td>
<td>42</td>
</tr>
<tr>
<td>Evaluation of services</td>
<td>25</td>
<td>39</td>
</tr>
</tbody>
</table>

Feedback from students is obtained to a large extent informally via student reports to Faculty Boards or staff-students committees or the occasional talk
with students. Some centres have also developed more formal ways of getting feedback; for example, there were centres which kept records of the use and monitored demand. In another place frequent surveys were conducted in order to identify areas for improvement. Feedback from staff was less frequent and relied heavily on the occasional conversation at the coffee break, lunch time or in corridors.

25 centres (39%) indicated that they had conducted regular evaluations of the services provided and/or particular items in the centre. These included questionnaires circulated to students at the end of the year in order to get a picture of the general usage of the centre, to "all normal procedures of proper evaluation". Some of these centres developed their materials with a 'built-in' evaluation.

Table 8.19 presents the ratings which indicate how the services of the centres were regarded as being perceived by various people and departments within the institutions. The rating was on a five point scale as follows:

1 = poor
2 = unsatisfactory
3 = adequate
4 = good
5 = very good

There were also columns to indicate 'no opinion' (NO) or 'not known' (NK).
### TABLE 8.19: Perception of centres

<table>
<thead>
<tr>
<th>Category</th>
<th>n</th>
<th>x</th>
<th>$</th>
<th>NK</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent</td>
<td>53</td>
<td>3.52</td>
<td>0.93</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Head of Department</td>
<td>47</td>
<td>3.70</td>
<td>0.93</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Academics own Dept.</td>
<td>445</td>
<td>3.64</td>
<td>0.67</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Academics other Depts.</td>
<td>22</td>
<td>3.95</td>
<td>0.72</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td>Librarian</td>
<td>12</td>
<td>3.66</td>
<td>0.77</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>A V Unit</td>
<td>23</td>
<td>4.21</td>
<td>0.73</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Ed Tech Unit</td>
<td>21</td>
<td>4.14</td>
<td>0.79</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Students in:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First year</td>
<td>38</td>
<td>3.86</td>
<td>0.70</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Second year</td>
<td>28</td>
<td>3.53</td>
<td>1.10</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Third year</td>
<td>28</td>
<td>3.39</td>
<td>1.25</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Fourth year</td>
<td>16</td>
<td>3.12</td>
<td>1.25</td>
<td>17</td>
<td>0</td>
</tr>
</tbody>
</table>

One of the notable things in the above table is that the level of agreement among the respondents is high since standard deviations are generally somewhat below 1.00. Another is that academics in other departments were seen as having a higher opinion of the services than those in the centre's own department. This could however be biased since the answers were provided by staff in charge of centres. Heads of department were also perceived as having a high regard for the centres as were the specialised educational units.

Apart from the good perception attributed to students in their first year, the rest of the students appeared to be in the lower end of the ratings. The higher standard deviations show polarisation and is consistent with the great majority of centres being available primarily for first year students.

### THE PEOPLE IN CHARGE OF CENTRES

The fifth section of the questionnaire was addressed to finding out who were the people in charge of centres, whether they were involved in staff development in their department or institution and how they described their own activities.
In the first instance staff in charge were asked to provide their own status as listed in table 8.20.

**TABLE 8.20: Centres' staff status**

<table>
<thead>
<tr>
<th>STATUS</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic</td>
<td>48</td>
<td>71</td>
</tr>
<tr>
<td>Technical</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Administrative</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Research staff</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

By far the largest group of people were academics and mainly lecturers, with about one quarter of these on the senior lecturer scale and one professor. 24% of the respondents said that they were involved in staff development in their departments and 22% in their institutions. The range of activities included membership of Teaching Methods Committees, general coordination for staff development and responsibility for Youth Opportunity Programme placements.

These people were asked to indicate which terms from a list provided they would use to describe their activities in the centres. Table 8.21 presents their answers.

**TABLE 8.21: Descriptors of activities**

<table>
<thead>
<tr>
<th>DESCRIPTOR</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems engineering</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Systems approach</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Educational technology</td>
<td>23</td>
<td>36</td>
</tr>
<tr>
<td>Curriculum development</td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>Educational development</td>
<td>34</td>
<td>54</td>
</tr>
<tr>
<td>Educational innovation</td>
<td>22</td>
<td>35</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
It is interesting to note from table 8.20 that 89% responses corresponded to the less 'technical' descriptors, educational development, educational innovation, and 73% to the more technical ones, educational technology, curriculum development, (total percentage exceeds 100% because responses overlap). Over half of the staff described their own activities as educational development; three other terms come closely together as second best descriptors: educational technology, educational innovation and curriculum development.

GENERAL COMMENTS

The final section of the questionnaire included open ended questions to allow respondents to supply additional information about their centres and to provide comments on the nature of the questionnaire or on particular questions. Further information was provided about the relationship between the centre and the department's staff as well as those in centralised units; some respondents took the opportunity to ventilate their feelings about the staff who did not cooperate or about how isolated they felt from the rest of the department. Two typical quotations illustrate staff comments in this section of the questionnaire, both related to the services that the centres provide.

Quote 1:
"On the whole I think the centre serves the students well though we are always seeking ways to improve it. We hope to begin a modest programme of updating materials in the next academic year".

Quote 2:
"The main disadvantage of our centre is that it is situated in a teaching laboratory. This is not really conducive to quiet study for the students using it. A separate room would greatly improve the situation but that would bring problems of its own, in that staff would be required there all the time during opening hours for supervision".

About 20 respondents took time to make comments. It was said that it was "O.K.", "very good" as two respondents put it. There were, however, some reservations; for example, "Questionnaire is O.K. but some of the questions are
very difficult to answer precisely because the design and nature of the resource centres in various places is different. Ours has features in common for example with many of the other institutions listed, but it also has many points of difference."

Critical comments were centred on question 2c: "did not complete question 2c" or "I hate completing questionnaires because the questions never seem to apply to my particular situation (e.g. Q 2c)".

There were also very positive comments that illustrated readiness and willingness to complete the questionnaire. One respondent pointed out that: "I have taken 'centre' to be the laboratory using audio cassettes and colour prints for which I am responsible. If the answers should cover a wider field please send me another form". Comments in this section also identified seven staff who were interested in knowing the results of the enquiry.

SUMMARY AND CONCLUSIONS

The development of departmental resource centres under various names began in this country in 1970 and reached its peak in 1975. Since then development has slowed down, even with some indications of a decline since there were four centres had to close down. Accommodation tends to be rather small but capital expenditure tends to be high which implies that the centres are reasonably well equipped.

A first glance of some of the statistics presented may lead to the conclusion that the level of use of the centres by students is relatively low. However, the evidence also shows that they were available primarily for first year students.

The responsibility for running the centres fell generally on one academic. This may explain why the number of centres which perform any evaluation activities is small.

The range of resources kept in the centres is very extensive. This is consistent with one of the aims of centres to provide an alternative to conventional teaching
and learning. The most frequent sort of materials were for providing background information. Materials for remedial purposes were not very popular. It was significant that in nine cases the centres housed built-in materials only.

Generally speaking centres have enjoyed sympathetic support from the Head of Department which has been translated into good provision of funds. Support from the rest of the staff is however divided. The relationships with the professionals in units such as audio visual and educational technology were considered to be good.

The present cut backs imposed from central government seemed to be affecting the centres: it was more difficult to ensure a budget for capital investment and for consumables. This makes staff consider institutional funding to be unsatisfactory and some have begun looking for alternative sources of finances.

The survey sample seemed to be comprehensive, since the enclosure designed to elicit information about other centres did not produce results. The same can be said of the four sorts of materials categorised in the survey: since no one suggested any other category these four categories seem to be exhaustive.

The relatively high rate of response within a short time indicates that there is great interest in the topic of departmental centres and that the people in charge are dedicated professionals. They provided invaluable cooperation to the writer's project and have shown interest in the results of the research.

Finally, behind departmental resource centres there are groups of dedicated academics who have introduced innovations for the benefit of their students. This is well regarded by both the Heads of Departments and students.
CHAPTER 9

CASE STUDY THREE: THE ESTABLISHMENT OF
A DEPARTMENTAL RESOURCE CENTRE

INTRODUCTION

One aspect of the writer’s work was to help in the process of establishing a resource centre for the former Department of Adult Education (D.A.E.), University of Surrey, (and which was to be renamed as Department of Educational Studies). The work was spread just a little over one year -October 1981 to December 1982- and three distinctive periods can now be identified.

The first period, from October to December 1981, consisted mainly of discussions within the D.A.E. which led to the presentation to the D.A.E. staff meeting of December of a set of proposals for the establishment of the resource centre.

A lengthy second period began with that staff meeting which, in the light of the Second Academic Planning Group Report, decided to initiate discussions with all the units to become within the aegis of the new Department. These discussions were to go on until June 1982 when the staff of the D.A.E. and Institute for Educational Technology (I.E.T.) (and which was to be renamed Institute of Educational Development, I.E.D.) accepted a revised set of proposals, this time for a resource centre for the whole new Department.

The third period, September to December 1982, began when there was a general realisation to the effect that, mainly because of space restrictions, an integrated resource centre would have to be postponed and that efforts needed to be
concentrated into the development of a preliminary scheme for the Department of Educational Studies.

The present chapter attempts to reflect upon the work to establish the resource centre and begins with a description of the process leading to the establishment of the centre. A brief background to the D.A.E. activities follows and it then presents the main body of proposals for the establishment of a resource centre for the Department of Educational Studies in terms of its aims, functions, components, structure, and so on. Next, the preliminary scheme for the resource centre is documented. A few concluding remarks as well as a few recommendations are then presented.

THE PROCESS

The study of the literature, case studies and national survey provided the basis to start developing a model for the establishment of a departmental resource centre; this emerging model was followed during the process of establishing a resource centre in the Department of Educational Studies. The model is summarised in the flow chart overleaf:
An important aspect to emphasise is that the Department of Adult Education had been for some time concerned with and interested in the departmental provision of resources. In particular this had been the specific pre-occupation of the Resources Interest Group. To this effect there had been numerous meetings and discussions, as well as papers and memos written. For example, in June 1981 and in a paper for departmental discussion, the Group clearly pointed out their interest as follows: "The Resources Interest Group feels that there is a need to establish a base for adult education resources, these to develop alongside the more specialised R.B., Nursing and the Human Potential Research Project libraries". R.B. stands for the Department being the Responsible Body in the county for the provision of university level adult education courses.

Interest Groups had existed in the D.A.E. for the last four or five years. These deal with academic and departmental concerns and bring together staff involved and interested in a particular area. Some of the other operating interest groups were the Research Support Group, Publicity, International Affairs, Staff Training, Pre-Retirement Education. Some of the advantages of the Interest Groups included the bringing together of people who shared experience and enthusiasm
to encourage discussion and maximise expertise and interests; the development of action and coordination of activities within and outside the department.

The writer's role included, in the first instance, his incorporation into the Resources Interest Group to help in the process of developing a departmental resource centre. The emerging model began to be applied with the surveying of staff attitudes towards the establishment of a departmental centre and 19 staff were interviewed for about half to three quarters of an hour each. These showed that staff were interested in looking for ways to use their resources in a more effective way and enthusiastic about the development of a resource base for the Department.

The initial discussions also showed that a great variety of resources were being used and a need for further developments. Regarding the former, D.A.E. members were using for their teaching, within and outside the University, at least six distinctive groups of resources:

- Human resources: Colleagues, outside speakers, students, etc.
- Institutional resources: The University and other libraries, the A.V.A. Unit, the I.E.T., Print Room, etc.
- Departmental resources: R.B.; H.P.R.P. and Nursing libraries.
- Equipment resources: Slide projectors, screens, epidiascope, record players, cassette recorders and players, science equipment, reprographic equipment, etc.
- Teaching and learning related resources: Audio tapes, video tapes, films, photographs, books, records, handouts, slides, reports, reproductions, wallcharts, transparencies, journals, theses, computer based materials, magazines, learning packages, etc.
- Research related resources: Reports, papers, journals, and
- Administrative related resources: pen, paper, and stationery in general, etc.

All the resources listed above were generally held by particular academics for their own courses, but also available to students who consulted the individual staff member. Because of the departmental space restrictions the resources were distributed all over the Department and there did not exist a central catalogue, despite some efforts from some academics and administrative staff. It was a generally held view that this state of affairs was no one's responsibility
in particular, but rather a result of the rapid growth, development and expansion
of the D.A.E.

Staff agreed that there was a real need for co-ordinating the diversity of
departmental resources; that in times of limited financial resources there was an
even greater need to bring together what existed; that departmental resources
were less effective if staff kept those resources for themselves; that the
development of more teaching and learning aids, teaching packages, etc. was
needed; that more help for students doing their final projects would be welcome;
that more information about research, ways of preparing proposals, funding
agencies, etc. were necessary. In short: there seemed to be a need to develop
something at hand to be used by staff and students and which was based at the
Department in order to fulfil in a better way some of the increasing demands in
the teaching and learning, research, extension and administration of the D.A.E.

On the basis of the information gathered the writer prepared an initial set of
proposals which were put to the D.A.E.'s Resources Interest Group. After
discussions and redrafting the proposals were presented to the staff meeting and
were accepted in principle. The meeting decided to delay decisions regarding
the establishment of a resource centre until University proposals for a new
Department were clearer. This consisted of the renaming of the Department
of Adult Education as Department of Educational Studies, the incorporation of
the newly formed Computer Assisted Learning Unit, and the transference of
many of the activities carried by the former Institute for Educational Technology.

The writer, on behalf of the Resources Interest Group began informal and formal
discussions with I.E.T. He was also charged with the task of preparing more
definite proposals for the establishment of a resource centre for the Department
of Educational Studies. A second round of talks with staff members was held
and they were also asked to fill in two forms regarding the resources they could
contribute to the centre (copies of the forms are included in appendix F). On
the basis of the new information a revised set of proposals was prepared and
discussed in the now twice enlarged Resources Interest Group (including D.A.E.
and I.E.T. members). They were then forwarded to the Head of Department,
who gave the go ahead and incorporated them into his proposals to the University
Resource Planning Group.

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The author's final engagement was concerned with establishing the preliminary scheme of the D.E.S. resource centre and, in particular, with developing a cataloguing system.

THE PROPOSALS

The basic idea was to develop the D.E.S. resource centre from the existing D.A.E. resources and from the I.E.T. resource centre. It is important to emphasise that the development of a departmental resource centre was to complement rather than overlap the University library or other centralised units. The centre will specialise in those areas of particular interest to the members of the D.E.S. In addition, it is hoped to develop a system whereby the resources contained in the resource centre will be generally available outside the D.E.S. To keep the potential users of the centre updated about the services provided, it was proposed that the publication of a news sheet be studied. The first issue of such a news sheet was concerned with explaining the opening of the preliminary scheme.

The resource centre was one of the many educational components of the Department and included the philosophy and approach to teaching and learning of the interested staff, their skills, attitudes, knowledge and creative ideas, their energies, and their internal and external networks of relationships; time; space; financial resources; and equipment.

The D.A.E. agreed that its resource centre would have the following as its aims:

   i) to co-ordinate existing resources and make them more readily available.
   ii) to achieve effective use of limited funds.
   iii) to promote the sharing of ideas and information.
   iv) to develop resources, including teaching and learning aids.
   v) to liaise with other University 'resource bases'.
On its part the I.E.T. resource centre had the additional aims of:

a) influencing the attitudes of individual teachers to teaching and learning, helping teachers to develop student learning, helping students to develop their own learning, helping teachers to develop their own teaching.
b) providing facilities for postgraduate students' research.
c) developing resource based learning, including distance learning.

An appropriate set of aims for the D.E.S. resource centre was a combination of aims of both the D.A.E. and I.E.T. In addition to these an aim from the emergence of the D.E.S.:

to increase the cost-effectiveness of its work force.

The departmental resource centre aimed to have at least five functions:

The first is a teaching and learning function by which
(a) students and staff will gain easier access to the departmental resources;
(b) the teaching will be enhanced through the use of newly developed resources;
(c) teaching and learning could be more easily shared through the possible use of other academics developed resources;
(d) the process of giving students greater independence may be facilitated;
(e) and consequently it would facilitate more learning activities, reduce teaching ones and thus give staff more opportunities.
(f) it would allow needed resources to be taken from nearby shelves as required; etc.

The second is a research function by which
(a) research into innovative teaching and learning methods can be conducted;
(b) support to current research projects can be provided through the provision of previously collected information;
(c) filing of research reports may be facilitated;
(d) the preparation of research reports via the holding of previous proposals and/or model applications can be made easier;
(e) a catalogue of funding institutions may be made available to staff interested in seeking outside funding together with their preferred procedures; etc.

The third is an administrative function through which
(a) general departmental information can be centralised and thus facilitate (to a certain extent) communication about what goes on in the diversity of activities performed in the whole new Department;
(b) a centralised place may be available to provide the very basic and unsophisticated facilities (pen, paper, etc.);
(c) the process of updating information may be made easier; etc.

The fourth is a function related to the department's extra mural activities through which it
(a) may facilitate the development of a mobile resource centre, to be taken away for short courses, workshops and conferences;
(b) could facilitate the publicity and marketing of courses and publications if information is made available to the users of the centre; etc.

Finally, an integrating function through which
(a) students, in addition to their coming to the Department to collect their mail, meet their tutors, read notice boards, can spend more time at the Department and be closer to the departmental enthusiasm;
(b) more informal encounters among staff may be facilitated too; etc.

The centre was made out of a number of components. To start with, each of the divisions, sections or subsections, of the D.E.S., willing to participate in the resource centre, might become a component of the centre. For example, there might be sections of the centre on aspects of, say
Some of these already existed in the I.E.D. resource centre, other groups had started collecting, collating and cataloguing their resources (e.g. H.P.R.P., Y.A.) and the Pre-Retirement section had worked enthusiastically, obtained outside financial support for £1,000 and has begun collecting and producing resources in its field.

Because of the diversity of aims, functions and components the resource centre needed some kind of structuring: as Interest Groups were also developed in the new Department as 'Standing Committees', the former Resources Interest Group was reconvened and continued taking overall responsibility for the structure and activities of the resource centre. There was also a need to develop a departmental resource team to take care of the day to day activities of the centre.

Materials to be used regularly were stored on open shelves as far as possible. Furthermore, those earmarked for particular use from time to time (e.g. R.B. collection), were to be stored away. There were also tables for the work of the users as well as viewing facilities for audio and visual resources.

The I.E.T. had sufficient equipment in the stock normally available to staff and students, to provide and maintain the requirements of its research and of its resource centre. This needed to be looked at in the light of the increased requirements of the D.E.S. staff if the present I.E.D. facilities were to be extended within the whole department.

When the resource centre is fully set up, its staffing is to come, in the first instance, from existing D.E.S. members. There will be a need for a budget specifically for updating information. To ease the burden of expenditure it is
hoped that the D.E.S. resource centre will in the foreseeable future be able to produce and sell materials to outside bodies.

THE PRELIMINARY SCHEME

General Description

The preliminary scheme was based upon the long term proposals and special consideration was given to what staff had said in the two rounds of talks and written on the forms they were asked to complete regarding the resources they could contribute to the centre.

As the Department was accommodated in two buildings and space was scarce, it seemed that the most appropriate place to locate the preliminary resource centre was in the open space of the third floor of Senate House. There were several advantages for this: it would easily incorporate the existing Nursing resources as well as those to be acquired for P.R.E. (in adjoining rooms); its proximity to the departmental kitchen made it easily accessible to all staff; and last but not least, the writer's desk was in this room and general supervision, in the first instance, was facilitated. The main, and only potential, disadvantage was the possible increase in noise level. Any problem with security of the items housed in the room was to be overcome by the use of lockable cupboards. The use of these cupboards was not to impede the organisation of displays in order to obtain maximum advertising and publicity if this was desired.

In the light of the above, some fifty items were collected from various quarters of the Department, which together with several other items already provided by staff members were housed in the third floor of the Senate building and which constituted the preliminary collection of the D.E.S. resource centre. Table 9.1 shows, in alphabetical order, the variety of resources held in the centre.
TABLE 9.1: Resources in Centre

<table>
<thead>
<tr>
<th>Audio tape</th>
<th>Leaflet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book</td>
<td>M.Sc. Dissertation</td>
</tr>
<tr>
<td>Booklet</td>
<td>Magazine</td>
</tr>
<tr>
<td>Catalogue</td>
<td>Newsletter</td>
</tr>
<tr>
<td>Chapter</td>
<td>Paper</td>
</tr>
<tr>
<td>Computer software</td>
<td>Prospectus</td>
</tr>
<tr>
<td>Folder</td>
<td>Record</td>
</tr>
<tr>
<td>Journal</td>
<td>Report</td>
</tr>
<tr>
<td>Journal article</td>
<td>Specimen</td>
</tr>
</tbody>
</table>

The Pre-Retirement Section
of the Resource Centre

As the Pre-Retirement Section was a major component of the Resource Centre of the Department of Educational Studies, it is now briefly reviewed. Discussions between the writer and Mr. Bernard Buttle, associate lecturer in the Department and involved in pre-retirement education, led to the writing up of a set of proposals to establish a pre-retirement education resource centre. The need for such a resource centre was identified as follows.

About half a million people retire every year in the United Kingdom. Most of them have to face a fundamental change in their way of life. This means that they have to make far-reaching adjustments in attitude and need to discover a new sense of purpose if retirement is to be a time of opportunity, satisfaction and self-fulfilment.

In all this, pre-retirement education has a decisive role to play and in recent years its value has become widely recognised by Government Departments, professional organisations, employers, trade unions, Institutes of Adult Education and Universities. The University of Surrey is recognised as being one of the educational bodies in the forefront of this sphere of work.
Over the years a fund of knowledge and useful material has been built up by organisations and individuals having an interest in pre-retirement education. In total, the material available is extensive and must cover most aspects of pre-retirement education. But it is not easily available. It is scattered about in various organisations and in various places.

The University sees an urgent need to develop a facility which would collect, collate, and make more easily available, to all interested parties, all useful resource material related to pre-retirement education. This facility could advantageously be provided through the development of a special Pre-Retirement Resource Centre in the Department of Adult Education of the University of Surrey, which could form an important section of the Department's resource facility, using expertise within the Department, including specialised facilities available to it through the Institute for Educational Technology, shortly to become within the aegis of the Department.

The five stages in which to develop the resource centre were also identified. The first stage would be AN INFORMATION SERVICE. For this purpose, the centre would collect information available from Government Departments, other educational institutions and the many agencies involved in this field; and develop systems for easy retrieval. The sources of reference would include, first, a record of human resources readily available in the region both from within and from outside the University and, secondly, an index of relevant physical resource material available (i) within the Department; (ii) through the extensive University Library and (iii) regionally and nationally. This would include relevant textbooks, Government publications, professional journals and articles (or extracts therefrom), research documents and audio visual and other teaching and learning aids. Further developments of the Pre-Retirement Resource Centre would be based upon the benefits derived from the evaluation of the first stage and would incorporate new functions into the Centre's service. These further stages could take the following form:

The second stage would be THE DEVELOPMENT OF NEW TEACHING AND LEARNING AIDS. These could take the form of video tapes, tape slide presentations, films and other audio visual resource material and teaching packs, prepared in conjunction with any other specialist body or bodies.
The fourth stage would be a TRAINING SERVICE. The Centre could act as a resource base for the development of seminars, courses and workshops concerned with the various aspects of pre-retirement education, as well as conferences for the exchange of experience among the bodies involved in this area of education.

The fifth stage would be a RESEARCH SERVICE. The Centre could act as the base for conducting surveys and research into matters related to pre-retirement education.

The final stage would be an INTEGRATING SERVICE. As the Centre gains momentum it could act as an integrating agent to encourage further co-operation among interested organisations.

As already indicated, the development of the Centre was to be carried out in stages. The initial stage would be in the nature of a pilot scheme, the objective being to open the Centre and subsequently to identify more closely the financial needs for the development of further stages mentioned above.

The costing for the initial stage in establishing the Resource Centre, over a period of six months, was worked out and is presented in the table 9.2 below:

TABLE 9.2: Costings for the initial stage of the establishment of a resource centre for P.R.E

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel and subsistence</td>
<td>200</td>
</tr>
<tr>
<td>Postage (surveys and requests for information)</td>
<td>100</td>
</tr>
<tr>
<td>Printing and photocopying (initial collection of articles)</td>
<td>200</td>
</tr>
<tr>
<td>Initial collection of books</td>
<td>500</td>
</tr>
<tr>
<td>Initial collection of non-books resources</td>
<td>300</td>
</tr>
<tr>
<td>Consultant's advice + indexing and cataloguing + evaluation</td>
<td>1,200</td>
</tr>
</tbody>
</table>

GRAND TOTAL £ 2,500
In its early stages the project was discussed with the Director of the Pre-Retirement Association and the Association's support and cooperation assured. This was made clear in the letter to seek their financial support sent to a limited number of large commercial and industrial undertakings within the South East Region which were already committed to the provision of pre-retirement training for their staff nearing retirement age, and which might be expected to appreciate the value of having access to a resource centre concerned with pre-retirement education. The letter letter stated that:

"Knowing of your interest in pre-retirement education, I am prompted to ask whether your Company might be willing to join in a sponsorship of this Department's proposal to set up a Resource Centre in Pre-Retirement Education.

"The Centre would become an integral part of the Department's wider resource facility so that users would also have access to material related to other aspects of adult education which touch upon preparation for retirement, such as tutor training, counselling techniques, philosophy, psychology, and educational technology in general.

"The proposal is outlined in the enclosed paper, and we believe the project could be of much benefit to everyone involved in this sphere. We would develop the Resource Centre in close co-operation with other organisations in this field and not least the Pre-Retirement Association."

The implementation of the first stage of the development of the Pre-Retirement Education Resource Centre began with the collection of resources from agencies involved in this particular field. A circular letter was sent to 47 organisations, which explained that the Department was engaged in the systematic development of a resource centre; that its purpose was to facilitate teaching and learning, research, individual development, and the exchange of information, through a more effective sharing of departmental resources; that the Centre would form an important section in the overall scheme; and that it would be developed in collaboration with the Pre-Retirement Association. The letter then sought their
help in supplementing the information already acquired through asking for their free literature, bulletins, newsletters, publications list, and other material which they felt would be relevant.

Responses were very encouraging and began coming in within a few days. Over two hundred items were incorporated into the preliminary scheme of the departmental resource centre. These included booklets, annual reports, leaflets, pamphlets, newsletters, publication lists, brochures, etc.

Collaboration with the Pre-Retirement Association developed further and a Resources and Information Officer appointed to look after and continue developing the Pre-Retirement Section of the Resource Centre.

The Development of a Catalogue

The case for developing a catalogue was self evident, it seemed most useful to use the capabilities of the recently acquired word processor. A data base was designed by the author containing twenty fields to record various pieces of information about each particular item. These range from the conventional ones such as author, title, publisher, etc. (and which makes it compatible with other automated systems, e.g. the University Library, E.R.I.C.) to those more peculiar to the departmental situation such as location, area of Department's work, restrictions on loan, etc. Table 9.3 shows the 20 fields.
The information to be included in each field was as follows: The FORMAT indicates whether the particular item is a book, journal article, computer software, etc. The second field indicates the AUTHOR (for books, etc.) or originator (for computer software, audio visual). The TITLE of the item is the next field, followed by the PLACE OF PUBLICATION (city of publication in the case of books, etc. or the Journal title in case of journal articles), the PUBLISHER (or Volume No, Issue No and Number of pages in case of journal article), the YEAR OF PUBLICATION. The current EDITION. The NUMBER OF COPIES of the item in the resource centre. The CLASSIFICATION NUMBER for purposes of facilitating searches. The SUBJECT or DESCRIPTORS of the item, again to facilitate searches. The AREA OF WORK IN DEPARTMENT to indicate whether
the item is mostly used for, say, further education, pre-retirement education, young adults, etc. The LOCATION of the item indicates whether the resource is in the resource centre or in one of the staff's offices. RESTRICTIONS ON LOAN indicates whether the item is for reference only, for staff consultation or has open access. For the particular case of computer software the following fields were included: COMPUTER to indicate the type of computer in which the programme was available, DOCUMENTS to indicate the sort of documentation that accompanies the programme, COMMENTS to indicate, for example, the language in which the programme is available and CONTACT to indicate the academic to be contacted for further details. Finally the field NOTE ON CONTENTS was designed to carry a brief note explaining the contents of the item; this was designed especially to facilitate the searcher decide on the suitability of the items. Fields 18 to 20 were left open and to be revised after a period of piloting the database.

To facilitate the incorporation of all this information into the database of the word processor, a form to be filled by the academic contributing with particular resources was produced by the author. This is included in the appendices (appendix G).

The author also produced, using the sorting, selecting and merging capabilities of the word processor, an annotated preliminary catalogue, ordered alphabetically by author, and containing a selection of the fields of the database. Table 9.4 provides two examples of entries in the catalogue printout while appendix G provides a larger selection of items from the catalogue.
The major advantage of cataloguing through the database of the Word Processor is that the search for items is facilitated to a very large extent. Searches can be done by any field or substring in the fields. For example, there can be searches by any word, e.g. a search by 'retire' will produce a selection of items in which retirement, early retirement, pre-retirement, etc. are included, or part of a word, e.g. 'elect' and in this last case the machine will pick up words such as electro, electron, electricity, electrical, election, electoral, etc. The catalogue also includes those publications that the Department receives regularly and the subject list of the holdings of the I.E.D. Until the catalogue is fully

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**TABLE 9.4: Example of entries in the catalogue**

<table>
<thead>
<tr>
<th>AUTHOR/ORIGINATOR:</th>
<th>Kemp F and Buttle B</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR OF PUBLICATION:</td>
<td>1981</td>
</tr>
<tr>
<td>TITLE:</td>
<td><strong>LOOKING AHEAD: a guide to retirement</strong></td>
</tr>
<tr>
<td>PLACE OF PUBLICATION:</td>
<td>Plymouth</td>
</tr>
<tr>
<td>PUBLISHER/PRODUCER:</td>
<td>Macdonald and Evans</td>
</tr>
<tr>
<td>NOTE ON CONTENTS:</td>
<td>This book is a general guide for preparation for retirement for blue collar shop and office workers.</td>
</tr>
<tr>
<td>LOCATION:</td>
<td>1 SE 20 (Resource Centre)</td>
</tr>
<tr>
<td>LOAN RESTRICTIONS:</td>
<td>Open access</td>
</tr>
<tr>
<td>WORK IN DEPARTMENT:</td>
<td>PRE</td>
</tr>
<tr>
<td>FORMAT:</td>
<td>Book</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AUTHOR/ORIGINATOR:</th>
<th>Cox M J and Lopez M J</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR OF PUBLICATION:</td>
<td>Undated</td>
</tr>
<tr>
<td>TITLE:</td>
<td>QSHM</td>
</tr>
<tr>
<td>PLACE OF PUBLICATION:</td>
<td>Guildford</td>
</tr>
<tr>
<td>PUBLISHER/PRODUCER:</td>
<td>University of Surrey. Unpublished</td>
</tr>
<tr>
<td>NOTE ON CONTENTS:</td>
<td>Simulation of the movement of a damped harmonic oscillator. The user can study the damaged simple harmonic motion in terms of the Quality value.</td>
</tr>
<tr>
<td>LOCATION:</td>
<td>13 AA 20 (C.A.L. Laboratory)</td>
</tr>
<tr>
<td>LOAN RESTRICTIONS:</td>
<td>Open access</td>
</tr>
<tr>
<td>WORK IN DEPARTMENT:</td>
<td>CAL</td>
</tr>
<tr>
<td>FORMAT:</td>
<td>Computer software</td>
</tr>
<tr>
<td>COMPUTER:</td>
<td>BASIC/GRAPHICS/NOVA AND PRIME</td>
</tr>
<tr>
<td>DOCUMENTS:</td>
<td>Student guide, teacher's notes and sample output</td>
</tr>
<tr>
<td>CONTACT:</td>
<td>Dr T Hinton, DES</td>
</tr>
</tbody>
</table>
developed, which in turn will determine a borrowing system, it is proposed that items from the centre may be borrowed by previous registration in a 'borrowers book'. This registers the name of the borrower, the date of borrowing, author and title of the item borrowed, and provides a space for entering the date of return.

CONCLUSIONS AND RECOMMENDATIONS

The establishment of a resource centre in the D.E.S. has been a means of augmenting some aspects of the present teaching and learning activities, and of facilitating aspects of research and administration. It would also provide the means of creating opportunities for further growth and development of individuals and of the Department as a whole as well as facilitating the exchange of experiences amongst the new department's staff.

Secondly, the centre will seek co-operation and exchange with University units and the production of new resources will be developed in collaboration with them.

Thirdly, the establishment of the resource centre has been an operation undertaken in various stages. This report has accounted for the three initial ones. Future stages of development will necessarily depend upon developments within the D.E.S. regarding the integration of the various divisions and access to additional space to locate a more definitive housing for the resource centre.

There were at least three factors which facilitated to a large extent the writer's role in helping to establish the centre; these factors were also positive elements for the development of the centre. The departmental philosophy of maximising the individuality and autonomy of people in an unstructure situation through discussion and evolution and by allowing individuals to act as they consider appropriate; the fact that the resource centre belongs to an educational department; and the existence of Interest Groups.

Recommendations at this stage are necessarily concerned with the procedure to be followed for the full establishment of the D.E.S. resource centre. It has to be pointed out, in the first instance, that, according to the experience accumulated
over the last year or so, the said full development of the resource centre needs a full time officer. Secondly, that because of the large amount of uncatalogued resources kept in the Department, it appears desirable to get someone to do this cataloguing. It is understood that some steps have been taken in order to obtain collaboration from the Manpower Services Commission. The cataloguing could be done under the supervision of the full time officer. Thirdly that, on the basis of the successful application for outside financing for the P.R.E. section of the resource centre, ways need to be found to get the centre developed to the stage of a pilot scheme which would make it possible to attract outside support for a more general resource centre, which could be of use to the University, the local and national communities.

Finally and with a view to achieving a more smooth development of the D.E.S. resource centre, some priority needs to be given to the provision of additional space in which to house the centre.
ACKNOWLEDGEMENTS

The author wishes to convey his appreciation to a great many people without whose collaboration this work would have not been possible: To Professor David James for making it all possible; to Dr James Kilty for much support and many thought provoking discussions; to Dr Alan Chadwick, Mrs Annette Strauss, Mr Bernard Buttle and Mrs Averil Heaton for much help and support; and to the staff for their valuable cooperation.
PART IV: RESEARCH CONCLUSIONS

CHAPTER 10: A SYNTHESIS OF PROGRAMME EVALUATION

CHAPTER 11: A CONCEPT OF DEPARTMENTAL RESOURCE CENTRE

Part IV reports on the research conclusions: chapter 10 presents a synthesis of the concept of programme evaluation in terms of its theme, purpose, functions, structure and methodology. Chapter 11 presents the conceptualisation of departmental resource centre in terms of defining the term 'centre', presenting the general tendencies and particular features found. The chapter also includes general recommendations for the improvement of existing services and for the establishment of new centres.
CHAPTER 10

A SYNTHESIS OF PROGRAMME EVALUATION

INTRODUCTION

The history of educational evaluation falls into three distinctive periods: Beginning in the 1940s with the works of R. Tyler and developing in the works of Bloom and his associates, the initial period is usually known as the behavioural approach to evaluation. The second period is characterised by a move away from that model, while the third period is characterised by a new appraisal of the concepts and methods which was, by and large, inspired by anti behaviourism and holism. Although these three different approaches developed at different times, they all coexist in today's educational practices and the behavioural model still seems to be the predominant one.

The review of the literature presented in chapter 3 showed that educational theory and practices contain a number of contradictions, which are reviewed briefly below.

THREE CONTRADICTIONS

The first contradiction concerns the polarisation between the traditional and the innovative approach. The former favours a detailed definition of behavioural educational objectives in order to determine, or evaluate, the extent of their achievement. The latter is more broadly based and looks not only for the expected outcomes but also, and as importantly, for unexpected outcomes.
There have been various attempts to minimise or ignore this contradiction by authors who have argued that the innovative approach is 'correct' but that demands for rigour and empirical justification oblige the deployment of the behavioural model (see e.g. Sheldrake and Berry 1975:3). On the other hand it is argued that the behavioural model can only be suitable for assessing skill related objectives (see e.g. Davies 1978:7). The polarisation between traditional and innovative approaches remains here, although some common ground is established.

The second contradiction, somewhat related to the above, arises from the many attempts to classify the different concepts of evaluation. These, rather than making the concept clearer, have introduced more elements of divergence and confusion without resolving the polarisation between traditional and innovative approaches.

The third contradiction is found within the innovative approach and concerns its description as methodologically eclectic. This has allowed, for example, Knapper (1980:159) to interpretative illuminative evaluation in a rather bizarre way, as follows:

"Illuminative evaluation is a type of programme evaluation where the use of formal, objective, 'scientific' designs is difficult for various practical reasons (lack of time, resources and so on). Illuminative evaluation is relatively subjective and flexible, and uses whatever techniques and sources of information are readily available".

In addition it could be argued that describing the approach as eclectic, allows room to dispute the claim that the innovative approach is indeed a new re-appraisal of the concept of evaluation since, as and when needed, it can borrow from the traditional approach. This would seem to imply acceptance of the traditional approach.

In the light of the above it appeared desirable to the writer to introduce some sort of re-ordering of the concept in order to gain a personal and more sensitive
understanding which would reflect the realities of the theoretical and practical worlds of evaluation.

THE SYNTHESIS

What Dearden and Laurillard (1977:3) wrote in a footnote needs to be further developed. They wrote: "In our view, the illuminative approach does not aspire to overthrow traditional evaluation. On the contrary, it has different methodology, precepts and intended benefits. It seems to us to supplement the traditional approach and to offer a new dimension to curriculum evaluation". Here the polarity between traditional and innovative approaches is evident as is the acceptance of traditional evaluation. What is now proposed is not something parallel to the traditional approach, but something that incorporates the positive factors and dispenses with those which are negative, something that absorbs, rather than borrows, concepts and methods.

The starting point of the synthesis is the theoretical framework provided by Parlett and Hamilton (1972), Jamieson et al (1977) and Parlett (1981). One of the major strengths of this approach is the fact that it was the first to introduce the real importance of the 'learning milieu' in which any educational programme is applied. As a result it was recognised that there are no two equal programmes and therefore they cannot be evaluated with the same methodological tools; consideration must be given to the singularities and peculiarities of each programme.

The Theme of Evaluation

If the concept of open systems, which is generally defined as a set of elements or components which are in interaction and which interact with other sets of elements, is applied to the educational world, the theme of evaluation appears as the study of educational practice at all levels. Each of these levels can be identified as a system so that from the largest to the smallest educational practice, e.g. from an entire national educational system through an institution's practices to a particular aspect of a lesson, all levels can be covered. The
main advantage of introducing the concept of open systems is that it clearly shows that any system under study is influenced by the interactions of its components as well as by the interactions with other systems.

The Purpose of Evaluation

The purpose of evaluation needs to be examined in the context of aiding the process of educational development by providing the necessary information for policy and decision making, as argued by Scriven, (1970:29-30). The evaluation study has to discover, in each particular application, the criteria for elucidating what is and what is not important within the specific system evaluated. It has to identify the existing relationships between the various components of the system and with other systems. It has to find what distinguishes one system from another and what is essential to each. It has to discover firstly what could be called the general laws of the system, that is, the broad tendencies of events and processes; secondly, the specific laws or interacting forces amongst its components, which constitute the particular circumstances of the study or what is known as the learning milieu.

The Functions of Evaluation

Programme evaluation has four major functions not in opposition to, but supplementing each other which together provide a more complete picture of what evaluation is about. The functions are: theoretical, ideological, critical and instrumental.

A first characteristic of the THEORETICAL FUNCTION is that evaluation never starts in a vacuum but starts from a base of knowledge previously formulated which, in one way or another, has been assimilated by evaluators. It is in this context that evaluation contributes to theorisation about educational systems under study and vice versa. Evaluators need to be aware of this in order to assess the influence of theory and personal views into the evaluation results.
The main element of the theoretical function is explanation, which consists of establishing the relationship between the various new factors and observations and the existing theoretical knowledge. The most complete form of explanation will be that which provides causal relationships between the processes and events under study. Evaluators can resort to four forms of explanation, as follows.

The first is that the newly studied processes are explained within the existing and predominant framework of concepts. For example when a study aims at assessing behaviour only, there is no alternative to explaining it within the previously formulated predominant theoretical framework, behaviourism.

Secondly, the explanation of processes may demand the formulation or introduction of new concepts, which have to be incorporated into the range of terms and concepts previously formulated. This is the case in evaluation studies which attempt to compromise the two theoretical frameworks.

Thirdly, what happens in the system under study can be explained through the creation of a 'grounded theory' which does not necessarily contradict the predominant framework. This happens, for example, in evaluations of the transactional type as well as those based on social action research.

Fourthly, the process of explaining events and processes demands a complete revision of the initial concepts of the predominant framework, which implies a truly open mind on the part of the evaluators in order to be responsive to all possibilities. This is what studies of the illuminative type tend to do since to explain in illuminative terms implies new suppositions, concepts and methodology.

What appears central to the theoretical function is description-interpretation because description does not consist of a simple listing of the information gathered, but also of an ordering, organisation and synthesis which involves simple classifications and systematisations. Description is an interpretation of reality and cannot remain either at the level of a simple explanation or at the level of philosophical categories only. For the purposes of describing, the philosophical method on its own is unsatisfactory, since it has a tendency to dilute specific processes into general reasonings whereas description has to comprehend what is specific to the system under study. To achieve this specific explanation,
description has to operate on at least four levels, the general, structural, the systemic theories and practical. Description is needed at the more general level to perceive the general tendencies in the system; it is based upon structural theory in order to analyse the interactions and functioning of the various systems and subsystems under study; it is based upon systemic theory in order to uncover the specific regularities of the elements, events and processes of the system's life; and it is based upon and selects from among the experiences accumulated during the study in order to aid in the systematisation of the processes and events.

The essence of the IDEOLOGICAL FUNCTION is how evaluation is understood. A central issue is how the methodological matters are dealt with, whether the evaluators are to answer their initial queries from their desks or whether there will be an open mind regarding the process of evaluation. It is this initial attitude which will decide upon whether the evaluation is to be bureaucratic, autocratic or democratic, in terms of MacDonald's (1974:14) classification, (see chapter 3). It follows that the evaluation process is not neutral but committed to the improvement, further development and growth of educational systems, it is committed to negotiate democratic evaluations (in MacDonald's sense).

The CRITICAL FUNCTION also stems from MacDonald's classification. An informed citizenry can only be obtained if evaluators criticise constructively the existing theoretical thinking of the system under study. It is also a function of evaluation to clarify the values held, and the weighting explicitly and tacitly given to them, by the people involved in the system. The INSTRUMENTAL FUNCTION is given by the applied character of evaluation. This function allows the study of subsystems which in turn permits the formulation of conceptualisations about the system. Knowledge about the whole system is gained through knowing its components and vice versa. It provides insight that can encourage discussion and contribute to decision making.

The Internal Structure of Evaluation

The fourth component of evaluation is its internal structure, the general procedure or phases of the evaluation study. There are four major stages which characterise an evaluation study and interrelate and overlap. These stages do not constitute an evaluation blueprint, rather they represent the broad tendency found by the
writer in the evaluation procedure. The four phases are preparation, execution, analysis and communication.

In the PREPARATION PHASE, discussions are held regarding the educational system to be evaluated and the terms of reference for the evaluation are clarified. This phase involves negotiating entry into the system and activities leading to the setting up of the study, including familiarisation with the system.

The EXECUTION PHASE involves a literature search of topics related to the system under study and the observation of events and participants' activities which allows evaluators to begin distinguishing between what is significant and what is secondary. As the data and information accumulate, evaluators are in a position to study in more depth those features which appear to be relatively more important and to conduct further enquiries, observation, experiments, etc. As the study unfolds and evaluators concentrate their enquiries, the process of analysis has begun.

The third phase of ANALYSIS AND SYNTHESIS begins as a minor component in the early stages of the study and grows constantly as data and information grow in the evaluators' files. Their examination aims to discover any general tendencies, including patterns of cause and effect and to articulate an interpretation and description of the processes involved. The theoretical function of evaluation plays a major role here. Analysis also involves the interpretation of any statistical data and comparisons are performed to handle the qualitative data in order to obtain descriptive typologies. A historical analysis of the system's past, present and desired future contributes to the placing of judgments into context.

The phase of analysis flows naturally into that of COMMUNICATING the evaluation results to the various interested audiences, in the first instance the participants in the scheme under study. Evaluation communication will generally not stop at this level, since there are other audiences interested; for example, practitioners in general and those in similar settings in particular, fellow evaluators or researchers, agencies, and last but not least the public at large. Ideally, adapted versions of the report should be made available to the different audiences because different groups have different specialisations and expectations,
they tend to develop their own specialised vocabulary and will only see the report's relevance to them when it communicates about matters of particular concern and interest and if the language used is familiar. Communication is not in principle restricted to verbal means, but also implies a choice of media for the specific audiences.

The Methodology of Evaluation

The fifth component of evaluation concerns the methods and instruments for gathering information. As there are no two educational systems which are quite the same the matter of instruments is intrinsically related to the specific situation. It will be the educational system under study and the particular circumstances in which it takes place which will dictate the evaluation instruments to be developed. The evaluator has to do a lot of field work, observation and listening so as to know what methods are best for the specific situation. In this circumstances, the desk-type-prepared instruments do not have pride of place since they will depict the evaluator's own thinking, prejudices and historical bias. It would be foolish however to disregard the enormous variety of methods which are available at the present stage of development of the social sciences. Those methods which appear to be most suitable for evaluation studies can be categorised into three main sorts: observation, means of gathering views and documentary analysis. Each of these take several forms and each has its own advantages and disadvantages; their best use comes from a combination of all to provide cross checked information, sustain information gathered by other methods. These three sorts are briefly reviewed below.

OBSERVATION is the direct perception of events and is a prime source of knowledge. Perceptions are reflections of events and objects in the consciousness of an individual through the effects of the outside world on the senses (visual, tactile or auditory). Visual perceptions are the most important, being the resulting data after the mind of the observer has already interacted through vision of the environment. The data received is coloured, filtered and then recorded as verbal, visual, symbolic, etc. representations of what was observed. Perceptions are important in the process of cognition, since they provide primary material for the formulation of concepts, connections, relations. As a result of perceptions, ideas and concepts are created in the mind and express the assimilation of objects by 'man'.

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Observation as a method of evaluation is not a disordered succession of casual impressions, but a process with a pre-determined aim, that of gathering information to help in deciding upon issues or as a method to check information obtained by other means. It is planned and has time limits. Observations are recorded in the form of note taking during or after the observation and the notes are coded according to various parameters; according to type of information, e.g. direct observation of events, methodological observation (evaluator's self instructions) and theoretical observations (evaluator begins to make sense), (Schatzman and Strauss 1973).

The main advantages of using extensive observation are, firstly, that the evaluator can perceive events in a direct form, not only those to do with teaching and learning, but also planning and evaluating, via meetings of staff as well as 'classroom' activity. Secondly, observation acts as a stimulus to thoughts which could not occur otherwise or from the mere analysis of secondary sources. There are however, some disadvantages and difficulties with this method. Direct observation and its analysis are time consuming. There is moreover a risk of influencing the events being observed, in that participants may tend to act 'normally' or 'usually' or in response to the evaluator's perceptions and purposes rather than spontaneously. Finally, there is the risk of the evaluators observing only what they want to see.

The MEANS OF GATHERING VIEWS can take several forms according to the type of information sought or to the means of its gathering. For example, if the audience is large or quantitative information is wanted, then the questionnaire is called for. If the audience is smaller or if more qualitative information is wanted, then the interview is the appropriate technique. There are, of course, other intermediate forms, such as the structured interview, during which the evaluators fill in a form containing a fixed set of questions. Interviews may also appear to be casual conversations.

The INTERVIEW as a means of gathering views involves the personality of the interviewer, skills, attitudes and sensitivity to interviewees and inter-personal processes. It is important to know the psychology of the interviewees, to understand them, to be delicate and tolerant towards them, their problems and weaknesses. In all this, the role of the interviewer is to intervene to help interviewees to express themselves, to free them from fears and tensions that
could influence their answers, to support their thoughts and feelings, to analyse conjectures and to go back to forgotten or abandoned issues. However and according to the circumstances, interviewers can also be confronting, authoritative.

The interview includes a plan of questions carefully selected. If the questions are the same for all the interviewees and in the same order then the interview is called structured or standardised, but if questions can be modified, dropped or new ones included according to how the interview develops, the interview is called open ended.

The main advantages of the interview are that it allows a deeper understanding of the processes under study. During the interview it is possible to detect the level of sincerity of the individual responses which makes the information gathered more spontaneous, live and natural and represents a good portrayal of reality; the interview not only builds up a detailed picture of the processes involved, but also includes a greater variety of events and considerations regarding particular matters.

There are also some disadvantages. Interviews demand careful preparation on the part of the interviewer, they also take time and their recording needs expertise. From a technical point of view, interviews are easy to conduct in pairs, one converses and the other takes notes, but it is more usual for the same person to perform both roles. To do this it is advisable to go through the notes soon after the interview in order to expand the notes and keep all details. Another way is to tape-record for which the permission of the interviewee is essential. However, the time for transcribing tapes is large compared with the interview time.

An educational evaluation needs to put its emphasis on the above two techniques, observation and interview, since they allow the building of a more complete and sensitive picture of events and opinions.

The QUESTIONNAIRE is particularly relevant if the audience is large and/or there is a need to sustain and quantify information obtained from other sources, such as observation and interviews. It is also relevant when the audience, although relatively small, is geographically scattered and difficult to approach.
The aims of questions set out in questionnaires usually determine their type; that is whether they are seeking information about respondents' personal functions or their motivations, their views and assessment of given events, achievement of aims, etc. When enquiring about facts, questions are usually of the fixed type in which the respondent is asked to insert ticks and numbers, yes or no, and short sentences. When information about functions or similar matters is wanted, questions tend to be more open ended and respondents more at liberty to word answers in their own style. When the assessment, valuing or sustaining of statements is looked for, the check list type of question is called for. When the achievement of objectives is wanted, the scored tests are usually employed but this last type of questionnaire can produce misleading information if used in isolation.

Evaluation studies ought to avoid the use of questionnaires not only because interviews and observations are better methods, but also because there are serious risks in their use. There is a temptation to make them too long in trying to satisfy the evaluators' queries. Questionnaires lend themselves to the inclusion of 'insinuated' answers when, for example, only those aspects of interest to the evaluators may be included in check lists without space for spontaneous comments from the respondents. There may be a tendency to use sophisticated vocabulary, or jargon, which cannot be easily interpreted by the audience. As well as risks in the preparation of questionnaires, there are also and more importantly, various disadvantages in their use. These have been very well articulated by Parlett and Hamilton (1972:20):

"There are of course several valid objections to questionnaires, particularly if they are used in isolation. Unless most carefully prepared, questionnaires can lead to mindless accumulation of uninterpretable data. Expensive in time and resources, such careful preparation must be weighed against the benefits likely to accrue. A second drawback is that many recipients regard questionnaires as impersonal and intrusive. Others keen to express their complicated views, find the questionnaire a frustrating, indeed trivialising medium. From these dissatisfied groups, some do not reply, yet these non respondents may be the most important in certain respects"
The third group of methods available to an evaluator is the ANALYSIS OF DOCUMENTS. There are several types of documents, the literature, evaluators data files and both official and personal documents concerning the system under study. The activities of any educational system and especially those in the early days of development are well documented in the form of proposals, minutes and reports which shed light on arguments, policies, agreements, etc. Their study can provide valuable information such as historical perspectives and other areas worth pursuing in observation and/or interviews. In general these are documents which are much more related to the system rather than the participants, as personal documents tend to be.

Access to personal documents such as correspondence, personal notes, drafts of papers, etc., is invaluable since they provide a sort of eye witness evidence on the past of the system under study. The evaluators should however be aware of the risk of incorporating into the data files any tergiversation of events coming from the prism of observation of the author of the documents.

One of the most widely accepted methods of analysing documents is 'content analysis' which consists in identifying key concepts, any stereotyping of events or jargon developed. This analysis helps in the identification of what is relevant for the purpose of the study. The evaluators should have a very open mind when studying these documents since they may throw light on to issues which may not come to the surface otherwise.
The inconsistencies within the theoretical framework of evaluation have been the driving force for the articulation of a synthesis; this does not attempt to be totally comprehensive or solve all the contradictions; rather, the intention is to sketch in broad outline, the theme, purposes, functions, structure and methodology of evaluation.

Evaluation has two major characteristics: one is that the explanation of reality can be formulated at four levels, with the illuminative permitting a more comprehensive description, while the other characteristic is that there is an ideological function associated with evaluation which is its commitment to development, to the advance of educational practices.

The synthesis broadens the concept of evaluation and takes it a step further in its development. It reflects a wide context of evaluation and does not appear in contradiction to, nor merely to supplement the traditional approach, but as a more comprehensive and flexible theoretical framework. The contributions to evaluation coming from fields as far apart as behaviourism and social anthropology are incorporated into one framework: they become forms of explanation. The strength of the synthesis is then its inner consistency and the simplicity of its assumptions.

This synthesis is not eclectic, because it considers the contributing elements in a new light, negating or leaving behind, for example, the narrow concept of evaluation which uses instruments such as achievement tests in isolation. Nor is the whole behavioural conception incorporated, but only what is valued according to the purposes and circumstances of the study.
It would seem that a more appropriate term to describe the methodology, in addition to flexible, is dialectic in the sense argued by Rowan (1981), which has a developmental, dynamic connotation providing room for change and transformation, rather than the static borrowing or selecting of eclecticism.

Finally, figure 10.1 presents a sort of idiosyncratic map or evaluation star, a summary of the synthesis with the components and influencing elements linked together with various relationships represented by lines. Other interrelationships are not shown for the sake of clarity.
FIGURE 10.1: Evaluation Star

- **THEME**
- **PURPOSE**
- **METHODOLOGY**
- **STRUCTURE**
- **FUNCTIONS**

- **Structure**
  - Analysis
  - Field Work
  - Methods
  - Planning
  - Preparation
  - Familiarising
  - Setting Up
  - Contract

- **Function**
  - Instrumental
  - Critical
  - Ethical

- **Theme**
  - Theory of Development
  - Politics
  - Audiences
  - All Existing Knowledge

- **Purpose**
  - Social Sciences
  - Mathematics
  - Natural Sciences
  - Philosophy

- **Methodology**
  - Forms of Reports
  - Communication

- **Evaluation**
  - Other Forms
  - Data Files
  - Official
  - Educational System
  - Educational World
  - Society
  - Personal
  - Various Forms
  - Questionnaires
  - Documents
  - Interviews
  - Observation
  - Structured
  - Open Ended
  - Planned
  - Unstructured

- **THEORETICAL FUNCTION**
CHAPTER 11

A CONCEPT OF DEPARTMENTAL RESOURCE CENTRE

INTRODUCTION

It was argued in chapter 10 that an evaluation has a theme, purposes, functions, internal structure and methodology. Previous chapters have dealt with all these elements except the function: the introductory remarks clarified the theme and purposes of the evaluation study, part I (chapters 1 to 3) reviewed the literature and further clarified the theme of this evaluation, part II (chapters 4 and 5) dealt with the structure and methodology employed, part III (chapters 6 to 9) presented the research results. The present chapter deals with the functions of an evaluation; it attempts to explain and interpret what a departmental resource centre is, by defining and describing the concept.

The chapter begins by reviewing some of the definitions provided in the literature, and in the light of the evidence accumulated these are criticised and a more comprehensive definition is proposed. In the words of the synthesis, the system under study is comprehended. This concept is then explained in terms of its general tendencies, functionings, and elements which are of a more particular nature.

Finally, some recommendations are advanced in order to contribute both to decision making and to development and improvement of the services that departmental resource centres in general provide for their students.
A DEFINITION OF RESOURCE CENTRE

As argued in the introductory remarks, the attention given by research workers has been focused mainly on the provision of institutional facilities rather than departmental settings. Definitions available for departmental centres have translated from larger settings. For example, a working party of C.N.A.A. has defined the centre as follows:

"LEARNING RESOURCE CENTRE
College or departmental accommodation for a storage of learning resources and related equipment, together with a cataloguing and retrieval system to gain access to the stock, and study places to enable them to use the materials"

(C.N.A.A. Working Party 1981:9)

In general, the term resource centre means different things for different people. Townsend (1977:15) has illustrated this by saying that: "To some people, it is simply a room where visual aids, both hardware and software, are centralised, to facilitate access and retrieval. To others it is a show piece — an area of (sometimes) a library or a separate room which can proudly be pointed — which establishes the 'with-it-ness' of the instruction — a credit for innovation. To yet others it is an area where students can go and look at film, video tapes, slides or printed matter or listen to radio, tape or record — an area where learning by doing has been replaced by learning by viewing".

Other definitions been have advanced by various authors and the following are a selection of these:

"The non-book resource centre(s) in an institution will usually be either part of the main library under the direction of the librarian or a separate media library under the direction of an audio visual specialist"

(Collier 1981:13-14)

"The term 'Learning Resource Centre' can now be taken to mean a discrete, physical entity (placed either in part of the library or
in rooms of its own), where electronic aids to learning are available, (but to the exclusion of other forms) for relatively private and to at least some degree guided study to be undertaken"

(Townsend 1977:3)

"A learning resource centre is a storehouse from which people can learn what they want to learn with a fair chance of doing it well"

(Powell 1974:32)

Most, if not all, definitions place the emphasis on the resource centre's physical accommodation area where materials are stored, with physical places, usually booths, where students can use those materials. The definitions fail to incorporate explicitly the human factor. It is clear, however, from all the evidence presented in part III that departmental resource centres are not just a physical place, but much more. It seems to this writer that a definition of resource centre cannot be comprehensive without the inclusion of one of its most important elements, the staff who participate and make the schemes possible; in other words, the human resources have to be included. The following is proposed as a more comprehensive definition or concept of resource centre, elements of which were advanced in chapter 9:

A departmental resource centre is an educational subsystem (one of many in a department) which includes the philosophy and approach to teaching and learning of the interested staff, their skills, attitudes, knowledge and creative ideas, their energies, and their internal and external networks of relationships; it also includes space, time, financial resources, equipment and the various systems of organisation whereby students can have ready access to and work with specialised learning resources related to the departmental disciplines.

This general concept reflects the practices of departmental resource centres, including those which place the main emphasis on physical accommodation.
GENERAL TENDENCIES

Several general tendencies were identified in the practices of departmental resource centres. There was a tendency for the responsibility for running centres to rest on one (or a few) academic(s) concerned and enthusiastic about educational innovations, who were also involved in staff development in their departments or institutions. Only 20% of the centres contacted were in the social and human sciences while 80% were in science and related departments. It would therefore seem that science topics lend themselves more easily to the development of alternative methods of teaching, one of which has been the resource centre. Another reason for this is that curriculum development started in the sciences in response to the need to update content.

Centres provided a wide range of learning resources with various types of media which were used in four major ways; as background (the most frequent), supplementary, built into courses, and remedial (the least frequent). Resources were in general available for students to use on an optional basis, and usage tended to be high.

Students tended to find the services provided by centres of great value to them in that centres encouraged their learning as well as making it easier and giving them more confidence for their exams. Student non use was related to their study styles and not to dislike of the services provided.

Those staff who found the services valuable did so because the centres made a contribution to their teaching, helping them to succeed in their higher education roles, research and teaching. Other staff thought that the use of learning resources lowered the standard of teaching, that the best teaching situation is chalk and talk and that students preferred the lecture.

Five functions performed by centres can also be included as general features since they were present in the majority of centres. (1) a teaching and learning function in which their contribution was the provision of services. (2) a research function in that they provided a base for experimental teaching, for the introduction of innovative schemes and for their evaluation. (3) a public relations function through which contacts with other departments, central services and
other institutions were developed; the marketing of some centres' materials could also be included in this function. (4) a production function which allowed centres to produce their own materials and to maintain the equipment, sometimes in conjunction with a central unit. (5) a consultancy function through which the centres not only provide tutoring for their students but also advice to other interested staff and, in the cases of those centres' staff who are involved in staff development, to the whole institution. Some of the centres also perform an additional function as integrating catalyst in that centres acted as meeting points between staff and students.

PARTICULAR FEATURES

Other features showed a more marked dependence on the special circumstances in which centres were set up, specifically the names that people gave to their centres in order to reflect their own activities. Within this phenomenon, there was, however, a tendency for chemistry centres to be called Learning Aids Laboratories, probably because of the influences of the Aston centre which was the first Laboratory of this kind to open.

As with the names, the aims of centres were very specific in reflecting their intentions. Some emphasised facilitating learning and provided aids supplementary to their conventional teaching, while others put their emphasis on teaching, and used the centres as the means to innovate and replace the conventional lecture.

Use of centres depended to a large extent upon their management style, on whether they were available for all students in the department or were developed for specific courses. There was a major trend for centres to be available for first years students specifically, but without excluding the rest. Where this was the case, the majority of users were in their first year.

The gathering of feedback from staff and students and the carrying out of evaluations also depended upon the particular situation. It varied from the occasional talk to all means of evaluation. But most centres did not perform any evaluation. This is consistent with the fact that the general running of centres relied, by and large, on one academic, who did not have the extra hands for the extra work.
Departmental staff involvement in the centres also varied from centre to centre, from simple encouragement of student use to producing materials and helping with supervising and tutoring in the centres.

The relationships between the centres and other departments and/or central services within the institution varied considerably, from exchange of catalogues, especially between library and centre to no collaboration at all.

THE HUMAN FACTOR

There are two kinds of conditions which influence social activities and changes, including education. The first are not directly dependent on the people involved in the particular situation: such as the given level of technology available; social and political developments generally and in departments; institutional and departmental structures. The second kind is totally dependent on the groups and individuals involved, such as their activities, and ability to act, consciousness, willingness, intentions, feelings; in one word, conditions dependent on people's animus. For the purposes of the analysis presented here, this second kind will be called 'the human factor'.

The human factor as a resource has been present and emphasised throughout this thesis. It is the most decisive factor for the implementation of innovations in general and of departmental resource centres in particular. For example, the level of departmental institutionalisation that centres have acquired does not depend on the number of staff involved or on the time they devote to the centre, but on their philosophies, approaches to teaching and learning, and motivations.

The philosophies and approaches to teaching and learning of the academics involved in departmental centres determine the aims of the centres, whether they keep materials available to students on an optional basis or their use is compulsory, whether they are supplementary or built into courses. Moreover staff reservations and antagonisms towards departmental centres are related more to their personal perceptions of their roles as teachers than to the work of the centres or to their degree of involvement in subject research.
The types of motivation of academics determines in many instances the type of innovation. For example, there are academics who regard the conventional lecture as a poor teaching instrument and look for innovations and the resource centre to improve their teaching. However, other staff, especially in subject with a higher prestige e.g. medicine and related disciplines, regard the lecture as 'the teaching method' and justify the development of a resource centre only if it is shown to be as effective as lectures.

The degree of motivation also determines the academics' involvement and commitment to departmental centres. Their involvement is voluntary in most cases and perceived to be in addition to their 'normal' teaching and learning, research and administrative duties.

Generally, staff responsible for centres are in the Lecturer status and a key element for departmental recognition of the centres is their style of communication. There are two types of communication, formal and informal, and there are at least four levels in which this takes place, communication with senior staff, peers, students and outsiders.

The most frequent form of communication is informal, with staff in their coffee lounge and corridors, with students through the occasional conversation. Formal communication takes place in staff meetings, staff-student committees, etc. In most instances communication with the Head of Department is good: he usually looks sympathetically at the development of the centre and is interested and involved in one or another with the centre's activities. Communication in this instance mainly consists of keeping the Head informed both of developments and needs.

Communication with other staff takes a variety of approaches, from including aspects of the centre in the agenda of staff meetings, via the circular letter with requests for particular contributions, to the development of personal contacts. It seemed that the last approach is the most successful since it allows both the centre's staff and the academic involved to indentify in detail the areas in which contributions can be made.
Communication with students varies from centre to centre, although most reported that this is an occasional venture only. Some centres distribute a leaflet at the beginning of the academic year with an outline of the services provided. Others publish a regular newsletter especially oriented to keep students and staff informed of new additions to their stock. Few centres reported that they perform regular evaluation to gather student reactions to the centres and their materials.

Centres survive with minimal communication with the outside world. Very few centres interchange information with the library or any other department. A few centres produce a newsletter which is distributed among staff, students and interested academics in other institutions. The level of exchange of experiences and materials among centres is relatively low. An exception is the work of the Educational Techniques Subject Group of the Chemical Society, which has held conferences and supported the production of materials, a particularly good example being the production of the audio cassette series entitled "Chemistry Cassettes" in which several academics from various chemistry departments participated. The cassettes were then used in those departments and made available to others through the market. It was reported that this venture was highly successful. Another example is the effort of a number of Biology teachers in Scotland to produce materials which were subsequently used in several Scottish universities. Some professional institutions, e.g. The Institute of Physics, The Biological Society, cannot produce information regarding exchange of experiences between centres.

The degree of departmental recognition and institutionalisation achieved by centres also depend on the type of leadership in the field of educational innovations given by academics responsible for centres and on the types of interactions developed. One as successful approach is to facilitate the implementation of other staff's initiatives. For example by encouraging staff to record a commentary at home and by ensuring that this type of recording was satisfactory for the purposes of the centres. Another is to initiate new projects, involving other academics, and guiding and helping staff producing materials for the first time. General statements requesting collaboration are unsuccessful. Leadership is most successful when it maximises the individuality and autonomy of people as well as allowing individuals to act as they considered appropriate.
Warren-Piper (1975:5-9) argued that staff development should be seen as a strategy designed, like education, to help individuals to be more self-reliant. Departmental resource centres play an important role in this kind of staff development since centres allow academics to become better professionals and grow as individuals through

i) the acquisition of new skills by producing materials,

ii) the opportunity to discuss their teaching,

iii) confronting new information and ideas,

iv) learning from their own mistakes and experience of others,

v) the opportunity to conduct research into teaching and learning,

vi) gaining a deeper insight into their teaching and learning,

vii) obtaining an increased awareness of student needs,

viii) increased willingness to consider changes and innovations,

ix) the opportunity to tackle new and different projects,

x) seeking new ideas,

xi) giving advice to newcomers.

Centres also play an integrating function through which a sense of collectiveness is developed by bringing together staff from a range of departmental activities. Departmental resource centres are not in conflict with the conventional lecture or lecturers who do not use the centres, but seek to improve on the teaching effectiveness of the departments concerned.

The activities performed by those involved are not however without problems, such as the little time they can devote to the development of new projects,
little financial support that centres have either from internal or external sources, the uneasiness created in many academics who think that producing materials for the centres can expose themselves and their teaching to others and be unjustly criticised, uncertainty created by the current wave of financial cut-backs, and the little recognition of educational development / innovation compared with research or book writing.

Despite these problems academics responsible for centres feel a great sense of satisfaction through

i) observing that the development of departmental resource centres has been long-lived and is a well established innovation,

ii) increasing self-assertiveness because of their personal involvement in the production of learning resources,

iii) having a greater sense of job satisfaction and personal realisation by noting that their innovation is appreciated by the majority of staff and students.

Some of the elements considered above are necessary conditions for the establishment of departmental resource centres while others are not. Elements related to the human factor are necessary, centres would not exist without, for example, the motivation to improve teaching and learning. The number of staff involved or the time they devote to the centres are not necessary conditions, but the more they are present the better the effect.

As a way of synthesising the various elements involved in the establishment / functioning of a resource centre, an idiosyncratic chart is presented overleaf. It has the resource centre in the middle, arrows towards it represent causes and those going out represent effects. The dotted lines represent the improvement cycle.
GENERAL RECOMMENDATIONS

Recommendations made here are of a general kind and are separated into two groups: recommendations related to the services already provided in departmental resource centres, which are made with a view to aiding in the processes of decision making in the various centres and in order to help solve some of the problems encountered so that their development is continued; and recommendations related to the establishment of new centres.

The recommendations for the improvement of existing services stem from the identification of problems in the centres (see part III), which can be categorised into: problems related to the human resources and problems related to the physical resources. In each of these categories are various subcategories as shown in figure 11.2 below.

FIGURE 11.2: Problem areas in centres

- HUMAN RESOURCES
  - personal views
  - participation
  - supervision
  - time
  - assistance
  - organisation
  - communication
  - awareness
  - flow of information

- PHYSICAL RESOURCES
  - materials
  - opening times
  - quantity
  - dating
  - periods
  - space / desks
  - space
  - crowdedness
  - equipment
  - dating
  - maintenance
1. One of the major problems regarding human resources was that centres did not get as much support from the general staff as their developers would have wished. Accordingly, centres should devise means for obtaining a greater degree of co-operation. Experience suggests that one of the most successful approaches is to survey staff views in order to identify the teaching areas in which the centre can help. Although the most common reason for no participation was lack of time, experience also suggests that when there is an interest and desire to improve, time is somehow found.

2. Lack of support for supervising the centres was another problem area. This has been overcome, in some centres, by developing a rota system among a number of interested staff. In other cases, the centre has a permanent organiser for the daily activities. In general centres should try and develop schemes to provide tutorial assistance. What is then suggested is that the centre staff develop systems of organising the time that interested staff can give, it may not even be necessary for the staff to be present in the centre as long as is known that they are available for consultation regarding the materials in the centre. This may imply that no one supervises the work of students but experience in centres indicates that what is needed are staff who can be consulted either in the centre or their own rooms. Furthermore, the extra degree of independence created in student users may suffice as a reason for no supervision of students' work in the centres.

3. Another problem was that some staff and students in the case studies were not aware of the materials housed in the centres. There is no reason not to assume that the situations are similar elsewhere. It is not only recommended that these staff pay a visit to the centres in order to know what happens in it, but it is also recommended that the centres publish some sort of news bulletin to keep people within and without the department informed of the new additions and developments in the centre.

4. It could also prove useful if efforts are put into the publication of catalogues of what is available, which would need to be regularly updated. Appendix C illustrates the catalogue developed in centre 1 and appendix G
reproduces a selection of items from the catalogue developed by the author using an automated system.

5. Cataloguing of learning resources, which was often lacking, would improve on the communication and awareness of participants in departmental centres. As most, if not all, institutions in higher education have computing facilities, it would appear desirable to introduce automated systems of cataloguing including notes on the content of the items held in the centre as well as list of resources relevant for the various courses.

6. Since there are staff who are more interested in educational development than others and who would dedicate more time to the innovations had they the time, centres should look for their department approval of a scheme which would release these more interested staff from other departmental duties, e.g. administration, teaching, research, in order that they could concentrate on the innovations.

7. Many centres are supervised by graduate demonstrators who, as the evidence from one of the case studies suggests, are not consulted by students and as centres lack support for printing, photocopying, talks with other staff, etc.; it would appear that a more effective way to invest the same amount of money could be the appointment of a part time organiser, who would take over the day to day running of the centre while the staff could concentrate on the development of innovations.

8. Recommendations concerning the physical resources need to start by pointing out that centres could try to be more responsive to students' requests for more materials in order to meet their complaint that materials do not cover the whole spectrum of their curriculum. This could be the first step towards the further development of the centres.

9. Another aspect of the learning resources which needs the attention of the centres' staff is the updating of their stock. Here again a more effective use of existing monies in the form of a part time organiser can be valuable. This could also facilitate the implementation of evaluation studies either of particular materials or of the services as a whole.
10. It follows from the above that the centres' staff could conduct, from time to time, reviews of student and staff opinions in order to gather a first approximation of the perceptions of those participating which could be the basis for the development of proper evaluation studies in those areas identified as in need.

11. The case studies and comments on the national survey showed that opening times are often a problem in the sense that sometimes they are not related to students' free time and that at times the centres get crowded. What is recommended here is that centres' staff should consider developing a plan, at least a term ahead.

12. It is also recommended that timetables are planned with the centres' users free time during working hours in mind.

The following recommendations concern the establishment of new centres.

13. A general plan is needed which needs to include the reasons for the development, i.e. what teaching and learning problems will be facilitated with such a development. A plan which is divided in various stages starting, as was done in case study 3 (see chapter 9) with a survey of perceived needs.

14. The sorts of functions that the centre is to have should determine its organisation and various components. The specific forms of facilitation of teaching and learning should be reflected in its organisation. Some general indications of what students find most useful are described in chapters 6 and 7.

15. A good scheme of communication needs to be developed from the very outset. The publication of a news bulletin as well as permanent personal contact with those participating appear to be the most desirable elements.

16. The accommodation of the learning resources should be in one place with as many facilities for students as possible, i.e. enough working places according to the expected use, including booths and desks for private study.
17. There should be some sort of committee, either advisory or steering, to
overlook the work and activities of the centres. This can, as shown in
case study 3, overcome general problems of communication as well as of
participation of the staff in the departments.

18. As regards financial resources, ideally a budget should be allocated to the
centre which needs to include the salary of an assistant. Whenever
possible, outside funding should be sought as a way of easing the burden
of departments, which are already in difficulties due to the limitation of
resources available.

Finally, most departmental resource centres have followed a spontaneous model
of development. They have started as a small scale innovation and grown as
they gained prestige and more staff (and departments) became interested. It
would seem that after more than ten years of development, a more systematic
model is desirable either for their continuing development or for the establishment
of new centres. This would also prepare them for the future, which, as shown
in part III does not appear easy due to financial cut-backs. One of the ways
to best achieve this is, as proposed above, through the preparation of a plan of
action divided into several stages, each characterised by its aims rather than by
time factors.
CONCLUDING REMARKS

These concluding remarks attempt to summarise, and put in perspective, the major points made throughout the four parts. It set out to:

(a) evaluate the educational significance of departmental resource centres,
(b) help in the establishment of a resource centre,
(c) assess the effectiveness of Six Category Intervention Analysis applied to interviewing,
(d) synthesise the concept of educational evaluation, and
(e) conceptualise departmental resource centres.

Part I
As an evaluation it considered the current knowledge in both fields (resource centres and evaluation) by means of a literature review of educational technology, and of educational innovations, with particular reference to departmental resource centres and of evaluation itself. This showed that the development of educational practices has accelerated during this century, especially since the second world war; that there are three co-existing conceptions of educational technology—audio visual, behaviourist and problem centred— with the last mentioned seen as a more comprehensive conception and better described as educational development.

The literature on centres showed that little attention had been given to departmental resource centres and that these have been developed since 1970 and constitute one of very many other innovations.
The literature review also showed that there are two opposing views about educational evaluation—traditional and innovative—the latter being more appropriate and comprehensive. There remained, however, some contradictions, which this writer has attempted to clarify and resolve.

Part II
Considerations on evaluation continued in part II which reported on the research methodology including the stages in which the evaluation was divided and the instruments used for gathering information. It also reported on the application of Six Category Intervention Analysis to interviewing and suggested that researchers who use the interview technique should be trained in this powerful skill model.

Part III
The results of the evaluation began to be reported in accounts of two case studies and a national survey of departmental resource centres. In the main these showed that departmental resource centres are a means of augmenting the departments' teaching and learning as well as facilitating a number of other departmental activities, e.g. educational research and communication. Centres are also a means of creating opportunities for further growth of individuals and of departments: they contribute to students becoming more self-directed learners and to staff becoming more competent professionals.

The activities which led to the development of a preliminary scheme for a resource centre for the Department of Educational Studies at the University of Surrey showed that for a department which makes extensive use of resources, someone in a fulltime capacity is desirable and that for the volume of resources involved the best way to approach the cataloguing is through automated means.

Part IV
In the light of the literature, evaluation reports and personal evaluation experiences, a synthesis of evaluation is presented in terms of its separate and integrating parts (theme, purpose, functions, structure and methodology). The synthesis gave evaluation two major characteristics: that educational practices can be explained at four levels, with with the illuminative being more comprehensive and absorbing the others, and that evaluation is committed to the
improvement and fuller development of the practices under study. This synthesis is within the framework of the innovative approach and is developed to resolve the contradiction with its opposing traditional approach. The synthesis do not cancel out or negate the traditional approach, it specifies the boundaries of application.

The departmental resource centre is considered in itself and reflected the functions of evaluation set out in the synthesis. A new definition is proposed to overcome the shortcomings of previous work and reflected on centres' development and life by placing equal emphasis on the provision of physical resources and the involvement of the human resources. Relations with other systems are considered and observed co-existence interpreted into causality. Centres' internal tendencies, staff and student perceived strengths, disadvantages, problems and views for the future are analysed, as are centres' relations with other within and without the department, senior and peer staff, students, academics in other departments, library and educational technology units.

Further Research

This research has identified a few areas which need further research and/or development. For example, further research into why chemists are in the vanguard regarding development of centres and communications appears desirable, as is the need for development of wider schemes of exchange.

It was also found that there is limited activity regarding feedback and evaluation and further research and development appears desirable into evaluation of specific materials as much as for the whole services offered by individual centres.

Higher education in general is undergoing re-organisation and rationalisation as a result of the financial cut-backs. Research and development into the role that resource centres are playing and can play in this rationalisation appears desirable.
This research has identified that human resources need to be emphasised as much as physical resources and that academics' philosophies and approaches to teaching and learning determine the type of innovation, it also appears desirable that further research and development be conducted into the training both of senior academics on teaching and learning management and of new teachers in developing self teaching materials.

A Note of Gratitude

Finally, this thesis would not be completed without a note of gratitude to a few people. To Dr. J. M. Kilty for much support in the difficult days before the starting of and throughout the project, for his supervision, thought provoking discussions, encouragement and friendship; to Professor James, Professor Griffiths and Mr. O'Connell; to all the members of the former Department of Adult Education and last, but not least, to my family.
APPENDICES

APPENDIX A: SOURCES OF INFORMATION
APPENDIX B: CASE STUDY ONE QUESTIONNAIRE
APPENDIX C: CASE ONE CATALOGUE OF MATERIALS
APPENDIX D: CASE TWO POPULARITY OF USE
APPENDIX E: SURVEY & COVERING LETTER
APPENDIX F: CASE THREE FORMS
APPENDIX G: PRELIMINARY CATALOGUE
APPENDIX H: REFERENCES
SOURCES OF INFORMATION

ABSTRACTS

Current Index to Journals in Education. ERIC. (Monthly)


Monitoring. Programmed Learning and Educational Technology. (Quarterly).


Information. British Life Assurance Trust. (Twice a year).

Education Index. British Library. (Yearly).

Current Awareness. (Monthly).

Times Index. Times Newspapers. (Yearly).

British Education Theses. (Yearly).
REGISTERS


Association for Programmed Learning and Educational Technology Yearbooks.

Medline.

BIBLIOGRAPHIES


JOURNALS

American Journal of Physics

B A C I E Journal

British Journal of Educational Psychology

British Journal of Educational Studies

British Journal of Educational Technology

British Journal of In-Service Education

British Journal of Sociology Education

Bulletin of Mechanical Engineering

Cambridge Journal of Education

Chemistry in Britain

Education in Chemistry

Educational Communication and Technology

Educational Media International

Educational Research

Educational Technology

Educational Theory
Engineering Education

Higher Education

Higher Education in Europe

Journal of Biological Education

Journal of College Teaching

Journal of Curriculum Studies

Journal of Educational Television

Journal of Further and Higher Education

Journal of Nutrition Education

Medical Education

Oxford Review of Education

Physics Education

Programmed Learning and Educational Technology

Psychology Teaching

Science Education

Studies in Adult Education

Studies in Educational Evaluation

Studies in Higher Education
APPENDIX B

CASE STUDY ONE: QUESTIONNAIRE

The aim of this questionnaire is to find out students' reactions and attitudes towards the services provided in the Biology Self-Teaching Laboratories on the 7th and 9th Floors in order to improve them.

Most of the questions can be answered by putting ticks into the appropriate places. Sometimes additional information is asked for. Please supply this if you can. You may write on the back of the pages if you wish.

Please do complete the questionnaire. Even if you do not use the facilities please answer questions 1 and 2 and 7-12 (questions 3-6 being applicable to users only). Please complete the questionnaire during the practical and leave it on your bench, it will be collected from you.

Thank you for your co-operation.

Name .................................................................

1. Did you do any Biology at school? Please tick the appropriate answer:
   (a) O-level .......... (c) SYS .......... (e) None at all ..........
   (b) Higher .......... (d) A-level ..........

2. How often do you use the facilities in rooms 723 and the 9th Floor? Please tick the appropriate answer.
   (a) Two or more times a week .......... ..........
   (b) Once a week .......... ..........
   (c) Once a fortnight .......... ..........
   (d) Occasionally .......... ..........
   (e) Never .......... ..........

   If NEVER or OCCASIONALLY, is this because (you may tick more than one answer):
   (f) You do not know what is available for particular subjects .......... ..........
   (g) You do not have enough time .......... ..........
   (h) You prefer to work at home or in the library .......... ..........
   (i) You do not study until your exams are near .......... ..........
   (j) You do not like the working conditions .......... ..........
   (k) If others, please specify: ...........................................
3. The following is a list of possible reasons why you may be using the self-instructional facilities. Please tick those with which you agree and add any others you may have:

(a) To clear up topics half understood in lectures
(b) To catch up with missed lectures
(c) To fill in gaps from school
(d) To complete work for practicals
(e) To get a deeper insight into topics
(f) To supplement the lectures
(g) To study your own notes
(h) To consult course textbooks and reprints
(i) To see the 9th Floor Displays
(j) It is a handy and quiet place
(k) If others, please specify:

4. The Self-Instructional Biology Unit offers the following resources. Please tick in:

(1) Column 1 those you have used.
(2) Column 2 your rating of their teaching effectiveness using the following scale:

1 = poor 4 = fairly effective
2 = not very effective 5 = very effective
3 = adequate 6 = no opinion

(3) Column 3 whether you would like more of these kind of resources.

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
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<tbody>
<tr>
<td>used</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7th Floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Quiet study room</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(b) Books</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(c) Reprints</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(d) Microscope slides</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(e) Electron micrographs</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(f) Posters</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>9th Floor</td>
<td></td>
<td></td>
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<tr>
<td>(g) Displays</td>
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<td>.....</td>
</tr>
<tr>
<td>(h) Filmloops</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(i) Filmstrips</td>
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<tr>
<td>(j) Filmstrip/slides</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(k) Slide programmes</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(l) Tape + workbook programme</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(m) Bioset viewer</td>
<td>.....</td>
<td>.....</td>
</tr>
</tbody>
</table>

260
5. The following is a list of topics covered by self-instructional materials. Please tick in:

(1) Column 1 those you have used.
(2) Column 2 the usefulness to you of the programmes used using the following scale:

1 = poor  4 = fairly useful
2 = not very useful  5 = very useful
3 = about right  6 = no opinion

(3) Column 3 the areas in which you would like more materials available.

<table>
<thead>
<tr>
<th>Column 1 used</th>
<th>Column 2</th>
<th>Column 3 more</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Effective Learning</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(b) Human Biology</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(c) Cell Biology</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(d) Genetics</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(e) Micro-organisms</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(f) Plants</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(g) Animals</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(h) Animal Physiology</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(i) Animal Behaviour</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(j) Evolution</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(k) Environment</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(l) Social Biology</td>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>(m) Microbiology</td>
<td>....</td>
<td>...</td>
</tr>
</tbody>
</table>

6. The following are the stated aims of the Self-Instructional Biology Unit. How well do you think they are fulfilled? Please rate according to the scale:

1 = not at all  4 = fairly well
2 = not very well  5 = very well
3 = about right  6 = no opinion

(a) To help people who have not done any Biology before to grasp the fundamental principles underlying the subject

(b) To fill in gaps in students' knowledge

(c) To provide a new mode of learning as some biological material is not easily learnt from books

Continued ...
7. Most of the self-instructional materials are supplementary to your lectures, would you like to see materials which are
   (a) an alternative to the lecture?
      Yes ...........  Not sure ...........  No ...........
   (b) a replacement for the lecture?
      Yes ...........  Not sure ...........  No ...........

8. The following is a list of methods through which Biology may be taught to you. Please tick in:
   (1) Column 1 those you have used.
   (2) Column 2 your rating of their teaching effectiveness using the following scale:
       1 = poor  4 = fairly effective
       2 = not very effective  5 = very effective
       3 = about right  6 = no opinion
   (3) Column 3 whether you would like to see more of these methods.

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<tr>
<th></th>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>used</td>
<td>1 2 3 4 5 6</td>
<td>more</td>
</tr>
<tr>
<td>(a) Conventional lectures</td>
<td>....</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(b) Conventional lectures plus handouts issued by the lecturer</td>
<td>....</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>(c) Practical laboratories</td>
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<tr>
<td>(d) Films</td>
<td>....</td>
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<tr>
<td>(e) Video films</td>
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</tr>
<tr>
<td>(f) Self-instructional programmes</td>
<td>....</td>
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<td>.....</td>
</tr>
<tr>
<td>(g) Quantitative Biology Schedules</td>
<td>....</td>
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<td>.....</td>
</tr>
<tr>
<td>(h) If others, please specify:</td>
<td>....</td>
<td>.....</td>
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</tbody>
</table>

9. Tutorial help is available three days a week and by special appointment at other times. Have you consulted the tutor?
   (a) Yes ...........  (b) No ...........
   (c) If YES, how many times? ............................................
   (d) If NO, please state why not:

Continued ...
10. Please comment on any reservations you may have about:
(a) 7th Floor Resources:

(b) 9th Floor Resources:

11. What sort of improvement(s) would you like to see introduced into the Self-Instructional Biology Unit?
(a) Short term improvements to the 7th Floor:

(b) Short term improvements to the 9th Floor:

(c) Long term improvements to the 7th Floor:

(d) Long term improvements to the 9th Floor:

12. Is there anything else you would like to tell us about the Self-Instructional Biology Unit?

Thank you for your help.
APPENDIX C

CASE STUDY ONE: CATALOGUE OF MATERIALS IN RESOURCE CENTRE

<table>
<thead>
<tr>
<th>BIOLOGY OF DEVELOPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD 1   Cells and Organisms</td>
</tr>
<tr>
<td>BD 2   Cells in Action</td>
</tr>
<tr>
<td>BD 3   Mitosis</td>
</tr>
<tr>
<td>BD 4   Meiosis</td>
</tr>
<tr>
<td>BD 5   Fertilization</td>
</tr>
<tr>
<td>BD 6   Cleavage</td>
</tr>
<tr>
<td>BD 7   Gastrulation</td>
</tr>
<tr>
<td>BD 8   The Formation of Organs</td>
</tr>
<tr>
<td>BD 9   Developmental Plant Physiology</td>
</tr>
<tr>
<td>BD 10  Growth</td>
</tr>
<tr>
<td>BD 11  Nucleus and Cytoplasm</td>
</tr>
<tr>
<td>BD 12  Hormones</td>
</tr>
<tr>
<td>BD 13  Regeneration and Developmental Switches</td>
</tr>
<tr>
<td>BD 14  Shape and Pattern</td>
</tr>
<tr>
<td>BD 15  Embryos and Larvae</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BEHAVIOUR OF ANIMALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 1   Studying Behaviour</td>
</tr>
<tr>
<td>BA 2   Control of Behaviour</td>
</tr>
<tr>
<td>BA 3   Nervous System and Behaviour</td>
</tr>
<tr>
<td>BA 4   Development of Behaviour</td>
</tr>
<tr>
<td>BA 5   Motivation</td>
</tr>
<tr>
<td>BA 6   Learning</td>
</tr>
<tr>
<td>BA 7   Orientation</td>
</tr>
<tr>
<td>BA 8   Survival Value</td>
</tr>
<tr>
<td>BA 9   Communication</td>
</tr>
<tr>
<td>BA 10  Social Organization</td>
</tr>
</tbody>
</table>
FILMLOOPS (* denotes no accompanying text)

FL 1 The Dividing Cell
FL 2 Budding of Yeast Cells
FL 3 Protists
FL 4 Paramecium
FL 5 Protozoa
FL 6 Fertilization and Cleavage (Sand dollar)
FL 7 Kochs postulates *
FL 8 A Freshwater Algal Bloom
FL 9 Oxygen Levels during an Algal Bloom
FL 10 Plankton
FL 11 Carnivorous Plants
FL 12 Regulation of Plant Development (1)
FL 13 Regulation of Plant Development (2)
FL 14 Photosynthesis Fixation of Carbon Dioxide (1)
FL 15 Photosynthesis Fixation of Carbon Dioxide (2)
FL 16 Effects of Red and Far Red Light on Seedling Development
FL 17 Effect of Red and Far Red Light on Internode Length
FL 18 Photochemical Properties of Phytochrome
FL 19 Phototropic response in Coleoptiles
FL 20 Root nodule formation
FL 21 Pollen Tube Growth
FL 22 Pathways of Water in Woody Plants
FL 23 Pathways of Water in Herbaceous Plants
FL 24 Flatworms
FL 25 Roundworms
FL 26 Hydra
FL 27 Coelenterates
FL 28 Freshwater Sponges
FL 29 Sponges
FILMLOOPS Continued

FL 30 Harmful Insects (2 copies)
FL 31 Aphid and its enemies (syrphid fly and lacewing predators)
FL 32 Aphid and its enemies (ladybug and wasp parasite)
FL 33
FL 34 Horntail Wasp
FL 35 Drosophila
FL 36 Praying Mantid
FL 37 How Spiders Without Webs Capture Prey
FL 38 Butterfly (1)
FL 39 Butterfly (2) (2 copies)
FL 40 Peppered Moth (+ booklet)
FL 41 Warning Coloration and Behaviour
FL 42 Animal Camouflage - Insects
FL 43 Mimicry
FL 44 Stickleback

FL 46 Breathing Methods of Aquatic Animals
FL 47 Farm Animals: Chick Hatching
FL 48 Darwin's Finches
FL 49 Comparison of Teeth in Animals
FL 50 Heart Muscle Response
FL 51 Meiosis
<table>
<thead>
<tr>
<th>FILMSTRIPS</th>
<th>FS 1</th>
<th>Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS 2</td>
<td>Fungi and Slime Moulds</td>
<td></td>
</tr>
<tr>
<td>FS 3</td>
<td>What is an Insect?</td>
<td></td>
</tr>
<tr>
<td>FS 4</td>
<td>Insects Living in Societies</td>
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</tr>
<tr>
<td>FS 5</td>
<td>How Plants are Classified</td>
<td></td>
</tr>
<tr>
<td>FS 6</td>
<td>Life Cycle of a Plant (+ notes)</td>
<td></td>
</tr>
<tr>
<td>FS 7</td>
<td>The Plant Kingdom (+ notes)</td>
<td></td>
</tr>
<tr>
<td>FS 9</td>
<td>The Desert - An Example of Adaptation</td>
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</tr>
<tr>
<td>FS 10</td>
<td>British Amphibians and Reptiles (+ notes)</td>
<td></td>
</tr>
<tr>
<td>FS 12</td>
<td>How Animals are Classified</td>
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</tr>
<tr>
<td>FS 13</td>
<td>Fossils (+ book)</td>
<td></td>
</tr>
<tr>
<td>FS 14</td>
<td>Skeleton and Muscle (+ book)</td>
<td></td>
</tr>
<tr>
<td>FS 15</td>
<td>Animal Histology (+ 1 book and 2 folders)</td>
<td></td>
</tr>
<tr>
<td>FS 16</td>
<td>Heredity</td>
<td></td>
</tr>
<tr>
<td>FS 19</td>
<td>The Air You Breathe (+ book)</td>
<td></td>
</tr>
<tr>
<td>FS 20</td>
<td>Water Pollution (1) (+ book)</td>
<td></td>
</tr>
<tr>
<td>FS 21</td>
<td>Water Pollution (2) (+ book)</td>
<td></td>
</tr>
<tr>
<td>FS 22</td>
<td>Population and Resources (1)</td>
<td></td>
</tr>
<tr>
<td>FS 23</td>
<td>Population and Resources (2)</td>
<td></td>
</tr>
<tr>
<td>FS 24</td>
<td>Evolution Today (+ notes)</td>
<td></td>
</tr>
<tr>
<td>FS 25</td>
<td>Darwin Discovers Nature's Plan (+ notes)</td>
<td></td>
</tr>
<tr>
<td>FS 26</td>
<td>The Enchanted Isles (+ notes)</td>
<td></td>
</tr>
<tr>
<td>FS 27</td>
<td>Bacteria Pathogenic on Human Skin (1)</td>
<td></td>
</tr>
<tr>
<td>FS 28</td>
<td>Bacteria Pathogenic on Human Skin (2)</td>
<td></td>
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<tr>
<td>FS 29</td>
<td>Fungal Infection</td>
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<tr>
<td>FS 30</td>
<td>Microbiology Food from Microbes (1) Familiar Foods</td>
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</tr>
<tr>
<td>FS 31</td>
<td>Microbiology Food from Microbes (2) Unconventional Food</td>
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<tr>
<td>FS 32</td>
<td>Microbiology Treatment of Sewage &amp; other used waters</td>
<td></td>
</tr>
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</table>
CASSETTE PROGRAMMES

CP 1  Effective Learning
CP 2  Plant Growth Regulators
CP 3  Cell Differentiation in Animals
CP 4  Nerve Cell
CP 5  Human Biology (1) (+ book)
CP 6  Human Biology (2)

SLIDE PROGRAMMES

SP 1  Pollution (1)
SP 2  Pollution (2)
SP 3  Meiosis in Corthippus Brunnens

BIOSET VIEWER

BV 1  Algae (+ booklet)
BV 2  From Egg to Chick (+ booklet)

SELF-INSTRUCTIONAL BOOKS

SB 1  The Antibiotic Principle
SB 2  Validity in Scientific Experiment
APPENDIX D

CASE STUDY TWO: POPULARITY OF USE OF RESOURCE CENTRE

GLOBAL RESULTS NO. 1

Week no. 1 = 363
Week no. 2 = 470
Week no. 3 = 485
Week no. 4 = 610
Week no. 5 = 668
Week no. 6 = 665
Week no. 7 = 627
Week no. 8 = 649
Week no. 9 = 579
Week no. 10 = 498

Therefore, the most popular week is week no. 5

Monday = 1130
Tuesday = 1369
Wednesday = 1431
Thursday = 1297
Friday = 387

Therefore, the most popular day is Wednesday

Time interval 9:10 = 611
Time interval 10:11 = 1631
Time interval 11:12 = 746
Time interval 12:13 = 514
Time interval 13:14 = 827
Time interval 14:15 = 854
Time interval 15:16 = 400
Time interval 16:17 = 31

Therefore, the most popular time interval is 10:11

Mornings (9.13 hrs) = 3502
Afternoons (13.17 hrs) = 2112

Therefore, mornings are more popular than afternoons
GLOBAL RESULTS NO. 2

Week no. 1 = 113
Week no. 2 = 212
Week no. 3 = 341
Week no. 4 = 285
Week no. 5 = 368
Week no. 6 = 285
Week no. 7 = 309
Week no. 8 = 347
Week no. 9 = 374
Week no. 10 = 286

Therefore, the most popular week is week no. 9

Monday = 611
Tuesday = 828
Wednesday = 562
Thursday = 687
Friday = 232

Therefore, the most popular day is Tuesday

Time interval 9:10 = 299
Time interval 10:11 = 798
Time interval 11:12 = 309
Time interval 12:13 = 326
Time interval 13:14 = 552
Time interval 14:15 = 424
Time interval 15:16 = 188
Time interval 16:17 = 24

Therefore, the most popular time interval is 10:11

Mornings (9.13 hrs) = 1732
Afternoons (13.17 hrs) = 1188

Therefore, mornings are more popular than afternoons

270
Dear

The Department of Adult Education is engaged in a research project which has two aims: The first is to document the development and use of resource centres in departments in Higher Education institutions. The second is to develop a resource centre for the Department (of Adult Education) with a view to achieving a more effective sharing of departmental resources to facilitate teaching and learning, research and individual development. In addition, the project provides the basis for Post Graduate research work.

Our project has identified about one hundred departmental centres. We now seek your assistance to acquire information to supplement what we have acquired through visiting several such centres and ask you to return the enclosed questionnaire. Its aims are twofold: firstly to provide academics with comprehensive data on the development and use of centres and, secondly, to provide the basis for an enlarged collaboration amongst those centres interested.

Most of the questions can be answered by putting ticks into the relevant boxes; in some cases, additional information is asked for. Please supply this if you can. Please feel at liberty to reword any of our questions if you think this necessary to enable you to answer them.

We shall be pleased to have any comments on matters relating to your centre and/or this questionnaire. We shall also be extremely grateful if you could enclose any other information you think appropriate.

We assure you that any information that you will give us will be treated confidentially and will not be used in any way that would identify you or your institutions.

If you regard this enquiry as an unwarranted incursion into your academic freedom, please say so (there is space at the top of the questionnaire) and return it rather than dispose of it.

When you have completed the questionnaire, please return it to us in the envelope provided, as soon as is compatible with your duties.

Thank you for your cooperation.

J M Kilty
Lecturer

M J Lopez
P G researcher
DEPARTMENT OF ADULT EDUCATION

DEPARTMENTAL RESOURCE CENTRES PROJECT

QUESTIONNAIRE

PRELIMINARY

If you do not approve of this enquiry please tick this box □ and return the questionnaire in the envelope provided. Thanks

1. THE CENTRE

Please tick the appropriate boxes and insert information in the spaces provided

| a) Name of centre
| b) Date of establishment
| c) Area occupied by centre (in sq meters)
| d) Number of student study places
| e) Opening times
  | Monday
  | Tuesday
  | Wednesday
  | Thursday
  | Friday
  | Weekends
  | Holidays
| f) Number of students in the department
| g) Number of those students for whom the centre is available
| h) Number of students who actually use the centre
| i) Is the centre available for students in
  | First year
  | Second year
  | Third year
  | Fourth year (if applicable)
  | Other groups (please specify)
| j) Number of academic staff in the department
| k) Number of these academics who have supplied materials for the centre and help to supervise the centre

1) Running the centre is the responsibility of
   - All staff in the department
   - Yourself supported by a committee
   - A committee of members
   - Yourself only
   - Others (please specify)

m) Supervision in your centre is provided by
   - Yourself
   - Academic staff
   - Technicians
   - PG demonstrators
   - Nobody
   - Others (please specify)

n) Please state briefly the aims of your centre (or enclose any documents where these are stated)
**LEARNING RESOURCES**

a) Please tick to indicate whether there are non-book learning resources available in:

- The main library
- Other departments

If so, please tick to indicate whether you keep catalogues of those resources

b) Please tick the appropriate boxes to indicate how the learning resources in your centre are indexed and catalogued:

<table>
<thead>
<tr>
<th>Indexed</th>
<th>Catalogued</th>
</tr>
</thead>
<tbody>
<tr>
<td>By medium</td>
<td></td>
</tr>
<tr>
<td>By lecture course</td>
<td></td>
</tr>
<tr>
<td>By topic</td>
<td></td>
</tr>
<tr>
<td>Others (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

c) Please indicate in the first column, the approximate number of learning resources available in your centre which fall into the categories below. In the second column, the approximate number produced by the agents listed:

<table>
<thead>
<tr>
<th>General background to topics</th>
<th>Your Department</th>
<th>Academics elsewhere</th>
<th>Commercial firms</th>
<th>Others (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplementary (optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built into course (compulsory)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remedial (pre-course requirements)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others (please specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

d) The following is a list of learning resource formats. Please indicate:

i) In the first column the approximate number you house

| Booklets | Programmed texts | Books | Reprints | Lecturer's notes | Handouts | Audio tapes | Audio tapes + booklets | Sets of slides | Tape-slides (synchronised) | Tape-slides (unsynchronised) | OHP transparencies | PIP materials | Film loops | Film strips | Video tapes | Computer based materials | Models | Model kits | Others (please specify) |
|----------|------------------|-------|----------|------------------|---------|-------------|------------------------|---------------|--------------------------|------------------------|---------------------|-------------|-------------|-------------|------------------------|-------|-----------|---------------------|

ii) In the second column tick to indicate that your centre has production facilities

APPENDIX NUMBER

PRODUCTION FACILITIES
### 3. Support

**a)** Please tick the appropriate boxes to indicate how you consider the support you are getting.

<table>
<thead>
<tr>
<th>FINANCIAL SUPPORT</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
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<tr>
<td>Capital expenditure</td>
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<tr>
<td>Consumable expenditure</td>
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<td></td>
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<tr>
<td>For staffing the centre</td>
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</tbody>
</table>

**Support from Academics**

- Head of Department
- Senior staff
- Provision of learning resources
- Encouragement to use centre by students

**Support from Units**

- Library
- Ed. Tech. Unit
- A.V. Unit
- Other (please specify)

### 4. Evaluation

**a)** Please tick to indicate whether you got feedback about the services provided in the centre.

- From students
- From academic staff

Please give brief details.

**b)** Please tick to indicate if you have evaluated the services provided in your centre.

Please give details. (Please enclose any documents you have produced)

**c)** Please tick the appropriate boxes to indicate how the services provided in your centre are perceived by those listed below.

<table>
<thead>
<tr>
<th>Yourself</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Head of Department</td>
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<tr>
<td>Academics in your Dopt.</td>
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<tr>
<td>Academics in other Depts.</td>
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<td>A.V. Unit</td>
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<td>Students in</td>
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<td>First year</td>
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<td>Second year</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Third year (if applicable)</td>
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<td></td>
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</table>
4. Yourself

a) Please indicate your status and grade

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<tr>
<td>Technical</td>
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<tr>
<td>Administrative</td>
<td></td>
</tr>
<tr>
<td>Research staff</td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

c) Please tick the appropriate box(es) to indicate which terms you would use to describe the activities in your centre

- Systems engineering
- Systems approach
- Educational technology
- Educational innovation
- Educational development
- Curriculum development
- Others (please specify)

b) Please tick the appropriate box(es) to indicate if you are involved in staff development in

- Your department
- Your institution
- If YES, please give details

5. General

a) Is there anything else you would like to tell us about your centre (e.g. advantages, disadvantages, relationship with library, units, etc.)

b) Please comment on the nature of this questionnaire or give detailed comments on particular questions

Thank you for your cooperation
With a view to a good coordination for the provision of resources, please complete this form and return it to Mario. (Detailed replies are not essential)

From

1. I have the following materials available and these can be either put into the Centre or borrowed for copying and subsequent return to me (please state which)

2. I am considering the production of the following materials

3. Please tick the box if you do not have any clear plans for the provision of materials but nevertheless would like to discuss ways in which suitable items might be provided.

4. Please use other side of this form to give any comments, suggestions and criticisms.

Thank you for your cooperation.
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<thead>
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<th>FORMAT</th>
<th>(book, article, computer software, etc)</th>
<th>No OF COPIES</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>TITLE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLACE OF PUBLICATION</td>
<td>(✓)</td>
<td>(please insert name)</td>
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<tr>
<td>LONDON</td>
<td>OTHER CITY</td>
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**IF IN A BOOK OF READINGS:**

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<th>to</th>
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**IF IN A JOURNAL:**

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<th>VOL No</th>
<th>ISSUE No</th>
<th>pp</th>
<th>to</th>
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</table>

**IF COMPUTER SOFTWARE:**

<table>
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<tr>
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**CONTACT**

| PUBLISHER OR PRODUCER | |
|-----------------------| |

**YEAR OF PUBLICATION**

<table>
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<tr>
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<th>(2nd, 3rd, etc)</th>
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**SUBJECT OR DESCRIPTORS**

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**RESTRICTIONS ON LOAN**

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<th>REFERENCE ONLY</th>
<th>STAFF ONLY</th>
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**NOTE ON CONTENTS**

(about 80 words)
APPENDIX G
SELECTION OF ENTRIES FROM THE PRELIMINARY CATALOGUE

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<tbody>
<tr>
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<td>Compiled over the years</td>
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<tr>
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<td>Mailing List</td>
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<tr>
<td>PLACE OF PUBLICATION:</td>
<td>Guildford</td>
</tr>
<tr>
<td>PUBLISHER or PRODUCER:</td>
<td>University of Surrey. Unpublished</td>
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<tr>
<td>NOTE ON CONTENTS:</td>
<td>The list includes the addresses of WEA Branch Secretaries; Adult Education Institutes; University Departments concerned with Adult Education; Univ of Surrey Heads of Departments; District Nursing Officers; and others.</td>
</tr>
<tr>
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<tr>
<td>PUBLISHER or PRODUCER:</td>
<td>University of Surrey. Unpublished</td>
</tr>
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<td>NOTE ON CONTENTS:</td>
<td>To teach the morphological arbitrariness of Russian pronouns.</td>
</tr>
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<td>CAL</td>
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<td>Computer software</td>
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<td>COMPUTER: FORTRAN IV or VDU</td>
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<td>COMMENTS: CYRILLIC input or output available. Requires the SIGMA graphics option controller</td>
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<td>TITLE:</td>
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<td>PUBLISHER or PRODUCER:</td>
<td>Penguin Books</td>
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<tr>
<td>NOTE ON CONTENTS:</td>
<td>It is probably Jane Austen's best loved work and certainly one of the most enduringly popular of English novels.</td>
</tr>
<tr>
<td>LOCATION:</td>
<td>11 SE 21</td>
</tr>
<tr>
<td>LOAN RESTRICTIONS:</td>
<td>Open access</td>
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<tr>
<td>WORK IN DEPARTMENT:</td>
<td>RB</td>
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<tr>
<td>FORMAT:</td>
<td>Book</td>
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</tbody>
</table>
Bacon R
Undated
RESERV-REMAS-RES READER
Guildford
University of Surrey. Unpublished
Suite of three plus one data file. The exercise demonstrates the relationship between policy and operations of an accommodation unit.
13 AA 20
Open access
CAL
Computer software
COMPUTER: BASIC or VDU or PRINTER
DOCUMENTS: Output, student notes
COMMENTS: User inputs policy decisions which can be evaluated later in a small group situation

Bentley P
1978
THE BRONTES AND THEIR WORLD
London
Themes and Hudson Ltd
The book brings deep understanding of the sisters and their brother Branwell. A biography.
11 SE 21
Open access
RB
Book

Birchenough M
1982
KEEPING THE COLLEGE UNDER REVIEW
Educational Management and Administration
Vol10 No3 pp195-202
Longman
This paper describes an experiment in institutional self assessment which took place in ILEA Colleges.
1 SE 20
Open access
MSc degree
Journal article
AUTHOR or ORIGINATOR: Brahms
YEAR OF PUBLICATION: Undated
TITLE: VIOLIN CONCERTO IN D MAJOR OP 77
PLACE OF PUBLICATION: D.A.E.
PUBLISHER or PRODUCER: D.A.E. Unpublished
NOTE ON CONTENTS: Cassette tape of the London Symphony Orchestra conducted by James Longhan. Maurice Hasson, violin. (Recorded from a disc for research and teaching purposes).
LOCATION: 10 SE 21
LOAN RESTRICTIONS: Open access
WORK IN DEPARTMENT: RB
FORMAT: Audio visual

AUTHOR or ORIGINATOR: Buist G B
YEAR OF PUBLICATION: Undated
TITLE: ATOM
PLACE OF PUBLICATION: University of Surrey, Unpublished
PUBLISHER or PRODUCER: Displays shaded contours diagrams of atomic orbitals, the corresponding wavefunctions and radial distribution functions.
NOTE ON CONTENTS: 13 AA 20
LOCATION: Open access
LOAN RESTRICTIONS: CAL
WORK IN DEPARTMENT: Computer software
FORMAT: COMPUTER: Versions available in BASIC and FORTRAN
DOCUMENTS: Student and teacher notes. Sample outputs. Program documentation

AUTHOR or ORIGINATOR: Buist G L
YEAR OF PUBLICATION: Undated
TITLE: MAZVEL
PLACE OF PUBLICATION: University of Surrey, Unpublished
PUBLISHER or PRODUCER: A series of programs illustrating the distribution speeds and energies of gas molecules. The distribution of energies is dealt with in two as well as three dimensions.
NOTE ON CONTENTS: 13 AA 20
LOCATION: Open access
LOAN RESTRICTIONS: CAL
WORK IN DEPARTMENT: Computer software
FORMAT: COMPUTER: BASIC
DOCUMENTS: Student notes
COMMENTS: Graphics package required
EVALUATORS AT WORK: Report of a Workshop
Norwich
IFAPLAN
The report reflects the opinions, attitudes and problems of a part of the workshop and was conceived as a restricted working document intended to stimulate discussion on evaluation.
3 SE 20
Reference only
Young Adults
Book

JOB SEARCH: A Job seeking Aid
Guildford
University of Surrey
Booklet designed to provide youngsters with ideas and advice for their job search.
3 SE 20
Reference only
Young Adults
Book

GPROPS
Guildford
University of Surrey. Unpublished
Property of Gaussian distribution. Enables the student to study the properties of a Gaussian distribution such as probability levels for observations lying outside a selected range.
13 AA 20
Open access
CAL
Computer software
COMPUTER: BASIC or COMPUTEK or GOC or TEKTRONIK
DOCUMENTS: Student notes, sample output, listing, teacher's notes
COMMENTS: Available on Physics NOVA, to be moved to PRIME
| AUTHOR or ORIGINATOR: | Cox M J and Lopez M J |
| YEAR OF PUBLICATION: | Undated |
| TITLE: | QSHM |
| PLACE OF PUBLICATION: | Guildford |
| PUBLISHER or PRODUCER: | University of Surrey. Unpublished |
| NOTE ON CONTENTS: | Simulation of the movement of a damped harmonic oscillator. The user can study the damaged simple harmonic motion in terms of the Quality value. |
| LOCATION: | 13 AA 20 |
| LOAN RESTRICTIONS: | Open access |
| WORK IN DEPARTMENT: | CAL |
| FORMAT: | Computer software |

**COLE: BASIC or GRAPHICS or NOVA AND PRIME**

**DOCUMENTS:** Student guide, teacher's notes and sample output

**CONTACT:** Dr T Hinton, DES

| AUTHOR or ORIGINATOR: | Department of Adult Education |
| YEAR OF PUBLICATION: | 1982 |
| TITLE: | MINUTES OF STAFF MEETING OF 3 JUNE 1982 |
| PLACE OF PUBLICATION: | Guildford |
| PUBLISHER or PRODUCER: | University of Surrey. Unpublished |
| NOTE ON CONTENTS: | The Agenda included: Apologies for Absence, Minutes of the last Meeting, Matters Arising, David's Report, Visiting Staff: future prospects, Resource Centre, Departmental Calendar, Reports from Interest Groups, and dates and time of next meeting. |
| LOCATION: | 16Se 21 |
| LOAN RESTRICTIONS: | Staff only |
| WORK IN DEPARTMENT: | Administration |
| FORMAT: | Paper |

| AUTHOR or ORIGINATOR: | Department of Adult Education |
| YEAR OF PUBLICATION: | 1981 |
| TITLE: | ANNUAL REPORT 1980-81 |
| PLACE OF PUBLICATION: | Guildford |
| PUBLISHER or PRODUCER: | DAE University of Surrey |
| NOTE ON CONTENTS: | The report provides a summary of the year's work in Adult Education at the University of Surrey. |
| LOCATION: | 17 SE 21 |
| LOAN RESTRICTIONS: | Open access |
| WORK IN DEPARTMENT: | Administration |
| FORMAT: | Book |
AUTHOR or ORIGINATOR: Edney P J
YEAR OF PUBLICATION: Undated
TITLE: THE CONCEPT AND CONSTRUCTION OF THE ALGORITHM
PLACE OF PUBLICATION:
PUBLISHER or PRODUCER: RAOC Training Centre
NOTE ON CONTENTS: 11 SE 20
LOCATION: Open access
LOAN RESTRICTIONS: HPRP
WORK IN DEPARTMENT: Book
FORMAT:

AUTHOR or ORIGINATOR: Edwards D
YEAR OF PUBLICATION: 1980
TITLE: PERSONAL GROWTH THROUGH CO-COUNSELLING
PLACE OF PUBLICATION: Rhodes, South Africa
PUBLISHER or PRODUCER: Department of Psychology, Univ of Rhodes
NOTE ON CONTENTS: The book is intended to provide background concepts and a working manual for those taking part in training courses in co-counselling. It relates in a thorough way the theory and practices of counselling and to the many prior and current developments in theoretical and practical psychology.
LOCATION: 11 SE 20
LOAN RESTRICTIONS: Open access
WORK IN DEPARTMENT: HPRP
FORMAT: Book

AUTHOR or ORIGINATOR: English Language Institute
YEAR OF PUBLICATION: 1982
TITLE: COURSES IN ENGLISH FOR ACADEMIC STUDY
PLACE OF PUBLICATION: Guildford
PUBLISHER or PRODUCER: Department of Linguistics and Regional Studies, University of Surrey
NOTE ON CONTENTS: Information provided on course subjects, fees and dates.
LOCATION: 17 SE 21
LOAN RESTRICTIONS: Open access
WORK IN DEPARTMENT: Administration
FORMAT: Leaflet
DIRECTORY OF MATERIAL ORIGINATING FROM PILOT PROJECTS
Norwich
IFAPLAN
The directory compiles a variety of curriculum and general information materials on the many aspects of transition of young people from education to working life, which were developed during the European Community Action Programme pilot projects.

3 SE 20
Reference only
Young Adults
Book

Gamble P
Undated
STREX
Guildford
University of Surrey. Unpublished
Strategy exercise involving six hotels.
13 AA 20
Open access
CAL
Computer software
COMPUTER: BASIC or PRINTER
DOCUMENTS: Output, student notes
COMMENTS: Student team input decision at intervals, computer reallocates market shares and outputs financial statements.

Gibbons S
1981
COLD COMFORT FARM
London
BBC Radio 4
Dramatised version of the novel recorded from the BBC for research and teaching purposes.
11 SE 21
Open access
RB
Audio visual
AUTHOR or ORIGINATOR: Gilbert G N
YEAR OF PUBLICATION: Undated
TITLE: DEMOG
PLACE OF PUBLICATION: Guildford
PUBLISHER or PRODUCER: University of Surrey. Unpublished
NOTE ON CONTENTS: Demonstrates effects of differential fertility and mortality on population through time.
LOCATION: 13 AA 20
LOAN RESTRICTIONS: Open access
WORK IN DEPARTMENT: CAL
FORMAT: Computer software
COMPUTER: Fortran or VDU
DOCUMENTS: Sample output
COMMENTS: Uses seven files containing population data

AUTHOR or ORIGINATOR: Glaser B G and Strauss A L
YEAR OF PUBLICATION: 1970
TITLE: DISCOVERY OF SUBSTANTIVE THEORY: A basic strategy underlying qualitative research
PLACE OF PUBLICATION: In Filshted W J (ed) Qualitative Methodology pp288-304 Chicago
PUBLISHER or PRODUCER: This paper was developed from qualitative research done during a study of terminal care in hospitals.
NOTE ON CONTENTS: 11 SE 20
LOCATION: Open access
LOAN RESTRICTIONS: HPRP
WORK IN DEPARTMENT: Chapter
FORMAT:

AUTHOR or ORIGINATOR: Griffin
YEAR OF PUBLICATION: Undated
TITLE: ROCK COLLECTION
PLACE OF PUBLICATION: Griffin
PUBLISHER or PRODUCER: Set of 50 rock specimens.
NOTE ON CONTENTS: 4 SE 20
LOCATION: Open access
LOAN RESTRICTIONS: RB
WORK IN DEPARTMENT: Specimen
FORMAT:
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<th>Author or Originator</th>
<th>Year of Publication</th>
<th>Title</th>
<th>Place of Publicat.</th>
<th>Publisher or Producer</th>
<th>Note on Contents</th>
<th>Location</th>
<th>Loan Restrictions</th>
<th>Work in Department</th>
<th>Format</th>
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<tr>
<td>Haigh G</td>
<td>1981</td>
<td>REGULATIONS FOR PRESENTATION OF THESIS or DISSERTATIONS</td>
<td>Guildford</td>
<td>University of Surrey</td>
<td>Regulations concerning thesis copies, style and copyright</td>
<td>17 SE 21</td>
<td>Open access</td>
<td>Administration</td>
<td>Leaflet</td>
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<tr>
<td>Hare R M</td>
<td>1975</td>
<td>THE LANGUAGE OF MORALS</td>
<td>London</td>
<td>Oxford University Press</td>
<td>The book sets out a brief and readable introduction to ethics which shall bring the beginner as directly as possible to grips with the fundamental problems of the subject.</td>
<td>11 SE 21</td>
<td>Open access</td>
<td>RB</td>
<td>Book</td>
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<td>Heron J</td>
<td>1975</td>
<td>PRACTICAL METHODS IN TRANSPERSONAL PSYCHOLOGY</td>
<td>Guildford</td>
<td>HPRP, University of Surrey</td>
<td>The purpose of this book is to present a new and comprehensive typology of strategies for self directed and voluntary access to altered states of consciousness involving different kinds of meditation. These are either introverted or extraverted, and are classed as witnessing, concentration, creative participation, desidentification and voluntarism.</td>
<td>11 SE 20</td>
<td>Reference only</td>
<td>HPRP</td>
<td>Book</td>
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<td>AUTHOR or ORIGINATOR</td>
<td>YEAR OF PUBLICATION</td>
<td>TITLE</td>
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<td>Jenks C L, Murphy C J and Simms D</td>
<td>1978</td>
<td>EXPERIENCE BASED LEARNING AND THE FACILITATIVE ROLE OF TEACHERS</td>
<td>Far West Laboratory for educational research and development</td>
<td>This guide presents some ways to improve the learning process at secondary and post secondary institutions. Specifically it deals with two related issues: various kinds of experiential learning activities and the role of the teacher.</td>
<td></td>
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<td>Joint Board of Clinical Nursing Studies</td>
<td>1977</td>
<td>THE RESEARCH OBJECTIVES IN JOINT BOARD COURSES</td>
<td>London Joint Board of Clinical Nursing Studies</td>
<td>The Joint Board has produced this introductory guide to the research objectives in the outlined curricula to enable course teachers to gain more knowledge and understanding of the subject.</td>
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<tr>
<td>Kelly A</td>
<td>1981</td>
<td>REPORT OF THE VICE-CHANCELLOR FOR THE SESSION 1980-81</td>
<td>Guildford University of Surrey</td>
<td>The report provides a summary of the year's work at the University of Surrey.</td>
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</tbody>
</table>
AN EVALUATION OF THE COURSE FOR TEACHERS IN GENERAL DENTAL PRACTICE

Kilty J M

1976

The course aimed at developing teaching skills and in particular those required in leading group discussions and seminars. Some of the report's conclusions were that the credibility of teacher education in the professions is growing slowly and that if dentists are dissatisfied with the way their profession is going, then now is time they must work in the field of education to ensure a healthier future both for the profession and their patients.

Lee V H

Undated

OSCILL

The first program allows students to investigate properties of harmonic and anharmonic models for different molecules. The second program demonstrates the relationship between transition of electrons between energy levels and intensity.

Martel S (ed)

1981

SUPERVISION AND TEAM SUPPORT

London

This is the third book in a series about social work practice in Family Service Units. In this book, the supervision and team support essential for all the Units' work is considered.
AUTHOR or ORIGINATOR: Moon T
YEAR OF PUBLICATION: Undated
TITLE: FSER
PLACE OF PUBLICATION: Guildford
PUBLISHER or PRODUCER: University of Surrey. Unpublished
NOTE ON CONTENTS: Fourier Series. Allows students to investigate the individual terms or sum of terms of the Fourier Series of four set functions.

LOCATION: 13 AA 20
LOAN RESTRICTIONS: Open access
WORK IN DEPARTMENT: CAL
FORMAT: Computer software
COMPUTER: BASIC or COMPUTEK
DOCUMENTS: Student notes, teacher's guide, program listing and sample output
COMMENTS: Available on NOVA and PRIME.
CONTACT: Dr T Hinton DES

AUTHOR or ORIGINATOR: NBS Microslides
YEAR OF PUBLICATION: Undated
TITLE: ROCK SECTIONS METAPHORMIC
PLACE OF PUBLICATION: NSB Microslides
PUBLISHER or PRODUCER: Set of twelve microslides.
NOTE ON CONTENTS: 4 SE 20
LOCATION: Open access
LOAN RESTRICTIONS: RB
WORK IN DEPARTMENT: Specimen

AUTHOR or ORIGINATOR: O’Casey S
YEAR OF PUBLICATION: 1958
TITLE: THE SHADOW OF A GUNMAN: A Tragedy
PLACE OF PUBLICATION: London
PUBLISHER or PRODUCER: Samuel French
NOTE ON CONTENTS: Play: A tragedy in two acts.
LOCATION: 10 SE 21
LOAN RESTRICTIONS: Open access
WORK IN DEPARTMENT: RB
FORMAT: Book
Owen D F
1974
WHAT IS ECOLOGY?
London
Oxford University Press
The book considers man as a part of nature and explains how ecology affects us, and our supplies of food, oil and other raw materials.
11 SE 21
Open access
RB
Book

Oxford A, Spragg D and Swain G
1981
KNOWING'S NOT ENOUGH
Leicester
National Youth Bureau
Five case studies of a social education approach in the Youth Opportunity Programme and addressed to people responsible for education within the Youth Opportunity Programme.
3 SE 20
Reference only
Young Adults
Book

Perls F, Hefferline and Goodman P
1951
GESTALT THERAPY: Excitement and Growth in the Human Personality
New York
Dell Publishing Co Inc
The book attempts to lay the foundations for the full application of Gestaltism in psychotherapy as the only theory that adequately and consistently covers both normal and abnormal psychology.
11 SE 20
Open access
HPRP
Book
Author or Originator: Ravel or Debussy
Year of Publication: 1978
Title: Bolero or La Mer
Place of Publicat.: Hayes, England
Publisher or Producer: EMI Records Ltd
Note on Contents: Quadraphonic recording of the Berlin Philharmonic Orchestra conducted by Helbert Von Karajan.
Location: 10 SE 21
Loan Restrictions: Open access
Work in Department: RB
Format: Audio visual

Author or Originator: Readings from Scientific American
Year of Publication: 1971
Title: Altered States of Awareness
Place of Publicat.: San Francisco
Publisher or Producer: W.H. Freeman & Co
Note on Contents: The purpose of this short reader is to provide the student of behaviour with some insight into several states of awareness that are distinct from the normal state of alert.
Location: 11 SE 20
Loan Restrictions: Open access
Work in Department: HPRP
Format: Book

Author or Originator: Registry
Year of Publication: 1974
Title: Notes for the Guidance of Research Students
Place of Publicat.: Guildford
Publisher or Producer: University of Surrey
Note on Contents: The notes provide guidance for admission, registration, appointment of supervisors, responsibilities of research students and examinations.
Location: 17 SE 21
Loan Restrictions: Open access
Work in Department: Administration
Format: Leaflet
**SYMPHONY NUMBER FIVE D485**

*Scubert Franz*

*London*

*Ernst Eulenburg Ltd*

*Symphony composed in 1816 and is scored for an orchestra unusually small.*

11 SE 21

Open access

**GAZETTE 352 1st April 1982**

*University of Surrey*

*Guildford*

*University of Surrey*

*Reports on the minutes of the Buildings and Estates Committee meeting of 17 Feb 1982*

17 SE 21

Open access

**MANAGEMENT AND MOTIVATION**

*Vroom V H and Deci E L (eds)*

*London*

*Penguin Books*

*This book brings together papers which represent the main work being done in the study of motivation.*

19 SE 21

Open access

**RB**

**Book**
Welbers G  
1982  
THE EC PILOT PROJECTS AND THEIR SIGNIFICANCE
Norwich  
IFAPLAN  
The paper gives general information about a comprehensive initiative in the field of education, which, in many respects, appears to be a milestone for the development of co-operation and interactive learning within the European Community and between Member States.
3 SE 20  
Reference only  
Young Adults  
Book

Youth Work Unit  
1981  
ENFRANCHISMENT: YOUNG PEOPLE AND THE LAW
London  
National Youth Bureau  
The information pack is addressed to full and part time youth workers who aim to prepare young people to deal with the issues they will inevitably face during transition from childhood to adulthood.
3 SE 20  
Reference only  
Young Adults  
Book
### SUBSCRIPTIONS IN D.A.E.

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<td>Dept Secretary</td>
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<td>Education Policy Bulletin</td>
<td>A Coleman</td>
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<td>F.R.E.E.</td>
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<td>N.I.A.E.</td>
<td>Dept Secretary and A Chadwick</td>
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<td>New Literature on Old Age</td>
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<td>Technology Week</td>
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<td>U.C.A.C.E.</td>
<td>A Chadwick</td>
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<td>Educational Centres Association</td>
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<td>L.A.C.E. or A.R.E</td>
<td>I Jones</td>
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<td>National Museum of Labour History</td>
<td>A Chadwick</td>
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<td>Pre-Retirement Association</td>
<td>B Buttle</td>
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<td>S.C.R.U.T.E.A.</td>
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<td>S.R.E.C.A.</td>
<td>D James</td>
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<td>S.R.H.E.</td>
<td>J Fisher</td>
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<td>Society of Industrial Tutors</td>
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<td>Southern Region Trade Union Information</td>
<td>J Fisher</td>
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<td>Surrey Trust for Nature Conservation</td>
<td>J Hobrough</td>
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<td>Association of Humanistic Psychology</td>
<td>J Kilty</td>
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I.E.D. JOURNAL SUBSCRIPTIONS

American Educational Research Association Journal
Aids, Communication and Electronics
A.S.T.D. Newsletter (Loughborough)
B.A.C.I.E. Journal
British Journal of Educational Studies
Bulletin of Educational Research (Newcastle Polytechnic)
Computers in the Curriculum
Computers in Schools
C.O.R.E. (microform only)
Education Policy Bulletin
Educational Computing
Educational Researcher (A.E.R.A.)
Evaluation Newsletter (S.R.H.E.)
H.E.R.D.S.A. News (Australia)
Higher Education Abstracts (Kington Polytechnic)
Learning Resources Bulletin (Middlesex Polytechnic)
Pipeline (U.S.A.)
P.L.E.T.
Practical Computing
Review of Educational Research
S.R.H.E. Abstracts
Studies in Higher Education
Teaching and Learning Newsletter (Swansea)
Teaching News (Birmingham)
Technical and Vocational Education (U.N.E.S.C.O.)
Trent Polytechnic Bulletin
University Education Bulletin (Canada)
University Teacher (Tasmania)
I.E.D. SUBJECT LIST

Adult Education 374
Assessment 378.146
   see also Evaluation Techniques 37.012
Audiovisual aids 371.68
   see also Computer aids 371.39

Biological Sciences 570.579

CAL 371.39
Chemistry 540
Classroom interaction 371.32
Communication theory 007
   see also Library techniques 02
Computer aids 371.39
Counselling 378.048
Curriculum 371.214

Degree Courses 378.046
Disadvantaged students 376
Distance learning 371.312

Economics 330
Education 370-377
   Higher education 378
Educational objectives 37.01 and 378.01
Educational Planning 37.014
Educational Policy 37.014
Educational Psychology 37.015
Employment opportunities 37.048.4
Engineering 620
Evaluation of teachers 371.136
Evaluation techniques 37.012
Examinations 371.27
Experiential learning 371.313

Finance 37.014
Further education 374

Games and Simulations 371.69
Group instruction 371.311.4

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  Accommodation 378.16
  Administration 378.1
  Counselling 378.048
  Degree courses 378.046
  Degrees 378.2
  Objectives 378.01
  Performance 378.146
  Students 378.18
  Teaching methods 378.147
    see also teaching methods 371.3

Immigrant children 376.7
Individualised instruction 371.311.1
Information retrieval 007

Keller plan 371.311.1

Laboratory work 371.388
Language 372.4
Lecturing 371.331
Libraries 02
  see also communication theory 007
    Research procedures 001.8
Literacy 372.4

Mathematics 510
Medicine 610
Microteaching 371.146
Middle school 373.33
Models 371.69

Numeracy 372.4
Nursery education 373.2

Objective testing 371.27

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see also evaluation 37.012

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Psychology 37.015

Research methods 001.8
see also information retrieval 007
libraries 002

Resources 371.6

Secondary education 373.3
Seminars 371.334
Science 500
Simulation 371.69
Sixth form 373.58
Social sciences 301
Staff development 371.14
Students 378.18
Study skills 001.8
Subject teaching and courses 372.8
Anatomy 372.8611
Biology 372.857
Chemistry 372.854
Economics 372.833
Education 372.837
Engineering 372.862
English language 372.4
Mathematics 372.851
Physics 372.853
Science 372.85
Technology 372.862
(for actual textbooks see under specific subjects,
e.g. Mathematics 510, Physics 530)

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see also staff development 371.14
Teacher evaluation 371.136
Teaching materials 371.6
Teaching methods 371.3
Computer aided 371.39
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Vocational training 377

Youth work 374.3
APPENDIX H

REFERENCES


Austerick K and Harris N D C (eds), (1972).


School resource centres. London. Evans/Methuen Educational.


Bobbit F, (1918).

Bobbit F, (1924).


Cooper C (ed), (1976).


Students guide. Sheffield. Sheffield Polytechnic.


Cowan J, (1975)b.

An experiment involving structured and unstructured tutorial material. Edinburgh. Heriot Watt University.


Is systematic curriculum design always feasible ?. Programmed Learning and Educational Technology Vol 17, No 2. pp 115 - 117.

Two contrasting approaches to curriculum development. Edinburgh. Heriot Watt University.
Heriot Watt University.

Freedom in the selection of course content: a case study of a course

Automatic tutoring by intrinsic programming. In Lumsdaine and Glaser

Who are the staff developers in U.K. universities and polytechnics. Higher

Foundations of measurement in educational technology: a review.
Programmed Learning and Educational Technology Vol 7, No 2. pp 93
- 112.

pp 1 - 14.

Educational technology at the crossroads: efficient message design or

Educational technology: archetypes, paradigms and models. In Hartley

Davies I K and Hartley J (eds), (1972).

Davis B, (1976).

Davis Q and Hills P, (1972).
The application of a systematic approach to an electrical engineering

Learning resources? an argument for schools. London. Council for
Educational Technology for the U.K.

Illuminative evaluation in action: an illustration of the concept of
progressive focussing. Paper presented at BERA second annual
conference.
Diederich M, (1972).


New Media and their Library in Education. London. Bingley.


Educational technology in the academic library. *Programmed Learning and Educational Technology* Vol 12, No 3. pp 151 - 162.


Supporting teaching for a change. London. The Nuffield Foundation.


Pretending not to be an educational technologist. Programmed Learning and Educational Technology Vol 12, No 6. pp 327 - 332.


Hamilton D, Jenkins D, King C, MacDonald B and Parlett M (eds), (1977).
Beyond the numbers game: a reader in educational evaluation. London. Macmillan Education.


Hanson J, (1975).


Harris, (1976).
The provision of support staff for the improvement of teaching and learning in universities in the U.K. British Journal of Educational Technology Vol 8, No 1. pp 55 - 60.


Hawkridge D, (1980).


Heron J, (1977)b.

Heron J, (1975).


Educational technology means men - or machines?. British Journal of Educational Technology Vol 2, No 2. pp 137 - 142.


311
Managing to teach as well?. In U T M U (1975). pp 54 - 70.

Teacher education and training. London. H M S O.


Audio visual aids in scientific higher education. London. H M S O.

Educational technology in tomorrow's world. Programmed Learning and Educational Technology Vol 6, No 2. pp 77 - 83.


Personal communication. Six category intervention analysis training course. November, University of Surrey.


Taxonomy of educational objectives handbook 2, the affective domain. London. Longmans.
Lawton D, (1980).  


Teaching machines and programmed learning. Washington D C. DAVI/NEA.


MacDonald B, (1971).  

MacDonald B, (1973).  


MacDonald-Ross M, (1976).  


Teaching and learning: an introduction to new methods and resources in higher education. Paris. UNESCO and the International Association of Universities.


Second Meeting of N C E T. In Willis (1972). p 158.


Packham D, Cleary A and Mayer T (eds), (1971).


Individualised instruction in Great Britain: a survey and case study.


Innovation, evaluation, research and the problem of control. Norwich. Centre for Applied Research in Education.


Sayer s, (1973).


Education -- experience or experiment?. Chemistry in Britain Vol 12, No 1. pp 15 - 17.

Field research: strategies for a natural sociology. New Jersey. Prentice Hall.

Looking at innovations: two approaches to educational research. Windsor. NFER.


Taylor P A and Cowley (eds), (1972).


Tiffin J, (1980).


Talking about innovations. Sheffield. Sheffield Polytechnic.


Tyler R W, (1949).

UTMU, (1975).
Issues in staff development. London. UTMU.

Teaching interviewing skills to medical students: a comparison of two methods. Medical Education Vol 10. pp 170 - 175.

Warren-Piper D, (1975)
The Longer Reach. In UTMU (1975), pp 1 - 19.


Willis N E, (1972).
Curriculum evaluation. Windsor. NFER.


Wittrock M C and Wiley D E (eds), (1970).  