

Learning Methods in Architects' Continuing Education

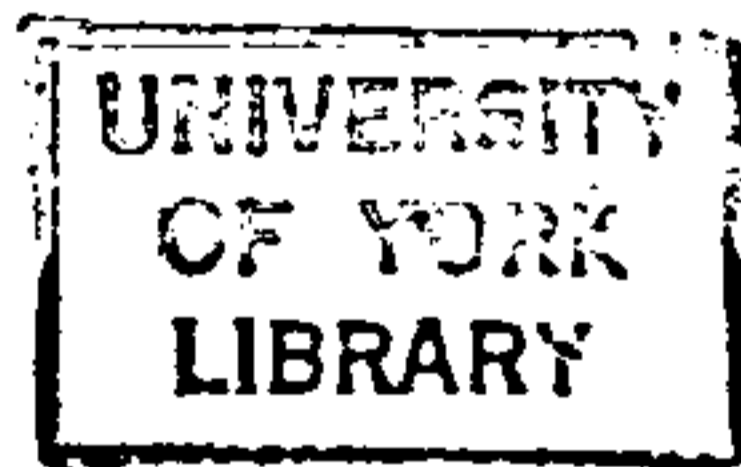
Stewart Harris

A thesis submitted for the degree of Doctor of Philosophy

University of York
Institute of Advanced Architectural Studies
June 1984

PAGE
NUMBERING
AS ORIGINAL

C013 5664 00 F0



CONTENTS	Page
Acknowledgements	5
Declaration	7
Abstract	9
<hr/>	
PART ONE	
Background	11
Chapter One	
Learning Methods in Continuing Education	13
Chapter Two	
Architects' Continuing Learning	27
Chapter Three	
A Case Study: Learning about energy in buildings	43
<hr/>	
PART TWO	
Methods Used by Learners	59
Chapter Four	
A Range of Methods of Learning	61
Chapter Five	
How Important is Each?	87
<hr/>	
PART THREE	
Four Arenas of Learning	119
Chapter Six	
Formally Organised Education	121
Chapter Seven	
Personally Organised Learning	171
Chapter Eight	
Non Deliberate Learning	207
Chapter Nine	
Office Action	241
Chapter Ten	
Observations	265
<hr/>	
PART FOUR	
To Demonstrate Utility	279
Chapter Eleven	
The Content of an Energy Learning Programme	281
Chapter Twelve	
A Second Case Study: Learning about energy in buildings	303
<hr/>	
References	321
Bibliography	329
List of Abbreviations	337
List of Figures	338
<hr/>	
Appendix	
Adult Learning Projects	341
<hr/>	

ACKNOWLEDGEMENTS

This thesis was supervised by Stuart Sutcliffe and Robert Irvine-Smith. My grateful thanks are due to them for their questions and challenges during the periods of research, consolidation and presentation, which helped me harden the material and seek out directions which may otherwise have remained unexplored.

A great many people contributed to the material in the study itself: literally hundreds of members of the architectural staff of NHS Regional offices and private practices set aside time and spoke with energy, interest and enthusiasm; Regional Architects and private practice principals gave their time and, more importantly, welcomed me into their offices to conduct seminars and interviews on matters which might have seemed at times to be irrelevant to their jobs in hand; many people at DHSS and at the RIBA and ARCUK gave me the benefit of their knowledge and looked out dusty records of decisions taken many years previously.

During the initial research period, the secretarial staff at IoAAS typed interview notes and I proffer my thanks to them, to Susan May and particularly to Diane Stockdale who typed and retyped this submission with great accuracy and cheerfulness.

The parts of this submission that arise from a report on NHS matters were commented on most helpfully by the NHS Continuing Education Unit steering group and they guided me through some awkward administrative problems. Ceri Davies, co-chairman of the group, has been a *deus ex machina*.

Within the Institute of Advanced Architectural Studies, Stuart Sutcliffe and Dr Jeremy Taylor considerably influenced the form and direction of the original research study. Over the four years I accumulated data and shaped this thesis, they joined in formal and informal discussions which were invaluable, stimulating and dynamic.

Acknowledgements often read as an obligatory litany: thinking back over the period of this research, I am struck by the real contributions these people have made to the work, and I am aware that many others who I have not been able to mention have helped in key ways as well: my thanks to all of them.

DECLARATION

The material contained in this study was collected during the period October 1977 to September 1981 when I was DHSS Research Fellow at the Institute of Advanced Architectural Studies, and from October 1981 to the present when I have been a consultant to the Institute. The work of the early part of that period was published in December 1978 by the University of York as Mid Career Education Needs of NHS Architectural Staff, Institute of Advanced Architectural Studies, Research Paper 16.

Chapter Four draws partly on interviews and analysis collected for that report, but not necessarily published, nor necessarily published in the form here propounded.

An early draft of Chapter Nine, Office Action, was published in Studies in Adult Education, September 1982 under the title "The Fourth Arena: Organisational action as a component of architects' continuing education". The chapter has been extensively revised in this submission.

Chapter Three was published in a slightly different form as a chapter in Case Studies in Continuing Professional Development, by Stewart Harris and David Rymer, Institute of Advanced Architectural Studies, Research Paper 22, 1983.

Chapter Eleven and the first part of Chapter Twelve are based on an unpublished article Stuart Sutcliffe and I prepared.

Abstract

This thesis sets out to question which learning methods architects recognise and utilise in their continuing education.

It starts by describing learning methods in continuing education generally and then moves on to an account of research that has been done in the architectural field specifically. This introductory part concludes with a case study of an education event designed to address the problem of the way the architectural team deals with energy using conventional methods.

A hypothesis is stated that the vast bulk of education usually utilises just part of the spectrum of ways architects learn. To generate a broader list of learning methods, the incidental accounts given by 71 architects during a series of interviews about their learning needs are plotted. These fall into generalised categories of Formally organised education, Personally organised learning, Non deliberate learning, and Office action. A follow-up study of the methods used by a second group of 115 building professionals to learn about energy is then described.

The central part of the submission describes these methods at some length, and makes observations about them. These relate to the whole field of CPD and are summarised in a separate chapter.

In the fourth, concluding part an account is given of how the second group of building professionals isolated their learning needs related to energy, and how an educational strategy was devised to respond to this, using the range of learning methods established.

The finding of the research is that a large palette of educational response is used by learners in practice. By utilising it, education designers can draw on a series of methods identified by learners themselves as being useful. This is not a prescriptive formula: education design, like all other forms of design, depends on an inspired response to an adequately articulated problem. But it is an attempt at enlarging the folk memory of educational solutions on which designers draw when reaching for unique learning strategies.

Part One

Background

Chapter One

Learning Methods in Continuing Education

"These studies ... are comparable to the efforts made by a mediaeval physician to determine which of two herbs had the greater curative value, when he had no knowledge of the chemistry, physiology or pharmacology involved"
(Wallen and Travers, 1963).

This thesis states that when educators set out to devise education for architects, they usually draw on only a small number of learning methods that are available to them. These come from a part of the learning spectrum which is here termed 'the Formally Organised Arena'; they are almost invariably held in a room specially set aside, though they do use a variety of strategies within that setting: lectures, seminars, workshops, distance-learning packages, role playing, and so on.

The hypothesis to be explored is that building designers - principally architects - recognise and use a much wider range than this. The purpose of discovering whether that hypothesis is true is to extend the educational intervention teachers make, and thus allow them to deliver education which is richer, more varied and which is likely to result in more uptake of the material being put across.

In order to examine the range of learning methods commonly used, a literature search was carried out. In some ways a focus on learning methods is a narrow approach, since there are many other factors which affect how architects and other adults learn. These range from their motivation to their emotional stability. Similarly, there are many views of the meaning of learning ranging from a view of totems in an anthropological approach, through organising theory in a systems behavioural one, to the function of the retina in a zoological approach. Nonetheless, a single focus at this early stage will help to clear the brushwood and establish the state of knowledge. Later in the research, as detailed questions of interpretation raise themselves, it will be necessary to return to the literature in various ways.

One criterion was set in carrying out this part of the study: that data should be collected from actual research into the various methods and avoid where possible simple statements of belief in their effectiveness.

Deciding on methods

What are the likely influences on the choice of a learning method

by an adult? There may be four. First there may be some preference on the part of the individual for one method or another. Second, there may be something about that which is to be learned that is particularly suited to a certain learning method. Third, more prosaically, the familiarity of a method may cause it to be chosen; put obversely, ignorance of the range of methods available will restrict the choice to familiar ones. And fourthly, equally prosaically, though no less effectively, the cost of providing education in one form may cause it to be preferred over another which appears to be better suited on the first two counts. Thus the influences are preferred learning styles; appropriateness to content; awareness; and practicality. Paradoxically, the last two are likely to have the greatest influence, though there is most to say about the first two.

Underlying these four factors is a more fundamental division, one which will reappear constantly through this research: who is choosing? The learner or the teacher? The vast bulk of the literature assumes that it is the teacher who will make the choice; indeed the first shock in a literature search is that bibliographies and library index trays make no reference to learning methods, preferring instead 'teaching methods'. Certainly the teacher will most often decide on the method in schools and universities. In continuing education though, which mostly takes place outside academic settings, it is more often the learner who is in charge of the education, and thus it is the learner who will most frequently choose. Allan Tough's research has shown this most clearly. In a series of interviews, now numbering many thousand, his major finding is that

"the chief planner is the learner himself"
(Tough, 1979).

The Appendix describes a subsidiary piece of research, based on Tough's work, which investigates the learning projects carried out by architects. More than two-thirds of the learning undertaken was planned by individuals themselves.

Methods and resources

This may be a convenient place, while the matter of terminology of learning and teaching methods is in the air, to clarify some of the terms used in this thesis. The chief of these is a clarification of the interchangeability of 'method' and 'resource'. On the whole, the term 'method' is used here. It is, however, often necessary to use the term 'resource' when plumbing in detail. In principle, the words

are corollaries of each other. Books are a resource, but reading is a method. Similarly, Reflection is a method, but the implication is that the learning is drawing on the inner resource of experience.

But in a more important sense they qualify each other. While it may be interesting to know that 'reading' is a major method of acquiring knowledge, it is less useful to an education planner than is 'reading books' or 'reading trade literature'. This is partly because the balance of information and interpretation is different in trade literature and books; partly because if reading material is to be made available, it needs to be clear which material is most suitable.

The learning context

Since 1970 there has been a relatively large amount of material published - especially in educational psychology - on methods of teaching adults (though this is as nothing compared to material on teaching methods for children). In general, most of the material describes individual methods, or a range of related methods, but there is a growing literature interrelating these sets in higher education studies.

There is an important qualification in that last sentence, of which it would be as well to be aware. The vast bulk of data about adult learning has been obtained from studies of undergraduate students, some from adult education class attenders. Neither of these groups represents adults generally let alone the architects being studied here. However, they are probably closer to the truth than studies of children, or pigeons, would be.

Matching the method to the learner

Earlier, the question of who plans a learner's education was touched on. The impression gained from reading the literature of the last ten years is that it is very much the learner. But it is doubtful whether this learner control is reflected in formal education practice. The great influences on learner-centred education have been Carl Rogers and Abraham Maslow. Their humanist end of the spectrum of learning theory psychology is undoubtedly dealt with most in contemporary publications. This may be contrasted with the position ten or fifteen years ago when the other end of the spectrum (represented by BF Skinner and operant conditioning) was of most interest.

Many of the approaches to teaching adults have in the past decade adopted Maslow's belief that learning involves 'self-actualisation' -

a self aware development of inner needs - and that students have responsibility for their own learning. This school also tends to differentiate (sometimes implicitly) between learning which is an acquisition of information and techniques, and learning which is, in Rogers' terminology, "significant learning":

"When (the learner) chooses his own direction, helps to discover his own learning resources, formulates his own problems, decides his own course of action, lives with the consequences of each of these choices, then significant learning is maximized"
(Rogers, 1969).

The teaching methods which Rogers and Maslow tend towards are thus those which involve learner participation, responsibility and self awareness: methods with titles like 'role-play', 'self-directed learning', 'discovery learning': experiential learning. These are methods which seem peculiarly appropriate for adults (Maslow is refreshingly blunt about his lack of interest in young people). Curiously, many of Rogers' followers assume that experiential learning can only take place in non-real-world settings. Walter and Marks (1981) for instance, list five experiential teaching methods:

"There are five methods that are central to experiential learning: simulations, exercises, group interaction, role playing and body movement"
(p178).

Whichever list of methods is generated, they all require that the learner is directly and actively involved in learning which requires some personal restructuring of knowledge. The use of groups is involved in many experiential methods, and the importance of learning from each other is stressed. The type of learning can be as unemotional as examining how fellow learners take notes, to gestalt experiences about relationships and personal growth as in T-group encounters.

In spite of the contemporary popularity of these methods in recent literature, there is little evidence to show that mature adults learn more by these methods than by more tutor-centred ones. Perhaps their popularity arises because they are more in tune with a less authoritarian world; perhaps they are written about because they have been under-studied in the past; or perhaps the side benefits of satisfaction in learning are the dominant justifications. Millard quotes Beach (1974) as finding

"that in a study of full time college students the use of small, self-directed learning groups encouraged

critical thinking, satisfaction in learning and the desire for further learning, although there appeared to be no measurable differences in students' examination performance and content retrieval ability whatever teaching methods were used"

(Millard, 1981).

So in recent years, experiential methods have been popular as a subject for written accounts. It seems unlikely that formal learning methods are as underrepresented in adult education as they are in the literature. There is certainly little (apart from assertions) which shows what affects the choice of method: the nature of the subject matter; the preferred style of the learner; or the aims and objectives of the planner. Here the adult education tutor is in a less favourable situation than the teacher of children who can draw upon a huge body of knowledge relating psychological theories to learning of the child and to teaching methods in the classroom. Two contrasting quotations illustrate this. Child in his general overview of research, Psychology and the teacher, says of children's education:

"Growth in the application of psychological principles to educational problems has become rapid and diverse in recent years."

(Child, 1981).

Howe, on the other hand, writes of adult education:

"For better or worse, researchers enquiring into the differing kinds of learning have proceeded with considerable independence, and while most of the scientists investigating human learning clearly share some common methods and approaches, and some assumptions about the way in which learning processes should be conceived, variations and discrepancies between the approaches of individual investigators are large and perhaps more striking"

(Howe, 1977).

Millard conducted an exhaustive survey of recent literature, and she concludes:

"Educational psychology has been concerned almost wholly with the education of children and young people. There is at present, no educational psychology of the mature adult learner per se. Perhaps the field is too difficult to define, too open to semantic and philosophical argument as to its nature, to enable the growth of a coherent body of theory. There is certainly a lack of rigorous definition of concepts in much of the writing on adult education, which makes comparison and unification of the work so far done exceedingly difficult"

(Millard, 1981).

There seems to be a curious separation between the theory and research into adult learning on the one hand, and the actual teaching of mature people on the other. Broadly speaking, many of those engaged in teaching adults (or helping them learn) have only a fleeting acquaintance with educational psychology: certainly it is often difficult to see the relevance. Moreover, some of the more useful research lies in obscure places (like Riegel's "Dialectic operations: The final period of cognitive development" in a journal on human development) - and more of it is framed in impenetrable language (Pask, 1973 for example).

Probably the most influential of the educational theorists on teaching practice in Britain is Piaget. His key summary of concept development in children's thinking suggests four stages, progressing from sensory motor through preconceptual and intuitive to concrete operations and finally formal operations. But Riegel's work (Riegel, 1973) suggests that Piaget's observations do not give a good description of the way adults think. Piaget's progression is away from contradictions, towards an absence of ambiguity. Riegel observes that adults can (and do) choose between alternatives which are equally probable (and occasionally equally improbable!) and by committing themselves to one alternative, deny themselves the other. So he argues for a fifth stage of cognitive development: what he calls 'dialectic operations'. In this the mature adult operates in a social environment which is not his creation. Furthermore he acts within a system in which

"dialectic conflicts and contradictions are a
fundamental property of thought"
(Riegel, 1973).

The clear link between this theory and educational practice is the encouragement of learners to consider and discuss alternative perspectives on their chosen subject matter. A good illustration from contemporary fiction is Laurence Durrell's "Alexandria Quartet" in which alternative interpretations are given of the same event: this serves to round the account, but Durrell makes no choice as to which is closest (if any) to the truth. Similarly, Anthony Powell's style of writing "A Dance to the Music of Time" provides a further illustration.

Fortunately, there are a number of researchers other than Riegel pursuing this area. Perry, for example, who is quoted in Entwistle and Hounsell. He says a learner's

"acts of evaluation must subtend more than discrete
rights and wrongs, and extend through time to assist
discrimination among complex patterns of

interpretation"

(Entwhistle and Hounsell, 1975).

Two key collections of writings provide useful summaries of current research. One is Howe's "Adult Learning" (Howe, 1977); the other is Entwhistle and Hounsell's "How Students Learn" (Entwhistle and Hounsell, 1975).

Howe's book collects the contributions of a number of psychologists who have undertaken and applied research in adult learning. The collection shows the differences in approach and assumptions by different researchers.

"Two particular considerations have influenced the choice of topics. First, I have given some emphasis to areas in which the outcomes of research activities can be regarded as broadly practical, insofar that applications to immediate practical problems of learning encountered in real life can either be made directly or are clearly foreseeable ... Second, I have avoided concentrating on those kinds of learning which are considered 'educational' in the usual sense. Many forms of learning which are given little or no attention in educational institutions have a vital role in adult life"

(Howe, 1977).

Furthermore, the ideology behind the choice is based on a view of the learner as

"a highly active and relatively autonomous being who makes plans and decisions, who organises his experience, and is far from being the passive recipient of environmental influences that earlier ideologies tended to suggest"

(Howe, 1977).

An illustration from Howe of the 'broadly practical' is the inclusion of Hartley and Brunhill's full description of typography, layout and design of written materials, or Donald Bligh's summary of the uses of audio-visual material. An illustration of the 'alternative forms of learning' is Thomas and Harri-Augstein's "Learning to Learn". This last indicates some dissatisfaction with the limits to the kind of scientific activity accepted by experimental psychologists. Instead they emphasise the highly personal nature of learning, stressing the interaction and give-and-take between learners and their source of knowledge.

"Thus for the authors the construct: 'As viewed by the teacher vs As viewed by the learner' is an important differentiation to be made in thinking and feeling about learning ... another important dimension for construing learning is: 'As

assessed against the original purpose (if any)
vs As assessed retrospectively"

"Most learning in education falls into the TO-category (teacher original). The teacher sets the purpose of the exercise and the learning is measured by reference to what he sets out to teach. Most personally valued learning falls into the category LR (learner retrospective). The learner recognises after the event that something significant has happened. Then and only then does the learner set about evaluating what has happened" (Thomas and Harri-Augstein, 1977).

Entwhistle and Hounsell's book, like Howe's, collects a wide range of writings, but unlike Howe's attempts to show how they can be arranged in a single continuum, from tightly controlled learning (Skinner's "The Science of Learning and the Art of Teaching") to open ended learning experiences (A chapter from Rogers' "Freedom to Learn"; Maslow's "Goals and Implications of Humanistic Education").

The work of Lindsay and Norman finds a central piece in Entwhistle's collection. Their information processing model of human learning suggests ways learners can analyse information presented in lectures particularly - though it has implications for most methods of learning. It focusses on the factors which affect good storage of information and, more importantly, why failure occurs in retrieval. Their theory differs from the classic stimulus-response model in that learning is seen as the result of active interaction with the environment. So over a period of time, what is remembered is subject to change, as in this illustration they make:

"Many people learn the story of Hiawatha as a child. The adult's recollection of the story is likely to be very different from his original learning. The adult's concept is the product of what has been thought about since the original learning as well as being partly made up of the original input"

(Lindsay and Norman, 1977)..

So the knowledge one has is in a continual state of evolution and this directly affects the gaining of new information. Children differ from adults in that they do not have this store of growing and evolving knowledge. The implication here is that some methods of learning are inappropriate for adults: rote learning for instance. The adult already has

"a great deal of information (which) has been accumulated and organised into a richly connected data base ... New things can be learned primarily by analogy to what is already

known. The main problem becomes one of fitting a new concept into the preexisting memory structure: once the right relationship has been established, the whole of past experience is automatically brought to bear on the interpretation and understanding of new events" (Lindsay and Norman, 1977).

The implication of this view is that teaching methods should be used which actively encourage adults to look for connections between what is already known and what is to be learned. Learning therefore needs to be structured so that learners can relate their past experience and knowledge to new concepts. Furthermore, Lindsay and Norman suggest that where this is not done - where new information does not fit with the learner's existing conceptual structure - it is likely to be resisted because the structure is made up of very complex and highly related sets of relationships.

An illustration which fits this theory can be found in an article by Howe included in his collection. It shows that successive attempts at remembering produces very consistent results of both correct and incorrect items.

"It appears that the subjects are unable to profit as much as one might expect them to from the opportunities for improvement and for making corrections that appear to be provided by the repeated presentations of the material. The version that an individual himself has reproduced appears to be particularly stable in his memory, and hence resistant to changes in the direction either of increased accuracy or increased forgetting" (Howe, 1977).

Again, then, there seems to be evidence pointing toward learner centred rather than teacher-centred approaches, with learners being encouraged to reevaluate and restructure evidence for themselves.

This brings forward another key contributor to Entwistle's collection: Gordon Pask. Pask's work is virtually impossible to read by anyone other than cyberneticists. Fortunately there are some good 'translations': one by Daniel is included in Entwistle (Daniel, 1975).

Pask demonstrates experimentally that learners can be divided into two groups: serialists, or step-by-step learners; and holist, or overall learners. He shows that these two groups adopt quite different learning strategies and have different kinds of problems. Furthermore, when Pask imposed holistic methods on serialists and vice versa, the result was little or no learning.

If it were possible to know in advance what the preferred learning

styles of learners are, it would be possible for teachers to employ different approaches. Millard suggests that this requires a fundamental shift.

"If there are still to be teachers as well as learners, then we must have more information about those we teach both in terms of cognitive and personality characteristics and about ourselves and our teaching strategies. At a grass roots level, this implies taking time off from teaching our subject and using that time to get to know our students and allowing them to get to know us, as well as enabling students to see that this is not merely a pleasant social activity but a necessary part of the educative process. Beyond this, there is the clear implication for the need for further research and the development of diagnostic instruments suitable for use by those providing a counseling service within the field of adult education." (Millard, 1981).

However, there are ways of handling the problem of preferred learning styles, other than abandoning a scholastic setting and becoming a barefoot teacher (or as John Holt might say, a t-teacher).

For one thing, adults may be more phlegmatic than Pask suggests. His work has been adjusted to incorporate the notion of a 'choosing approach' in which some learners are seen as being able to adopt a serialist or holistic approach to meet their own objectives (and these learners are found to be most successful). Similarly they may be able to adopt the alternative strategy to suit the structure with which they are presented.

Then, in piecemeal education which is common in adults' learning undertakings (Tough's 'learning episodes'), there is seldom only one pure method. For example, a lecture is often followed by discussion; even the disembodied lecture method of television is frequently reviewed by watchers over coffee the following day. It should be noted that the serialist/holistic division is not inherent to any method. Thus a serialist lecture can be followed by a holistic discussion in the corridor. These alternatives can theoretically be built into the design of any education in at least three ways.

One way is to make the education robust: allowing redundancy to occur. Redundancy not in the sense that it has no validity for the learner, but in the sense that the content is reiterated in different forms. A second way is to develop this by deliberately designing alternative routes through material which a learner can preselect. The third way is Millard's and Holt's: first understand your learner's

preferences.

It might be cynically argued that there is a fourth way too, a way most frequently adopted. That is to accept that a certain proportion of learners are condemned to failure because their preferred style does not match the teaching style. In adult learning this may be less cruel than it appears; since certification is seldom the objective of the learning, a learner (given a certain amount of persistence) can abandon one approach and pick up another - provided there has been no blow to self esteem. Finally, Pask suggests that some learners are not necessarily shackled to only one style: his 'choosing approach'.

Matching methods to content

So far in this review, the focus has been on research on learning styles. This is not intentional, it arises because of the paucity of work on any of the other themes. As far as matching learning methods to the content of what is to be learned, there is hardly any work at all. Self evidently it is possible to make broad generalisations about the acquisition of, say, skills by practice rather than by theory - of learning pottery by throwing clay around rather than by being lectured at - but even these break down under examination. Holt, for example, in "How Children Fail" believes that the key activity in learning to ride a bicycle, or to sing in tune (both skills) resides not in practice but in an imaginative leap that conceives such things possible.

Rowntree sums up the state of knowledge well:

"Sometimes, our choice of media is strictly limited by the nature of our objectives. In other words, it may be necessary to ensure the kind of stimulus presented by the media is appropriate to the kind of ability the student is aiming to acquire ... The student who must 'identify which of a set of soil samples are sand, which clay and which loam' may get some help from words, printed or spoken, but he will be unable to make the discrimination until he gets his fingers on the realia - some soil specimens ...

But if we are helping our students towards affective objectives, change of attitudes, for instance, we will probably feel that none of the above media will be very helpful and, instead look for one involving intensive human interaction, eg simulation games or group discussion.

But usually a given objective can be achieved with the help of any one of a number of media. In fact, if it is not as obvious as in the paragraph above that one medium is essential, it probably does not matter which is used.

So, most objectives will not help us too much in choosing media" (Rowntree, 1981).

Familiarity and cost

So far in this review, the last two principal questions I listed affecting choice of method - familiarity and cost - have not been touched on.

Obviously, methods that learners and teachers choose are governed by those they are aware of. A teacher may be so bound by classroom methods (as so much of the literature is) that they are unaware of the values learners place on, say, contemplation of their life experience - and be resistant to it as a method when made aware. Similarly, students may for instance be unfamiliar with role playing, hence not choose it as a method.

Some methods are more expensive than others. For a pilot to learn to fly by crashing aircraft might be found to be more expensive than setting up flight simulation desks. More realistically, writing a distance learning package will undoubtedly need more time (= money) than giving a one-off lecture. In both cases, the cost of the education is related to the investment and the potential amortization of that investment. Often the attractiveness of a course of action for either the learner's style or the content's needs is purely hypothetical in the light of the need to have it available in the short term ("I don't want it right, I want it Tuesday") or because of a lack of capital for the investment that would be needed.

Summary

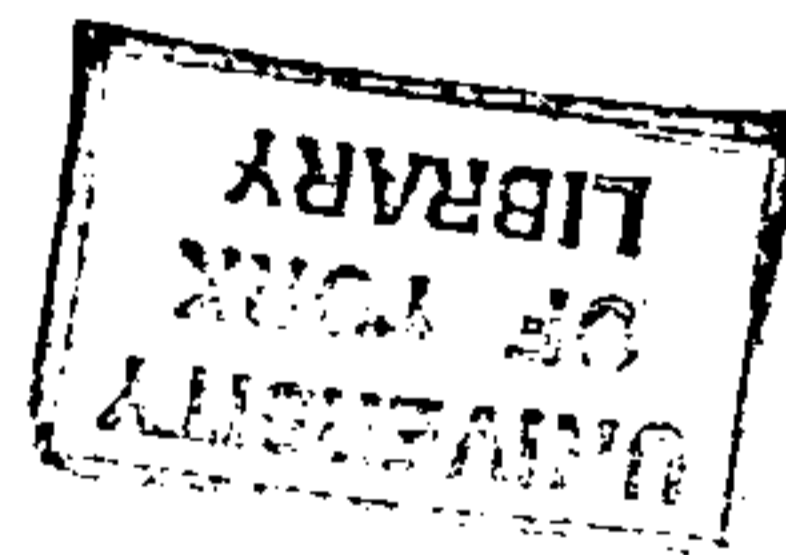
A literature search of the state of knowledge about learning methods appropriate to adults was carried out. This suggests that of the four principal reasons for choice, three have received very little study. The influence of cost on choosing particular methods has received very little attention. No studies have been made of whether choice (by teachers or learners) is influenced largely by familiarity, but this, by definition, seems likely.

Appropriateness of methods to the content of what is to be learned seems to operate at the most obvious level only, and appears to have little influence on choice.

There is a large body of work on matching learning methods to preferred learning styles, but in spite of the concentration on this

question in the last ten years, it appears to be little applied in practice. One reason for this is that the individual preferences of learners are seldom known in advance - particularly in continuing education where teacher/learner contact is fleeting and discontinuous. However, it is possible to deal with this in a number of ways, the most attractive being density of presentation in which learners can make choices.

So far, the description of methods has referred to adults generally. What particular research has been carried out among architects?



Chapter Two

Architects' Continuing Learning

"Continuing Education is really common sense. As the York Report ... states 'The building professions are faced with legislative, technological, economic and social changes of an altogether new order and complexity. It is becoming progressively more difficult to keep pace, let alone influence the course of events' "
(Leader column "The need for continuing education", Building Design, 3 March, 1978).

"So the academics and their hangers-on are at it again. The York Institute exists and hence it must justify that existence and the delightful egotistical existence of its self-styled 'tutors'. Also the architectural media exists, hence we must satisfy the ever increasing need for gobbledy-gook to fill its pages. Our points are amply illustrated by ... an editorial suggesting that an architect, after seven years full time training, cannot cope with alteration work and a new building!"
(Letter from AE Mainwaring and KG Murrin, Sussex, in Building Design, 17 March, 1978).

What is the nature and extent of architects' continuing learning? What methods do they employ to continue their learning, and how much time do they spend doing this? This chapter provides a brief review of research which has been undertaken to answer these questions, and shows where there are gaps in our knowledge of these matters.

THE EXTENT OF CONTINUING EDUCATION

Evidence to establish the extent of architects' continuing learning after leaving university might be sought in two areas. The first is to examine the growing literature on architects' continuing education to see what evidence is presented there. A second is to look at what formal continuing education events are offered and to assume there is a causal link between supply and demand for continuing education.

Research reports

In a report sponsored by the Department of Education and Science (DES), Education and Work: A study of paid educational leave in England and Wales 1976/77, Killeen and Bird showed that up to four million people a year receive some kind of paid educational leave. This involves about 20% of the workforce and represents 26 million

working days a year. Professionals and managers are ten times more likely to receive it than other workers. They also showed that the vast bulk of this leave was spent in vocational education (Killeen and Bird, 1981).

Since the early 1960's there have been a series of research reports that have attempted to map the extent of architects' continuing education in the UK.

In 1962, a Royal Institute of British Architects (RIBA) report, The Architect and His Office, found that about one-third of architectural offices were sending staff on courses (RIBA, 1962, para 2.66).

In 1971, Powell, Napper and Territ in an Architects Registration Council of the United Kingdom (ARCUK) paper on Continuing Education found that the amount of money being spent by offices on continuing education represented just over one day's education per year for each technical member of staff (Powell et al, 1971, para 7.1.0).

In 1973 and 1975, Hedge reported on research she had undertaken for ARCUK in Mid Career Education for the Building Professions. She estimated that short courses reached 20% of registered architects at a generous estimate (Hedge, 1975) and in a review of her work later reduced this to "around 15% of the profession" (Hedge, 1976).

In 1978, Carter, in a major article in the Architects' Journal, "Continuing Education", guessed that about one-fifth of all architects attended courses, though he presents no evidence to support this claim (Carter, 1978).

Later in 1978, Harris, in Mid Career Education Needs of NHS Architectural Staff, looking at records of courses attended by National Health Service (NHS) staff, found that on average 32% of staff in offices attended a course each year (Harris, 1978, p66). This averaged 52 man days education per year per office. In a further examination of office records two years later, it was found that this had increased to 243 days per office: representing 4.9 days per member of technical staff (CEU Newsheet 8, 1981).

All of these statistics had related to attendance on short courses. Few of the authors concerned would claim that short courses are coterminous with continuing education, but the only real attempt to plot a wider range of learning methods was a survey of office expenditure carried out by the Institute of Advanced Architectural Studies (abbreviated to IoAAS in this research) for ARCUK in 1980, Continuing Professional Development for Architects: A report for ARCUK (Gardner

et al, 1981).

It used the term Continuing Professional Development (CPD) to cover the continuing education spectrum and defined this to cover

"1. External education i.e. courses, lectures, seminars, meetings, discussions, workshops, conferences, study tours, visits.

2. Internal education i.e. activities with visiting lecturers/tutors, activities with internal lecturers/tutors, activities with bought/hired packages, office visits and tours, reading, study time: library costs.

3. Other CPD activities i.e. Professional committee work, internal staff assessments, teaching."

(Gardner et al, 1981, p12).

A questionnaire asking for data on these matters was sent to 300 UK offices. Responses were received from 96 (31.8%). Of these, 78 sent material that could be used for analysis. The findings of the survey suggested that considerably more time was being spent in continuing education activities than any of the previous reports had discovered. This may have been partly because of a wider definition of what continuing education consisted; or may represent a real growth in activity across the 20 years since The Architect and His Office was published.

The survey showed that the average annual investment by offices was 5.6 days per member of technical staff - about 42 hours per year. About half of this was in external education, about a third in internal education and the remainder in other CPD activities.

Conclusions on research reports

In the five reports that have presented evidence about the amount of continuing education undertaken by architects, different methods of describing this have been used. Some have reported on whether courses have ever been attended at all, some on the number of people attending per year, some on the number of offices who send staff per year.

The most recent and the widest-ranging of these reports suggest that in the offices surveyed the average amount of education undertaken is just over one week per year (Gardner et al, 1981).

Although this is substantial, there are two major limitations on how applicable it is to architects in general. Firstly, more than two thirds of the offices contacted did not reply. No evidence or suggestions are made about why this should be: the reasons may be

straightforward and not affect the results; but they may also be that education is not valued by the non-responding offices and little undertaken. The data presented is also averaged out per member of staff in offices: there may be some members of staff who do not undertake any at all (this applied to Harris' 1978 NHS course attendance figures).

But at the very least, substantial amounts of time are being spent in continuing learning by some architects: they plainly believe that they did not learn 'all they need to know while they were at university'.

Short course provision

Further evidence about the extent of continuing education may be found in the existence of the large numbers of short courses and short course providers.

The sheer numbers of short courses available for architects to attend has grown enormously since the war, although the number available is not, of course, a true indication of the numbers of people attending (let alone the amount that is actually learned). The Department of the Environment (DoE) publishes every two to three weeks a library journal called "Current Information in the Construction Industry" (CICI) (formerly Ministry of Works Library Bulletin). This carries notices of courses, conferences and meetings to be held in the period immediately ahead of the date of publication. It is by far the most comprehensive guide to events of this kind, and while it may not carry a notice of every event of interest to the building industry, it selects comprehensively. I obtained back copies of CICI and counted the number of events publicised for the month of October from 1945 to 1982. Figure 2.1 shows in column 1 the number of October events recorded. Since there are fluctuations from year to year (which may be dependent on how busy the profession is), column 2 shows a three year running mean to average out these fluctuations and better reflect underlying trends. However, growth in numbers of courses may simply be a reflection of larger numbers of qualified architects. Column 3 shows the number on the register of the Architects Registration Council for each year. Column 4 shows an index figure representing the three-year running mean corrected for the volume of architects. Figure 2.2 shows this statistic graphically.

The survey shows that there are about seven times as many

Figure 2.1

Trends in Course Provision

Number of courses, conferences and meetings held in October from 1945 to 1982

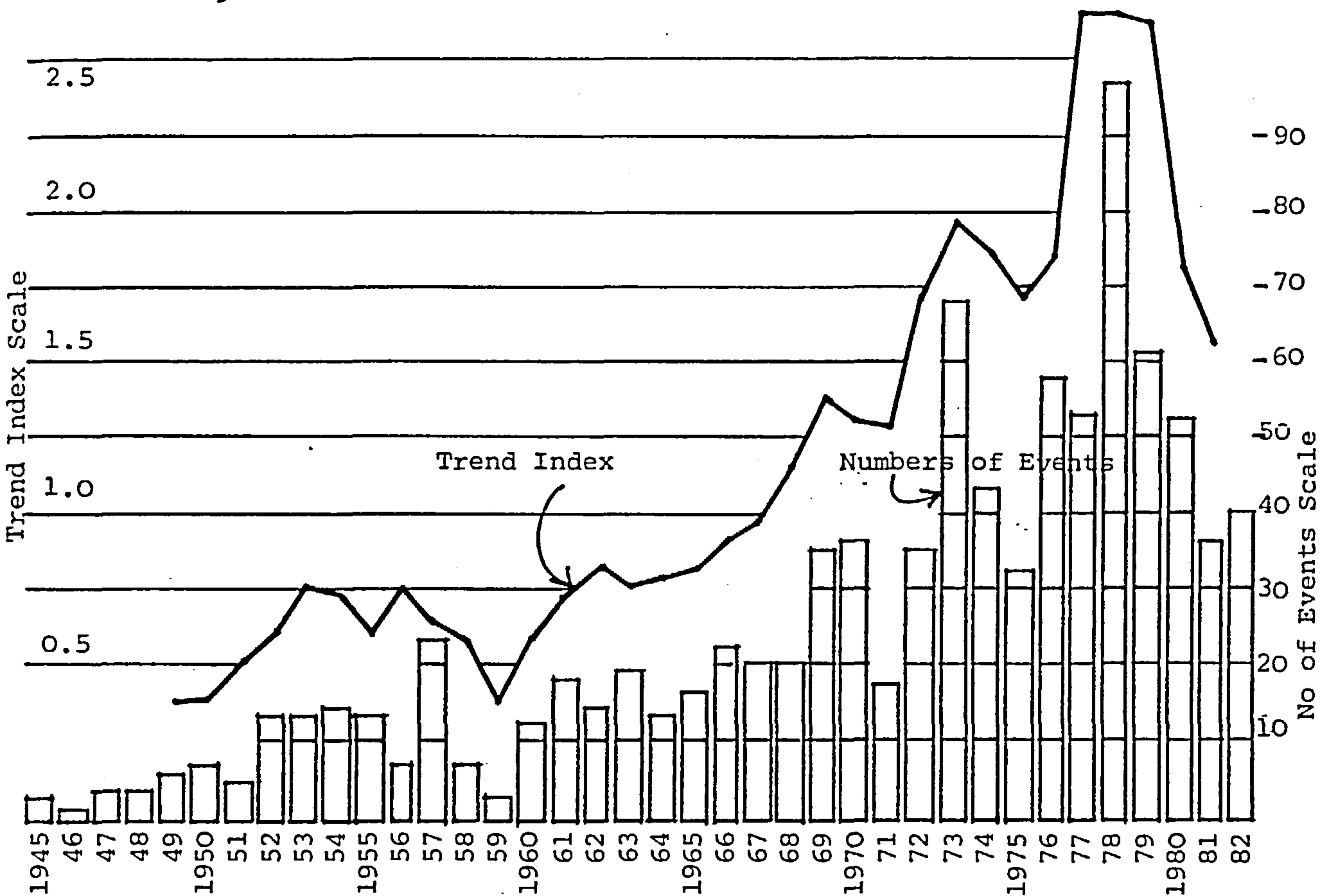
Year	No of events	3yr mean	No of Archs ('000)	Trend Index
1945	3	-	-	-
46	1	2.67	no data	-
47	4	3.0	no data	-
48	4	4.67	no data	-
49	6	5.67	15.824	0.36
1950	7	6.0	16.312	0.37
51	5	8.33	17.072	0.49
52	13	10.33	17.639	0.59
53	13	13.33	18.000	0.74
54	14	13.33	18.500	0.72
1955	13	11.33	19.000	0.60
56	7	14.33	18.892	0.76
57	23	12.33	18.835	0.65
58	7	11.0	18.987	0.58
59	3	7.3	19.183	0.38
1960	12	11.0	19.436	0.57
61	18	14.67	19.981	0.73
62	14	17.0	20.693	0.82
63	19	15.33	20.811	0.74
64	13	16.0	20.911	0.77
1965	16	17.0	21.224	0.80
66	22	19.33	21.377	0.90
67	20	20.67	21.325	0.97
68	20	25.0	21.652	1.15
69	35	30.33	21.947	1.38
1970	36	29.33	22.399	1.31
71	17	29.33	23.069	1.27
72	35	40.0	23.728	1.69
73	68	48.67	24.559	1.98
74	43	47.67	25.334	1.88
1975	32	44.34	25.559	1.73
76	58	47.67	25.884	1.84
77	53	69.33	26.223	2.64
78	97	70.33	26.573	2.65
79	61	70.0	27.012	2.59
1980	52	49.67	27.575	1.80
81	36	42.67	27.636	1.54
82	40	-	-	-

Sources: Number of courses, conferences and meetings in Current Information in the Construction Industry, formerly Ministry of Works Library Bulletin. Number of Architects from ARCUK Annual Reports.

Figure 2.2

Trends in Course Provision: Graph

Source: Figure 2.1



education events publicised in 1979 per registered architect as there were 30 years earlier, although the growth rate is now declining.

Conclusions about short course provision

If it may be assumed that there is a causal link between the number of courses provided and the demand from architects to continue learning; if, that is, the number of courses is an indicator of learning needs, then at least some members of the profession, and some academic establishments, think that architects do not in fact learn all they need to know in their undergraduate years. Furthermore, the massive increase in provision since the war seems to hint that there is a growing awareness of the need to continue learning.

Although the data collected by various research studies and an

examination of course provision shows considerable education activity, they do not reveal how widespread this is.

A second limitation on data collected about courses is that this is not necessarily the only method used by architects to continue their learning: non-participation in courses does not necessarily mean non participation in continuing education. This caveat also applies to all but the 1981 ARCUK survey as well.

THE NEED FOR CONTINUING EDUCATION

In the quotations which opened this chapter, the view of the York Centre about the need for continuing education was expounded. The sentiments there expressed have been adopted universally by the authors of the various research reports on architects' continuing education. In the very first of these, The Architect and His Office, the authors wrote

"We are convinced of the need for more refresher courses for practicing architects to help the profession keep abreast of the present high rate of technical development in all fields of the building industry ..."

(RIBA, 1962).

Powell, Napper and Territ claimed that their visits

"showed that a majority of principals in private and public offices accepted the need for continuing education as an integral part of practice life. It is seen by them as an important means of developing the service given by and the growth of a practice as well as increasing the individual competence of its members."

(Powell et al, 1971, para 7.1.0).

Hedge, in her summary of her work, started by saying

"None of the major professions nowadays seriously disputes the importance of continuing education."

(Hedge, 1976).

Harris summarises ten reasons that had been advanced, writing

"As to why continuing education, of whatever kind, is necessary, the arguments have been well rehearsed. They include

- Keeping up to date with advancing technology - new materials and building techniques, for instance.
- Keeping up to date with professional and social concerns - like new codes of conduct, or the sociology of redevelopment.
- Keeping abreast of new methods of doing things - calculating energy loss or managing the project.

- Filling gaps in knowledge.
 - Relearning forgotten skills and knowledge.
 - Unlearning things misconstrued or out of date.
 - Becoming equipped to handle increased specialisation - e.g. landscape or hospital design.
 - Learning to deal with non-architectural aspects of the job - management and politics.
 - Keeping abreast of legislation - new statutory law, interpretation of case law, the building contract.
 - Being stimulated by new ideas and new environments and the fresh discussion of old problems."
- (Harris, 1978, p13).

So, as has been said, formal reports on continuing education all claim that it is necessary for a variety of reasons; on the whole, convincingly.

Other views

Not everyone finds these views convincing, however. In 1981, ARCUK, following up the office resources survey previously mentioned, commissioned IoAAS to examine the demand for continuing education among architects.

For some years prior to this, ARCUK had devoted some money to aspects of continuing education, notably by being the major funder of the York Centre. The York Centre's work in its last years of existence had concentrated on policy. In 1978, it had published a Policy on Continuing Education (York Centre, 1978) which argued for incentives to encourage architects to undertake education, or what it called CPD - Continuing Professional Development.

In 1980, not before time, it was decided to test the market and IoAAS did this by selecting 23 topics to do with work on existing buildings and hypothesising three or four different educational formats for each. These were sent to 40% of the architectural offices in the UK; some 2000 in all.

12% of the offices contacted responded positively (Gardner, Sutcliffe and Taylor, 1981).

The impression this gives of limited interest in continuing education is compounded by letters in the architectural press published at the same time the research was being conducted. Peter Gibbs-Kennett, education director of the RIBA, wrote a laudatory article for Building Design about continuing education generally, and the ARCUK research in particular (Gibbs-Kennett, 1981). Soon after, Building Design's letter

column carried a response from Ian Cooper of Cambridge (who, it later appeared may have had a vested interest in responding) objecting to the term CPD for continuing education as a "semantic sleight of hand" and going on to suggest that the RIBA's "commitment to continuing education springs from a desire for self protection, from a desire to protect the interests of members ...". These "feelings of unease were aggravated" by a suspicion that "the 'CPD system' would be used ... to impose new conditions regulating entry to the profession".

This correspondence continued over the next few weeks with a reply from Gibbs-Kennett and a letter from Roger Smith of London claiming that CPD might be seen as "a job creation scheme for academics and administrators"; that "the only pressure groups rooting for continuing education programmes seem to be RIBA mandarins and educationists ..."; and that "the American term for this approach to selling is hyping".

A few years prior to this, the York Centre policy had met a similarly negative reception from the letter writers in the profession. Part of Messrs Mainwaring and Murrin's letter has been quoted; of the nine letters published in Building Design triggered by these two reports, seven attacked the proposals. Of the two that were supportive, one came from a teacher (Building Design letters column, 1978-81; Bottomley, 1978).

How significant are these indications of lack of support for continuing education? The report on the 1981 ARCUK study, commenting on the low response, looked at the bright side:

"the quality of the response we received was excellent"
(Gardner et al, 1981, p25).

Furthermore, letter columns are a notorious stamping ground of the derriere garde (the same Building Design page that carried two letters attacking the ARCUK study also carried two arguing for abandoning the metric system and giving information on where Imperial scale rules could be manufactured).

OTHER PROFESSIONS

Chapter One has reviewed research carried out in management education and the teaching professions as it affects the use of learning methods. Other professions have concentrated not so much on methods as on the issue of incentives to their members to continue their education. The RICS, representing surveyors, for instance, requires that all new members undertake 20 hours structured education every year (Clark et al, 1981); the RTPI requires all members to undertake 50 hours CPD over two

year periods (CPDC, 1983); doctors have for many years provided courses in local centres but have recently given up financial incentives they offered in favour of moral pressure; chartered accountants have a points system for specified educational activities; solicitors and civil engineers require new members to attend a number of short courses in the years immediately following qualification (Waterson, 1984).

Although none of these efforts are directed at learning methods, the sting in their tails is that they predetermine which methods are suitable by requiring that some external validation is possible. In the absence of examination or testing, the only possible validation is attendance at courses.

ARCHITECTS' UNDERGRADUATE EDUCATION

Undergraduate education provides a base to continuing learning. What do architects learn then, and what methods does it make them familiar with?

Student architects need to spend seven years studying, passing examinations and being assessed in various ways, in order to register and be allowed to call themselves by the protected title "architect".

Compared with continuing education, there is a rich literature of formal undergraduate education. This applies to all fields, and to architectural education in particular: the various schools issue prospecti; the architectural journals review education from time to time (e.g. Architects' Journal, 1978); there are Royal Institute of British Architects Guidance Notes (e.g. 1969, 1972, 1975, 1977, 1979); Gardner (1974), Males (1976) and Cox (1978) are among those who have recorded the history and growth of architectural education; and Mackinder (1980a) provided a compact survey of architecture and building courses. All of these have been drawn on in this outline.

There are 38 recognised schools of architecture in the UK and Ireland, all but four of them either in universities (17) or polytechnics (17). Traditionally, the RIBA has vetted their standards and although the 1932 and 1938 Recognition Acts required ARCUK to participate in this, in practice, ARCUK has devolved its responsibility to the RIBA.

The RIBA outlines the subject it expects to see undertaken. These are shown in Figure 2.3. Although the schools all have to include these as minimum content requirements, they are free to add others they consider relevant: computing, mathematics, communication

Figure 2.3

Subjects To Be Undertaken in Schools of Architecture

	1969	1979
PART ONE		
A Design	✓	✓
B Building Technology	✓	
B1 Structures	✓	✓
B2 Materials	✓	✓
B3 Environmental Science	✓	✓
B4 Services Engineering	✓	✓
B5 Principles of Building	✓	✓
C History and Social Studies	✓	✓
G1 Professional Practice		✓
PART TWO		
A Design	✓	✓
B Design Technology	✓	✓
E Planning and Economic Studies	✓	
E1 Social and Planning Implications of Building	✓	✓
E2 Building Economics	✓	✓
F Dissertation	✓	✓
G2 Professional Practice		✓
PART THREE		
G Professional Practice	✓	✓

From RIBA Guidance Notes and Regulations 1969 and 1979.

studies, for example. This curriculum does not show the amount of time devoted to each subject, and the most striking characteristic of the school's teaching is its reliance on studio work ("A" in the RIBA list): reliance, that is, on design projects undertaken by students. The purpose these serve is to give students experience in the manipulation of space, of structure, of aesthetics and of planning, and it occupies the vast bulk of the teaching time available. In theory, the other subjects slot into the studio work as they become relevant; in practice, they are often lecture subjects undertaken in isolation. Figure 2.4 is an example from Mackinder (1980a) of typical subject divisions and the amount of time they occupy.

The other striking characteristic of the way undergraduate courses are organised is that two of the seven years spent as a student are outside the school, in practice (and most commonly in an architect's office). The usual pattern is to spend this as the fourth and seventh year, but there are variations.

In pre-practice training, there is one other strand worth looking at briefly. Postgraduate education is not often undertaken by architects. By and large, they see their undergraduate education preparing them for practice, not academia. Howrie (1974) describes a research

Table
EXAMPLE OF A FIVE YEAR ARCHITECTURE COURSE
SHOWING TYPICAL SUBJECT DIVISIONS

SUBJECT	TEACHING & ASSESSMENT	TIMETABLE/YEARS					
		1	2	3	5	6	
Building Technology Construction and Materials (inc. Materials Science)	Lectures & film	60h	48h	24h			
	Lab & practical demonstration	30h	15h	15h			
	Studio project	6w					
	Essays	1	1				
Structures	General studio design work and CDP	•	•	•	•	•	
	Written Exams		1	1			
	Site visits	•	•	•			
	Lectures	30h	24h	24h			
Environmental Science and Services	Lab, practical work & model testing	15h		15h			
	Studio project	1w	8h				
	General studio work and CDP	•	•	•	•	•	
	Written exam	1	1	1			
Advanced structure, legislation fire etc.	Lecture	60h	48h	48h	16h		
	Lab or practical	30h	30h	30h			
	Site visits		•				
	Studio project	4w		2w			
Humanities History and Appreciation of Architecture	Practical & General studio work & CDP	•	•	•	•	•	
	Essay	1	1	1			
	Written exam		1	1			
	Lecture				16h		
Social and Cultural Studies (Social & econ. history, psychology, sociology)	Project work				•	•	
	Essay				1		
	Lectures						
	Seminars, visits	45h	45h	24h			
Building production and performance	Essay & seminar presentation	1	1				
	6,000 dissertation			1			
	Seminars	45h	48h	24h			
	Essays	2	2	1			
Building production and performance	Seminars				3h		
	Site visits				•	•	
	Project work						

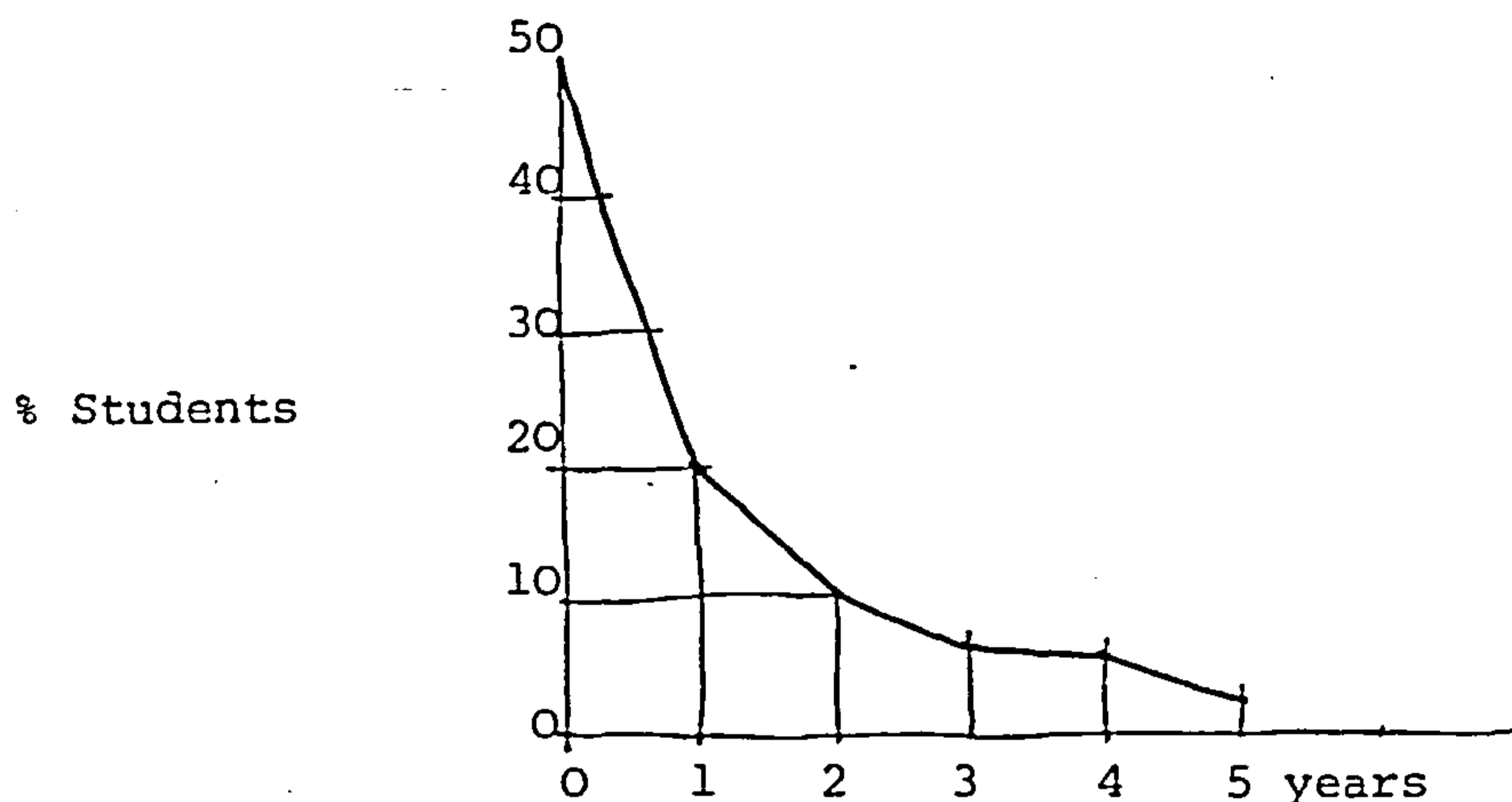
h = hours spent
w = weeks
• = unspecified content

Figure 2.4
Subject Divisions in Undergraduate Schools of Architecture
(from MacKinder 1980a)

SUBJECT	TIMETABLE/YEARS					
	1	2	3	5	6	
Design Theory & Methodology	Lectures	30h	24h	24h		
	Lab work			•		
	Studio project work					
	& CDP	•	•	•	•	•
Theory of design including computer aided design	Essay	1	1			
	Lecture	30h		24h		
	Seminar	15h		12h		
	Studio project		6w	7w		
Planning Planning and Landscape	Essay	1	1			
	Written exam			1		
	General studio project work & CDP	•	•	•	•	•
	Lecture					
Professional Studies Introduction to practice and management	Lecture		18h			
	Essay		1			
	Case study report					
	Lecture				2h	
Building and Planning law	Written exam				1	
	Studio project				•	
	Lectures					12h
	Lectures				9h	
Building Economics Specification	Part spec. for design project				1	
	Lectures					15h
	Written exam				1	
	Major comprehensive design project					•
Management	Lectures					
	Written exam					
	Major comprehensive design project					
Design	Lectures					
	Written exam					
	Major comprehensive design project					
Total no. of lecture hours		255h	207h	168h	89h	
Total no. of hours for practical demonstration and Lab work			75h	45h	60h	
Total no. of seminar hours			80h	68h	48h	

Figure 2.5

Postgraduate Education Undertaken Immediately After Graduation



2% -Indeterminate. Source: Howrie

project which followed the careers of 373 graduates from four schools: 80% of all their graduates over five years. 64 of them had undertaken education which resulted in paper qualifications. 45 of these students were in Town or Urban & Regional Planning, or in Landscape: further degrees which would move them out of the strictly defined field of Architecture. The remaining 19 (some of whose returns were ambiguous) might be viewed as postgraduate students: this represents 5% of this sample. There is a strong drive to undertake postgraduate education immediately after graduation - so it might be seen as part of an extended preliminary period of training - as Figure 2.5, taken from Howrie's figures, shows. Wigfall and Fischer (1971) report that of ex-students of architecture at University College London (UCL), 19.6% of the 1960 graduates and 12% of the 1964 graduates went on to take further courses after completing Part II - half of them in the area of Planning.

BEFORE 1958

It should be noted, however, that the system described has only been in operation since the 1958 Oxford Conference. Clark, Harris and Todd (1981) demonstrated that in NHS architects' offices, the age distribution is such that three-quarters of NHS architects qualified before this, and one-tenth are old enough to have qualified before the

Second World War. What was the undergraduate educational system between the War and the Oxford Conference?

The 1938 Registration Act allowed four routes to registering as an architect. One was "free" entry for august Academicians. A second was by providing documentary evidence that the applicant was a principal in practice, or had been an assistant for ten years. The third was via full time courses, the fourth via part time courses. These routes remained in existence until 1950 when the second was closed. (Gardiner 1974).

The main strand is the contribution made by practical experience. The closure of the full time experience option did not immediately close all experience-related routes. Gardiner shows that in 1974, 30% of qualifications were still via the RIBA exam, though increasingly since then the requirement for 2 A-levels, coupled with freely available grants for full time courses, has resulted in a withering away of the part time option. As the profession increased its reliance on full time courses, it increased also the length of the related practical experience years. A 1939 committee recommended that it should be 18 months in length; in 1955 it was extended to 2 years.

THE LINK TO PRACTICE

Once these years of preliminary education are over, are graduates equipped for practice? Many believe not. Wigfall and Fischer (1971) report that between 16% and 25% of UCL students were dissatisfied or very dissatisfied with the adequacy of their training. Howrie (1974) quotes many examples. He writes that the following comment was typical of many answers about how well prepared the ex-student was:

"... I think other schools have the same - all the other schools I have come across seem to have the same sort of situation ... I think the whole thing was too academic and think there should be much more applied work." (p59).

and again

"One obviously feels when one walks in the office the total inadequacy of one's training." (p61).

Howrie notes of this last comment: "A very common phenomenon!" Harris (1978) notes that although it was not part of the study undertaken,

"The appropriateness of architects' undergraduate education was often mentioned, generating sufficient heat to provide a cosy glow of annoyance for many people. It appears that the offices' expectations and schools' intentions mismatch to a large degree." (p177).

This alleged mismatch might be seen as being deliberate. Wise (1968) outlines a view of differing expectations:

"... the identification of responsibility for two areas of education have not been clearly spelled out - education in the schools, and education in practice - and I believe that only a coming together of these two elements can produce the true professional. ... the schools are not able to produce a professional product, and indeed should not be trying to do so. Their job is to produce a graduate with a firm basis of understanding of the nature of architecture ... The real way of handling the situation is for the office to take on the responsibility for turning the graduate into a professional ... and it is ... education in practice which is the first task of the profession to its entrants." (p16/17).

This view is similar to Cunningham's (1978)

"... The Schools have a limited educational function and that at a given time the development of each individual should be entrusted to others; in short that practice is a continuation of education around architecture."

The thrust of these two arguments - both, incidentally, from heads of architectural education establishments well-known for running short courses - is into practice as the educational milieu.

SUMMARY

There are two strands of continuity between undergraduate and continuing education. The practice element - learning on the job - has always been seen as part of the education of an architect, even though in today's educational system it lives on in a vestigial form. And undergraduate education has never in itself been intended to equip a graduate to be a practicing architect. So some form of continuing professional development must be assumed to be part of a continuum of training.

The methods that undergraduate education employs - and thus the methods that architects are familiar with - are largely project work (i.e. workshops) and day to day practice itself. The lecture method plays a subsidiary role.

Ironically, moves amongst professions generally to legislate to ensure that their members undertake a certain amount of CPD, have focussed on short course attendance as the vehicle for insuring that they continue to develop as professionals.

Chapter Three

A Case Study: Learning about energy in buildings

"Example is always more efficacious than precept"
(Sam Johnson Rasselas).

Part One of this thesis has outlined methods currently used in continuing education. Chapter One referred to the body of work being explored in contemporary practice. The point made there is that although experiential methods are much explored in written accounts, it may be doubted whether they are as frequently exploited in the actual events themselves. Moreover, even when they are, there tends to be a provider orientation in action: that is to say, the content of what is to be learned is determined by teachers; and the methods used are decided on by teachers in the light of their own enthusiasms and their "folk memory" of how learning may be put over.

To conclude this Part, a case study will be described which illustrates contemporary good practice in provider centred education. It is an example of a carefully structured piece of formal education, designed by experienced teachers drawing on conventional teaching methods currently employed.

The purpose of including it here is to demonstrate the shape and content isolation that contemporary practice assumes. In the final chapters of this thesis, another example will be given to contrast it with education designed to draw on the evidence the two central parts of this thesis will present; of the methods architects use when left to themselves.

THE ARCUK STUDY

The education events arose from the ARCUK CPD Report (Gardner et al, 1981). In that, a number of forward-looking education events were hypothesised and offered to potential learners to get their reactions. The Institute of Advanced Architectural Studies commissioned David Rymer (then secretary to the Institute) and myself to test some of the hypotheses in practice.

This event was part of a series of case studies of continuing education using the Formal range of methods in

new settings: principally the office itself. Five events were arranged and they are reported in Harris and Rymer (1983): serial courses of one afternoon for four weeks; a video and discussion held in an office; a visit; an event in a local centre; and this study, taking the office venue for a more elaborate test, and dealing with the topic of upgrading the thermal performance of schools.

The event was run twice. The first was in Bedford County Council's offices, the second at Hampshire County Council. The two were very different in detail, both in the knowledge and familiarity the participative learners had of energy matters, and in the way the content was presented. The key things identified had to do with restricting the breadth of matters dealt with - energy conservation covers so many things from an overall grasp, through detailed calculations, to office strategies for approaching the problem. The most beneficial outcome of the events were raised awareness on the part of participants, and the demonstration that office events are very cost effective, saving as they do the incidental costs of travel and overnight stays that accrue to course attenders. Disadvantages are the loss of opportunity to meet new people facing similar problems to those of attenders. In Hants this was overcome by participants being invited from two other local authorities, and in Beds there was the advantage of putting office staff who work in dispersed locations in touch with each other.

Figure 3.1

ARCUK CPD REPORT: Menu 1, Item C

UPGRADING THE THERMAL PERFORMANCE OF EXISTING BUILDING FABRIC

In Office Workshop

2 days equivalent

To develop group expertise in calculation and providing solutions to insulation upgrading problems

- Presentation of bought-in written and audio visual material by in-house staff ($\frac{1}{2}$ day)
 - Study period and exercises assessed against ideal worked solutions ($\frac{1}{2}$ day)
 - Application to in-house project assessed by specialist tutor (1 day equivalent)
-

FEASIBILITY

Menu 1 Item C in the ARCUK study (Gardner et al, 1981) describes an in office workshop: it is shown in Figure 3.1. The plan was to develop this idea, and then contact experts to fill it out, and finally contact offices to tune it to their requirements.

Preliminary discussions were held in York to develop the idea. This resulted in two changes of emphasis from the menu. One was that instead of using packaged educational materials, the event would consist of lecture inputs from experts themselves, together with workshop experience. The second variation was that the scope of the event was broadened to include strategic matters as well as the tactical ones of insulation mentioned in the ARCUK Menu 1, Item C.

Four offices were contacted who had responded to this menu in the ARCUK CPD study and two decided that they would like to participate.

THE BEDFORD EVENT

One of these was Bedfordshire County Council. Before they were met to tune the event to suit their needs, some of the experts in the field of energy conservation were first contacted to develop the proposals to the outline design stage.

BEDS DESIGN

There were three experts who helped to design the event. Prof Peter Burberry of UMIST took charge of the education relating to principles of energy efficiency and detailed calculations. Max Fordham, a consultant engineer, was to cover the servicing implications and explore the relationship between fabric and plant. And Peter Page, Assistant County Architect of Essex County Council, was to make an input

Figure 3.2

UPGRADING THERMAL PERFORMANCE OF SCHOOLS: PROGRAMME

DAY ONE

- 2.00 The CPD Development Studies (David Rymer)
 - 2.10 Energy Conservation: an historical survey in Bedfordshire County Council (Ken Banks/Alf Burnett)
 - 2.30 Lincroft School: a description (Lionel Lambert)
 - 2.50 Principles of Energy Conservation (Prof Peter Burberry)
 - 3.30 Small Group Discussions: Upgrading priorities at Lincroft, including tea (Course Members)
 - 4.30 Plenary Review: Upgrading priorities (Prof Peter Burberry)
 - 5.00 Calculations, Units of Measurement (Prof Peter Burberry)
 - 5.45 End
-

DAY TWO

- 9.00 Mini Exercise: Calculations
 - 9.40 Major Exercise: Upgrading proposals for Lincroft
 - 11.00 Coffee
 - 11.20 Review of progress, then The Essex Experience: Case Studies (Peter Page)
 - 12.30 Lunch
 - 1.30 Major Exercise continued
 - 3.15 Form and Services (Max Fordham)
 - 4.15 Ways Forward: Discussion
 - 5.15 End
-

of case studies.

The inputs from these experts were incorporated into a draft of a programme and then two members of the Bedfordshire County architects and engineers (Lionel Lambert, who was to be the main liaison, and Ken Banks, an engineer) helped to put it into the context of the work Bedford does.

Most of Bedford's work is at present concerned with upgrading - getting on for 98% of it. And 75% of this is concerned with schools. Most buildings are in traditional construction of load bearing brickwork, but there are a few timber framed, and a few curtain walled schools. There is a total stock of some 500 buildings, but 180 of these are the key energy consumers, taking 85% of the fuel.

The principal need of the office was seen as being the involvement of all the architects in energy performance, using office specialists to provide data and explain the procedures used for gathering it. In addition, engineers and technicians were to join in, in order to benefit from the interdisciplinary implications of energy conscious design.

So the event was to include virtually all the architectural staff, and was seen as a 'task force' (a popular phrase at the time) taking over the office for a day and a half.

The final programme arrived at is shown in Figure 3.2. Peter Burberry acted as chairman.

Since the office was virtually being taken over for the event, it was designed to start after lunch on the first day to allow staff to clear their desks of pressing work.

MOUNTING

The event was held on 10-11 June, 1982.

The venue was in the County's conference facilities. This was a part of the building that the course members had seldom, if ever, penetrated. The conference rooms are on the ground floor, the architectural department on the fifth floor. So, although this was an 'in house' event (with the cost advantages of not having to pay for the hire of the room) it was in a sense, a local centre (in that it was unfamiliar territory).

The first three sessions (CPD studies, Beds Energy Assessments and the Lincroft School introduction) took place in a cinema: a gloomy setting. The other lecture inputs were in the committee room: a very pleasant space with an oval table large enough to seat all the participants. The small discussion groups and workshops took place in a lounge: grouped chairs and low coffee tables.

Besides the lecturers, 24 people attended the event. Fourteen of them were architects, two were mechanical engineers and two quantity surveyors. The other six participants were surveyors.

THE HAMPSHIRE EVENT

The role of the IoAAS planners in the event mounted by Hampshire was entirely different from that in Bedford. Having provided the initial stimulus for putting on an in-house course, the educationalists withdrew from actively planning it because Hampshire wanted to review its overall approach to energy. The initial target date in the spring of 1982 was therefore postponed until the autumn, while Hampshire considered its strategies.

HANTS DESIGN

By the autumn, Hants had developed a wide-ranging approach. Derek Poole the Deputy County Architect wrote

"I enclose ... our proposed programme so far. You will see that rather than a one-off thing, we have incorporated it in the whole programme. This I think gives it more relevance and is likely to have more

Figure 3.3

ENERGY CONSCIOUS DESIGN: PROGRAMME

10.00 Introduction of attenders
10.10 The CPD Development Studies (David Rymer)
10.20 The Hampshire Approach (Derek Poole)
10.30 Principles of Energy Conservation in the Design Process,
including coffee (Gordon Nelson)
11.50 Workshop Session 1: a School (Norman Roberts)
12.45 Lunch
13.50 Workshop Session 1 continues with 20 minute plenary part way
through
15.20 Group reports
15.40 Retrofit (Gordon Nelson)
16.00 Tea
16.30 Workshop Session 2: Retrofit
17.30 Microcomputers (Jim Powell)
18.10 Participants' use of microcomputers
18.30 Dinner
20.40 Review of the day
21.30 End

people interested"

The programme extended the theme of energy to environmental physics generally, and also saw as a target group county members who were taking management decision, not only the design team who were putting them into effect. Included were sessions on

- Lighting (September)
- Energy Conscious Design (October)
- Economics of Energy Conservation: for Members (November)
- Acoustics (December)
- Alternative Energy Technology in Agriculture (January)
- Passive Solar Design (January).

The outline design of the event here being described - Energy Conscious Design - had been planned by Derek Poole, Norman Roberts (Directing Officer of Resources) and Gordon Nelson (Oxford Polytechnic School of Architecture). The preliminary programme was sent out to prospective attenders in the Hampshire County Office as well as Berkshire County, Southampton City and Portsmouth City Architectural Departments. Included in the preliminary papers was a 10 page primer and quiz by Gordon Nelson, designed to show the kind of issues that the one-day event would deal with.

The night before the event the people concerned with the detailed design of the programme met to formalise arrangements for the following day. Also present besides the three education planners and the IoAAS planners was Jim Powell of Portsmouth Polytechnic who was to contribute a session on computers.

The detailed programme was in fact amended as the event progressed, and the course actually took the form shown in Figure 3.3.

MOUNTING

The venue was an olde worlde Trust House hotel with very attractive character and only slight inconvenience from reconstruction work currently in progress. The symposium itself was to take place in a lounge of considerable character, which was converted overnight by the removal of settees, sofas, coffee tables and their replacement with a square plan of tables and chairs.

There was also the use of additional seminar space in a double bedroom with private bathroom en suite.

The event was attended by 19 participants in addition to the six planners, lecturers and observers. There were 12 architects present, five services engineers and three quantity surveyors.

FEEDBACK

Six weeks after the Beds course, each participant was asked to write an A4 sheet of comments under four headings:

- Organisation and structure
- Usefulness
- Office application and
- General comments.

There were 17 responses from the 24 attenders - a response rate of 70%.

The questionnaire sent out to the Hampshire participants six weeks after the event was different from the Bedford one. The wide spectrum of comments returned from the broad Bedford questionnaire were very difficult to analyse, so the questionnaire was amended for Hampshire to cover 18 specific questions.

There were 15 responses from the 20 attenders - a response rate of 75%. The questionnaire consisted of a series of questions about how participants approached the event, and about what happened before it started. The questionnaires are shown in Figures 3.4 and 3.5, and the responses in Figures 3.6 and 3.7.

The success of the event and its application

Figure 3.6 shows that in Bedfordshire, only four of the 19 comments giving an overall opinion of the event were adverse. So it seems that this event might be judged a success.

Participants were specifically asked to mention the application

THE INSTITUTE OF ADVANCED ARCHITECTURAL STUDIES

THE KING'S MANOR, YORK

YO1 2EP Tel. 0904 24919

15th July 1982

DEV 1

To all participants in the two day event held at Bedford City Hall, on the 'Upgrading of Thermal Performance in Schools', on the 10 - 11 June 1982

As we told you at the time, we are asking you for your co-operation in supplying us with a 'feed-back' from the event. We would like this in the form of one A4 sheet of comments from each participant, and would be most grateful if you would write on the sheet your name, qualifications and age (none of this information will be published in anyway and none of the comments will be attributed).

Below this, please could you arrange your observations under four headings:-

1. organisation and structure
2. comments
3. usefulness
4. office application

We would be most grateful if you would return the A4 sheet to (CPD), Secretary, The Institute of Advanced Architectural Studies, King's Manor, York. YO1 2EP.

DAVID RYMER
SECRETARY

QUESTIONNAIRE

relating to the CPD venture held at Romsey on 7 October 1982

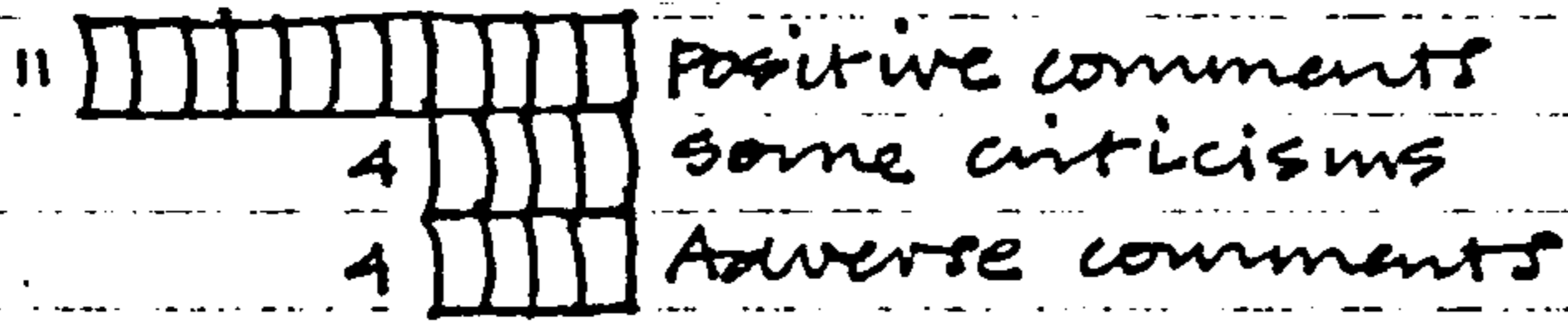
You will recall that the Institute of Advanced Architectural Studies took the role of observer at the above event and that we indicated we would be issuing a brief questionnaire in 6 weeks time. Our hope is that you will be kind enough to complete this questionnaire and return it to us in the s.a.c. All the replies will be treated confidentially and no attributed comments will be published. The response will, however, enable us to better assess the success and potential of different styles and patterns of CPD activity.

Figure 3.5
Hampshire County Council Energy Event Questionnaire

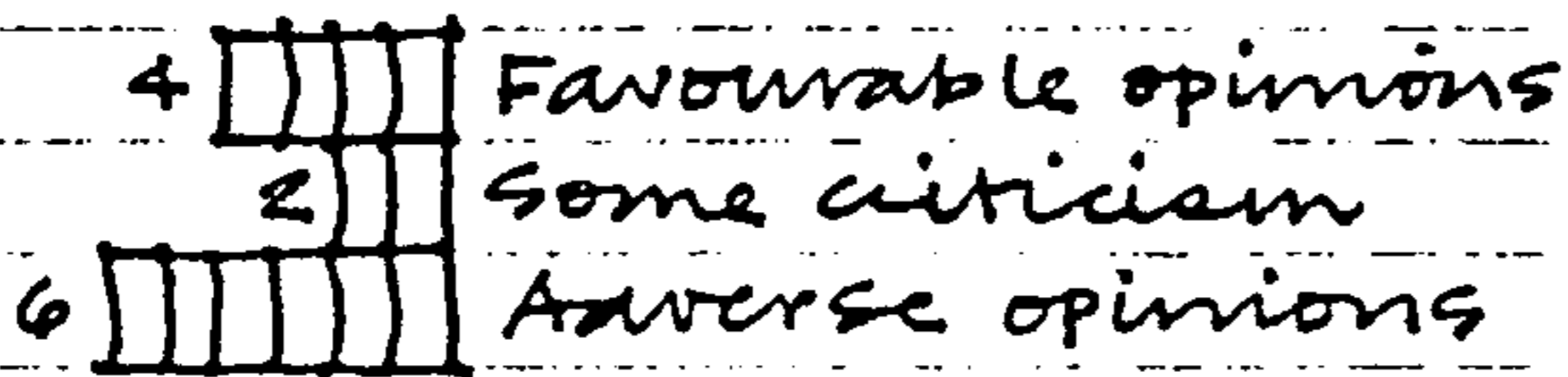
	<p>9. Speakers Please comment on their knowledge, suitability, ability to arouse interest etc.</p>
	<p>10. Chairmanship Was an outside Chairman helpful, appropriate or ineffective?</p>
	<p>11. Was the size of the group helpful?</p>
	<p>12. Should this event be seen in isolation or as a part of a comprehensive programme of CPD events?</p>
	<p>13. Duration What is the appropriate length for such an event?</p>
	<p>14a) How do you relate the need for a local event of this sort with the need for national courses, modular events or School-based learning? b) How far could the need be met by self education and publications?</p>
	<p>15. a) Have you actually used the material covered in your day-to-day work in the office? b) Has your awareness been heightened and thereby indirectly affected your recognition of energy problems in design work?</p>
	<p>16. Have you any other relevant comments on this event?</p>
<p>1. Name</p>	
<p>2. Position and organisation</p>	
<p>3. Reason for attendance (or motivation)</p>	
<p>4. How did the event appeal to you in prospect (ie before you attended)?</p>	
<p>5. Did you find the Pre-Course Test prepared by Gordon Nelson useful as a preparation for the event? (Please add comments)</p>	
<p>6. Was the venue suitable (if not, what venue would you prefer)?</p>	
<p>7. Comment on the suitability of the space, furnishings and services at the venue (the White Horse Hotel)</p>	
<p>8. Programme Content Was the subject matter too large? Appropriate? Sufficiently varied in content and activity? Interesting? Relevant to your workload etc? Please make your observations on the content along these lines.</p>	

Figure 3.6
Bedford Energy Event: Responses

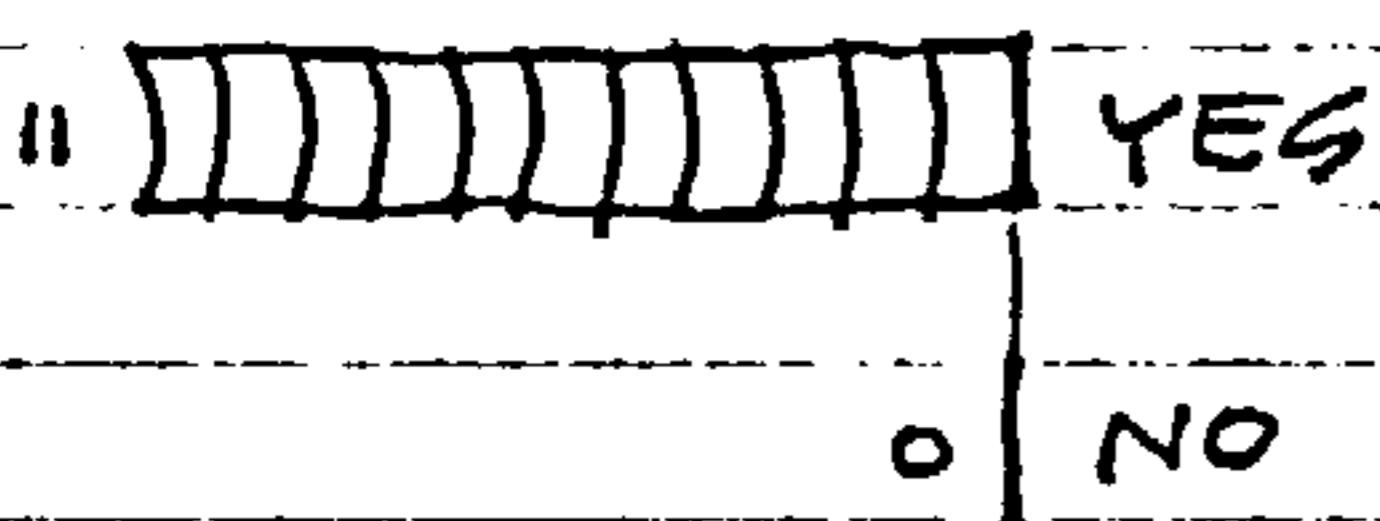
Impressions of the EVENT overall



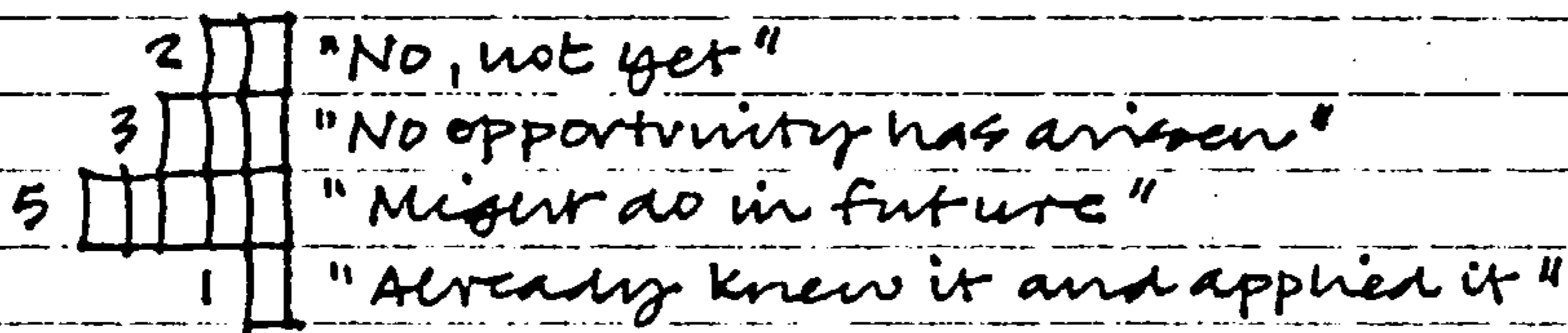
Opinions about the STRUCTURE of the event



"Has your AWARENESS been heightened?"



"Has any knowledge gained been APPLIED?"



"Was the event of the RIGHT DURATION?"

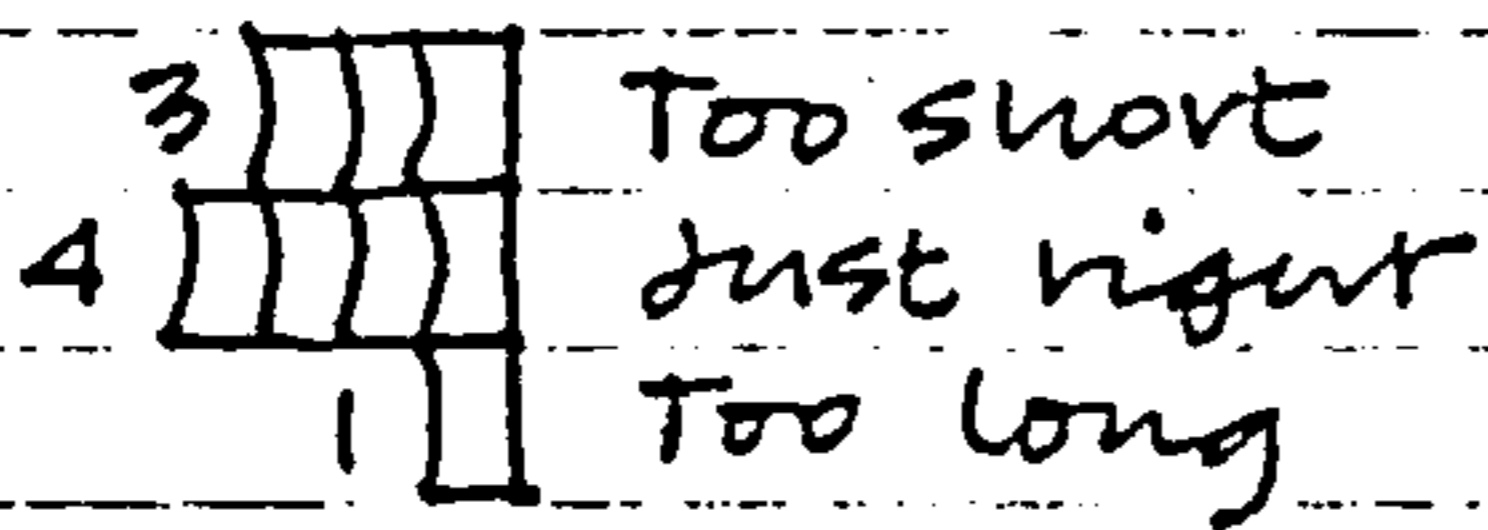
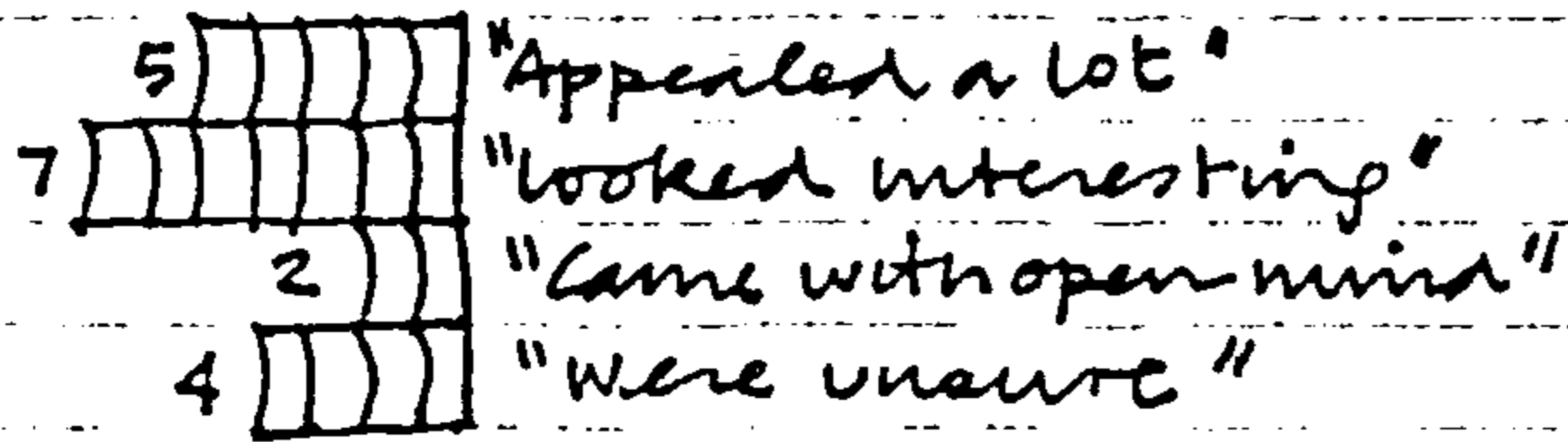
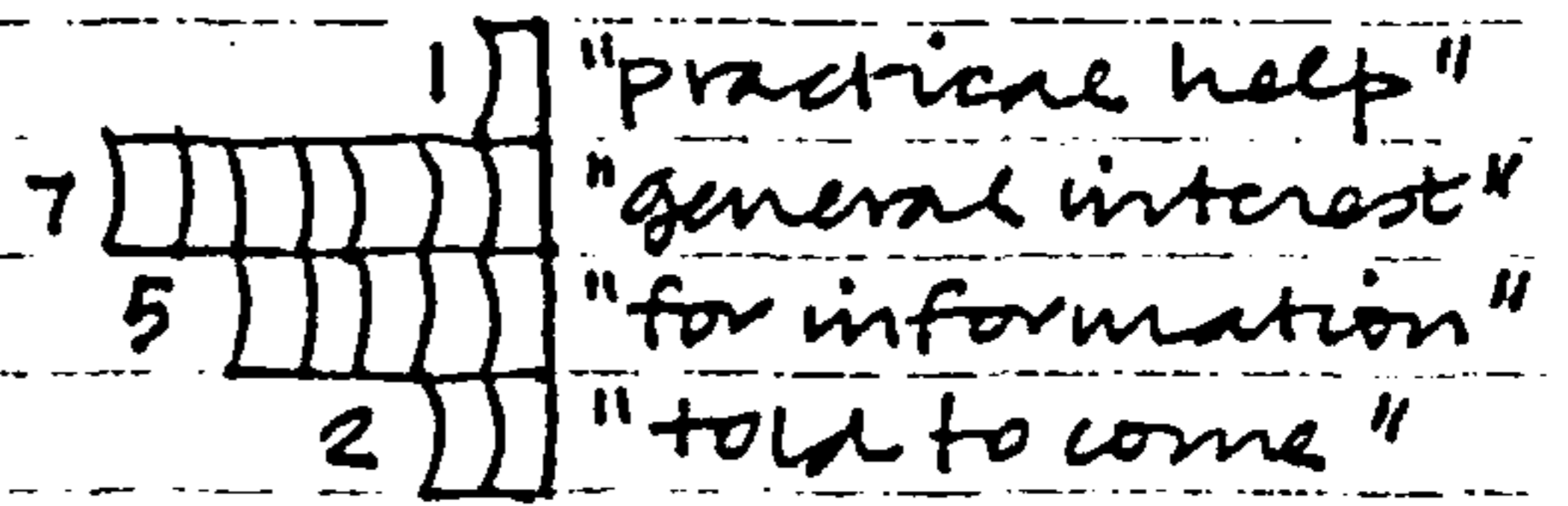


Figure 3.7
Hampshire Energy Event: Responses

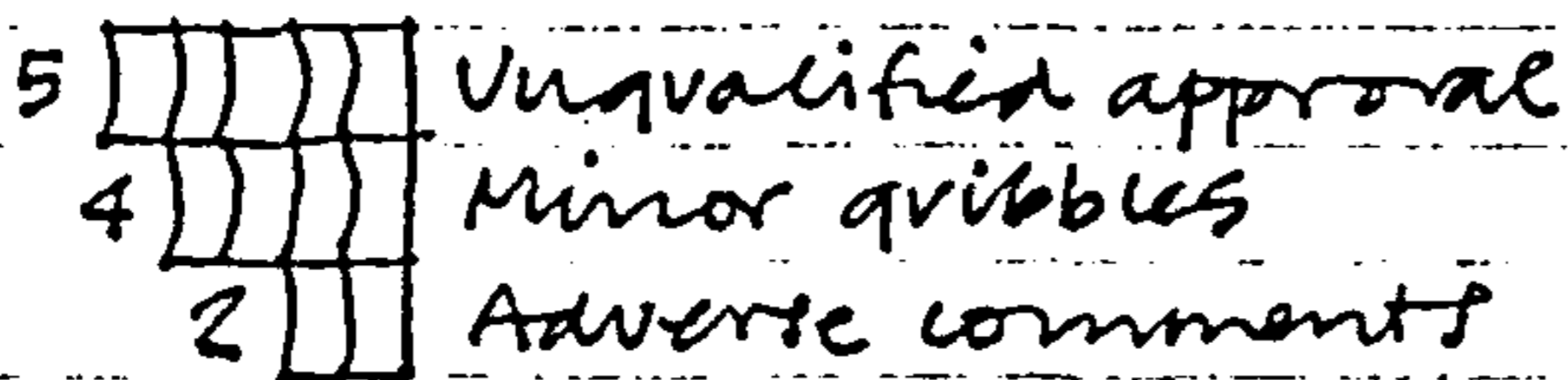
What did you think of the event IN PROSPECT?



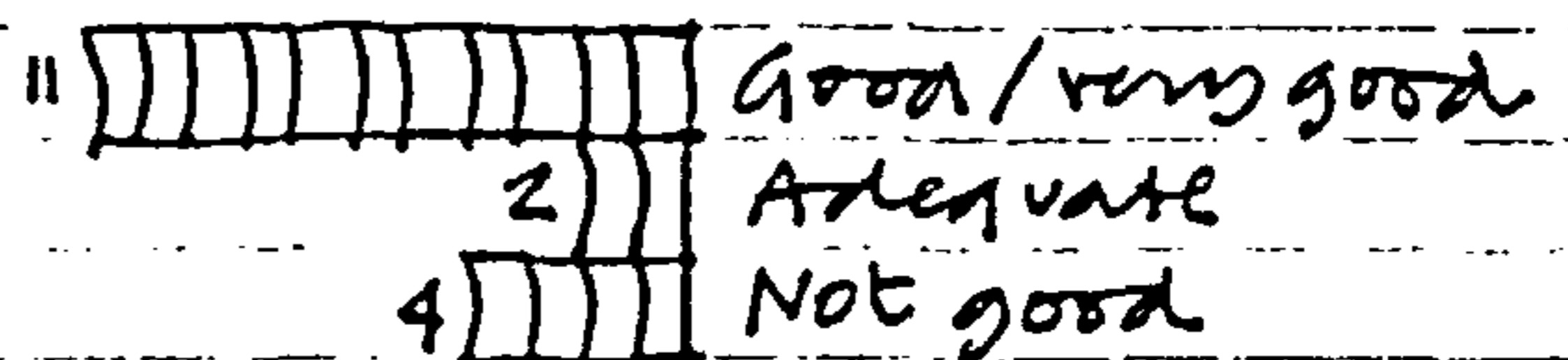
Reasons for attendance



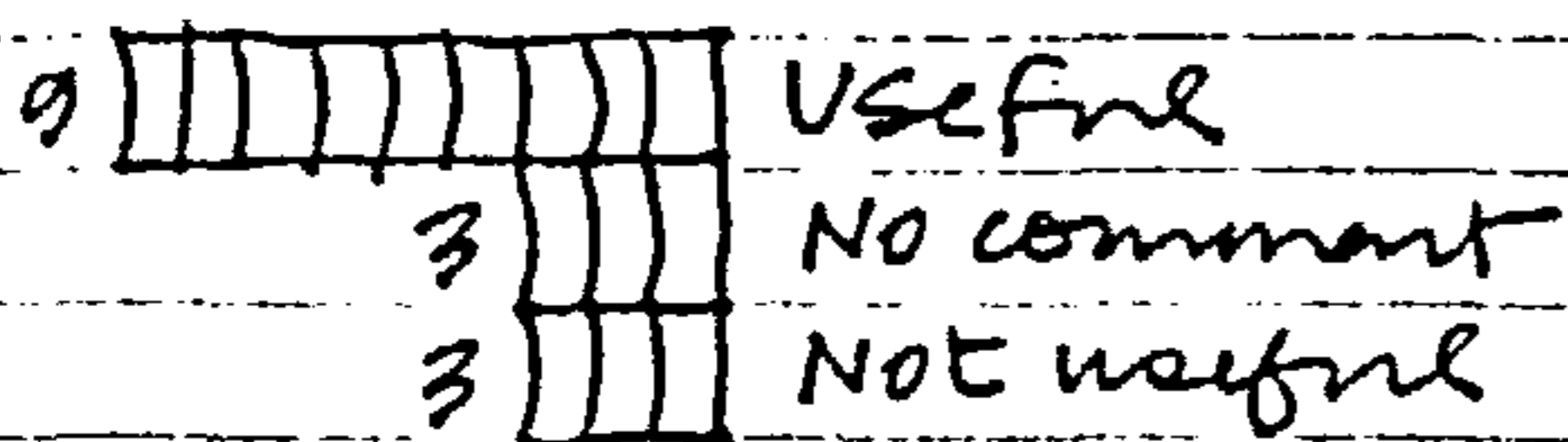
Verdicts on the COURSE CONTENT



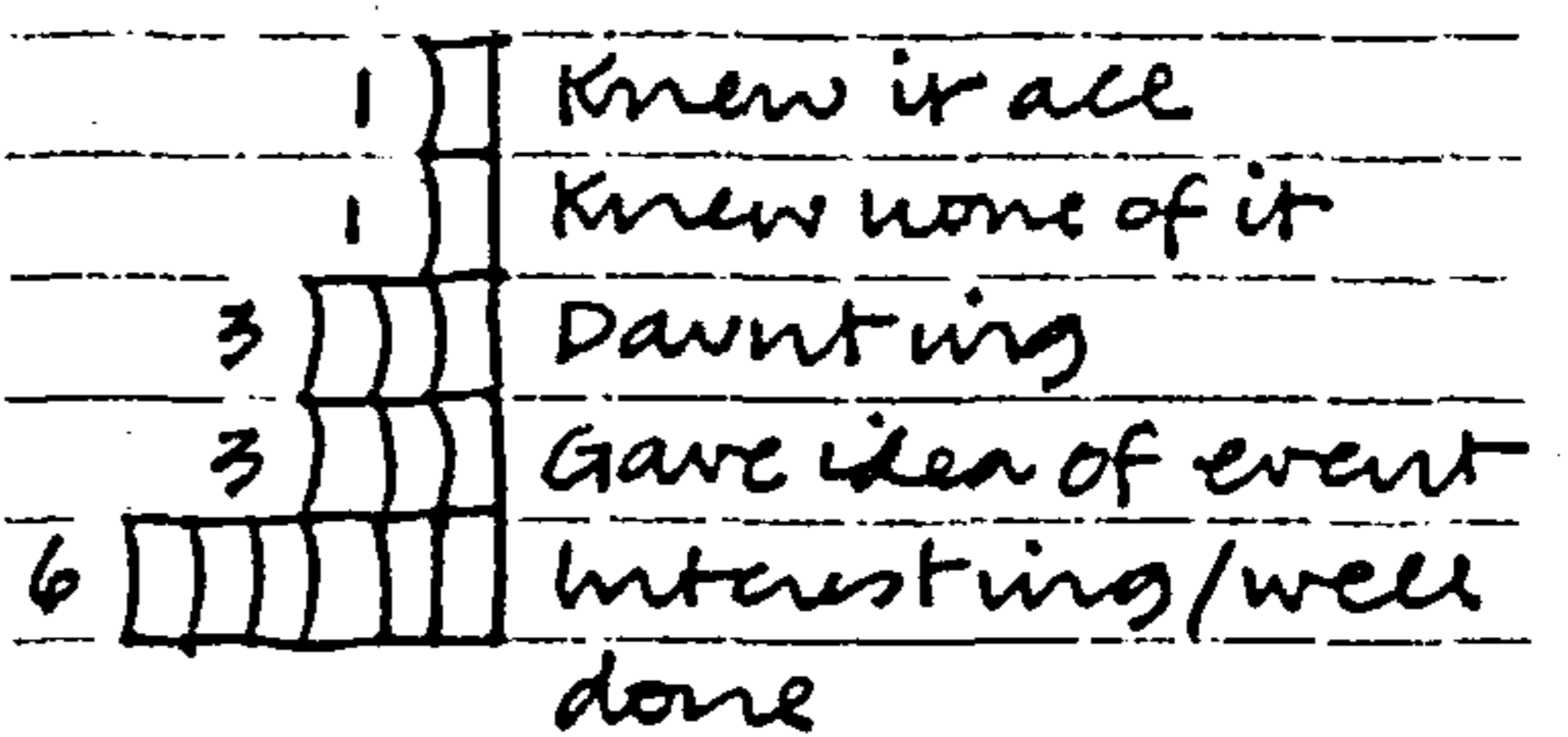
Verdicts on the LECTURERS



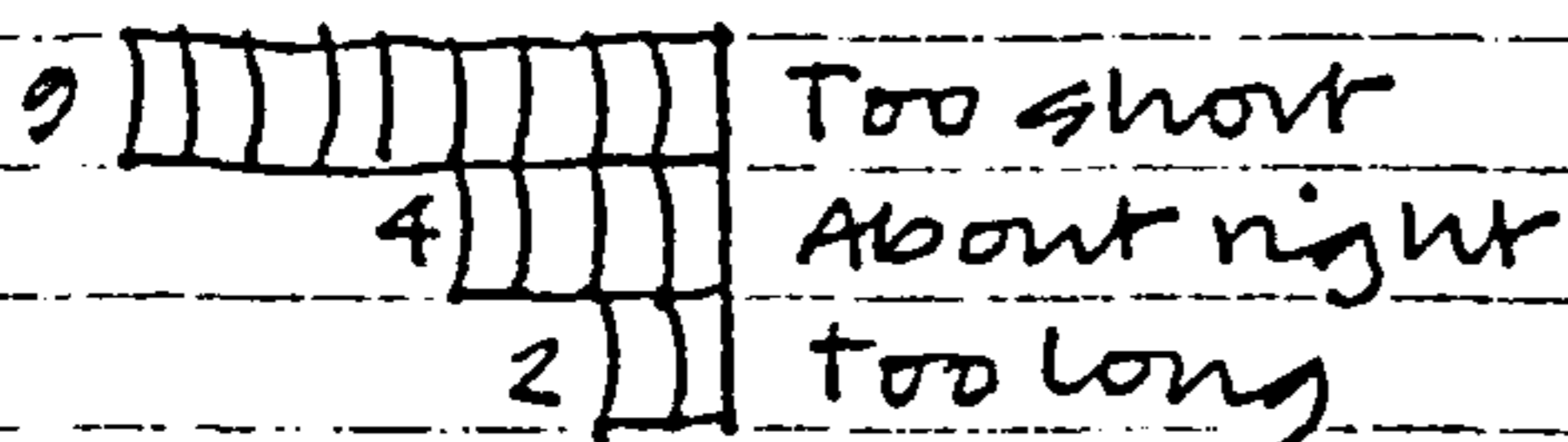
What participants thought of the PRE COURSE TEST



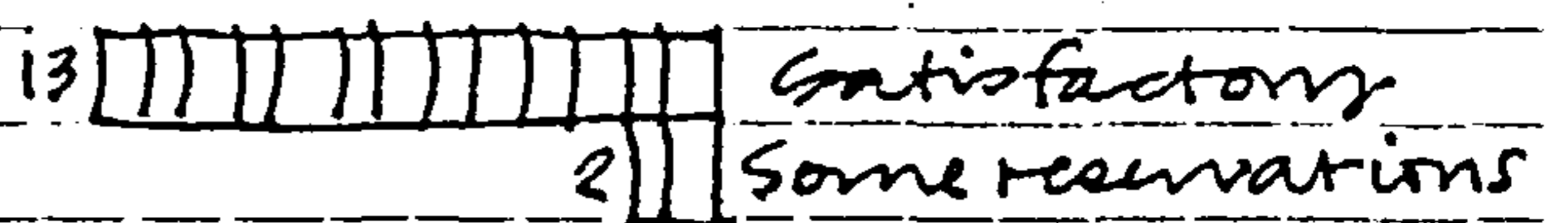
... and COMMENTS they made



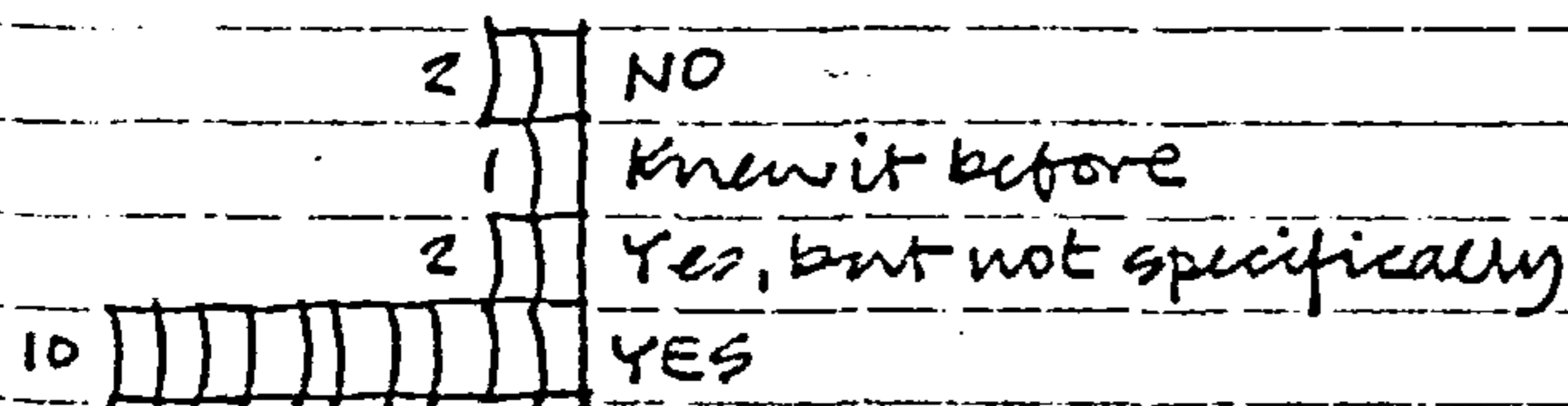
Was the DURATION right?



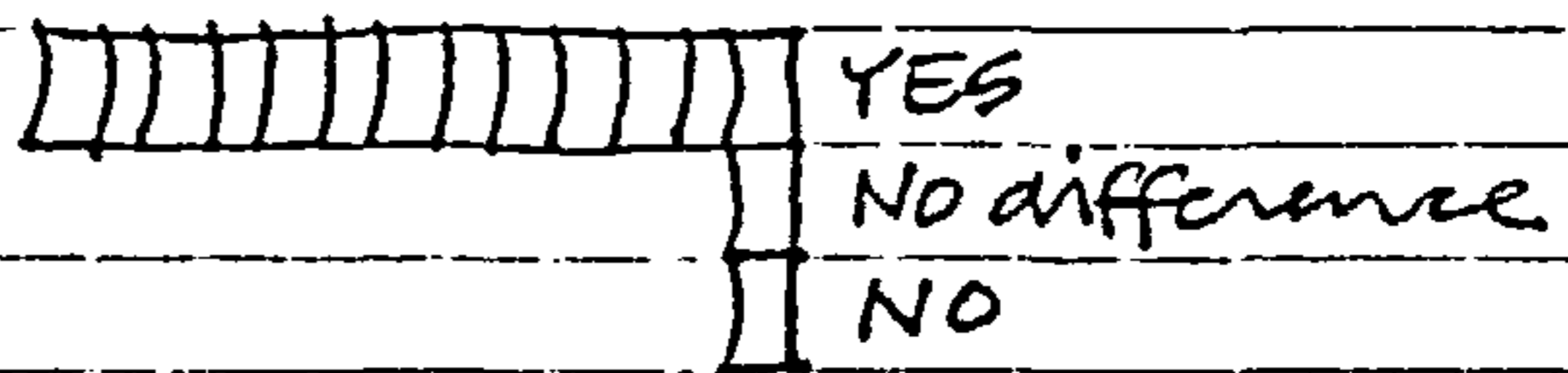
Verdict on the VENUE



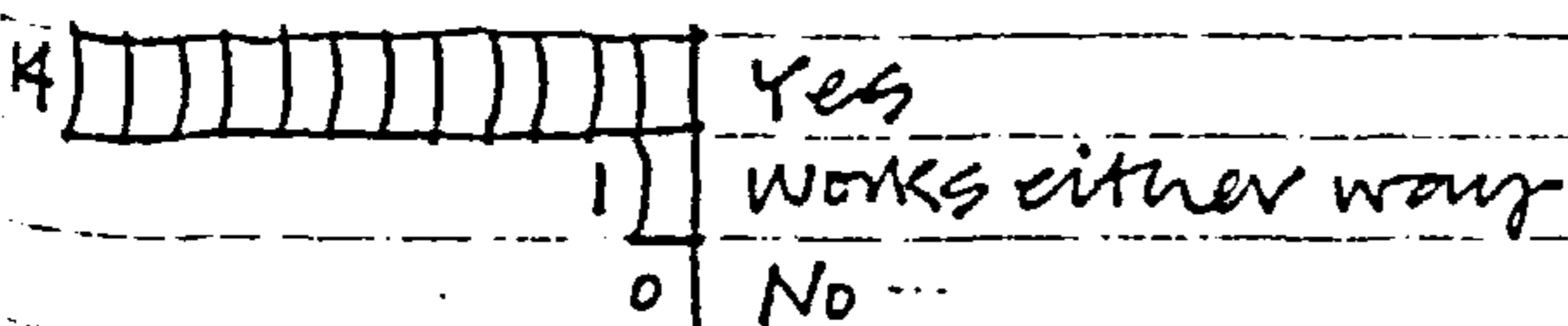
Have you APPLIED the learning?



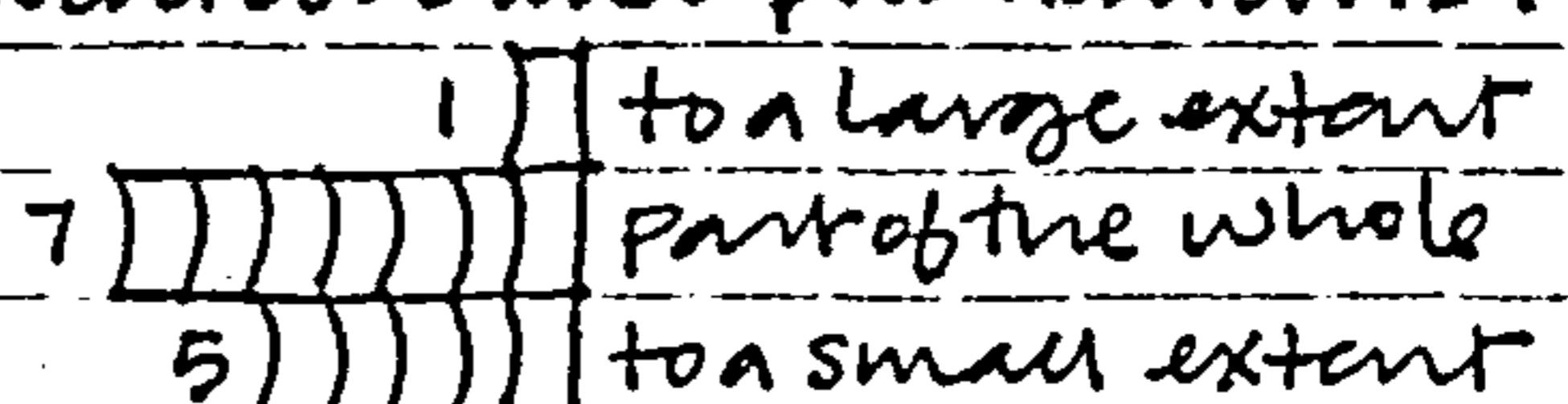
Did the event result in HEIGHTENED AWARENESS?



Should CPD be part of a programme?



Can CPD needs be met by self-education and publications?



that had been made in the office of their learning. In the six weeks that elapsed between the course and the questionnaires, no-one had made use of the knowledge gained unless they knew it before.

This appeared to be because they were not being asked to undertake work with an energy element in it. It seems clear that the office management needs to be sure of its objectives when proposing continuing education, and to give some thought to how the new knowledge or skills gained will be put into effect.

The event itself stressed the great advantages that accrue through the use of microcomputers. The evidence of the office having learned from the CPD event, as well as individuals, would be shown by the acquisition of these. Eighteen months after the course these were being introduced into the Bedford office, though not as a direct result of it.

Theme of existing buildings

Four Bedfordshire respondents were very critical of the event having strayed away from the title of existing buildings, though many people thought the deviation was actually beneficial. But attenders are very clear about what they have been led to expect and do not like variations, even if these seem advantageous to the education designers.

Pre-course test

One unique feature of the Hants event was that shortly before it was due to be held, a pre-course test was sent out to participants. Nine people said they found this useful, three said it was not useful and three either did not read it or did not comment.

Six of the participants said that they found it interesting or amusing, or that it was well done. Three others said it gave an idea of what to expect. Three said they found it daunting, or too long or confusing. One person said he knew it all and another that he knew none of it.

So overall, the opinion of participants was that a pre-course test was a useful preliminary to attending the event. This reflects too on the issue of what participants were expecting from the course. Having worked through the exercises (or even having looked through, since there may be a doubt about how fully the test was actually done), attenders would have a fairly clear idea of what the course expected of them.

Time and length

There were 12 comments from Bedfordshire about the length of the

course, or about the amount of time allowed for exercises. Three comments said the event was too short, one that it was too long and four that it was about right (of which two thought starting first thing in the morning would be better). In addition, there were four comments that the time allowed for practical exercises was too short.

So three out of eight comments made about the length thought that 1½ days was not enough to cover the subject sufficiently well. In the report back by lecturers, there was a general agreement that not enough time had been allowed. Moreover, Peter Burberry, the chairman and chief energy adviser, took a strong view of the shape of the course:

"I take the view that in general there should be a carefully controlled exercise of limited scope after any new technique is introduced. This makes it possible for the students to gain confidence in a reasonably simple situation and renders checking and the recognition of errors relatively simple ... the in-house nature of the course does make it possible to have some sort of follow up exercise run by the office itself ... or it might be more appropriate to let the application arise in the context of normal office activity but have some organized feed-back or appraisal of results"

The Hants participants also found the workshop sessions too short. However, the problem of judging duration and timing is well illustrated by one architect who several times mentioned the lack of time, but who wanted a shorter day.

Venues

The ARCUK CPD Report indicated that events held 'in office' were likely to be an important strand in providing continuing education, and all the experience held in these case studies confirms this.

However, there was a subtle variation in what 'in office' means in practice. 'In Office' events are not necessarily held in offices. In Hants a hotel was used, and in Bedfordshire the County conference facilities. In similar studies in Glasgow and Oxford, not reported here, only in Oxford was the event held in a room in the office.

These were all office events, however, in the sense that it was office staff who formed the major part of the audience.

The dog that didn't bark

There was no mention in the questionnaire returns of advertising or difficulties of publicising the events. A characteristic of office

events is that, once having got the agreement of the office management, there is an almost guaranteed audience.

Office events, then, have the edge over local events in having a lower failure rate - and certainly entailing less abortive work if they do fail.

But there is some evidence that a benefit of local events is putting people in touch with others from a wide spectrum of practice working in a similar area - a benefit that does not apply to the same extent in office events. This is not a new discovery. John Carter, in a classic special edition of the Architects' Journal on Continuing Education (Carter, 1978) quoted Angela Hedge's work (1975):

"The value of a course often lies as much in the meeting with colleagues as in the actual information put across. It is an opportunity for self assessment. One might add: an opportunity in a situation 'away from it all'.

There are many signs that the success of a course depends as much on the conditions of learning as on the overt teaching. 'The least articulated reason for attending', says Mrs Hedge, 'is to "feel important", to feel in touch with the latest information or the best expert in a subject'.

All this evidence tends to alter the conventional picture of continuing education. If the real value of courses is other than pedagogic, would some sort of educational activity without lecturers be of equal or perhaps greater benefit?

... One can imagine a successful course that imparted no 'new' knowledge or skill whatever, that merely promoted lively challenge and response between attenders"

Office events do not naturally have this characteristic although it can be built in. Hants, for example, invited other local authority practices to join in. Beds found that mixing other disciplines into the event resulted in better inter-staff knowledge and contact.

CPD in isolation or comprehensively

A minor note on the context of one-off events: all the other case studies showed a consensus of opinion in favour of a planned CPD structure; the Hants participants confirm this, 93% thinking events should be part of a greater whole.

CONCLUSIONS

This pair of case studies demonstrate some important aspects of mounting CPD events.

The first point to be made is that in office events can be very

successful. For one thing, they are very cheap: staff time away from the office is reduced, and the additional expenditure that accrues over and above the course fee can be avoided (mileage or rail fares, overnight accommodation, and incidental expenditure on meals and so forth). There are domestic benefits for attenders too - not being away from home; making the usual journey to work; and so on. And the education can be finely tuned to the particular concerns and resources of the office. In Bedford, for example, the energy event dealt with existing buildings, that office's main workload. Hampshire, by contrast, focused on new build.

There are, of course, some disadvantages too. There is a danger that the 'spiritual refreshment' of being out of the office can be lost. Another is that many people welcome the chance to meet other practitioners and compare notes. Attempts need to be made deliberately to overcome or substitute for these - by inviting outsiders, for example.

Hants also demonstrated that an office committed to and experienced in mounting CPD can handle the planning and administration of these events themselves.

While the venue of these events was novel, the methods used were not: they draw on the range of Formal education: lectures and workshops. Within the questionnaire returns, and in the comments made by the chairman, the need for an integration of an education event into the learning and application of learning in the office environment is repeatedly mentioned. Moreover, this study, like the other case studies, stress the learners' view that many different forms of CPD need to be brought on stream.

Part Two goes on to explore what these parallel methods are, in the views of learners, and Chapter Twelve in Part Three shows how these may be adapted to education aimed at audiences similar to those involved in this study.

Part Two

Methods Used by Learners

Chapter Four
A Range of Methods of Learning

"There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy."

(William Shakespeare, Hamlet I v 166).

Chapters One and Two have described the state of understanding of methods used in continuing learning. There is a clearly definable drive towards extending the range used, certainly away from the lecture method towards experiential learning, although little data has been presented of what alternative methods there are.

One potentially rich manner of approaching this problem is to interview learners themselves about the profitable ways of learning they have experienced. This would have two advantages. First, it would provide a list, a taxonomy, of methods they recognise as being appropriate. Second, it would help to highlight those that they have found most beneficial: while this might not suggest that teachers adopt the methods overnight and abandon approaches they conceive to be appropriate, it would illustrate alternatives to be considered. It should be clear that it is not being advocated that learning tasks are set up in proportion to the outcome of learners' experience; nor that the results of such an investigation would provide a prescriptive formula to be followed. Designing education, like other forms of design, depends on an inspired solution to a well-understood problem: the most an account of methods favoured by learners can do is to enrich the understanding of the range of solutions there are, which can then be adapted by designers. Gerlanter (1978) in his study of how design is undertaken, shows that designers frequently reach into their store of concept solutions and adapt previous models. If this store arises from an understanding of how learners already learn, so much the better. Moreover, Lawson in "How Designers Think" (1980) argues that the design process is not a logical step-by-step process, but one in which creative leaps are made and then rigorously post-rationalised: but that the creative leap is influenced by a context of knowledge and of stored analogy.

A PRELIMINARY EXPLORATION

In order to generate a preliminary list of methods architects use in their continuing learning, a study originally undertaken for other

reasons provided what Checkland (1976) calls a 'rich picture' of the problem.

In 1978, the Institute of Advanced Architectural Studies (IoAAS) at the University of York undertook research for the Department of Health and Social Security (DHSS) into the mid career education of National Health Service (NHS) architectural staff. The objectives of the research programme were to investigate the continuing education needs of architects and to frame ways of responding to them. A report on the investigation was published at the end of 1978 (Harris, 1978) and as a result of its recommendations, a Continuing Education Unit for NHS Architectural Staff (CEU) was established at York and has now been in existence for four years.

During the research period, large numbers of staff were met in semi-structured interviews as part of the process of establishing learning needs. These interviews also gave the opportunity to investigate how architects set about their continuing learning at present, since in talking about their learning needs interviewees also incidentally mentioned learning methods they had adopted. It was possible to reexamine the interviews and list the methods mentioned.

METHODOLOGY

The question of how architects continue to learn was approached in a way similar to that outlined by Glaser and Strauss in The Discovery of Grounded Theory: Strategies for qualitative research (1967). This contends that theory should be generated from an examination of systematically obtained and analysed data. Chadwick and Fielden in Approaches to Research in Adult Education (1979) have noted the difficulties and limitations that affect adult education research and which also affect the NHS architects study: the difficulty of designing scientifically representative samples; the lack of substantial data bases from which to start; the use of small samples (giving limited predicting power) as a means of raising and reviewing larger questions. They too point to Glaser and Strauss' methods as a basis from which to start dealing with these methodological problems.

In the overall research framework, both architects themselves and people in a position to comment knowledgeably on their work were

interviewed. The purpose of this was to get a rounded view of architects' education needs. In this report, only the architects' responses have been examined since the question here addressed is how architects learn, not how they are perceived by outsiders to learn. Similarly, in the interviews, the architects sometimes spoke of actual learning experiences and sometimes postulated possible ways of learning. While their postulated solutions are not without interest, the main concentration in this examination is on actual experiences, since the architects have tested these and found them either to work or not to work: both equally interesting results.

Participants

71 architects and architectural technicians were interviewed in 11 NHS regional architectural offices across the UK; this represents 9% of the staff. Respondents were spread evenly through the responsibility grades in each office from regional architect (or chief architect) to technician.

Thus in the offices, with a few exceptions, one member of the main grades were interviewed. Figure 4.1 shows this, and the exceptions. Chief amongst the exceptions were the inclusion of two regional works officers who were architects and 11 other members of staff. These last were mainly students and though the total number interviewed is much the same as the other grades, they came from only four offices, since students were not working in all the offices in the schedule. While approximately even numbers of staff of all grades were interviewed (between ten and 13), these do not represent the same percentage of each level, since there are more principals, seniors and technicians than other grades. Of all the staff in NHS offices, the interviews reached 29% of RWOs, 61% of RAs, 12% of ARAs, 6% of PAs, 7% of SAs, 5% of technicians and 22% of students and other unqualified staff. So the effect of interviewing similar numbers in each grade results in those which have great numbers being under-represented, and those which have few being over-represented.

It might be added that in the interviews a further six regional offices were visited, but the results of those have not been included here either because they were visited in a series of pilot studies while the methodology was being worked out, or (in two cases) regional architects were reluctant to allow interviews to be carried out with any other than the upper levels of responsibility.

Figure 4.1

First Set of Interviews: Participants

	Office	Regional Works Officer	Regional Architect	Assistant Architect	Principal Regional Architect	Senior Architect	Technician	Students and other staff	Total
Yorkshire	1	1	2	2	0	2	0	8	
Trent	0	1	1	1	1	1	0	5	
East Anglia	0	1	1	1	1	1	0	5	
NE Thames	1	1	1	1	1	1	1	7	
SW Thames	0	1	1	1	1	1	1	6	
Wessex	0	1	1	1	1	1	2	7	
Oxford	0	1	1	1	1	1	0	5	
South Western	0	1	1	1	1	1	2	7	
Mersey	0	1	1	1	1	1	2	7	
Wales	0	1	1	1	1	1	3	8	
Scotland	0	1	2	1	1	1	0	6	
Totals	2	11	13	12	10	12	11	71	

The people who were interviewed (with one exception, all men) were selected by the regional architect, not by the interviewer.

It should be made clear that since the purpose of this analysis is to raise and consider methods of learning, not to quantify them, that both the percentages of levels interviewed, and the randomness of staff selection, is not an issue in this research.

Interview schedule

The form of the interview was a semi-structured questionnaire. In this, interviewees were asked about "problem areas" they came up against in their daily work and what success they had had in dealing with these. To structure the informal discussion, each respondent was led through four main areas. The first was to do with problems relating to the process of making buildings: the way design teams work, their contact with other disciplines, and difficulties the interviewee had (or had had) in the administration of design, of people or of the Building Contract. The second area in the interview

was the architectural product: practical architectural problems, aesthetic considerations and feedback. The third area was about personal development: the interviewee's previous experience, job satisfaction and awareness of development and motivation. Finally, the question of education was dealt with directly: what undergraduate education had been undergone, what other learning experiences had been had, and what might be undertaken, together with a query about the learning objectives of these.

The reason for leaving overtly educational questions to the end was to focus on the purposes of education rather than education itself, especially since this might be narrowly perceived as "courses". The information about learning methods came both from the early parts of the interview in which successful and unsuccessful experiences were recounted, and from the more specific discussion of education.

With one exception, interviews were held in private rooms or offices with single members of staff. This had partly to do with the confidential nature of the interview, but more to do with minimising the natural embarrassment some people feel when talking frankly of their ambitions, achievements or limitations. Full written notes of what interviewees said were kept, in which an attempt was made to catch their character as well as their sense. Tape-recording was discarded after an early pilot, as it was found that transcribing and editing was too long and tedious a process. It was also feared that, as some previous studies have shown, the presence of a tape-recorder might inhibit the frank flow of comment. It was found that an hour and a half was needed for the first interview of the day (because it established background information about the office). Interviews thereafter lasted about an hour each.

Clustering

Detailed transcripts of the interviews were kept and at the end of the interview schedule points made by the interviewees were sorted into similar kinds of responses: all mentions of reading books were put together, all those referring to consulting experts together, and so on. Altogether, interviewees mentioned 33 different kinds of responses to their problems. These individual collections were then examined and broadly similar solutions were clustered together.

Within the 33 groups, the 71 interviewees mentioned 153 different

kinds of successful learning experiences and 23 unsuccessful experiences. The term 'successful' in this instance is used to mean that having had some problem or learning need, they had solved it (or partially solved it) in a particular way. 'Unsuccessful' means that they had had experience of a particular response and found it not to work for them (though neither necessarily implies that the solution would work for others). Both experiences are equally valid. Mike Brearley, when reappointed captain of England, wrote about his batting failures:

"It was Jung, I think, who said that we learned from our failures, success merely confirming us in our mistakes."
(Brearley, 1981).

The interviewees also often postulated solutions to the problem areas they mentioned, and indeed sometimes presented the problem in terms of a possible solution. ("We need a course on project management"). 79 positive possibilities were mentioned and there were eight negative possibilities ("I wouldn't think a course would work").

So, of the solutions advanced, two-thirds were based on experience (referred to here as 'proven') and one-third were postulated.

In the analysis of this first set of interviews, more reliance has been placed on the solutions based on actual experience than on postulated solutions. Not only has the interviewee more data on which to advance a solution, not only has there been some understanding of what the solution implies, but it seemed to me that the word 'course' was frequently used rather loosely to mean 'a course of action' rather than 'a short course'. Postulated solutions are, however, useful to conject a wider range of learning, particularly about more unusual ways - like sabbaticals, for example. Figure 4.2 shows the successful and 4.3 the unsuccessful methods mentioned.

Ordering learning methods

A preliminary inspection of the methods mentioned by architects in the interviews suggests that they vary extensively, and that some are different in kind from each other. 'Courses', for example, are clearly part of the conventional range of education events put on by academic bodies. But what is one to make of suggestions that instead of undertaking learning, the problem is 'sidestepped' by sub-contracting specialists?

The objective of this investigation is to enrich the range of

responses to learning problems. It would be useful to subcategorise the methods according to who is most likely to use them in planning education: teachers, learners, employers.

At this stage, it would be useful to conduct a further literature search for systems of ordering learning methods.

None of the literature fits happily with the data this research uncovers. Perhaps the closest is Warren Piper and Glatter's (Warren Piper and Glatter, 1977). Although they do not evaluate methods, Glatter's grid does suggest a taxonomy into which they can be related. On this matrix, one axis suggests learning "on the job" and "off the job". The other axis is providers: "the employing organization" and "some outside body". So methods such as job rotation and apprenticeship are on the job/provided by the office; publications and workshops are on the job/provided by outside bodies; staff seminars, visits, study leave are off the job/provided by the employing organisation; courses, conferences and secondment are off the job/provided by outside bodies. This matrix does therefore recognise the office initiatives and job related learning identified by the architect sample. It also recognises written materials and the live education event. Though it does not record packaged education, or for that matter exhaustively explore the clusters mentioned, they can easily be allocated within the grid. Inevitably, there will be different views about an organising taxonomy and allocation of methods within it, but these are semantic difficulties and matters of judgement. The biggest weakness of the Glatter grid is that it is provider orientated, and takes no note of independent learning: especially using inner resources and self-structuring experiences. As will be shown, the architects interviewed suggested that these account for at least a quarter of fruitful learning. On the other hand, it does deal with some aspects of learning the architects in the second set of interviews were unable to: especially with strategic matters in the domain of the employing organisation that provide opportunities to learn (eg debriefing on return from courses) or make such learning unnecessary (eg clear instructions).

Dubin asked professionals about five clusters and found that they recorded their most fruitful learning experiences as

"42% on the job problem solving ... 20% interaction with colleagues ... 16% publishing and independent reading ... 14% formal courses ... 4% outside professional activities"

(Dubin, 1971, quoted in Hedge, 1975).

Again, this does not cover all of the spectrum of methods architects identified - especially personally organised methods. The biggest difference (loosely assuming that the 'office action' mentioned by architects can be grouped with 'on the job problem solving' and that 'packaged education' which Dubin does not mention could be part of his 'formal courses') is the recognition of the importance of using inner resources and self-structuring learning. As to the other differences, there are a number of explanations which could reasonably account for them. This research focusses on specifically recalled past experiences; Dubin's does not. Perhaps architects do utilise methods to a different extent to other professionals - though the low rating they give to on and off the job learning then looks rather alarming. Or perhaps different methodologies can account for some variation in returns on collaboration and written materials. The two sets are more or less agreed about the extent to which formal education is used, if packaged education can be subsumed therein.

Wickett (1980) does not provide detailed figures on the extent to which the resources and methods he has tested are used. It must be said that they cover part of the range asked about in this research in an idiosyncratic manner. Sources are

"a group ... a friend ... an expert ...
written materials ... TV/radio ...
programmed materials ... displays ... self."

Methods are

"reading ... discussing ... doing ...
observation ...TV/radio ... reflecting"
(Wickett, 1980).

Some of the methods and sources Wickett asks about are very trivial (Displays, TV) and not surprisingly, he finds they are "hardly used". Others subsume many important sources (Experts, for example). Then again, he separates methods and sources, but they do not cross relate (what is the source equivalent of "doing"? Why is not "listening" listed as a method to relate to the source, "experts"?).

Fryer (1979) investigated building site management and finds that managers rank their means of learning social skills thus: coaching - job rotation - external courses - in company courses - private study. Like the other authors mentioned here, there are criticisms that must be made of the completeness of the list he offered for assessment.

Walter and Marks (1981) describe 16 major teaching methods, and classify them into three groups. The majority of these methods are

teacher-dominated and are divided into 'classical methods' (such as reading and lectures) and 'central methods' (which involve participation by learners, such as games and body movement). The remaining seven methods (which include watching others, fantasy and field experience) are lumped together as 'supporting methods'. The titles chosen are a reflection of the utility Walter and Marks have: 'central methods' means central to their teaching activity; the word has no descriptive life outside that. They also have difficulty in keeping their categories separate:

"Group discussion is also a classical method, but it was mentioned (under central methods) as a facet of group interaction"
(Walter and Marks, 1981).

McLagen (1978) arranges her methods in several different ways, according to the use she has for them. She calls methods 'information sources' and clusters them in four types of 'motivation sources': then in four other types according to the 'learning result' (eg knowledge, skill, creativity). Although these groups do not overlap, and she has some difficulty in compartmenting (for examples, books and reflection are both classified in three of the four available categories), her objective in seeking such clusters has obvious utility. However, her list of 'information sources', although including 'application projects' and 'performance contracts', consists largely of classroom techniques like 'audiotapes', 'tests', 'demonstrations'. She does not distinguish between education provided by the teacher, and that sought by the learner. More importantly, her category 'encourage applications in real situations' makes no reference to the 'real situation' of the workplace.

Boydell (1976) has written a useful description of experiential learning, in which he brings together many different interpretations of this kind of teaching. His two main categories are based on 'Gestalt insight' theory and on 'autonomous-learning' theory. In the first, he classifies methods such as role play, discussion and 'reflective lecturing'; in the second, classroom learning communities and work situations. He thus provides a rich resource as far as non deliberate learning and personally directed learning are concerned, but of course does not describe non-experiential methods such as reading, since these are not part of his brief. More awkwardly, he makes no mention in his main taxonomy of the environmental factors that affect learners mentioned by some experientialists such as 'alone time' or, in the list

generated by the architects here, of sidestepping or office structuring. These do, however, find a place in his overall review, where he refers to 'power distribution' and 'teamwork' as part of the 'learning climate'. Nonetheless, of all taxonomies discussed here, his is the most watertight even though he has difficulty with the differing internal qualities of some methods. An example is lectures which depend upon the lecturer's approach to isolate them as experiential ('reflective lecturing') or didactic.

Rowntree (1981) classifies methods according to the stimulus they provide for learners.

"So how do you decide on methods? ... This will depend on four main factors ... the type of learning situation you will be in - what I call the pedagogic structure ... which methods you happen to be familiar with ... what you believe to be the advantages and disadvantages of the methods ... constrained by what you regard as the practicalities of your situation"
(Rowntree, 1981).

In what is clearly a teacher-orientated approach, he lists five stimuli - human interaction, realia, pictures, written symbols and recorded sound. This taxonomy has some abstract charm in that it reduces methods to primitive communication symbols. But besides ignoring the learner's motivation and the context in which learning and practicing occur, the classification itself becomes untenable as soon as the primitive stimuli are used in combination.

Mackenzie, Evant and Jones (1976) in their Unesco 'Introduction to new methods and resources' say that it is normal

"for teaching methods to be classified ... on the basis of the size of group and the presence or absence of dramatic instrumentation such as television. These categories are then compared on the assumption that the variation between categories is much more important than the variation within categories".

They oppose this view, and suggest six dimensions of classification: characteristics of group members (eg how much the students know); modes of interaction (one way, discussion, flexible); the nature of the material resources; the modes of use of those resources; and time factors. Within this framework, however, they do not give an easily extractable nomination of methods and resources. As usual with taxonomies, they also have trouble keeping methods tied to the objectives they state. For example 'grasping difficult concepts and problems' can

be met by lectures, programmed instruction used by a group, and to a lesser extent by individual study or discussion groups.

Hawrylyshyn (1975) deals with management education which has pioneered the use of experiential methods. He relates teaching methods to learning objectives quite directly: knowledge is appropriately learned through reading, lectures and discussion; attitudes through games, feedback groups, etc; skills through simulations, projects, study trips and so on. He uses the link between objectives and methods in an illustrative way only, and does not explore anything like a broad spectrum. Significantly, his methods are all group methods (apart from 'selective reading') and while he takes for granted that the office environment is important, he makes no reference to the learning that the office itself should undertake.

So much for overt attempts at taxonomies. It may be worth inspecting another form of taxonomy, however: those that are covert. While some authors do not set out to validate their systems, they do need to present their material in some structured way: by chapter headings, for instance.

Jennifer Rogers' classic 'Adults Learning' (1977), for example, has a chapter on lectures and demonstrations; another on case studies, games, etc; another on distance teaching; one on discussion; and so on. She does not review self-motivated activities, or environmental factors, and says of discovery learning only that it is

"likely to remain an occasional strategy for short sharp use rather than a normal way of learning"
(Rogers, 1977).

In Rogers and Groombridge (1976), she and her co-author admit

"In fact most adult learning goes on outside the classroom and always will"
(Rogers and Groombridge, 1976).

Beard, like Rogers, hints at a taxonomy in chapter subdivisions. In her most widely distributed book, Teaching and Learning in Higher Education (1976), she has five chapters on learning methods: lectures; discussion; practical and laboratory teaching; instruction without the teacher being present (eg programmed learning and computers); and independent study. Only this last appears to stray outside the standard classroom arena and it has a teacher-orientation (taking notes, essays, reading and so on).

Gagne's hierarchy is only incidentally a methods taxonomy. His highest category, problem solving, may indicate experiential methods, but the two preceding that, principle learning and concept learning, could indicate any number of appropriate methods.

So all of the taxonomies discussed here are inadequate to capture the methods architects themselves listed. It was therefore decided to group the architects' methods into four clusters which related to who was most likely to arrange for them to be used. Like all the taxonomies discussed, it suffers from the problem of water-tightness in allocating methods into the four clusters. But it does have some utility in transferring this research to practice, as Part Four will demonstrate.

FOUR ARENAS OF LEARNING

The result of this process of classification was the assembly of the data into four clusters. Three of these are familiar in educational terms.

The first was titled, Formally organized education, and is readily recognisable. It uses a range of formal educational events and methods, and its characteristic is that it is mounted by the intervention of some

outside or academic body. It includes courses, kits, etc.

Personally organised learning similarly uses readily recognisable educational devices organised, in these cases, by learners themselves. It includes reading, visits to buildings, exhibitions, etc.

Non deliberate learning refers to the incidental learning that goes on as the architect carries out the job in hand. It includes practical experience, learning from colleagues, etc.

These three arenas of learning are modelled fairly accurately in architects' undergraduate education. Formally organised education is represented in lectures and seminars; Personally organised learning takes place in spontaneous reading and visits and observation of buildings; and Non deliberate learning is represented in the two years of "practical experience" in offices that are built into the total of the seven years' study architects must undergo before they can write the examination that will allow them to register.

Figures 4.2 and 4.3 show a list of ways of learning that were mentioned and how they were clustered.

The Figures also show that when this clustering had been done, there remained a substantial number of comments which could not easily be grouped in these three main learning arenas. They seemed to have in common a theme of action on the part of the employing organisation: this either formed a necessary preamble to a learning experience, or eliminated the necessity for the learning to take place. It has been titled "Office action".

It should be noted, however, that in an important sense defining hard and fast barriers between the ways of learning mentioned is an absurd endeavour, since they clearly form part of a continuum. For example, "research" could be entered under Formally organised education or alternatively, could be thought of as a practice often undertaken as a prelude to designing a building and not deliberately educational at all. "Asking colleagues" could be part of the design process and entered under Non deliberate learning, but it links with using specialists in the office as tutors. In turn, their presence in the office depends on Office action. And the notion of tutors being available to help learners might be thought of as an aspect of Personally organised learning. In spite of these semantic problems, it seems useful to group broadly similar learning activities together; hence the

Figure 4.2

Successful Learning Experiences: The first interview

ARENA, learning methods	PROVEN No of mentions	%	POSTULATED No of mentions	%
FORMALLY ORGANISED				
EDUCATION	61	40%	51	65%
Education generally	1		1	
Courses (away and in-office)	39		35	
Lectures	1		4	
Seminars	-		1	
Workshops	2		1	
Game playing	-		3	
Undergraduate courses	4		4	
Postgraduate courses	-		1	
Books, manuals, guides	12		1	
Kits, tape/slides, videos	-		-	
Films	2		-	
PERSONALLY ORGANISED				
LEARNING	18	12%	9	11%
Building visits	4		3	
Teaching others	1		-	
Research	3		1	
Trade literature	1		-	
Information services	1		2	
Exhibitions (e.g. trade)	1		1	
Journals, magazines	7		2	
NON DELIBERATE LEARNING	45	29%	4	5%
Practical experience (e.g. working on a design project)	32		1	
Site visits	5		2	
Discussion with colleagues	8		1	
OFFICE ACTION	29	19%	15	19%
Workplace location	5		6	
Sabbaticals	-		2	
Office meetings	6		2	
Job rotation and exchange	-		3	
Job team structure	3		-	
Specialists	6		-	
Office procedures	3		1	
Checklists	2		-	
Office library	-		-	
Computer modelling	1		1	
Sidestepping	3		-	
Total	153	100%	79	100%

use of the term "clusters" to indicate loose association rather than rigid boundaries. In all these decisions, the objectives of the learner will largely determine what is most appropriate classification: this is, of course, often difficult to ascertain.

Figure 4.3

Unsuccessful Learning Experiences: The first interview

ARENA, learning methods	PROVEN		POSTULATED	
	No of mentions	%	No of mentions	%
FORMALLY ORGANISED				
EDUCATION	-17	74%	-7½	83%
Education generally	0		-1	
Courses (away and in-office)	-14		-3	
Lectures	0		0	
Seminars	0		0	
Workshops	0		0	
Game playing	0		0	
Undergraduate courses	-1		-1	
Postgraduate courses	0		0	
Reading generally*	-1		-½	
Books, manuals, guides	0		-2	
Kits, tape/slides/videos	0		-1	
Films	-1		0	
PERSONALLY ORGANISED LEARNING	-3	13%	-½	6%
Building visits	-1		0	
Teaching others	0		0	
Research	0		0	
Reading generally*	-1		-½	
Trade literature	-1		0	
Information services	0		0	
Exhibitions (e.g. trade)	0		0	
Journals, magazines	0		0	
NON DELIBERATE LEARNING	-2	9%	0	0%
Practical experience (e.g. working on a design project)	-2		0	
Being given responsibility	0		0	
Site visits	0		0	
Discussion with colleagues	0		0	
OFFICE ACTION	-1	4%	-1	11%
Workplace location	0		0	
Sabbaticals	0		0	
Office meetings	-1		0	
Job rotation and exchange	0		0	
Specialists	0		0	
Office procedures	0		0	
Checklists	0		0	
Office library	0		0	
Computer modelling	0		-1	
Sidestepping	0		0	
Total	-23		-9	

* Divided equally between Formally and Personally organised learning.

Defining questions

A classification of methods of learning might be thought of as having two aspects, depending on whether the learning episode was deliberately undertaken or not.

If it was deliberately undertaken, was it organised by the

Figure 4.4

Preliminary Classification of Learning Methods and Resources

LEARNING	Deliberate	FORMALLY ORGANISED EDUCATION	Live	Education generally Courses (away & in-office) Lectures Seminars Workshops Game playing Undergraduate courses Postgraduate courses
			Packaged	Books, manuals, guides Kits, tape/slides, videos Films
	Unintentional	NON DELIBERATE LEARNING	Self structured	Building visits Teaching others Research
			Using cool data	Trade literature Information services Trade exhibitions Journals, magazines
			On the job	Practical experience (e.g. working on a design project) Site visits Discussion with colleagues
			Real alternatives	Workplace location Sabbaticals Office meetings Job rotation & exchange
			Focussing on specialists	Specialists Office procedures Checklists Office library Computer modelling
			Sidestepping	Sidestepping Job team structure

learner? Or did the learner leave it up to someone else to organise? Note that the questions here are to do with organising the learning method. It is not to do with the initial wish to undertake some learning - to find out something or to acquire some skill. It is not to do with planning the whole undertaking, merely the learning methods and resources to be used.

But a deal of learning appears to have been gained as a result of some other undertaking. Working on a design project, for example, where the central focus is to make a building, sometimes results in the

architects acquiring, willy-nilly, some knowledge or skill. This kind of learning may be thought of as non-deliberately acquired. Sometimes the opportunity to learn in this way depends on the working environment being organised in such a way as to allow the learning to happen. In a sense it means that the office has had to go through a preliminary learning phase.

This classification is easier to see diagrammatically and Figure 4.4 shows it.

The defining questions, then, used for classification here were first of all

- did the learning depend on some organisational aspect of the main job of work? These were classified as "Office action".
- Was there a definite intention of learning before the method was used? If there was not, this was classified as "Non deliberate".
- Of those being deliberate, was the education organised by some outside body having an educational objective and without the learner needing to reorganise or collate it? If it was, this was classified as "Formally organised".
- Of those being deliberate, was the education organised by the learner, by drawing on or undertaking personal experiences or by organising published material in a personal way? If it was, this was classified as "Personally organised".

FINDINGS

The pie diagrams in Figure 4.5 show the proportion of comments about successful learning that were made which have been clustered in these four arenas. The relative sizes of the pies for "postulated" and "proven" solutions are proportional to the number of mentions. Formally organised education experiences account for about four-tenths and Non deliberate learning for nearly three-tenths of the total. The remaining three-tenths is divided between Personally organised learning and Office action.

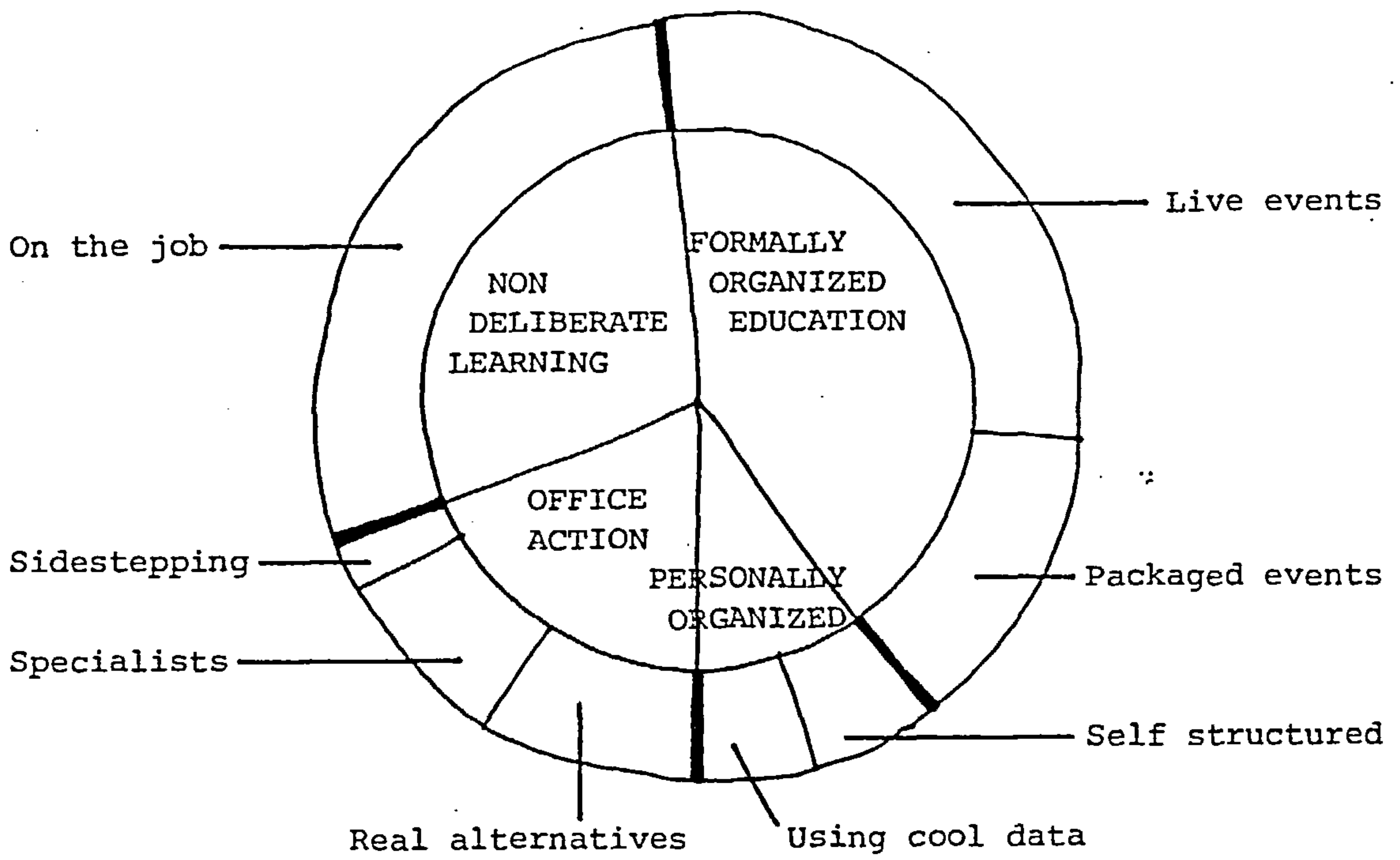
In postulated learning, the proportion of mentions of Office action and Personally organised learning remain exactly as the proven findings. Non deliberate learning shrinks to one-twentieth and Formally organised education expands to occupy two-thirds of all mentions.

It is important to note that these proportions are only a first

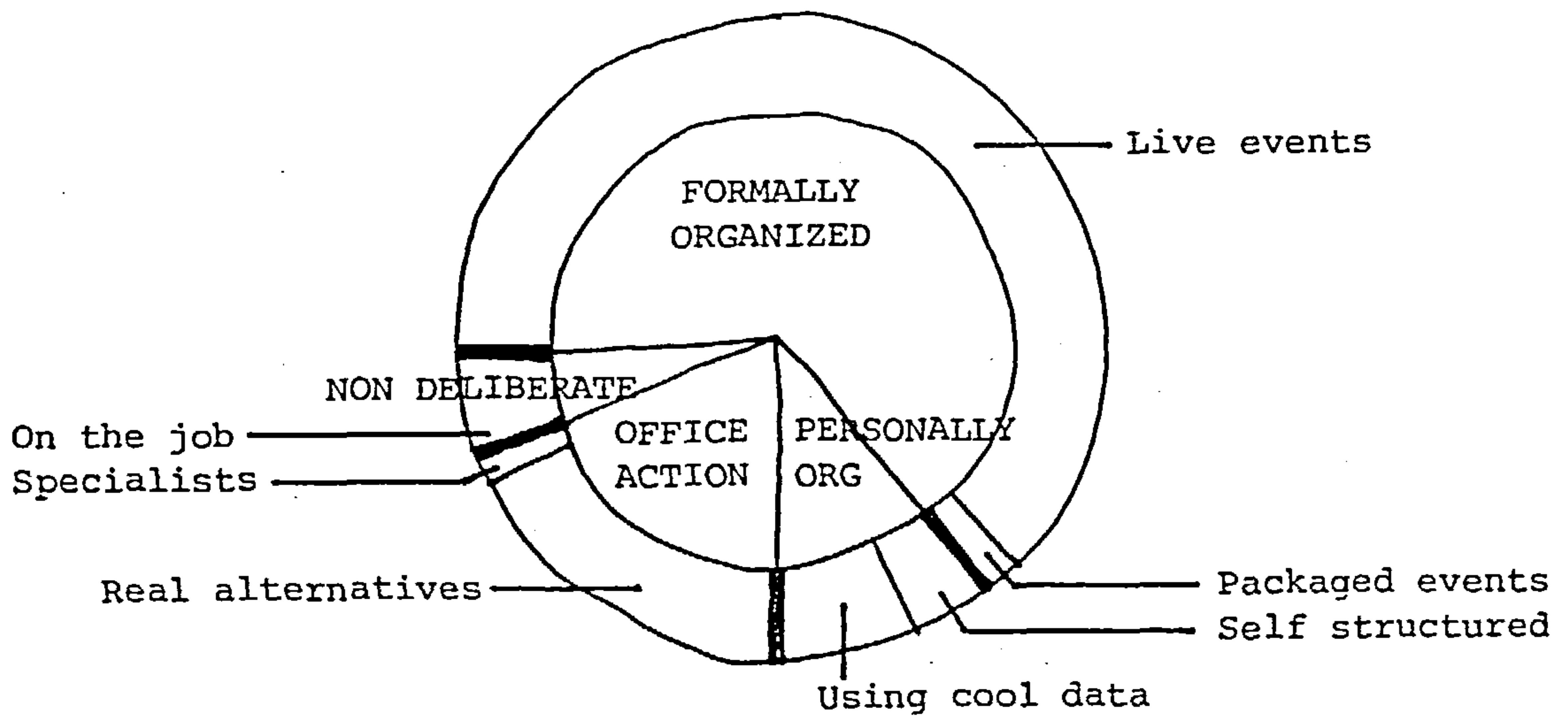
Figure 4.5

Proportions of Successful Solutions Mentioned

PROVEN



POSTULATED



indication of the presence of various kinds of learning methods, not an accurate reflection of how much they are used. Therefore, two caveats about the diagrams should be made. Firstly, because the classification of learning experiences depends on the learner's objectives, the value of one method against another cannot be accurately assessed. For this reason, figures in the diagram have been avoided, and a graphic representation made instead. This shows the rough relationship while avoiding spurious accuracy. Secondly, a "mention" which is the value used to construct the diagram reflects neither the amount of time spent in the activity, nor the intensity of the experience. So undertaking a major piece of learning would score as strongly as undertaking something relatively trivial. Undertaking learning by one method - say by experience - may be a very much more diluted way of learning and may take much longer than by another - say by reading a manual. On the other hand, the learner may retain the knowledge or skill more tenaciously; it will again depend on the learner how much of an experience is actually learning - some people may find no education at all in being given responsibility, in parallel others sit through a lecture without absorbing anything. The interviewees appeared not generally to fall into this class, or they would have mentioned the experience as not being good for learning, but extending the form to others may have this result.

Formally organised education

The four-tenths of mentions that have been clustered as Formally organised were in the main live events. Three-quarters were mentions of live events - and overwhelmingly of away and in-house courses. Postulated learning was almost entirely live - again courses. Packaged learning accounted for one-quarter of proven experiences (though it hardly figures in postulated learning) and this was mostly the use of Books, manuals and guides.

Personally organised learning

About one-eighth of mentions of learning experiences made were about methods clustered here as Personally organised. Proven and postulated experiences were constant at about this proportion. In both cases too, mentions were evenly divided between those which were

self structured (e.g. building visits) and the use of cool data (e.g. Magazines, Information services).

Non deliberate learning

There were many mentions of Non deliberate learning among the ways architects said they had successfully learned. This was usually referred to as "by experience", though there were some mentions of Site visits and Discussion with colleagues. All mentions were of "on the job" learning. In the past - in proven experiences - about 30% of learning had occurred this way. As might be expected, because the learning was non deliberate, when planning future education, architects mentioned it considerably less: only 5%.

Office action

Architects mentioned Office action to much the same extent in proven and postulated learning experiences: nearly 20%. There was some mention of sidestepping problems in the past which was not seen as a strategy for the future. The remainder of mentions were equally of Real alternatives (e.g. workplace location) and the use of Specialists. In postulated learning, Real alternatives made up nine tenths of the total.

OBSERVATIONS

In each chapter of the two central parts of this thesis, a number of observations will be made about the material in the chapter and these observations will be brought together in Chapter 10. Thus the first part of each chapter is an exposition of data, the second part a commentary on the data, making the obvious points contained in the exposition, raising questions, drawing out themes and making tentative conclusions. The observation sections are grouped into standard headings (not all of which are salient to each chapter):

- Four arenas
- Use of learning methods
- Interconnections between arenas and methods
- Enriching education
- Some problems of methods

- Continuing professional development
- Links between content and methods
- Qualities of mature learners
- Learning by other disciplines.

FOUR ARENAS OF LEARNING

1: A convenient classification

In this first set of interviews with architects, 32 different kinds of learning experiences emerged. A convenient way of clustering these is according to who is responsible for organising them: in whose domain they are. This led to the notion of four arenas. Formally organised education is the domain of educators and consists of live events and packaged learning materials. Personally organised learning is the domain of learners themselves and consists of self-structured learning opportunities and the use of "cool" data. Non deliberate learning is the domain of no one set of people, since it happens without planning and is synonymous with on-the-job learning. Office action is the domain of office managers and consists of real alternatives to learning, of focussing on specialists and of strategic approaches, such as sidestepping problematic areas which throw up the need for learning. The first two arenas might be thought of as Deliberate activities, the learning which accrues from the other two arenas as Unintentional. Figure 4.5 shows the taxonomy diagrammatically and gives details of the methods and resources included in each arena.

2: There are alternative taxonomies that might be used

Clustering methods and resources into arenas according to who plans the education is not the only method that might be used of organising the data. An alternative is, for example, arranging it according to whether the events are live (e.g. visits) or packaged (e.g. trade literature). The advantage of this system is that the classification is easier to make. The disadvantages are that the ordering system is a peculiarly static one, giving no clear indication of where the initiative lies to utilise the resource. A further disadvantage is that some events which use mixtures of live and packaged material - education kits are an example - lie somewhere midway between

the extremes. Furthermore, as will be seen in later chapters, observations which arise in respect of enriching educational media are one of the significant directions that future education planning might take. Generally, enriching media involves mixing media, thus moving events away from the taxonomic extremes towards a blend of the two.

Another taxonomy would be distinguishing clearly between methods of learning (e.g. reflection) and learning resources (e.g. tape/slides). This has some attraction in clarity of definition. But the labels that are attached to various ways architects have used to advance their learning are only nominally a "resource" or a "method". Resources always imply some activity to make them meaningful (i.e. making them methodological) and methods always involve drawing on some resource. Thus, Books are a resource, but reading books (the implied activity) is a method. Similarly, Reflection is a method, but the implication is that doing so draws upon inner resources of experience and skills.

So there is no hard and fast, readily-available method of classification. Learning methods are not like botanical families where plants can be classified according to their genetic origin. Rather, the reasons for attempting classification are firstly, to make a mass of data assimilatable (the main purpose of 'covert' taxonomies) and secondly, to recognise the characteristics and conventional limitations of methods in order to use them, and in order to amend them where they are inadequate, and in order to blend them so that disadvantages of one system can be balanced by advantages of another. In a word, utility.

There can be no correct taxonomy, but some systems are more useful as tools for understanding and applying learning than others.

3: The focus on all resources and methods of learning

It is an intention of this research to establish which resources and methods of learning are utilised by architects. As a third observation, it is noteworthy that previous research into architects' continuing education has largely concentrated on the Formally organised arena alone - and within that, predominantly on the short course.

4: To what extent are various resources and methods utilised?

This first set of interviews with architects about how they have learned in order to solve problem areas they have come up against has been primarily designed to explore the range of approaches used. As might have been anticipated, it covers many Personally organised methods. Less predictably, it reveals the existence of the learning undertaken by the office as a contribution to resolving the problem areas.

But it does not attempt to measure the extent to which various methods are utilised. Though some first indications about utilisation are possible from the data (by counting the number of "mentions"), this is not the prime purpose of this set of interviews, nor can it be a particularly accurate method. The question of how much various methods are used is an interesting one, and an attempt to measure and further map this will be carried out later in this submission.

5: Is not further mapping of some resources required?

The list of methods generated by the first set of interviews does not necessarily cover the whole gamut of useful methods. Others need to be added as they become recognisable, and this will be done in the second set of interviews.

Most importantly, the second most frequently mentioned method of responding to problems in this first set of interviews was "by experience". It was mentioned 32 times, compared with 39 mentions of Courses and 12 mentions of Books in third place. It is clearly a much used source, but as it is a very wide-ranging and indeterminate title, and in the second set of interviews an attempt should be made to distinguish it more clearly, perhaps by breaking it down into more easily quantified parts.

INTERCONNECTIONS BETWEEN ARENAS

6: Arenas, and methods, overlap

Even at this simple stage of mapping, it is clear that there are strong interconnections between some of the methods and arenas. This will be examined in detail in Part Three when each method is described

in detail. At this stage, there are some immediately observable interconnections. The chief of these is the similar premeditation in Formally and Personally organised learning undertakings, and its corollary in unintentional learning in what is titled Non deliberate learning and Office action.

There are clearly very strong links indeed between Office action and Non deliberate learning, where the former might be seen as a necessary prerequisite for the latter to effectively take place.

ENRICHING CONTINUING EDUCATION

7: Could clearer understanding of the characteristics of learning methods extend their use?

This chapter has enumerated the methods of learning utilised by architects. Part Three will explore each method. This is important, since a good understanding of the qualities, limits and advantages of each method is required by educators and learners to properly utilise them. There are indications in the table of postulated experiences that where learners have a clear grasp of a method they are prepared to use it, and vice versa. Thus the well-recognised resource of Short courses go from 25% in proven experiences up to 44% in postulated. Conversely, the ill-defined and obscure resource of Practical experience drops from 21% in proven experiences down to 1% in postulated.

8: The purpose of analysis is synthesis

There seems to be potential for enriching the most common formal education method, the short course, by allying it with other methods. But again, this cannot be done until the characteristics of other methods are understood. Thus it will be clear that the attempt made in this thesis to disentangle various methods is not to isolate them, as might appear from the concentration on taxonomy, but the very reverse. By first isolating and understanding various aspects of learning, they can be brought together and reintegrated with this understanding.

CONTINUING PROFESSIONAL DEVELOPMENT

9: To what extent can CPD utilise familiar methods of learning?

CPD has a main aim, the improvement of architects' performance. It has in the past tended to concentrate on educational methods which can be readily recognised and measured: that is to say, on the Formally organised arena. First indications in this chapter are that the Formally organised arena represents a small part of useful learning. The question therefore is, can the spectrum of methods recognised by CPD organisers be extended and if so, how?

LEARNING BY OTHER DISCIPLINES

10: Can methods of learning used by architects be compared with learners generally?

Theories of teaching suggest that subjects can be taught by a proper analysis of content to any group. Do architects utilise a range of methods similar to other groups? Can general teaching theory be applied to architects in a straightforward way; and can this research into the extent of methods used by architects be translated into methods for other groups? These questions must be explored in future studies.

SUMMARY

To generate this view of how architects continue their learning, a methodology similar to the first stage of Grounded Theory was used: an examination of an extended series of interviews held with 71 architectural staff. This systematic examination revealed 264 comments about learning methods, 153 of which were positive and based on experience. In other words, no preliminary assumptions were made about how architects learn; rather, they were simply asked about problem-solving and this revealed a range of methods.

Since the interviewees were not presented with a pre-researched set of methods, it is very possible that they would have failed to remember some that they had found useful. In the absence of such a

checklist, they may have tended to fall back on methods that are clearly defined in their minds. The huge bias towards "courses" in their postulated solutions suggests this.

Very roughly, about half of the useful learning experiences described were deliberately undertaken, about half unintentional.

DIRECTIONS

But to get a better picture of what values are placed on various methods, it is necessary to go back into the field with the grounded theory and check and develop it. In doing this, some of the other detailed questions that have started to arise may also be approached.

Chapter Five
How Important is Each?

"Run it up the flagpole and see if anyone salutes."
(saying current in DHSS, c 1980)

Glaser and Strauss' methodology of grounded theory suggests that in order to generate an hypothesis, data is first obtained and systematically analysed (Glaser and Strauss, 1967). Chapter Four of this thesis has used the first part of that method: the comments made by 71 architectural staff in NHS Regions about how they have learned has been extracted from structured interviews about their learning needs. This has been analysed and a list of learning methods generated from what they said. This list has been clustered into generally similar groups and four arenas identified.

The second stage of Glaser and Strauss' methodology suggests that having generated theory from general field data, specific investigations can then be carried out to verify or nullify it. During 1981 an opportunity arose to carry out a detailed investigation of the methods architects use to continue learning.

METHODOLOGY

In the autumn of 1981, the building divisions of the NHS and the DHSS asked the CEU to provide some educational experiences for architectural staff about energy conservation in health building design. The Continuing Education Unit, of which I was for two years a member, commissioned me to contribute to help design the educational programme. In this, I worked with Stuart Sutcliffe. We planned and carried out the research and development of the study together, but we tended to have special responsibility for aspects of it: I was chiefly involved in assessing methods of learning; Sutcliffe chiefly responsible for assessing the necessary content; both of us for developing the findings of the research phase into educational contexts.

We proposed to our sponsors that before designing and delivering education about this topic, we should undertake some preliminary work. First, we wanted to extend our study to include services engineers and quantity surveyors, as well as architects. (The CEU brief runs to architectural staff only). Second, we wanted to establish how much these design team members already knew about energy: plainly, it would be purposeless to teach them what they already know. Thirdly,

extending this, to identify where they needed, or wanted, more education. And fourthly - the main concern relevant to this section of the research - to identify the methods they had used to learn about energy with a view to using these methods in future educational designs.

The shape of seminars

Each seminar was held in a number of stages keyed to a proforma, shown in Figure 5.1. It started with an introduction by Sutcliffe about why energy efficiency was thought to be important and what the objectives of the seminar were. Participants then introduced themselves in turn and each said what were their reasons - if any - for being interested in the subject.

I then approached the question of learning about energy by outlining the four arenas described in the previous chapter of this thesis, listing the various sources and methods of learning that had been generated, and giving examples of some of them (Q1 in the proforma). It was suggested to participants that their understanding of energy was greater now than it had been five years previously. How had the learning that had taken place come about? Each participant was asked to try and recall as many learning experiences as possible that had energy as a main theme (Q2 in the proforma). The method here used is the notion of Adult Learning Projects described in detail in the Appendix (Tough, 1979). A difference, however, is that Tough's methods ask interviewees to recall deliberate learning undertakings: here the interest is broadened to any learning, whether the learner set out deliberately or not. In order to make a list of experiences, learners had first to assess their state of knowledge, and then attempt to post-rationalise the experience into a describable "learning project". (This was called a "learning programme" in the seminar to avoid confusion with the architectural use of the term "project"). Many participants found this difficult to start with - and there were often puzzled expressions and jokes at the beginning of the exercise - but gradually settled to the task. It took about 15 minutes for them to make a list of this kind. They were then asked to number the experiences and to indicate, if possible, how long each took.

Participants were then asked to select two of their learning projects and to inspect a list of learning methods originating from this research (Q3). They were asked to indicate which of the methods

had been used in each learning project and to say how important each was. They did this by using a 1-5 scale where 5 meant essential and 1 meant present but not dominant. A blank or dash meant that the method had not been used.

In the next stage of the seminar an exercise was carried out, focussing on buildings, to help learners identify their strengths and weaknesses of knowledge (Q4 and 5). This is described in Chapter 11.

Finally, each participant was asked to describe a new learning project that they thought they needed to undertake, drawing on the exercise to establish their weaknesses (Q5) and on the exercise in which they identified methods of learning (Q3). Having done this, they returned to Q3 and scored "Programme X" for the methods they would utilise and how important each would be. The final half-hour of the seminar was spent sharing and developing each person's proposal.

So the methodology allowed the preliminary classifications that arose in Chapter Three to be checked in two ways. First, participants had before them a checklist to jog their memories, and did not have to ponder their experience from scratch. Second, they weighted the values they attached to each method, thus giving a more considered judgement of the importance of each, rather than the bland "mention" recorded in the previous chapter.

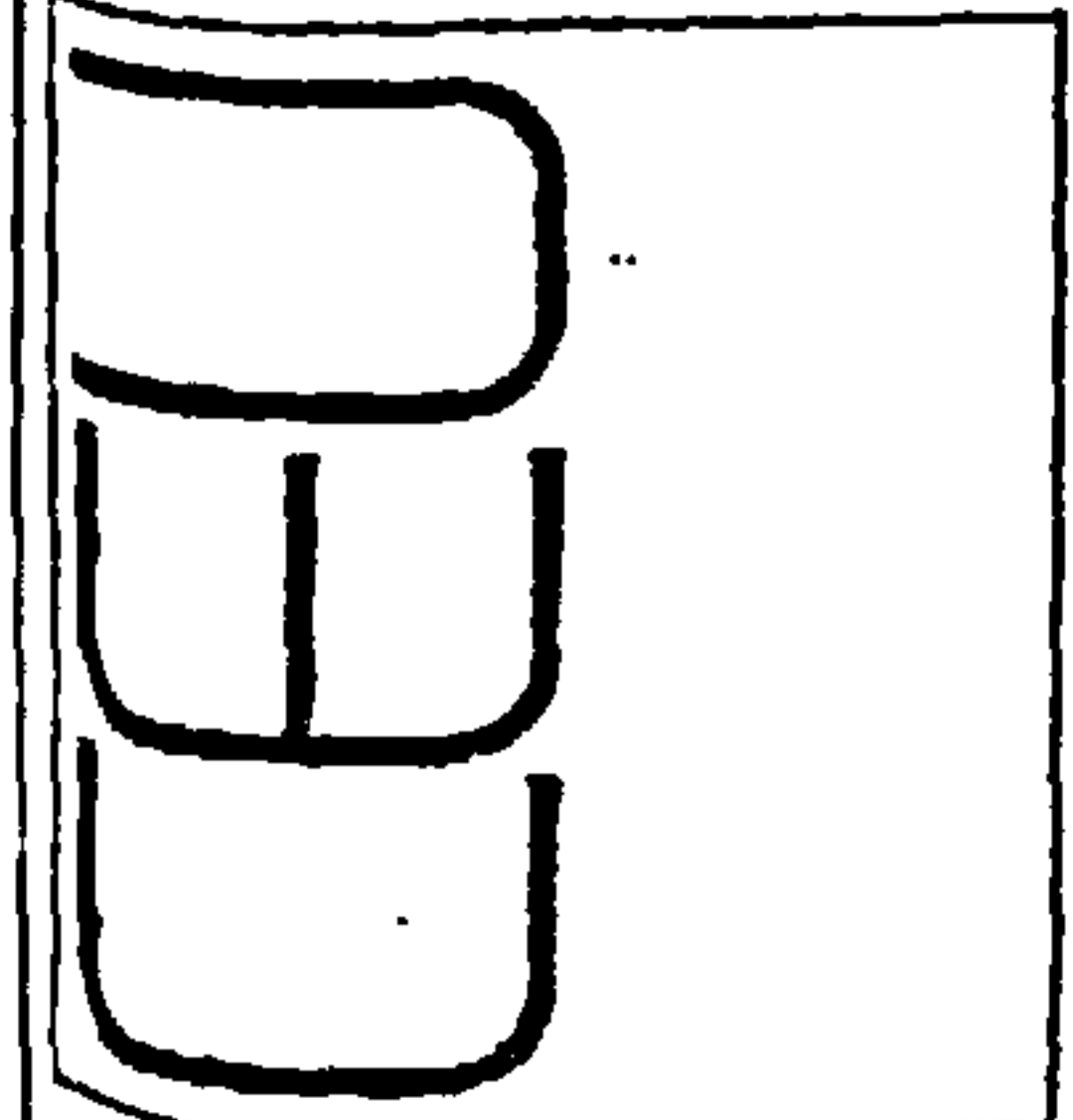
This chapter will be concerned with the learning projects designers had undertaken, with the methods they used to learn, and to a lesser extent with the methods they proposed for future learning. An account of the development of their analysis into new learning provision is given in Part Four.

Mounting the seminars

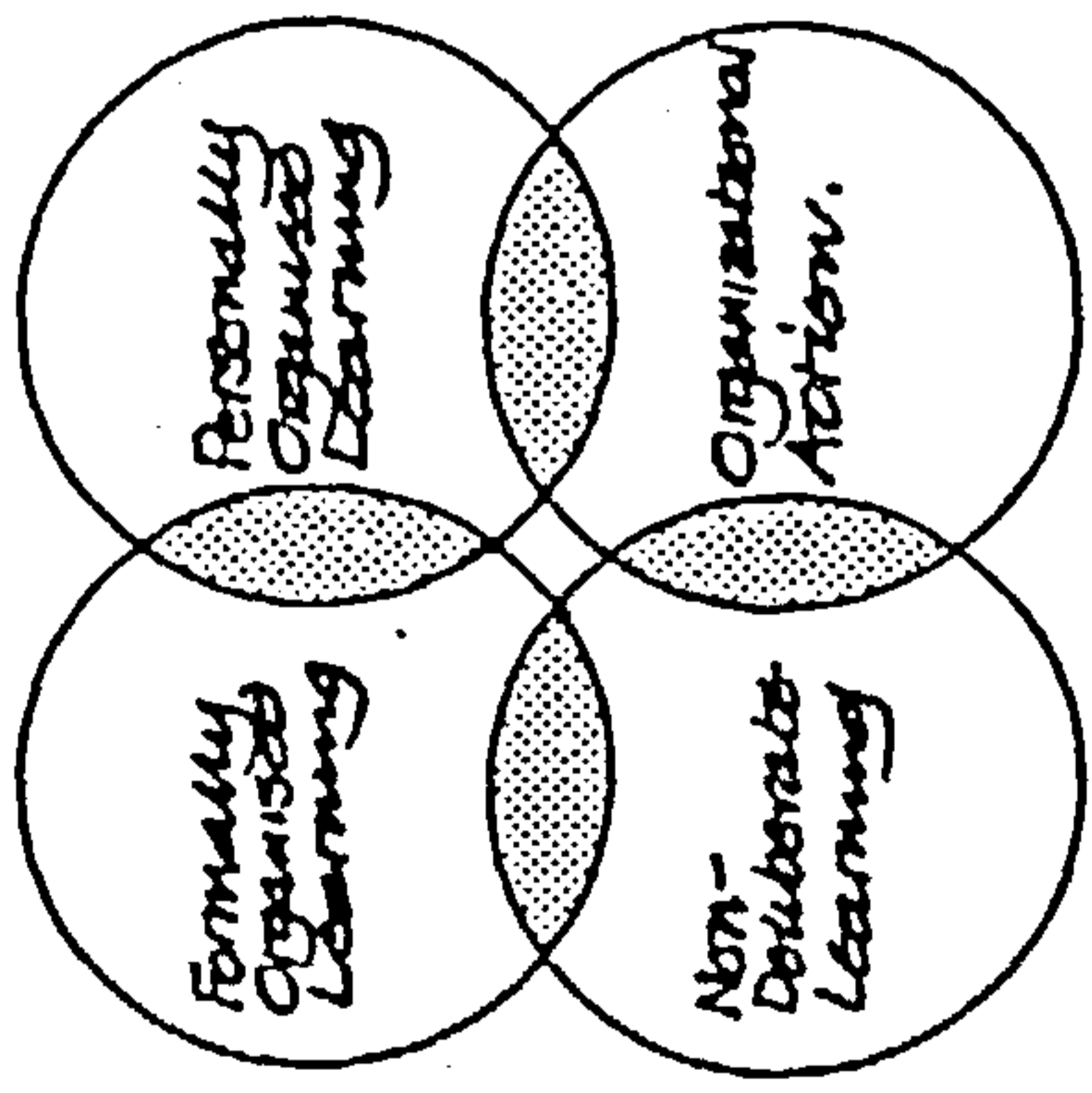
Altogether, 12 groups of learners from all parts of the UK were interviewed: a total of 117 people. Nine of the groups were NHS building designers, three were from private practices undertaking a large number of health buildings. Figure 5.2 shows the distribution, location and professions of the interviewees.

The basic interview conducted took three hours, including a break for tea or coffee. Almost all the seminars were held in conference rooms in or near the practice; two were held in less formal surroundings in easy chairs. The offices themselves set up the administrative arrangements, provided tea and invited members of the

INSTITUTE OF ADVANCED ARCHITECTURAL STUDIES
CONTINUING EDUCATION UNIT
 FOR NHS ARCHITECTURAL STAFF
 UNIVERSITY OF YORK, THE KING'S MANOR, YORK YO1 2EP
 TELEPHONE (0904) 59861 EXT 864
PROJECT DATA



ENERGY EFFICIENT BUILDINGS



1 Areas of Learning

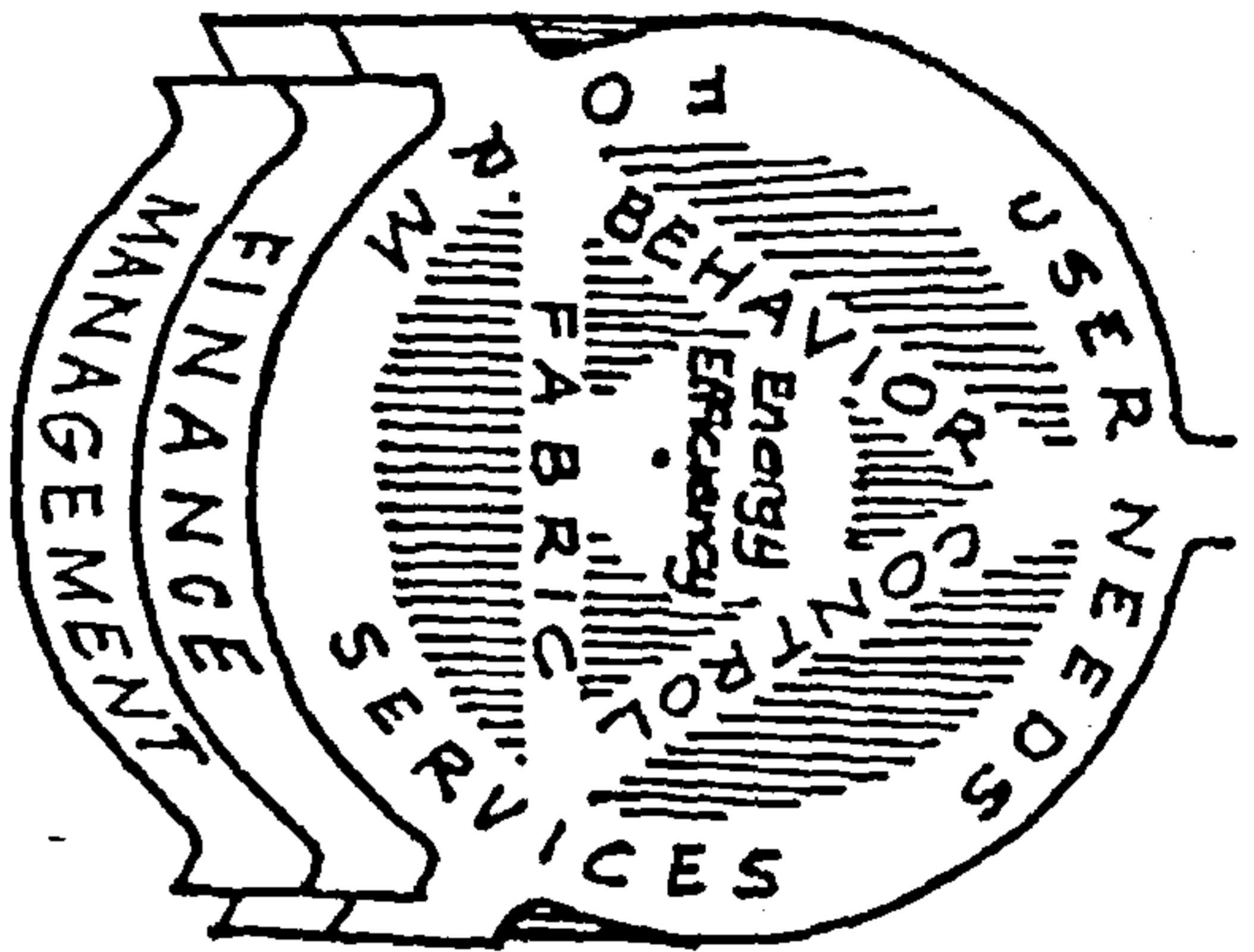
2 List of learning programmes undertaken during the past 5 years about aspects of energy
 Number them and give an estimate of the time taken on each one

3 List of resources and methods used in 2 learning programmes related to energy and buildings

Programme 1	Programme 2	Programme X
Courses (away and in office)		
Lectures, seminars, workshops		
Camping, role playing		
Research		
Teaching others		
Undergraduate course		
Kits, tape/slides, videos		
Films		
TV, radio		
Source documents, eg legislation		
Books, manuals, guides		
Journals, magazines		
Trade literature		
Information services		
Exhibitions		
Visits (building and site)		
Experiencing buildings		
Dramming plans		
Reflecting on experience		
Working on a design project		
Using experience and own skills		
Asking experts		
Discussion with colleagues		
DIY		
Formal assessments		
Office procedures		
Checklists		
Office expert		
Office meetings		
Computer modelling		
Job rotation and exchange		
Workplace location		
Submittals		
Other (please state what)		

Tim Clark DipArch Ext 855/864 Stewart Harrell BArch Ext 864/863 Diane Stockdale BA
 Stewart Sutcliffe RIBA Ext 864/861 Frankie Todd BA(Hons) Psych/Soc Ext 85

4 Aspects of Energy Efficient Buildings



16

5 Matrix
Mark 1 low
5 high

	How influential are these aspects in the design and management of energy efficient health buildings	To what extent are these aspects within the control of your particular professional discipline	What do you consider to be your strengths and weaknesses in your knowledge of these aspects
User needs			
Behaviour			
Form			
Fabric			
Services			
Controls			
Finance			
Management			

6 Programme X
Detailed description
of a job related
learning programme
that you consider to
be a priority
(See also 3 -
resources and
methods)

7 Personal Details

Name :
Profession :
Age Range : 20-30 31-40 41-50 51-65
please ring
Region or
Practice :

Figure 5.2

Energy Efficiency Seminars: Participants

Office	No of Interviewees	No of Architects	No of Technicians	No of Quantity Surveyors	No of Services Engineers	No of Others	Location
G	10	8	2	-	-	-	Glasgow
N	8	4	-	1	3	-	Newcastle
B	10	6	-	1	3	-	Birmingham
H ¹	13	9	4	-	-	-	Huddersfield
W	11	6	-	-	5	-	Cardiff
WP ¹	6	6	-	-	-	-	Cardiff
Y	10	3	1	1	5	-	Harrogate
R ¹	10	3	-	2	4	1	Central London
S	10	7	1	1	1	-	Croydon
NE	13 ²	9	-	1	3 ²	-	NE London
NW	5	4	1	-	-	-	NW London
E	11	5	1	1	3	1	Cambridge
Total	117	70	10	8	27	2	
%	100%	60%	9%	7%	23%	2%	

Key ¹Private offices ²Includes 1 private engineer

office to take part. Wherever possible, the seating was arranged around tables to form a complete circle, so that each participant (including ourselves) was approximately equal and there was no physical emphasis on any one person.

The first two seminars in the series - at Glasgow and Newcastle - were used as pilot studies to test the proforma and assumptions built into the shape of the event. The data obtained from those has not been used in the main analysis here, but is used to calculate the total number of learning projects undertaken. These pilots also helped extend the list of possible learning methods.

Figure 5.2 shows the number of professionals who attended the seminars. There are healthy numbers of architects and engineers. It has been said that attendance at the seminar was voluntary, and disappointingly few quantity surveyors participated, even given that they are a minority amongst NHS building staff. There are too few to draw statistical conclusions from their returns, though they contributed

usefully to the discussion periods around the table.

The offices themselves selected volunteers to participate. They represented all levels of responsibility in the office from technicians and year-out students to chief architects. A fault in the proforma was failing to record the responsibility levels methodically. Participants were asked to record their ages, however. Figure 5.3 shows these together with histograms of the age ranges of NHS architects, technicians and quantity surveyors (from Clark et al, 1981).

Four of the 117 participants did not record their ages. 21 of the remainder were between 20 and 30 years (19%), 35 between 31 and 40 years (35%), 22 between 41 and 50 years (19%) and 35 between 51 and 65 years (31%). So half were younger than 40 years and half older.

The age ranges of NHS engineers are not available; and the numbers of architectural technicians and QSs interviewed are too small to be worth examining. Figures of the ages of NHS architects in 1978 are available - though these are four years out-of-date. It appears that the sample underrepresents architects younger than 40 years and overrepresents those older than 40 years - especially the 41-50 age band. Since levels of responsibility are more or less related to age, it seems likely that the more senior levels of responsibility are over-represented in the sample of architects. (This may not be true of QSs and technicians, as Figure 5.3 shows).

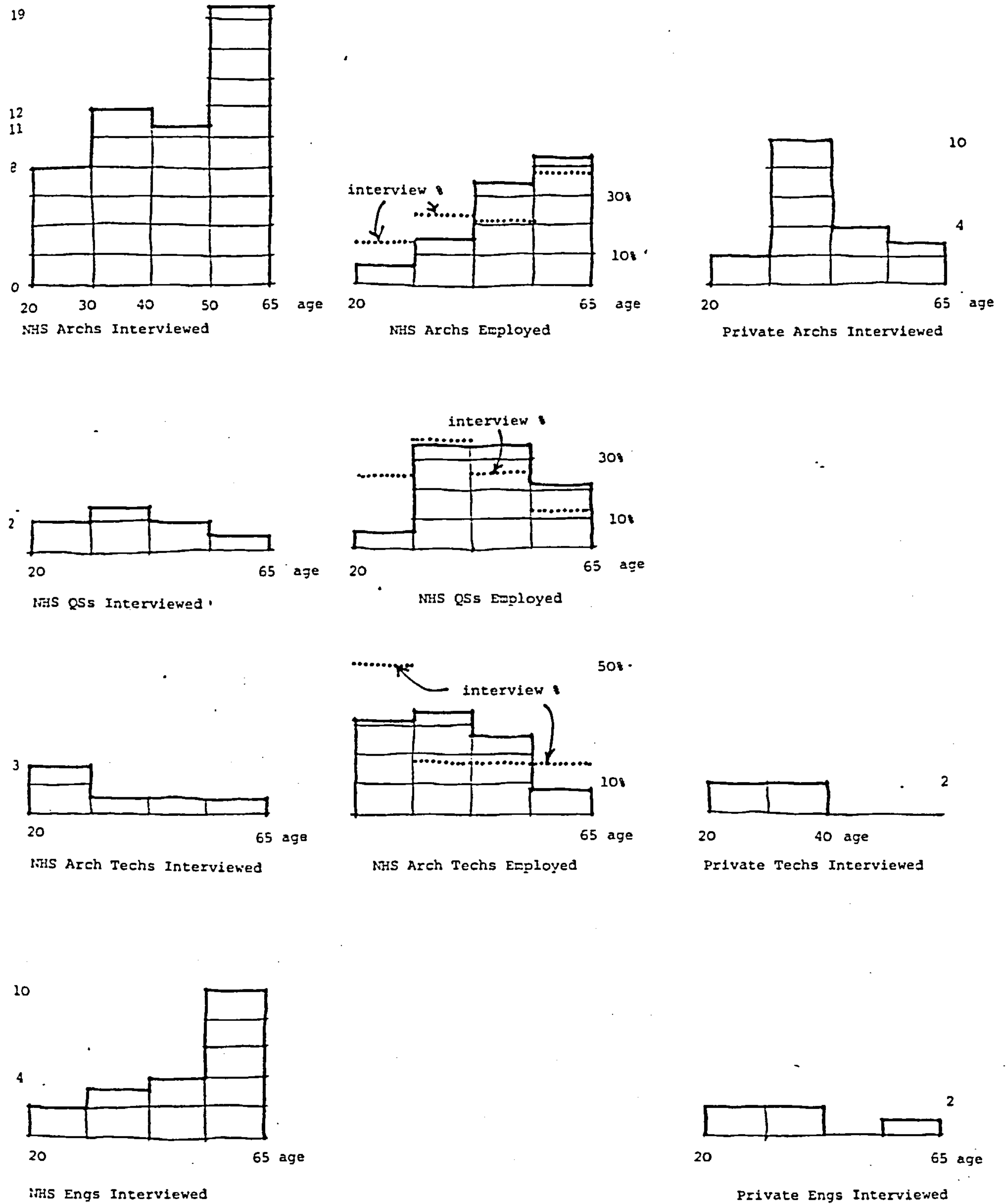
ARCHITECTS' LEARNING METHODS

What learning methods are most favoured by architects in connection with energy matters? To discover the answer to this, an examination was made of all of the learning projects entered in Q3. In this question, participants were asked to select up to two of the projects they had listed and score a list of learning methods for how important they had been in undertaking the learning. There were ten groups who provided details about learning methods: the first two pilot seminars have been excluded, since they entered their methods in a different way from the others.

Details were given of 110 past experiences in learning. These have been termed "proven" learning experiences in this thesis. Details were also given of 44 learning undertakings that participants designed for their future use. These have been called "postulated" learning experiences.

Figure 5.3

Age Range of Participants



Sources:
 Interview ages from pro forma
 NHS Employee ages from Clark et al (1981)

Figure 5.4 shows a breakdown of the accumulated scores given for each method listed. The first column shows Postulated solutions. These were derived from the future learning project "Programme X" participants devised. Unlike the first set of interviews, these may be thought relatively reliable guides since designers had been taken through exercises sensitising them to the many possible solutions and they had seen for themselves their own preferred learning styles by examining their past learning experiences. The second column shows Proven solutions - methods participants had successfully employed in the past in connection with a specific learning project.

The third column is titled "Rise" and indicates how much more or less a method is likely to be used in the future. (To establish this, Postulated and Proven experiences were indexed at 1000 overall and the figure is the difference between the two scores).

The fourth column, "Strength", is the average value participants ascribed to each method on the scale from 1 to 5. This indicates how powerful the method is as a way of learning and is useful because although a method may have been used by few participants, they may have found it particularly useful. (It should be noted, however, that there may be a statistical tendency for lower numbers of responses to produce extravagant results).

The fifth column shows the number of times a method was mentioned. This is similar to the way the first set of interview results were obtained and takes no account of how strongly methods were valued.

It was very common for several methods to be used in projects, and the sixth column shows the percentage of projects in which the method was used. (An alternative way of scoring this would have been to show the Proven score as a percentage. This produces figures of the order of 2.9% on average, with high scores of around 7%. This means that significant differences need to be shown to two points of a decimal place: tiresome to read). Figure 5.18 at the end of the chapter summarizes the four arenas, and their contributory parts, in diagrammatic form.

FINDINGS

Some methods are used more than others. "Very important" methods have been selected on an absolute (and arbitrary) criterion of

Projects' Methods of Learning About Energy

Learning method	POSTULATED (44 projects)	PROVEN (110 projects)	RISE ^λ	STRENGTH ^φ	NO OF PROVEN MENTIONS	USED IN x% OF 119 PROJECTS
FORMALLY ORGANISED EDUCATION	459½(25%)	833½(20%)			309½(23%)	
Courses (away & in-office)	88	96	25	3.2	30	25%
Lectures, seminars, workshops	122	151	30	3.0	51	43%
Training, role playing	37	32	12	2.9	11	9%
Undergraduate courses	12	39	-3	3.9	10	8%
Books, manuals, guides	84	285	-24	3.3	86	72%
Records, tape/slides, videos	51	50	16	2.5	20	17%
Films	43	54	10	1.7	32	27%
TV/radio	15	89	-14	2.1	43	36%
Exhibitions+	7½	37½	-5	1.4	26½	22%
NONALLY ORGANISED LEARNING	591½(32%)	1786(44%)			612(45%)	
Gaining experience & own skills	62	225	-21	3.7	61	51%
Reflection	79	204	-7	3.0	67	56%
Building visits*	50	85	6	3.2	26½	22%
Examining plans	74	123	10	2.0	63	53%
Teaching others	35	54	6	2.6	21	18%
Research	82	211	-7	3.5	61	51%
Trade literature	39	244	-39	3.1	80	67%
Source documents	47	200½	-23	2.7	74	62%
Information services	60	125	2	2.8	44	37%
Exhibitions (e.g. trade)+	7½	37½	-5	1.4	26½	22%
Journals, magazines	56	277	-37	3.1	88	74%
DELIBERATE LEARNING	513(28%)	1104½(27%)			335½(25%)	
Working on a design project	111	227	6	4.0	57	48%
Site visits*	50	85	6	3.2	26½	22%
Asking experts	108	213	7	3.2	67	56%
Discussion with colleagues	135	258½	10	3.1	83	70%
Experiencing buildings	97	207	2	3.3	62	52%
Do it yourself	12	114	-21	2.9	40	34%
ON THE JOB ACTION	264(14%)	373(9%)			142(10%)	
Workplace location	27	39	5	4.3	9	8%
Job rotations	18	0	10	0	0	0%
Office meetings	29	64	0	2.6	25	21%
Formal assessments	42	58	9	2.9	20	17%
Job rotation & exchange	15	9	6	3.0	3	3%
Specialists	24	72	-5	2.5	29	24%
Office procedures	26	66	-2	2.4	27	23%
Checklists	39	47	10	2.2	21	18%
Computers	44	18	20	2.3	8	7%
	2(0%)	0			0	
TOTAL	1830	4097		3.0	1367	

* Site visits have been equally divided between building and site visits
 λ is the difference between proven and postulated scores out of 1000
 φ Exhibitions have been equally divided between Formal and Personal arenas
 Strength is the proven score divided by the no of mentions i.e. average rating out of 1000

being used in more than 60% of all projects.

"Important" methods are considered to be those used in more than half of all projects, or those scoring at least 3.5 on the "strength" rating. In addition, those showing a rise in intended use of 16 points or more are recorded. Although these criteria are arbitrary, an examination of all figures shows that there are natural divides in the scoring - there is a gap in the percentage of use, for example, between 62% (source documents) and 56% (where several methods score). Similarly in the strength scores, Research at 3.5 is separate by a gap from five other methods scoring 3.2 or 3.3. And in the "rise" scores, the lowest in the upper register, Kits at a rise of 16 points is separated by four to six points from six other methods. Figures 5.5, 5.6, 5.7 and 5.8 are graphic representations of scales on which these kinds of scores are shown.

Four projects in every nine were Personally organised. Very important learning methods within this category are the use of

- Journals and magazines (used in three out of every four projects)
- Trade literature (used in two out of three projects)
- Source documents (used in 62% of projects).

Other important resources are

- Reflection (56%)
- Examining plans (53%)
- Drawing on own experience and skills (51% of projects, 3.7 average score) and
- Research (51% of projects, 3.5 average score).

Rather more than a quarter of projects could be described as Non deliberate learning: 27%. A very important learning method is

- Discussion with colleagues (used in seven out of ten projects).

Other important resources are

- Working on a design project (scoring an average of 4)
- Asking experts (used in 56% of projects)
- Experiencing buildings (52%).

Formally organised education accounted for one-fifth of all mentioned learning. A very important resource was

- Books, manuals and guides (used in 72% of projects).

Additional important methods of learning are

- Undergraduate education (scored at 3.9 on average)
- Lectures, seminars, workshops (a rise of 30 points in intended future use)

Figure 5.5

Percentage of Projects Using Various Methods

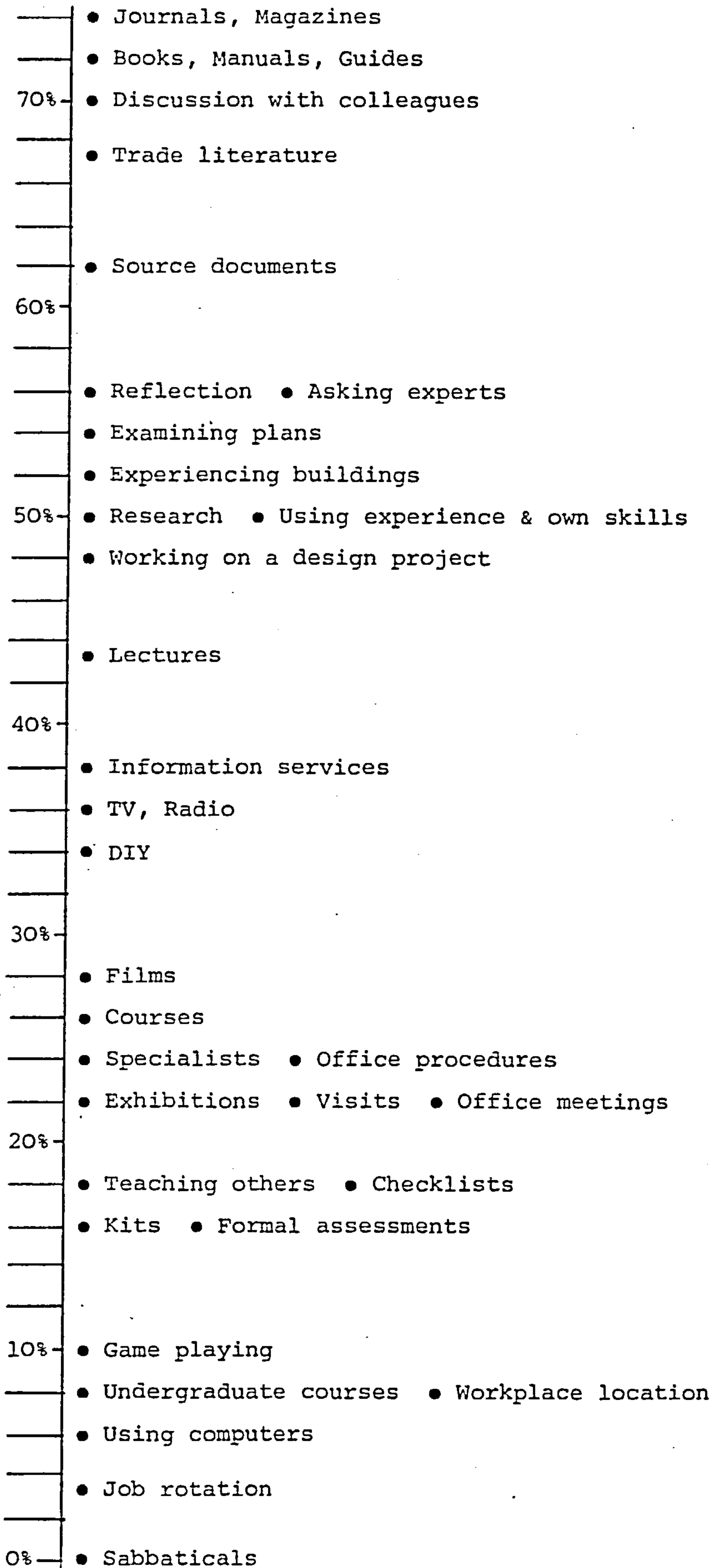


Figure 5.6

Strength: Score out of 5

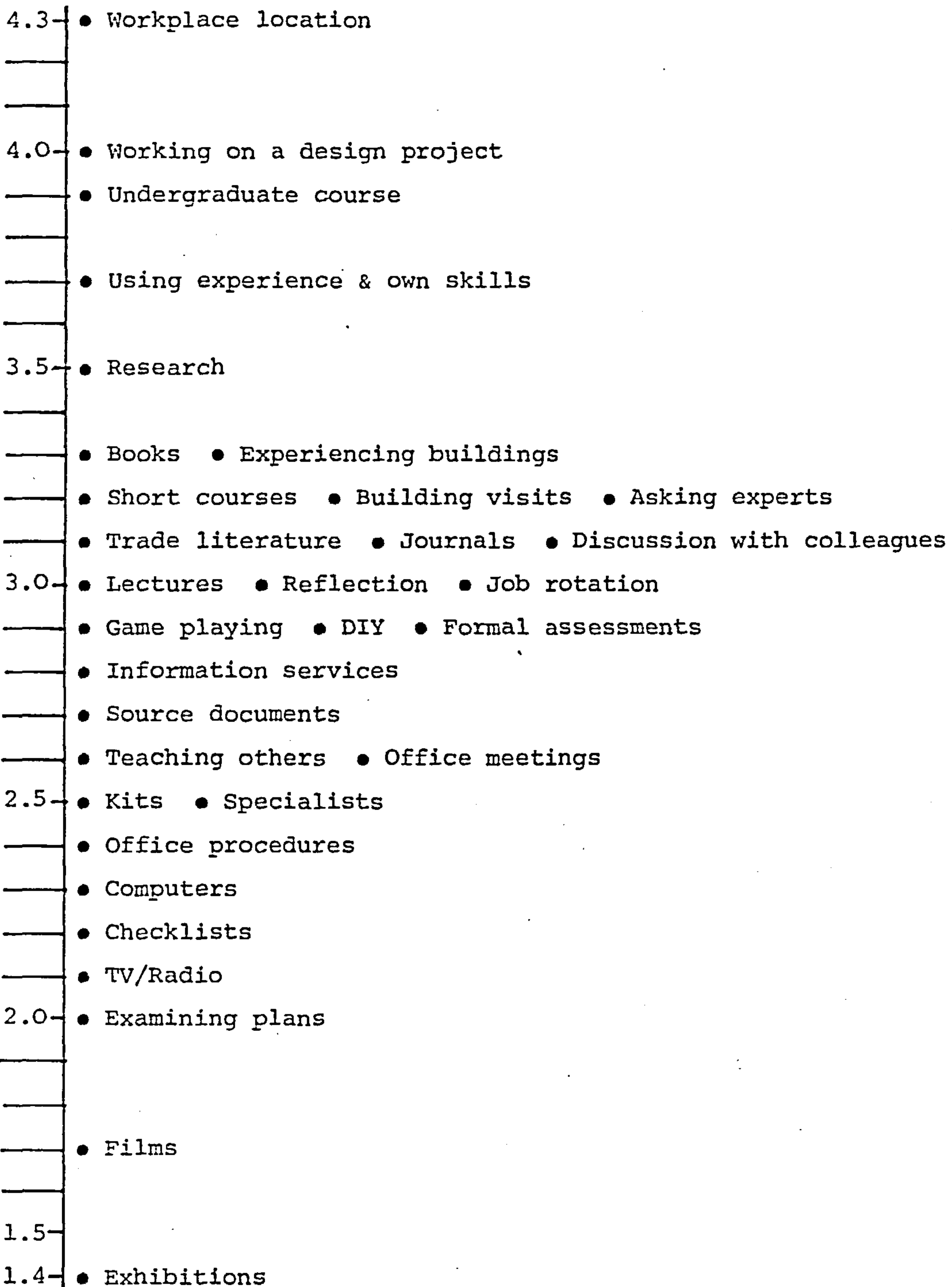


Figure 5.7

Number of Mentions

- Journals, Magazines
 - Books, Manuals, Guides
 - ● Discussion with colleagues

 - 80— ● Trade literature

 - ● Source documents

 - 70—
 - Reflection ● Asking experts

 - ● Examining plans
 - Using experience & own skills ● Research ● Experiencing bldgs
 - 60—
 - Working on a design project

 -
 - Lectures
 - 50—

 -
 - TV, radio ● Information Services

 - 40— ● DIY

 -
 - Films
 - 30— ● Short courses ● Specialists
 - Office procedures
 - ● Exhibitions ● Visits ● Office meetings

 - Teaching others ● Checklists
 - 20— ● Kits ● Formal assessments

 -
 - Game playing
 - 10— ● Undergraduate courses ● Workplace location
 - Using computers

 - ● Job rotation & exchange

 - 0— ● Sabbaticals
-

Figure 5.8

Rise: Difference in extent to which methods will be used in future

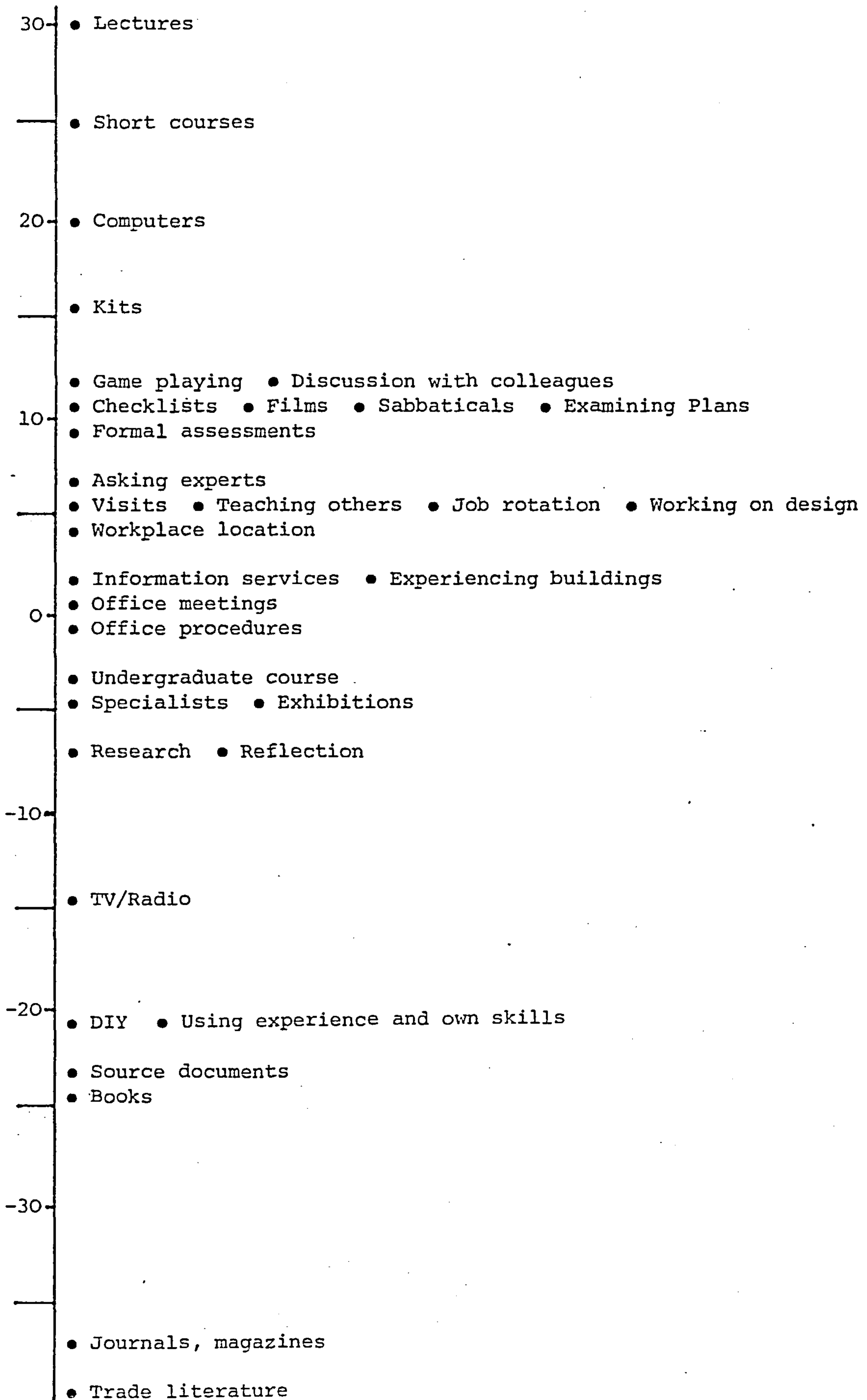


Figure 5.9

Summary of Four Arenas of Learning: The first set of interviews

ARENA	No of mentions of "proven" experiences	%
Formally organized education	61	40%
Personally organized learning	18	12%
Non deliberate learning	45	29%
Office action	29	19%
Total	153	

- o Courses (a rise of 25 points)
- o Kits, videos, tape/slides (a rise of 16 points).

Office action accounted for one-eleventh of methods of learning. There were no individual methods that would rank with those described as "very important" above, but one method was particularly valued and one showed potential for future use

- o Workplace location (scored at 4.3 on average)
- o Use of computers (a rise of 20 points in intended future use).

COMPARISONS

Now this differs considerably from the distribution first outlined in Chapter Three. Truly it is written "small samples (give) limited predicting power"! However, Chadwick and Fielden developed that remark to point up the value of attempting prediction at all: "a means of raising and reviewing larger questions".

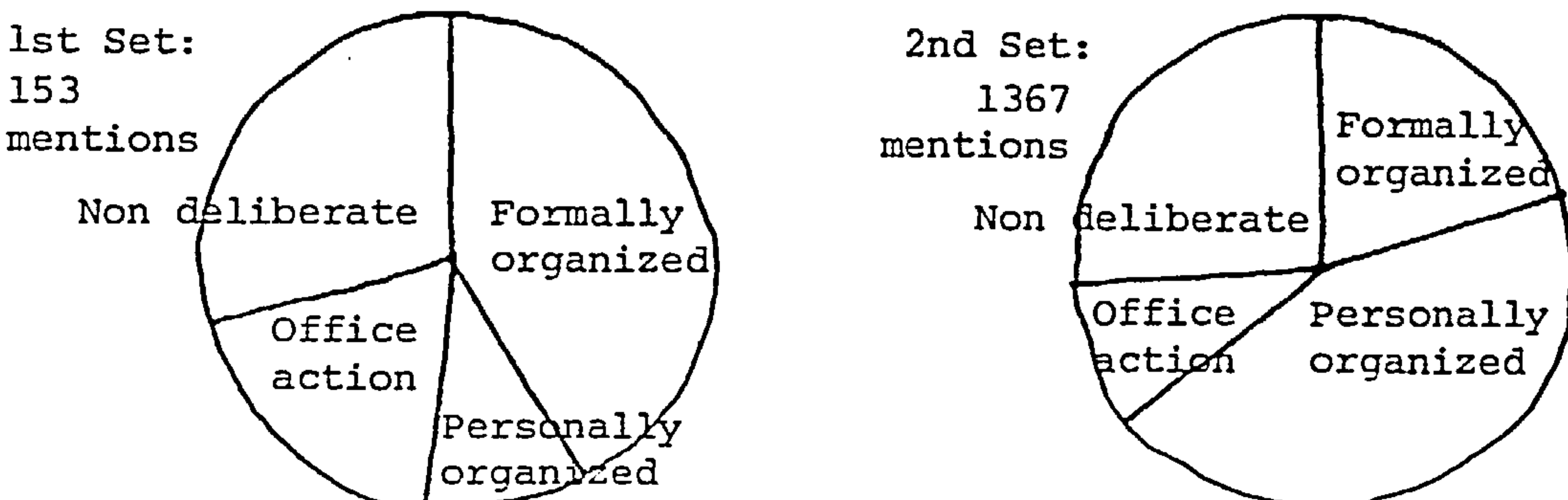
Figure 5.9 summarises those findings; Figure 4.2 gives fuller details.

In what way does the research into how architects have learned about energy-related topics differ from those early predictions? Figure 5.10 shows the differences graphically.

The biggest difference lies in the value placed on Personally organised learning. The early sample suggested that this accounted for about one-eighth of all methods used. The energy study suggests

Figure 5.10

Comparison of 1st & 2nd Set of Interviews



that the collection of methods grouped as Personally organised account for 3½ times as much as this: sometimes more like four-ninths of the total.

Non deliberate learning is ascribed approximately the same value in both sets of interviews.

Office action appears to be half as important as first suggested: closer to one-tenth than one-fifth of useful experiences.

Formally organised education appears to be the reciprocal of Personally organised: half as important, accounting for two projects in ten rather than four in ten.

Is the detailed study more likely to replicate the reality of the methods architects use to continue learning? Or are there other factors - differences in methodology or content for instance - that account for the variations? There are indeed a number of differences between the early research and the energy project, and the next paragraphs will discuss these and attempt to make judgements on their importance.

A general study vs a particular study

In the first set of interviews, the question asked was how had learners solved problem areas they were faced with? Four areas of concern were suggested: design process, design product, personal development, education generally. In the second set, a specific problem area was addressed: the design of energy efficient buildings. Could the general nature of the first set have caused a different result from the topic bias of the second?

To some extent it must have. But when the content of energy learning is examined, it certainly covers the first two areas of concern in the first set of interviews: design process and design product. So it might be expected that the results of the two sets would be aligned along those areas. The third area of the first set was personal development, and this might be expected to bias the result of the first set towards Personally organised learning. It did not. Conversely, the fourth area of the first set - education undertaken - might be expected to bias the result towards Formally organised education. It did.

So, two parts of the first interview might be expected to show no differences from the second set. The other two parts of the first

Figure 5.11

Content and Methods: The first set of interviews
 No of mentions of positive "proven" experiences

TOPICS	Formally organised education	Personally organised learning	Non deliberate learning	Office action	All	ENERGY RELATED?
General: not specified	1	5	16	1	23	✓
New Ideas	1	1	-	1	3	✓
Planning, External Environment	-	-	-	-	-	✓✓
Interior Design	-	-	-	-	-	x
Services and Structure	1	-	-	-	1	✓✓✓
Building Science	5	7	6	3	21	✓✓✓
Legal: Contract	9	1	4	3	17	✓
Legal: Legislation	2	2	-	4	8	✓✓✓
APM: Project Management	1	2	2	-	5	✓
APM: Man Management	1	-	1	3	5	✓✓
APM: Interdisciplinary Working	3	-	-	4	7	✓✓✓
APM: Management Generally	7	2	8	3	20	✓✓✓
Design	9	7	5	7	28	✓✓✓
Conservation, Maintenance	1	-	1	-	2	✓✓
Computer Applications	1	-	-	-	1	✓✓✓
Education	-	1	-	-	1	x
Professional Matters	-	-	-	-	-	x
Personal (inc. refreshment)	7	1	1	-	9	x
Other	-	1	1	-	2	-
Total	49	30	45	29	153	

APM = Advanced Practice and Management

interview might be expected to show up Personally organised and Formally organised education. This did not happen for personal development but did for education generally: these points will be explored later.

However, the fact that the first sample's interview schedule covered four areas does not mean that they were mentioned equally. Figure 5.11 shows the number of positive proven solutions that were quoted in the first set of interviews. The subjects with which they dealt have been entered down the left side of the table. (The subject headings are adapted from the RIBA's standard list: Planning and external environment have been grouped; legal and Advanced Practice and Management subdivided). Down the right side, those that affect an understanding of energy matters have been ticked. All but four of the topics do. The only significant exception is Personal matters. (This was usually spiritual

refreshment) which accounts for 9/153 mentions.

It might be concluded from this that a study of energy efficiency is a fair microcosm of matters that concern architects generally. While it would be impossible to get a case study to replicate the general, the case study chosen should be mimicing the general to a greater, rather than a lesser, extent. One might be relatively confident therefore that the energy study would be broadly representative of learning generally.

Interviewer bias in first set of interviews

In the previous chapter, it was mentioned that interviewer bias might have been present in the first set of interviews.

Interviewees know that I came from IoAAS - famous for its short course programme - and therefore might have assumed that my main interest was in Formally organised education. This was recognised in framing the interview schedule and an attempt was made to overcome this by addressing the question of how problems had been solved, rather than enquiring about education initially. Nonetheless, some bias may have been present.

More seriously, in the interview schedule of the first set, interviewees were asked towards the end of the interview about education they had undertaken. This must undoubtedly have caused participants to refer to Formally organised education, to the detriment of their other learning experiences.

This problem of interviewer bias was not present in the second set (at least not in this form), since a checklist of many kinds of ways of learning was tabled and it would have been clear to participants that there was not an overriding concern with formal kinds of learning.

It seems very likely, therefore, that the first set of interviews seriously overrepresents the Formally organised arena.

Methodological differences may account for the variation

It may be that the different methodologies used for the two sets of interviews have caused the variations in results. In the first set, no hints were given to participants about what constituted learning (apart from the bias towards Formally organised education

already mentioned). Indeed, it was only an examination of what they said that allowed a taxonomy to be conjectured at all. In the second set, a list of 33 methods and resources was tabled.

In the first set, therefore, participants in recalling how they had solved their problem areas had no common base from which to start. They had to recall experiences with no framework or memory-jogging aids to help them, and could easily have forgotten to mention some experiences.

Furthermore, the first set may not even have recognised some of the resources set out in the second proforma. Back-up reading, reference to trade literature, updating by journals might have been so familiar that participants failed to recognise them, and thus mention them, as education. This may be one of the reasons why courses were so often mentioned in the first set - they are readily recognised as "continuing education".

So the methodology which provided a checklist was considerably better and the second set was more likely to reflect the ways architects learn than the first.

Weighted scoring may differ from first mentions

In the first set of interviews, architects mentioned highly significant ways of learning. In the second, they scored the list of ways of learning on a scale from 1-5. So ways of learning that score low on the scale, but score consistently, may cause a different result to emerge from a rating based on first mentions.

Figure 5.12 calculates the percentage scores for each arena from the second set of interviews, based on weighted scores (used as the standard in the second set of interviews) and on numbers of mentions (the standard used in the first set of interviews). As can be seen from the table, there are very marginal differences; nothing as significant as the difference between the sets of interviews. It must be

Figure 5.12

Weighted Results Compared with Number of Mentions

Arena	Weighted result	Number of mentions
Formally organised education	20%	23%
Personally organised learning	44%	45%
Non deliberate learning	27%	25%
Office action	9%	10%

Figure 5.13

Internal Comparison of Architects' "General Understanding" Projects

	Subsample (a)	Subsample (b)
Formally organised education	175.5 (19%)	172 (20%)
Personally organised learning	383.5 (41%)	387.5 (45%)
Non deliberate learning	248 (27%)	224.5 (26%)
Office action	124 (13%)	84 (10%)
Total	931	868

concluded that different methods of tallying scores have no significant effect.

Internal inconsistency

The results tabled in each set of interviews are the sums of a number of personal learning preferences. It may be that any sample is bound to be distorted: that people's preferred learning styles differ so greatly that only a very large sample will iron out the differences. It is not possible to check this in the first set, but it can be done in the second.

The 42 architects' learning projects that had "General Understanding" as a central focus were taken and shuffled. Then the scores given by participants were allocated alternately to subsamples (a) and (b). Some respondents had entered two "General Understanding" projects, and this method meant that where this occurred one project was allocated to subsample (a) and the other to (b). Figure 5.13 shows the result. There were 21 projects in each subsample; a score of 931 in (a) and 868 in (b). The overall results are close to each other. The widest divergence is four percentage points. In this test, therefore, the number of returns was large enough to iron out divergences of personal style: accuracy appears to be within 2% of the norm. National Opinion Polls of voters' intentions are within 4% - although it must be said that their accuracy in reflecting General Election results fluctuates notoriously!

Within the limitations of statistical certainty, the results of the second study are internally consistent. The second set is unlikely to be invalid because of variability in learners' preferences.

Sample size

In the first sample, 71 architects and technicians were interviewed. They mentioned 153 powerful learning experiences: an average 2.2 each. By no means all mentioned ways of learning, however. In the second sample, 80 architects and technicians were involved in the seminars. 17 of these were not asked to score the checklist (pilot seminars). There were two further spoilt papers and six did not provide details. So on the face of it, there were fewer architects in the second sample, though this is misleading because not all those in the first sample actually mentioned learning experiences (they were not pressed to do so).

The second sample mentioned 284 very valuable learning experiences (i.e. those they scored "5"): an average of 4.7 mentions each. This is twice as many as mentioned any learning experience in the first set. In addition, there were very many more mentions of other valuable experiences (ranging from 1 through 4): 1083. Altogether, then, there were 1367 "mentions": nearly nine times as many as in the 153 in the first sample (actually 8.9).

Although there were similar numbers of architects/technicians in each sample, the second set produced scores on considerably more examples of learning methods. The larger sample of 1367 indicates that the second set is more likely to be accurate.

Duplicated entries

All of the reasons considered so far indicate that the second set of interviews is on the whole more likely to indicate preferred styles of learning than the first. One consideration counter to these that may cause errors in the second set is the presence of overlaps. A participant might have scored "courses" as well as "lectures", even though these formed part of the same method; similarly for the same experience, "working on a design project" may have been scored as well as "using own skills and experience". If there were more overlaps of this kind in one cluster than in another, that arena would tend to score more highly in total. Without knowing what was in the participant's mind, it is difficult to know whether one arena is more unbalanced by this than another. It must, however, cast some doubt on the validity of the second set.

Strategies and tactics

Finally, there is one other consideration that may cast some doubt on the extent to which arenas are used. Many of the ways of solving problems suggested under Office action may be thought of as strategies; and many have more to do with the organisation learning than the individual learning. For example, there were some methods suggested by the first group that could not be included in the second group's questionnaire - sidestepping problems altogether is an example. Since the second set of interviews asked participants to focus on their own learning and to give an assessment of methods used, this would tend to exclude these kinds of strategic approaches. It may therefore be concluded that the questionnaire used in the second set tended to ask questions which underrated the value of Office action as a set of methods of approaching learning. This will be explored in greater depth in Chapter Nine.

Conclusions on the accuracy of the interviews

Overall, the second set of interviews appear more likely to reflect accurately methods of learning used by architects than the first set. The first set seems particularly likely to have overrated the importance of Formally organised education. There remains some doubt, however, about whether the second set is entirely accurate, particularly in respect of the value of Office action.

The early research, then, has been useful for raising a number of ways of learning: generating a list of Formally and Personally organised methods; developing a better grasp of Non deliberate methods; and introducing the notion of Office action as a component in architects' learning. In addition, it has given a great deal of colouring to these individual methods and raised questions which can be - and some of which have been - followed up in more systematic research. Amongst other things, it has suggested that there may be linkages between what is to be learned, and how it may be learned: between content and appropriate methods.

OBSERVATIONS

There are some observations and questions arising from the

Figure 5.14

Classifying Learning Methods: Second set of interviews

Deliberate	FORMALLY ORGANISED EDUCATION	Live	Courses
			Lectures
			Seminars
			Workshops
			Gaming
	Undergraduate		
	PERSONALLY ORGANISED LEARNING	Packaged	Books
			Kits
			Tape/slides
			Video
Films			
NON DELIBERATE LEARNING	Using Cool Data	TV/radio	
		Exhibitions	
		Inner Resources	
		Using experience & own skills	
		Reflection	
Unintentional	PERSONALLY ORGANISED LEARNING	Self Structured	Building visits
			Examining plans
			Teaching others
			Research
			Trade literature
	OFFICE ACTION	Real Alternatives	Source documents
			Information services
			Exhibitions
			Journals
			Working on a design project
OFFICE ACTION	Focussing on Specialists	The Job	
		Site visits	
		Asking experts	
		Discussion	
		Living	
OFFICE ACTION	Sidestepping	Experiencing buildings	
		Do-it-yourself	
		Workplace location	
		Sabbaticals	
		Office meetings	
OFFICE ACTION	Focussing on Specialists	Formal assessments	
		Job rotation & exchange	
		Specialists	
		Office procedures	
		Checklists	
OFFICE ACTION	Focussing on Specialists	Library	
		Computers	
		Team organisation	
		Sidestepping	
		Sidestepping	

ARNING

exposition of data accumulated in this research study that require extension and discussion immediately. In Part Three, these will be expanded in detail, and in Chapter 10 all conclusions will be drawn together.

FOUR ARENAS OF LEARNING

1: A taxonomy of learning methods

In Chapter Three, a system of classification of learning methods was outlined, comprising Formally organised education, Personally organised learning, Non deliberate learning and Office action. In this study, the theoretical taxonomy these generated was valued, and it appears that a wide range of methods is indeed employed. Figure 5.14 shows how the methods have been classified.

2: Extent to which arenas are utilised

Subject to the limitations of sample size and topic bias, Formally organised education accounts for 20% of all methods; Personally organised learning for 44%; Non deliberate learning for 27%; and Office action for 9%. This, together with the extent to which subclusters of methods are used, is shown in Figure 5.14. Part Three will examine each cluster and subcluster in detail.

USE OF LEARNING METHODS

3: A mixture of learning methods is commonly employed

The chief characteristic emerging from this set of interviews is that architects very seldom use only one method or resource when undertaking learning. The 110 projects of which details were given mentioned a total of 1367 methods: an average of 12 per project. Some of these were, of course, supporting activities, rather than the prime material used, as indicated by the weighting given to them. Nonetheless, even a low weighted resource may reinforce and round out

information, or provide the application experience that makes it relevant. So, a major finding arising from the second set of interviews is that the most characteristic quality of the way architects employ resources is to draw on many of them for any one learning undertaking.

METHODS OF LEARNING AND CONTENT

4: There are connections between what is to be learned and how it is learned

An examination of proforma returns shows that individuals vary considerably in which methods they employ. This applies to different projects undertaken by the same person; and to the same kinds of projects undertaken by different people.

Nonetheless, similar kinds of projects did seem to utilise broadly similar kinds of learning methods. This raises the question of whether some methods are more suited to some topics than others. To investigate this, the 110 detailed projects that were reported on in detail were examined. Q4 of the seminar (Figure 5.1) included a diagram which included eight aspects of energy use in health buildings. This has eight aspects:

- Form
- Function
- Services
- Controls
- Client Needs
- User Behaviour
- Financial Matters
- Managerial Matters.

The details provided by participants of their learning projects were examined and allocated to the eight aspects listed above. Where projects covered more than one aspect, they were entered twice if two aspects were concerned, or entered under a "general" title if more. This general title also includes learning projects which were too unspecific to enter, and also matters outside building - for example, studies of world resources and fuel, or clothing. In this examination,

all returns have been examined, not only those from architects.

There were low numbers of projects detailed on some aspects - insufficient to be worth detailed examination. There were, however, besides "General Understanding" six in which quite a few participants had undertaken learning. Two of these had sufficient returns to allow subdivision. The full list of headings is:

- General Understanding: 63 projects
- Fabric: 25 projects
- Legislation (an aspect of Fabric): 13 projects
- Financial Matters: 9 projects
- Form: 7 projects
- Services: 29 projects
- Alternative Energy (an aspect of General Understanding): 10 projects.

Figure 5.15 shows which methods were most used in learning about the seven topics, and also which are used by architects overall. The method of rating is to take the weighted score for each method as a percentage of the total of weighted scores. As mentioned earlier, this is a somewhat clumsy method of referral, but it does have the advantage of being able to add the various methods together to reach 100%. The figure also shows clustering of the methods into the four arenas.

As far as Formally organised education is concerned, most project types were within 3% of the overall average of 20%. One exception is studies of Alternative Energy (using ambient energy sources, windmills, etc), where learners utilised the collection of methods in 26% of cases.

In the Personally organised arena there was more divergence, but most project types were within 4% of the 44% norm. Alternative Energy studies were again different at 39%, five percentage points lower. Studies of Form were also different, using the arena 7% more frequently (the greatest difference).

In Non deliberate learning, most projects were within 3% of the norm of 27%, but Legislation studies used the collection of methods 4% less than the average.

Office actions were usually within 3% of the 9% norm, but Alternative Energy studies were 4% lower than this.

While some variations must be expected, given the relatively low numbers of returns on each topic, variations of between 17% and 26% for Formally organised education, between 39% and 51% for Personally

Figure 5.15

Preferred Learning Methods

Total weighted scores for seven topics. Scores of more than 6% have been entered as a percentage figure after the rank number. If no percentage is shown, it was less than 6% and the rank number is entered in italics for comparison with other topics.

	FORM	FABRIC	LEGIS- LATION	SERVICES	COSTS	GENERAL	ALTER- NATIVES	ALL ARCHS
ARENAS								
Formally organised	17%	18%	20%	19%	19%	20%	26%	20%
Personally organised	51%	48%	48%	44%	48%	43%	39%	44%
Non deliberate	26%	28%	23%	30%	26%	26%	30%	27%
Office action	6%	6%	9%	8%	7%	11%	5%	9%
METHODS								
Books, Manuals, Guides	2:8½%	3:7½%	2:7½%	6:6%	6:6%	1:7%	3:7½%	1:7%
Journals, Magazines	1:9½%	1:8½%	4:6%	10	4:6½%	2:6½%	2:7½%	2:6½%
Discussion with col- leagues	9	6:6%	7	3:6½%	1:8%	3:6%	4:7%	3:6¼%
Reflecting on experience	4:7½%	9	8	2:6½%	3:7%	8	5	10
Trade literature	4:7½%	1:8½%	3:7%	9	4:6½%	6	13	4:6%
Using experience and own skill	8	8	6:6%	1:7½%	8	7	7	6
Research	11	4:7%	4:6%	8	2:8%	12	9	8
Experiencing buildings	3:8%	10	8	3:6½%	10	10	7	9
Asking experts	15	7	10	7	11	5	1:8%	7
Working on a design project	6:7%	5:6½%	10	5:6%	18	4:6%	11	5
Source documents	10	11	1:9½%	11	8	9	20	11
Examining plans	6:7%	12	16	15	15	14	20	14

Figure 5.16

Twelve Most Used Methods

	FORM	FABRIC	LEGIS- LATION	SERVICES	COSTS	GENERAL	ALTER- NATIVES	ALL ARCHS
Total score in category	270	902	470	1194	316	2558	287	4097
Books, Manuals, Guides	23	69	35	72	19	174	21	285
Journals, Magazines	26	75	29	55	21	168	22	277
Discussion with colleagues	13	54	26	77	26	152	20	258½
Reflection	20	45	24	79	22	131	16	204
Trade literature	20	75	34	58	21	141	11	244
Using experience and own skills	15	46	28	90	15	133	14	225
Research	8	61	29	64	25	106	13	211
Experiencing buildings	22	43	24	77	14	122	14	207
Asking experts	7	49	22	67	13	142	23	213
Working on a design project	19	57	22	73	7	148	12	227
Source documents	9	42	44	46	15	124	5	200½
Examining plans	19	32	9	31	9	93	5	123
Total score of 12 methods	201	648	326	789	207	1634	176	2675
% 12 methods comprise	74%	72%	69%	66%	66%	64%	61%	65%

organised, between 23% and 30% for Non deliberate learning, and between 5% and 11% for Office action do indicate that different approaches tend to be taken to different topics. Of all the topics, Alternative Energy (having, incidentally, the most peripheral relevance to NHS architecture) uses Formally organised methods much more than other topics, and uses Personally organised and Office action much less. Studies of Form are also striking. They use the Formal cluster of methods much less than other topics do, and Personally organised much more.

Where do specific differences lie? Figure 5.15 also shows that 12 particular methods of learning were used more often than others in the list. Figure 5.16 shows that these 12 usually account for two thirds of all methods. The rank ordering of these learning methods, shown in Figure 5.15, vary considerably from topic to topic. In no case is the rank order the same, even for the first three methods. As an example, Asking experts was usually low in the rank ordering - 15th in the case of Form studies. It was, however, first on the list for studies of Alternative Energy. Another example is using Journals and Magazines: except for studies of Services (10th) always in the first four.

So it appears that some methods of learning are used more frequently than others. But it depends on the topic being studied which methods are most used: there are strong indications that some methods are better suited to learning about some topics than others. Also, some methods and resources are simply more generally available than others.

LEARNING BY OTHER DISCIPLINES

5: Architects and engineers employ resources to much the same extent; Qs show some differences

This study is about how architects learn. Can the results which are emerging be transferred to assumptions about how other professions learn? There is an opportunity to monitor this in the main analysis. Architects gave details of 110 learning projects. In addition, services engineers gave details of 38 and Qs of 12. The number of Qs is very small - too small to reach robust conclusions - but the engineers sample ought to provide useful data. Figure 5.17 shows the extent to which the three groups drew upon various arenas.

It shows that engineers and architects are very close to each

Figure 5.17

Engineers', Architects' and QSs' Use of Arenas

"Proven" experiences

	Architects	Engineers	QSs
Number in sample	(110)	(38)	(12)
Formally Organised Education	12%	12%	17%
Personally Organised Learning	51%	52%	54%
Non Deliberate Learning	27%	27%	25%
Office Action	9%	10%	4%

"Postulated" experiences

	Architects	Engineers	QSs
Number in sample	(44)	(13)	(4)
Formally Organised Education	20%	18%	30%
Personally Organised Learning	37%	39%	35%
Non Deliberate Learning	28%	27%	23%
Office Action	14%	15%	11%

other (so close in fact that the result must be a fluke!) in the arenas they utilise - for both "proven" and "postulated" learning. Tentatively, QSs seem to use Formally planned education more in their proven experiences and Office action less. The figures here are very low, however, and QS figures for "postulated" learning useless.

So, it looks as though architects and engineers learn in very similar ways. Quantity surveyors use formal education more and office action less. There is an opportunity here for further studies: if there is a difference, may it be ascribable to convergent vs divergent thinking?

SUMMARY

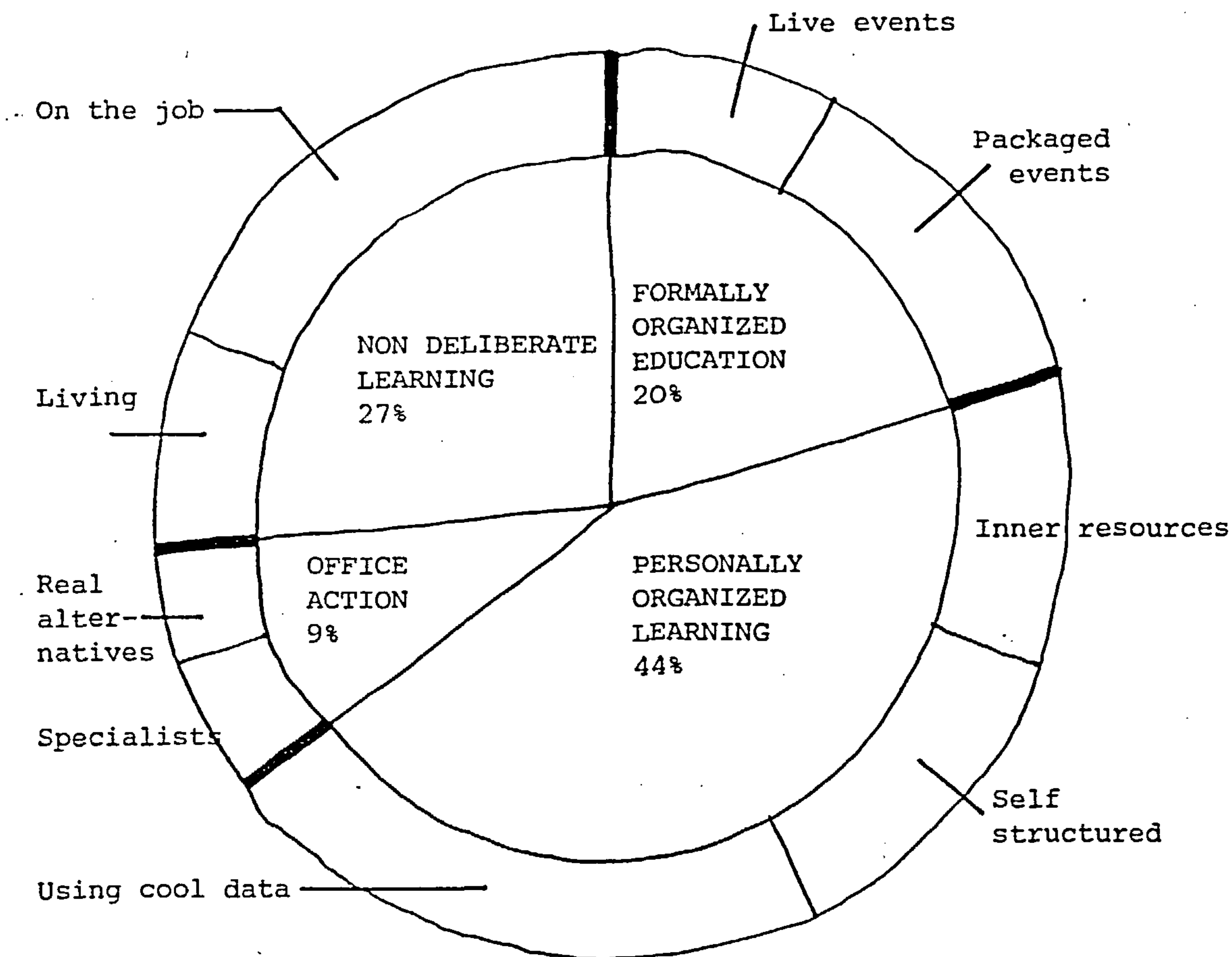
In Chapter Three, a series of interviews was described which generated a list of learning methods and resources. In order to value the importance of each of these methods, a research study of energy in buildings was undertaken. This indicated that architects (and engineers) use deliberately organised learning methods for nearly two thirds of their learning; unintentionally learning-orientated methods for the remaining third.

Personally organised methods are most frequently used, accounting for four-ninths of all methods. Formally organised and Non deliberate learning methods are also important, together accounting for another four-ninths. And Office action seems to contribute close

Figure 5.18

Four Arenas: The second set of interviews summarized

PROVEN



on 10% to learning - though there is a suggestion that the importance of this arena may have been underestimated in the methodology.

It also seems that it depends on what is being learned as to which methods are employed - that some methods are more suited to learning about some topics.

Furthermore, engineers and architects employ the arenas to much the same extent - though there is a hint that quantity surveyors differ in their preferences.

DIRECTIONS

What are the nuances, strengths and weaknesses of the learning methods in the four arenas? In Part Three, each arena will be described in detail and a number of observations made about each.

Part Three

Four Arenas of Learning

Chapter Six

Formally Organised Education

"After five minutes the speaker is still elaborating on what he is going to say. After 10 minutes all pencils have been put down. After 15 minutes people are gazing out of the window, rubbing their faces or just sitting with that glazed look. It is plain the speaker has badly misjudged the knowledge and experience of his audience. Perhaps mercifully he has not even noticed that he has lost them.

After 20 minutes one man is asleep. Others are holding whispered conversations.

The lecture ends, behind schedule, with no time for questions but a grateful rush for coffee

This - or something like it - is how most of us would picture 'continuing education', the course."
(John Carter, "Continuing Education" in The Architects' Journal, 26 April, 1978).

In Chapter Four, it was suggested that to try and separate out different arenas of learning is a difficult and in a sense self defeating thing to do. On the other hand, to attempt to review the ways that architects learn requires breaking down their overall learning efforts; by analogy, projecting them through a prism to reveal a spectrum in which each colour can be described, the overlaps and fuzzy connections noted, while accepting all the time that none of this will describe white light and that the colours need to be put together again at some stage. This chapter will deal with Formally organised education: that is to say, with learning methods and content organised (framed, mounted or assessed) by some body (or bodies) other than the learner; who has an educational objective; and where the learner does not need to collate or reorder it.

THE INTERVIEWS

In the first set of interviews, approximately one-third of all comments made about proven learning methods were about Formally organised education. And when interviewees were speculating about possible ways of learning, they turned to formal education twice as frequently as this. Figure 6.1 shows how comments were made in detail.

Figure 6.1

Formally Organised Education Methods: First set of interviews with architects. No of mentions of positive "proven" and "postulated" (in italics) experiences.

	Books, manuals, guides	Education generally	Courses	Lectures	Seminars	Workshops	Game Playing	Undergraduate	Postgraduate	Films	All
General: Not specified	2(0)		1(1)					0(1)			1(2)
New Ideas		1(0)									1(0)
Planning, External Environment			0(2)								0(2)
Interior Design			0(1)								0(1)
Services & Structure							1(0)				1(0)
Building Science	3(0)		4(3)				1(0)				5(3)
Legal: Contract	1(0)		9(6)	0(1)							9(7)
Legal: Legislation			2(5)	0(2)							2(7)
APM: Project Management	2(0)	0(1)	1(2)					0(1)			1(4)
APM: Man Management			1(0)								1(0)
APM: Interdisciplinary Working			2(2)				0(2)	1(2)			3(6)
APM: Management generally	1(0)		5(7)				0(1)			2(0)	7(8)
Design	3(1)		6(5)	1(1)		2(1)			0(1)		9(8)
Conservation, Maintenance			1(0)								1(0)
Computer Applications			0(1)					1(0)			1(1)
Professional Matters					0(1)						0(1)
Personal (inc. refreshment)			7(0)								7(0)
Total	12(1)	1(1)	39(35)	1(4)	0(1)	2(1)	0(3)	4(4)	0(1)	2(0)	49(50)

Not mentioned: Education matters; Kits, tape/slide, videos.

Figure 6.2

Formally Organised Education: Second set of interviews with architects

	Archs postulated	Archs PROVEN	No of proven mentions	Strength out of 5	Used in % of 119 projects
Courses (away and in office)	88	96	30	3.2	25%
Lectures, seminars, workshops	122	151	51	3.0	43%
Gaming, role playing	37	32	11	2.9	9%
Undergraduate courses	12	39	10	3.9	8%
Books, manuals, guides	84	285	86	3.3	72%
Kits, tape/slides, videos	51	50	20	2.5	17%
Films	43	54	32	1.7	27%
TV/radio	15	89	43	2.1	36%
Exhibitions*	7½	37½	26½	1.4	22%
Total Formally organised education	459½	833½			
Total all	1830	4097			
% Formally organised education	25%	20%			

* Exhibitions have been equally divided between Formal and Personal arenas

In the second set of interviews, the set of methods revealed by the first interviewees were more accurately assessed and are shown in Figures 6.2 and 6.3. It seems likely that Formally organised education accounts for one-fifth of all experiences. When architects postulated future learning, they were inclined to use it more - about one quarter of the total number of methods listed could be thought of as Formally organised. Though this may at first sight appear a low number, it will later become clear in this thesis that almost all learning methods can be enriched by formalising them to some extent - and thus making them, at least partly, Formally organised.

In clustering ways of learning together, there are a number of methods that can be used to develop a taxonomy. One of them is "live" versus "packaged" resources. A lecture would be classified as the

Figure 6.3

Formally Organised Education: Second set of interviews with all professions

	PROVEN			POSTULATED		
	Archs (110)	Engs (38)	QSS (12)	Archs (44)	Engs (13)	QSS (4)
Courses (away and in office)	23	29	0	48	35	76
Lectures, seminars, workshops	37	40	25	67	84	124
Gaming, role playing	8	2	4	20	9	48
Undergraduate courses	10	12	36	7	0	38
Books, manuals, guides	70	69	79	46	45	48
Kits, tape/slides, videos	12	12	11	28	28	19
Films	13	13	7	23	21	0
TV/radio	22	11	86	8	6	0
Exhibitions*	9	14	0	4	8	0
Total Formally organised education	20%	20%	25%	25%	24%	35%

Figures for each profession have been translated to a figure/1000 of all projects recorded. Total scores for professions were as follows

- Archs proven = 4097 points
- Archs postulated = 1830 points
- Engs proven = 1618 points
- Engs postulated = 536 points
- QSS proven = 280 points
- QSS postulated = 105 points

* Exhibitions have been evenly divided between Formal and Personal arenas

former, a book as the latter. However, this is a very static concept. In this exposition, a more dynamic classification is used - who organises the learning method? This leads to the notion of arenas, each being the domain of some group of organisers. Thus the taxonomy acts not only as a classification method, but also provides indicators about what kind of action is necessary, or possible. A difficulty with it is that sometimes resources which are very similar to each other would clearly be grouped together in a live/inanimate classification system and get separated in this system, and defining questions

need to be much more elaborately framed. For example, Books and magazines in the first taxonomy would undoubtedly go into an "inanimate" category. Here they have been separated. Books belong in Formally organised resources because they are "framed ... by somebody other than the learner; and where the learner does not need to collate or reorder it". Magazines, on the other hand, consist usually of random collections of articles, and though they obey the first part of the defining question (framing) they do not obey the second (collation). Learners most frequently have to collate separate articles in some mental or physical way to make continuing sense of them. Some resources are particularly awkward to classify and in this chapter and the next, explanations of why some methods have been classified in one way, others in another, will be explained at the start of each detailed description.

That said, live and inanimate teaching materials remain a useful way of dividing a mass of methods. In this chapter,

- six learning methods are subclassified as "live"
- seven as "packaged".

These will be dealt with in detail after some background into the literature on Formally organised education.

BACKGROUND

There are some difficulties in describing this arena of learning in the context of all learning methods. It is rather like describing the solar system: a great deal more is known about one planet than any of the others. Within the category of Formally organised education alone, the interviewees who spoke about their problem-solving had had extensive experience of courses. They were, therefore, able to give a good deal of information about how successful they were. This contrasted with other Formal educational media like kits, which without experience may just seem a good idea - or be attractive because of their novelty.

In the early days of the continuing education movement, Formal education meant courses, courses put on in academic establishments. In The Architect and His Office, in Powell, Napper and Territ, in the RIBA and ARCUK committees, even in Malcolm McEwan's "What Can Be Done About Incompetence?", the term "courses" and "continuing education" are used more or less interchangeably.

"Without continuing education it is difficult to introduce renewable registration, because the facilities for achieving higher standards do not exist.

There is a chicken and egg situation. The keen architect who wishes to keep up-to-date can find few courses to enable him to do so."

(Malcolm McEwan, "What Can Be Done About Incompetence?"; Architects' Journal, 19 November, 1975).

Why should there have been this extraordinary assumption made? Like John Carter, many people are initially struck by the ludicrous exclusion of all other forms of learning when continuing education is examined

"How do people who never go on courses manage to 'keep up with things'? They read the AJ, BRE Current Papers, new books, they talk to colleagues; go about with their eyes open ..."

(Carter, 1978, p801).

However, again like John Carter, having made the broadening statement about the range of ways of learning, almost all research papers have fallen back on a study of courses. This is as true of Hedge in 1973 as it is of Clark, Harris and Todd in 1980.

Hedge in 1973 outlined the learning opportunities she perceived in her section headings to Chapter 2

"Short courses ... long courses ... local meetings and symposia ... office courses and seminars ... information, consultancy and bibliographic services ... print sources ... unintentional and accidental learning"

(Hedge, 1973, pp8-18).

Her 1976 report which developed the 1973 work follows up only the in office course events with the use of tape/slides to help them along.

Carter, after the statement quoted earlier, devotes the rest of his article to a history and criticism of the growth of the continuing education movement in terms of courses, and his article is concluded with several pages giving details of what away courses are available.

Clark, Harris and Todd are driven to introducing qualifying clauses in their report on surveyors

"If we have dealt in the main with 'courses' in this chapter, it is because it is on 'courses' that we have information. We would certainly not suggest that this is the only or even the most important way of learning ..."

(Clark et al, 1980, p66).

Nonetheless, courses are what their report provides most data on.

Even the 1980 ARCUK investigation which set out to present a range of ways of learning about a range of topics related to existing buildings concentrated predominantly on the course format, albeit held in offices or local centres.

One possible reason for this is that course provision is in the domain of educationalists; it is educationalists who write research reports; and therefore they are most equipped to write about what is closest to their experience. Another reason is that statistics are relatively easily collected about courses and course attendance, and therefore researchers measure what is measurable and avoid everything else. The whole area of independent learning and incidental learning is so ill-defined, movable and obscure that it is difficult to deploy investigations to map it. Furthermore, concepts of what education is are related in many people's minds to school and undergraduate education. And when continuing education is considered, undergraduate models are often employed, with their pattern of lectures and design exercises as described in Chapter Two - forgetting, perhaps, the value of the "year out".

However, Hedge's 1973 report signalled to the profession for the first time that the aliding of continuing education and courses was obscuring real issues and though she did not pursue it, she broadened the course concept to include other activities.

"This survey suggested that ... far more mid career learning goes on amongst the building professions than might be thought from looking at the short courses alone. To concentrate all efforts on improving this traditional format for mid career learning may not be the best or only way to ensure that continuing education achieves maximum effect"
(Hedge, 1973, p19).

In talking about short courses, interviewees sometimes did not distinguish between away courses and in office courses - that is, events using the office itself as a setting. In the outline of what learners said which follows, these types have not been separated: the differences between them are essentially administrative, though this is a major consideration.

In the next section of this chapter, the methods that have been classified as Formally planned will be described. The nuances and comments interviewees made about each will be presented, and the order in which this will be done will follow the schedule presented in Chapter Four.

LIVE EDUCATIONAL FORMATS

Short courses

Short courses were the most frequently mentioned of all the ways of learning in the first interviewee sample: approximately one quarter of all mentions made (Figure 3.1). In the light of the attention courses have received in the literature, this might be thought unexpectedly low. It is not as low, however, as the study about energy efficiency indicates. In that study, courses only contributed one tenth as much as that.

Amongst the solutions that were postulated by the first set of interviewees, the proportion of courses mentioned was much greater than their proven experiences. More than two-fifths of these comments referred to courses, compared with, again, one-tenth that amount in the second set.

It should be clear that a prime purpose of the first set of interviews was to generate ideas about how architects learn, and figures arising from that are only preliminary indications. Chapter Four discussed this and showed that there are a number of reasons for believing that the figures in the first set wildly overestimated the contribution courses make to learning. Chief amongst these is the way the interview schedule concluded with a specific question about education (as opposed to earlier questions about solutions to problems) and this may have focussed interviewees on courses. Another is interviewer bias: interviewees knew that I came from an educational establishment with a reputation for short courses, so may have been pre-sensitised to this form, in spite of attempts to make the questionnaire order unprejudiced in this regard.

Furthermore, the data on postulated solutions is suspect for three main reasons: the number of mentions is small; learners had not been taken through any form of pre-sensitisation to a range of possible learning methods; and there is considerable doubt about whether interviewees meant a short course or were using the term interchangeably with continuing education as early reports did. As an example of this, a response to the following outline of need could be met in several different ways, not only by a course.

"Building and Fire Regs courses are needed, particularly as they relate to Crown Property. Particular hospital configurations which are

risky should be illustrated - eg Podiums."
(Principal Architect).

While the second set of interviews is not free from bias, it seems considerably more likely to reflect reality than any other data.

What is the influence of subject matter - of topics - on methods?

In Harris (1978) it was shown that in NHS architectural offices, the most frequently attended courses dealt with matters relating to legislation or possible legislation. This includes topics which deal specifically with Building Regulations and Legislation (nearly a fifth), as well as aspects of the Building Contract which may result in arbitration or claims (more than a quarter). Together, these account for nearly half the course attendance.

Next most popular are management topics - Man and Project Management - which account for between a fifth and a quarter of courses. Third in frequency are Design Matters in general which comprise almost one-fifth of days spent on courses. This title, unlike the others, includes many different kinds of topics from Building Type Studies to Health Planning to Colour.

An analysis of several Regions' attendance was compared. This showed that the national average of the most popular subject areas was not followed in each Region's choice of courses. There were very great differences between one Region and another, and even from year to year in the same Region.

Furthermore, he presented evidence that suggested that there is little continuity of staff attendance on courses from one year to another, partially generated, perhaps, by peculiarities of the work pattern from year to year. Courses on health centres, for example, were popular in many Regions when there were a number of these on the drawing boards. Regions in the same year, however, showed no similarity between Regions at all as far as ranking of topics is concerned. There is little statistical congruity to suggest common themes emerging as a result of common pressures.

To summarise the analysis of course attendance figures Harris provided, two themes seem to emerge. In all Regions and at all times studied, the Building Contract was seen as being important. Apart from that, Management, Legislation and Design Matters accounted for the bulk of course attendance. Together, these represent seven out of eight courses. Within this general framework, apart from the Contract, there were violent fluctuations of interest between Regions in the same year, and even in the same Region from year to year.

How do the number of courses which interviewees recall relate to the number they actually attended?

Short course recall

Generally speaking, the Formal education experiences the first set of interviewees most frequently recalled were the three areas which constitute the vast bulk of courses: Legal Matters, Management and Design. Figure 6.1 shows this. Within this generalisation, however, there were significant divergences from what might have been anticipated.

Legal Matters were recalled only half as frequently as might be expected. Within this category, courses on Legislation in particular were very infrequently mentioned, considering that about one-fifth of all time spent on courses have to do with this topic. Fewer than one in 20 mentioned Legislation. Furthermore, twice as many said that courses were not a good way of learning about this topic! Although Office action was the preferred alternative method in the experience of the interviewees, when they speculated about how to solve their learning needs 15% mentioned courses to deal with Legislation. So courses do not seem to be a favoured way of learning about legislative topics, but the first set of interviewees did not suggest radical alternatives. The unreliability of postulated solutions is revealing here. In spite of twice as many people saying that courses on Legislation had not been a good format, five out of seven still postulated them as solutions. Furthermore, if it may be assumed that it is the office managers who send staff on courses, they appear to be far more worried about Legislation than interviewees themselves.

Among legislative topics, courses on Building Regulations were more likely to be well-received than those which are broadly, not specifically, relevant. Health and Safety at Work, for example, did not often engage learners' attention and in one case,

"you could almost hear the snores"
(Principal Architect).

Health and Safety at Work is a topic in any case where, because of the broad nature of the legislation and its newness at the time the interviews were conducted, there was not a lot of expertise about its application. A health and safety inspector, for example, gave a talk and

"we found later he got the whole thing wrong"
(Assistant Regional Architect).

Typical of comment on a Building Regulations course, on the other hand, was one thought "excellent" because before going the learner found he needed to understand and apply the regulations and

"let's face it, the regs aren't written in
laymen's terms"
(Technician).

As has been mentioned by almost all authors of research reports, relevance of course material is absolutely paramount

"A lot of what the profession demands is needed immediately. For example, if a practice gets its first primary school, and there isn't a course until seven months hence, one opportunity is wasted."
(Hedge, 1976).

This was shown, too, in the adult learning projects study where the single most important reason for undertaking learning was demands of the job.

In addition, when the learning is relevant to work in hand, some learners like to be told once and for all of the limits of the material.

"It was spaced out over several weeks. This was not a good way of organising it - spread out over a long period"
(Senior Architect).

Paradoxically, a disadvantage of courses - that they are available intermittently and not in relation to the preparedness of learners - is matched by an advantage - that once learners are ready, they like to feel they have covered everything there is to know about the topic and so they have the planning organised by an expert. In debriefing periods of regulation courses at York, it is common for course members to want assurance that they have applied their knowledge and "got it right": model answers to exercises are often asked for. This need for information is not the only purpose learners see in Legislation courses, however. Changes in attitudes are also valued.

"Putting this into effect is difficult ... but it gave me a better appreciation of fire risks and I can now avoid a loggerhead situation with the fire officer"
(Senior Architect).

The Building Contract was the course subject most frequently attended: because of this, it might have been expected that it was the subject area most frequently recalled. This was indeed so. Courses on the Contract represented more than a quarter of all courses;

nearly one-fifth of all courses mentioned as being beneficial referred to courses on the Contract.

"that part of courses which have involved contract law have been most valuable"
(Principal Architect).

The importance of understanding the Contract was stressed by a Regional Architect.

"There are 24 people in the office who need updating on the contract ... three people are sent on a course each year, giving an 8-year cycle of knowledge"
(Regional Architect).

On the whole, favourable comments about courses on the Contract were just that - they give no insight into why one course was successful, another not. Timing seems important.

"We didn't have enough time to get into it"
(Assistant Regional Architect).

So does back-up material. A lecture course was thought

"very, very useful. We were given quite full notes"
(Assistant Regional Architect).

A senior architect, however, drew a graphic picture of the way courses can come over. He had attended three courses on the Contract.

"I have been told I am weak in this area, but I'm not motivated to learn about the contract because I've never needed to. You can be in this place until you are 65 and never come into contact with it ... The first course was in London at a hotel: 150 people in a large room in that hot summer. They just talked on and on. I fell asleep. I went outside and lay in the park in the sun.

The second was held locally ... The same thing. Two-thirds of the people weren't interested. If you're on a job and have particular problems with the contract, then you'd be fascinated.

The third was (by a management consultant working in the office). Very nice - interesting. But unfortunately I missed one lecture because I was so busy. Then I lost the thread."
(Senior Architect).

This kind of criticism of Building Contract courses was by no means uncommon. One-third as many comments were negative as were positive; only adverse comments on Legislation were more than this. Furthermore, among those who postulated solutions one-third again said courses, as a way of learning about the Contract, were not good (it was rare for postulated solutions generally to debunk courses).

"The course on running a large contract which discussed documentation and staff management was less successful. The main category of successful teaching (here) has been experience."
(Technician).

"On a course you might not have to apply your knowledge for two years. Then you'd have forgotten it, or the contract would have changed."
(Student).

This theme will be taken up in Chapter Eight (Non deliberate learning), but it is one which recurs in connection with courses. An ARA thought well of a three-day course on the Contract, but noted another method of learning.

"It was noticeable that the representatives there from the construction industry were far more knowledgeable. They're obviously studying it all day long."
(Assistant Regional Architect).

Within the topic of the Contract, matters dealing with Arbitration (where there has been a dispute) were particularly mentioned.

"There are the difficulties ... in keeping up to date with current attitudes of the contractor to the contract. I do think the Industry is quite good about providing these. Last year I (attended one which) took the form of lectures with discussions after them. There weren't any workshops. I do think the workshop technique is useful, but it takes more time. In a short time you can get more over with lectures"
(Assistant Regional Architect).

Arbitration courses, though, are a good example of material getting too remote from the needs of users.

"I can't say I got a great deal from it. It was too esoteric - it was too remote from needs I'll ever have"
(Senior Architect).

On the whole, it appeared that courses on the JCT Form of Contract itself were better thought of than Contract Management. It also seemed that Contract courses, unlike most other short course formulae these days, rely heavily on the lecture method, and that for this topic, this is not disliked. This may depend on how authoritative the lecturer is (c.f. Health and Safety at Work). A PA said of an Arbitration course,

"The form was lectures with questions on cards ... I found it useful. I'm a fan of George Stringer."
(Principal Architect).

Although many criticisms were made of courses dealing with the

Contract - and although practical experience was recommended by many people - overall it was a popular way to learn. Among the 17 topics recorded in this analysis (Figure 6.1), in only five had interviewees found formal education the best method. Courses on the Contract were one of the five examples, and numerically far the greatest and thus statistically more interesting. (The others were Materials and Components, Health Planning, Specification and Spiritual Refreshment).

As far as the balance between courses mentioned and courses recalled in matters relating to Practice and Management Matters are concerned, there is not much that can be concluded. Although both Project Management and Man Management were mentioned less frequently than attendance on courses would cause one to assume, Management Generally was mentioned often enough to float this figure upward. There was some favourable mention of Interdisciplinary Working being learned about on courses, though the favourite way in the experience of the interviewee group was by rearrangement of the workplace.

Management courses are directed at bosses at one end and workers at the other.

"Among the tutors was B-, a psychiatrist. British Steel use him for appointing people to jobs. It was quite hair-raising."
(Regional Architect).

"There was opposition ... about letting me go. The course was about trade union leadership: how to deal with management; how to handle difficult situations ... like redundancies."
(Technical Officer).

On the whole, Management courses seem to be liked, though there are exceptions.

"I didn't learn anything. Arguing over the tea table was interesting, but the course itself was a lot of chaps lecturing. Management isn't interesting in itself. I accept fatalistically that it's something I've got to do."
(Assistant Regional Architect).

Another topic that is wrapped up in the APM heading is Office Management - procedures, policies and particularly induction of new entrants into these methods. Existing courses on this are described as

"no good. They try and explain the whole NHS, which is not relevant and can remain a mystery. It should be geared to a particular discipline. The audience is ... disinterested and bored, partly because the presentation is boring. You

should have worked in a department for a month or so before the course, so that you have a frame of reference."

(Principal Architect).

Harris examined this topic in detail as well (see ppl44-146). The main problem with courses found in that study was that the mounting of a course seldom matches the intake of new staff. Two solutions proposed are tape/slide packages and continued reliance on Non deliberate learning - see Chapter Eight. However, where a course is imaginatively mounted and the intake mismatch problem is accepted, they can be popular. The contrast between the previous quote and the next one revolves entirely around good course planning - not around the appropriateness of a course as a medium.

"It consisted of a one-week course, with a second week some months later ... The course was an introduction to planning processes involving various disciplines - the medical side, the nursing side - and how these disciplines linked with each other. One of the exercises we took part in was being formed into project teams and given a hypothetical brief. That was quite fruitful. In the four months between the two sections of the course we had to develop a project we were actually working on in the office to show how we saw it in the future ... Strangely, some of the people on the course had been in the NHS for up to two years."

(Principal Architect).

Design Matters represented about one-fifth of all courses and almost exactly this proportion of all formal education recalled by interviewees. Within this heading Building Types represented about half the courses attended. Among those recalled, however, courses on Building Types only represented one-quarter. This disparity is especially striking in the context of learning generally, where Building Types accounted for more than half of all education undertaken in respect of Design Matters. In fact, no-one mentioned courses as being good for Building Types, although there were two mentions of workshops which can form part of course content (described in the previous section). In the adult learning projects study, Building Types were among the most frequently undertaken. They were predominantly planned by learners.

There is a hint here that learners do not find courses a significant way of learning about this aspect of designing, yet those who decide to send staff on them (probably the managers of the office, specifically Regional Architects) consider the topic worthwhile.

There may be many reasons for this. One is that learners may so thoroughly absorb the learning preamble to undertaking a project related to a specific type of building that they forget the formal experience in the context of overall learning by doing. A more likely reason is that a course on a building type is very hard-edged: easy for course providers to package and easy for managers to perceive. Providers and nominators may find these qualities attractive and easy to justify. Learners appear to think differently. Another characteristic of certain types of building is that there are fashions which are dictated by national NHS policies. This means that a new type of building (currently the Nucleus design of hospitals) will be extensively deployed at any one time. This again means that a course can be suitable for expounding it.

"The range of buildings you do is enormous - from hospitals to staff houses. It would be useful to have a course on a particular project you're going to do, like a mentally-handicapped unit. I've noticed that building types are inclined to come together, depending on the ideas of the political party in power. Over the years we've had maternity units, psychiatric, geriatric, general hospitals. This is the way it goes."

(Principal Architect).

So courses seem appropriate for some kinds of building types that are new and come together, though few architects considered them a particularly good way of learning. Again, there are good and bad courses. A student attended a course on Mentally Handicapped Housing with very good credentials - a new building type, put on at the RIBA, organised by DHSS.

"It wasn't very good. There were four speakers who had to say too much in a short time, so it wasn't deep enough."

(Student).

Also included in the subject heading of Design (and related to Building Types) is Health Planning. There were not a lot of comments about learning about this and there were only 15 mentions in Harris, 1978 of it being a problem area. Those that did comment had found courses perfectly adequate. This applied especially to new entrants to the Health Service. There seemed to be a feeling that there is a discrete body of knowledge about health planning and that this can be put over in a course planned by an expert. The courses quoted under induction into office management could as well have been about health planning more generally.

One other aspect of designing was frequently mentioned and that is Specification, where courses were mentioned to the exclusion of all other learning methods and no-one had a bad word to say. Four people spoke about courses of this kind - all of them about the National Building Specification (NBS) courses. What a PA said reads like an endorsement for soap flakes in "Woman's Own":

"I'd never written a spec in my life! We were starting from scratch. I had many uneasy nights; I was going to force onto my friends this awful business of writing these garbled specifications. Somebody said 'What about NBS?' ... It was an eye-opener. I'm absolutely sold on it, a superb document ... Going on a course makes it easier to sell."
(Principal Architect).

In turning to areas other than the three main ones, there is usually too little information on which to comment. The two subjects which are exceptions are Building Science and Personal Matters.

Courses on Building Science were recorded as 5% of all courses. Recall by staff of formal learning experiences was at nearly three times that rate - the bulk being in courses. Materials and components were especially referred to in connection with successful courses. Learning about construction was equally divided among the four arenas and comprised the chief subject within the Building Science category. An in-house discussion of building failures, for example,

"was popular and went on and on and on into the evening."
(Principal Architect).

Although the number of people talking about Building Science is low and therefore too much should not be read into their preferences, there is some interest in what they say about the success of the course method.

The last of the course bound matters to dwell on is Personal concerns. No courses about this were recorded in the returns from Regions, but in the interviews a number of comments were made about it being a problem area which was solved by courses. Two specific areas were mentioned: Personal Efficiency and Spiritual Refreshment.

Personal Efficiency came up only once or twice. A course about communications and effective presentation was typically described as

"not a great deal of use to me. It was really techniques for addressing a lot of people ..."
(Senior Architect).

Two other people mentioned courses on communications with mixed feelings.

"I don't think it was a waste of time ... but it's difficult to get these things into practice"

(Technical Officer).

Spiritual Refreshment as an ostensible purpose of courses was first mentioned by Angela Hedge and taken up by John Carter. Carter summarises Hedge:

"The value of a course often lies as much in the meeting with colleagues as in the actual information put across. It is an opportunity for self assessment. One might add: an opportunity in a situation 'away from it all'.

There are many signs that the success of a course depends as much on the conditions of learning as on the overt teaching. 'The least articulated reason for attending', says Mrs Hedge, 'is to "feel important", to feel in touch with the latest information or the best expert in a subject'.

All this evidence tends to alter the conventional picture of continuing education. If the real value of courses is other than pedagogic, would some sort of educational activity without lecturers be of equal or perhaps greater benefit?

... One can imagine a successful course that imparted no 'new' knowledge or skill whatever, that merely promoted lively challenge and response between attenders"

(Carter, 1978, p804-5).

About one in 12 of the comments made by interviewees dealt with these kinds of "purposes" of courses.

"What you want is courses which give you spiritual motivation - no, that's too romantic - let's say a spur to the psyche"

(Principal Architect).

"I do a certain amount of moving around the Region, so I don't get as stale as an assistant sitting around grinding out details. It's especially stimulating for them to get away on courses."

(Assistant Regional Architect).

"Sending people on courses away from the office has the advantage of getting them out of their homes and offices. And if they come back with some facts, that's all the better"

(Assistant Regional Architect).

"People return from courses full of enthusiasm and life. Lazy, idle, complacent staff need this. The alleged purpose of the course is almost secondary"

(Assistant Regional Architect).

The importance of short courses

In the second set of interviews, the value of short courses in relation to other learning methods was assessed. Though they are not as useful as the first set in providing nuances of understanding, they do contribute to a holistic picture, albeit in relation to energy matters.

Short courses are used by architects in connection with only 25% of their learning projects (mean: 34%). The average score they were awarded on a scale of five was 3.2 (mean: 3.0). Overall, they make up 2.3% of all proven learning methods, and 4.8% of all postulated. Compared with Books (used in 72% of projects) or undergraduate courses (scored on average 3.9 out of five) they do not seem to be a particularly vital learning method.

There are a number of special considerations which apply to courses, however, which are worth bearing in mind: they require a great deal of pre-planning to attend and cannot be picked up like books; they imply a time commitment of at the very least half a day; they are an ideal vehicle for enrichment from other methods. These points will be returned to in the observations at the end of the chapter.

Moreover, when indicating what kinds of methods they would use in future education, architects (in very considered replies) said they would use them twice as frequently as they do now. This is the second greatest rise in intended usage between the second set's proven and postulated projects.

There were rather fluctuating impressions of the extent to which other professions use courses. Engineers had used them a third more frequently than architects in the past, but intended to use them only marginally more in the future. The small number of Qs showed very bizarre results. None had found courses contributing to any of the past learning projects they detailed. Yet they said they intended to use them frequently in future - three times as much as architects do now!

Lectures, seminars, workshops

Lectures are the very stuff of adult education. All those evening classes, all those WEA meetings depend on them. The post-war continuing education movement for architects developed from the one

off lecture, and for many years courses were simply assemblies of the lecture component. When Hedge analysed the content of short courses in 1973, she was able to identify this kind of course (which she called the "conference"; rather inappropriately, since conferring is what was not happening) as the most frequent. Times, understanding and fashion change and an analysis of York Institute courses today would find very many not following this pattern - thanks largely to monitoring of attenders' reactions and to the work of Donald Bligh.

The one-off lecture persists as a form in its own right, however. In an analysis of education events publicised in The Architects' Journal "Diary" for 1978, 101 lectures were recorded compared with 110 courses. These consisted mainly of talks at the RIBA and to special interest groups (Harris, 1978, p13).

The essence of the lecture is that the lecturer knows more about the topic than the listener: there is a flow of information in one direction from expert to novice. Questions may follow the talk (usually restricted to matters of clarification) and this is one of the advantages over other unidirectional methods like articles, books or recorded talks. Another advantage of the lecture is that it can deal with esoteric subjects where there is not a sufficient size of audience to warrant publication or broadcast. A third quality is that it can deal with new findings - typified in Royal Society lectures caricatured in B movies of the scientific-horror genre. Fourthly, it has the immediacy of a live event, as an interviewee said,

"I don't like books. I learn better in a face-to-face situation"
(Senior Architect).

In the interviews, learners frequently called lectures "courses" - another example of the universality of that term. This appeared to relate especially to in-house courses mounted by the office itself where a lecturer (perhaps from practice) came in for an afternoon meeting. Popular among these - and in RIBA evening lectures - are design subjects: a prominent architect talking about his work and showing slides, for example.

"I put on slide seminars ... of particular architects' buildings. If they were put on at 4.45pm not many people turned up - they had trains to catch. If they started at 4.00pm then they all turned up ... Architects need stimulation and motivating to produce better buildings."
(Assistant Regional Architect).

Is there a hint there that the reasons for mounting such an event

(motivation and stimulation) is different from the reasons for attendance (relief from boredom)? I noted in one interview a postulated solution by the RA who

"is worried that not enough emphasis is put upon the aesthetic aspects of building. 'We're not talking about architecture. When we get together we talk about the nitty gritty - important things but not the real issues.' He is unsure about how to tackle this. 'One idea is to get eminent designers to come to the office and talk'." (Regional Architect).

Seminars were less frequently referred to. This is somewhat surprising in the light of experience architects have had of the method in courses. They seem reluctant to extend it into office events - except those dealing with management and design topics. This will be taken up in Chapter Nine in the context of office meetings. The seminar form is typified by a student who thought the idea of discussing controversial issues would progress understanding on all sides. He found the Regional Architect overbearing:

"He doesn't draw out opinions, he gives them. He came around wanting to get signatures on a letter to the RIBA on rule 3.6 (Advertising). I told him I agree with letting the rule lapse. He walked away. He wasn't interested. We could have had a seminar on the issue - having opinions swayed and swaying opinions. But there was no argument or discussion" (Student).

The essence of the seminar is that participants play a big part in the proceedings. In highly-structured seminars there will be a predetermined lesson to put over which is discovered by participants testing their ideas and finding it for themselves: the discussion method. In unstructured seminars, there may be no predetermined lesson, the point being to see if one will emerge from the debate: the discovery method. Both seem good for exploring attitudes and helpful for reinforcing information; not so good for skills except verbal articulateness. There is a wide range of examples in education (classroom bound topic seminars) and practice (office open forums, project crits). Hedge found this kind of contribution to course structure second in frequency after lectures, and noted the key activity as being assimilation. Perhaps infrequency of seminars in NHS offices is attributable to the line management system on which they are based: the equal give and take of seminars may be difficult to handle: who holds the ring?

The distinguishing feature of workshops is that some practical work is involved - projects or exercises. Ideal for learning skills, they are also good for exploring attitudes. Hedge found these little used in 1973, but again York courses have changed radically: seldom is a course mounted without members breaking into workshop or syndicate groups.

So workshops are common in away courses and in some of the in house courses, particularly those mounted with the help of the CEU. They seem less common when in-house courses are designed by offices themselves. The real life equivalent of a design exercise is, of course, the project itself and it is a very common way of learning - albeit Non deliberately. Chapter Eight explores this: the practical experience accruing from projects. One very notable workshop was held in a slightly unusual setting however, which would be a part of Office action, and two interviewees mentioned it independently. It resulted in the wide promulgation of the Harness Hospital system, the ancestor of the Nucleus Hospitals now being built in great numbers through the country.

"Another possibility is to run design workshops with multidisciplinary staff working on a health building, within cost limits, but concentrating on design as a problem.

When the Harness programme was being designed, five or six teams spent a week in Bournemouth designing this way. Then the teams had a talk by a Californian architect doing a similar project for the Miners in America, giving an international view." (Regional Architect).

A topic the RIBA included under Advanced Practice and Management is Interdisciplinary Working. In the study into the content of education needs which parallels this research (Harris, 1978), Interdisciplinary Working emerged as the topic most frequently mentioned as being a problem area. There were not a lot of examples given of approaching it successfully through formal education. A weekend design collaboration exercise which is run intermittently at York received universal acclaim, and in their postulated solutions interviewees often mentioned a course of this kind. Harris argued that more fruitful ways of approaching the problem may lie in workplace arrangements or in-office courses where real teams work together (see Harris, 1978, pp112-117 for a full discussion of this). This kind of solution is pursued in Chapter Nine.

Lectures, seminars and workshops were asked about together in the second set of interviews. Architects had used them more frequently in their energy learning projects than any other Formally organised resource except books - 43%. This is, however, modest in comparison with other learning methods than will be mentioned in other arenas. Architects and engineers used them at about the same contributory rate in the past (around 3.8%) and intended to use them more in the future - engineers particularly so. (The small number of QSs had used them only half as much but scored them as being particularly interesting as a potential learning resource; intending to up their contribution to 12½% of all methods. This is far and away the highest score the four QS projects indicated and helps the QSs postulations of the value of Formally organised education reach 35% - their highest score. The temptation to read meanings into these flimsy figures is almost irresistible!).

One further interesting characteristic of the use of these media is that even though engineers and QSs intend to use lectures to a greater extent than architects intend to, this does not mean that architects' intentions are trivial. Far from it. The rise in score between lectures valued at the present and valued in relationship to future education was the greatest of any mentioned by architects - 30 index points.

Game playing

Some interviewees mentioned game playing. Perhaps they were attracted to this as a way of being frank without being personal, perhaps as a way of understanding others' points of view. It was particularly mentioned (postulated, note) in connection with conflicts arising from interdisciplinary working.

"Game playing could help sort out these problems of architects and engineers understanding each other. We cannot see clearly how they work."

(Senior Architect).

Gaming and role playing scored low in the energy assessment, being used in only 9% of projects and being rated at 2.9 for effectiveness. None of the profession had used these methods for more than 1% of their past learning, though architects were mildly interested in using

them in future. The small number of QSs were a little more interested, intending to up their contribution to nearly 5% from the present ½%.

Undergraduate education

Some interviewees returned to the context of university education as a solution to problem areas. Undergraduate education and postgraduate education were referred to and so was research work.

In what they said about undergraduate education, interviewees were usually demonstrating how they did not have a problem with areas their colleagues did.

"I had done some computer work at college ... Learning how to solve one problem, I've been able to understand how to do others."
(Senior Architect).

"My mutual training was done with (engineers). I speak a common language"
(Technical Officer).

"There's a suspicion that they don't teach building construction in the schools any longer - though I must say the chaps we've had here have been very matter of fact. I see they've got Mitchell (books on Building Construction). They do use it."
(Assistant Regional Architect).

"We have a fairly good systems engineering course at M-, so I can calculate most of the work done here"
(Student).

These kinds of comments were made several times, in particular the question of interdisciplinary understanding coming about in undergraduate days. As mentioned in Chapter Two, however, undergraduate education came in for a fair amount of criticism for its separation of theory from practice. No-one in interviews mentioned the aim which many teachers see as being fundamental in architects' training: the absorption of attitudes of the approach to design problems.

Postgraduate education was seldom seen as a relevant method of extending knowledge or skill. One interviewee saw its potential as directing architects into other professions by building on their intrinsic abilities.

"We have an advice giving capacity greater than others outside believe to be the case. The credibility gap occurs because of others misconceiving our role ... We should be able

to take off our architect's jacket and move into a different area where we can sensitise others about what the (building) impact of their decisions are ... I'm applying to read for a Master's degree in health facility planning ..."

(Senior Architect)

In the second set of interviews, among the proven learning projects recorded by architects, undergraduate courses had been a contribution to only 8%. However, their effectiveness rating was 3.9 out of five. This was the third highest average score allocated (though there were only ten mentions, and there can be a statistical anomaly in low figures, since large numbers of mentions tend to aid regression to the norm). They are therefore an important resource.

Architects and engineers were close to each other in having drawn on this resource in their proven experiences. In postulating what resources they intended to use in the future, architects did not mention undergraduate courses as frequently, and engineers did not mention them at all. The small number of Qs valued undergraduate courses as a contribution to past projects at about three times the rate of architect/engineers, and intended to continue using them at this rate in the future.

PACKAGED RESOURCES

Books, manuals, guides

In the first set of interviews, books contributed about 7.8% to the overall list of resources. In the second set they continued to contribute at about this rate. This seemingly modest figure conceals their importance. 7% of all learning resources puts them in first place - not true of the first set of interviews. 7% of all weighted resources mentioned can also be examined in another way. Since almost every project had used a combination of learning methods, to what extent are books used in each learning project? The answer is in 72%. In other words, out of every ten projects recorded seven had used books as a contributory resource. Clearly, they are a very important method of learning indeed.

In the assessment of projects about particular topics, a subtle distinction in the importance of books emerges. Although their use is in first place overall, only in General Understanding topics are they

first. In studies of Form they are second to Journals. In Legislation studies, second to Source Documents. In studies of Fabric they are third to Journals and Trade Literature. In learning projects about Alternative Energy they are third to Asking Experts and Journals. And in studies of Costs and studies of Services they are as low as sixth position. Clearly, they are applicable to some kinds of studies more than to others.

Another characteristic is that scored by weighting, they emerge at 3.3 out of five on average - really moderately good and so they are clearly not simply a top-up device, as Examining Plans, for example, appears to be.

As far as comparisons between professions are concerned, they were remarkably consistent in both proven and postulated experiences. Among proven learning architects were 7.0%, engineers 6.9% and Qs 7.9%. When it came to postulated education, all three professions dropped their interest to around 4½%. There is little in data or notes of discussions during seminars that can explain this drop.

There were some useful mentions of books in the first set of interviews, but not enough to explain satisfactorily how architects use them. For such an important learning resource this really is disappointing and a follow-up survey should certainly be contrived to plumb this in more depth.

Interviewees mentioned books particularly in connection with learning about Building Science and Design. An interesting sub-theme here is that their Building Science reading tended to be for specific information, their Design reading for concepts.

In general, books and manuals deal or tend to deal with one point on the information - application - concepts scale. Books do contain information, but where this is in isolation they come closer to being manuals. Books were sometimes mentioned by interviewees as leading to understanding of some topic - Design, for example.

"I've brought books from home which I keep here - the library doesn't buy them, it's technical. People do borrow them: the Alvar Aalto paperback, Banham's 'Well Tempered Environment' ... Wright's 'In the Nature of Materials', (Corbusier's), 'When the Cathedrals Were White'. People say to design is a matter of opinion. No! Taste is a matter of opinion. I don't like Baroque churches or Versailles, but I wouldn't deny they're great pieces of architecture."

(Regional Architect).

From this extreme, dealing with theory and observation, there is a combination type of book which deals with both data and concepts, for example DHSS guidance:

"I don't know anything about hospitals except what one picks up from one's colleagues and the (Hospital) Bulletins and (Health) Building Notes."
(Principal Architect).

"A young chap learns the ropes by looking at Ministry Guidebooks, leaflets, pamphlets on what to do. But they're only guides and often out of date."
(Principal Architect)

Other books that deal with information in the context of concepts are some books on construction, mentioned by more than one interviewee.

"I use Mitchell ('Building Construction') a lot - more as a memory jogger than anything else."
(Senior Architect).

One interviewee mentioned resorting to technical information of this kind in the context of a detailed learning need.

"We only need to learn about specialist things like reinforced concrete, thermal insulation or sound insulation. If the Ministry says 'step up the U-value of walls', we think, 'Got to use our loaf on this one', and we rely on the technical literature."
(Principal Architect).

And then, at the information end are the true manuals: the 'how to do it' descriptions, often accompanied by checklists.

"Urwick-Orr Management Consultants set up a 'Procedural Manual for Project Management' system which they developed in consultation with staff."
(Assistant Regional Architect).

There is a rich literature on management of the project, less directly tailored to a particular office than the Urwick-Orr example.

"I found those two books 'Architect's Guide to Running a Job' and 'Architect's Guide to Running an Office' very helpful."
(Student).

This kind of office manual was also referred to as a postulated solution - though contradictorily.

"What you don't want is a manual called 'How To Fill In Time Sheets'. What you want is ... someone keeping an eye on you."
(Student).

"If there were some official document which showed us how it (office procedures) should be

done, you could start talking to people from there."

(Technician).

There are thus some semantic problems. Books, Manuals and Guides fits happily into the "inanimate sources" category, but there are some problems in allocating it to the Formally organised arena. Although the set of resources obey the first part of the defining question, "Was the education organised by some outside body having an educational objective ..." not all of them obey the second, "... and without the learner having to reorganise or collate it". On the whole, guides obey both parts - the organising framework is set and the reader follows it. Some books do this, particularly those dealing with concepts. But some books, and many manuals, are largely used as data banks of information. In these cases, learners certainly dip into them, reorganising the data to their own purpose. This would classify them as Personally organised. On the whole though, more than half the resource seems not to fall into this last category and it has been therefore treated as Formally organised. It might be possible in future research studies to plumb the question of the learner's objectives which are at the heart of the semantic difficulty, though in the present state of understanding there are other more basic problems which need sorting out.

Films

Films are more widespread and a better established medium than other audio-visual methods. The great advantage they have is that they can vividly show real events which would otherwise have to be described; that because of their dynamic nature they can show processes. Their disadvantage is that they require to be set up, and usually hired - both requiring administrative activities. Also, in an office, the projector in the same room is terribly noisy. There are a number of stock films available for hire and made by public information bodies, such as the Canadian Film Board. TV frequently shows films of general interest (e.g. "Spirit of the Age") and there are some Open University (OU) films of more specialised interest (though usually art history oriented). "History of Architecture and Design 1890-1939" is particularly good. Again, information about availability has been a constraint on their use, though comprehensive catalogues are becoming available. BISFA hope to republish their catalogue in 1983, after being

out-of-date for some years. Architectural Newsreel is a company which tours architectural offices with sets of short films, usually about manufacturers' products by whom they are funded.

Mackinder in her review of teaching about how building materials and components are dealt with in architectural schools found that films

"were reasonably popular with students in place of ... a lecture (but that) their success as an additional 'carrot' to students outside lecture time was less successful. A number of schools host the Architectural Newsreel Films and show them during lunch hour periods, with attendances which most only describe as moderate ..."

(Mackinder, 1980a, p79).

In the second set of interviews, Films contributed in only a minor way to architects' learning resources - about 1½% of all weighted scores. Engineers also had used films at this rate, QSS rather less. Architects and engineers saw films as being more a valuable resource in their future education than they had been in their past, though the small number of QSS rated them not at all.

Overall, at present, architects have found that films can contribute to just over a quarter of all learning projects, but they seem to be incidental in this contribution: the average score was 1.7 out of five, the second lowest rating.

Comments by the first set of interviewees were few, but what they did say indicates that the criterion of success depends upon how well the film is conceived and made, not about the suitability of the medium to the content. The John Cleese films on management were singled out for praise as "popular" and "excellent".

Kits, tape/slides, videos

During the period of this research, the education kit was a much vaunted but little achieved medium. At its simplest, this is the tape slide package: a recorded lecture with accompanying slides and booklet (or just a set of slides or an audiotape). This horse and buggy medium is being overtaken by the videotape which is less fussy to use, but for which at present replay equipment is still rare. Videos and tape/slides are not completely interchangeable. Some education experts like the side access possible with slides, where one slide can be picked out for use for other purposes; rather as a horse can be used

for purposes other than pulling a buggy. It might be anticipated that video will become increasingly used as the equipment becomes more widespread, and the cost comes down, just as the automobile did. Films, too, are being transferred to videotape and contacts with the main producers of film for the building industry suggest that this is already happening (see IoAAS, 1981b; CEU, 1981 and BISFA, 1982 catalogues of audio-visual aids).

There have been a number of experiments with tape/slide packages for education, and the medium is now well established. Leaders in the field are the Commonwealth Association of Architects (CAA) and Pidgeon Audio-Visual who have now published a number of packages.

The kinds of content with which packages deal are quite wide ranging, though there are gaps in some areas and oversupply in others (notably materials and art history). A difficulty with tape/slides has been access to knowledge about what is available. This has been met to some extent by the catalogues mentioned earlier. The Building Centre recently investigated the possibility of setting up a distribution and hiring network to make them more accessible. This met with a cool response from architects polled about the idea.

Video films are very new and no interviewee mentioned them at all - nor were they mentioned in either Harris, 1978 or Mackinder, 1980. On the whole, the medium is being used to re-record films, the indications being that once the machines are set up they are easier to load and also to post. Perhaps, too, the association of video with TV is pleasurable and there are spin-offs in acceptability of the content. The CEU has made some videotapes, mainly adaptations of tape/slide material, but one which was a new venture. This was particularly interesting from the point of view of balance of lecture content and visual content. Normally, tape/slides suffer if there are long periods of theory with no visual back-up to attract the eye. Video can show the lecturer simply talking - sufficient to prevent the balance of audio and visual from becoming disjointed.

TV and Radio

In the second set of interviews, participants were asked about their use of TV and radio as learning resources. A surprisingly large number had found that their learning projects could draw on these media. Participants indicated that 36% of all their projects had had TV or

radio as an ingredient - albeit at the low rating of 2.1, indicating perhaps that the contribution was supplementary. So TV and radio were used in more projects than courses were; though if the low strength rating is taken into account, they are not as important. They may also have contributed to learning projects in a chance manner - i.e. not planned at the beginning but happened upon during execution. Certainly, when all professions were postulating their learning, they mentioned them infrequently.

Engineers mentioned TV rather less than architects, about half as often. (The small number of QSs on the other hand recorded them in their proven experiences as being the most valuable of all Formally organised media! And then, to completely demolish any reliability on their sample, mentioned them not at all in postulated education!).

Audio-visual media

But all of these descriptions see audio-visual media as the packaged equivalent of the lecture. That is to say, they are instructional. Few audio-visual packages have attempted to deal with discussion or discovery modes of learning. To some extent, this is inherent in the medium itself, and certainly inherent in the way the medium has been presented. Television's Channel Four has set itself the aim of making TV viewing less of a passive experience, and time will tell if the audio-visual medium can be reinterpreted in this way. The two directions that seem possible are modelled on the BBC's "Open Door" programme and TV children's programmes. "Open Door" set out to allow minority interest groups to actually make films themselves for transmission. Richard Mabey in Children in Primary School (1972) has shown how audio-visual material need not be straightforwardly instructional, but can utilise the seminar method. Some schools, he reports, even allow children to wield the video camera themselves and construct their own programme. Another direction is seen in TV programmes for young children, such as the BBC's "Play School" and "Why not turn off ..." and ITV's "Rainbow". A regular feature of these are model making demonstrations which are intended to (and do) motivate the children to undertake activities after the programme. "Rainbow" even has an activity pack of material which can be purchased through book and toy shops.

Very few adult education organisers have ventured into these

fields yet. Perhaps making videotapes will be more likely to take off in the schools of architecture (and by teachers before pupils) than in offices. Brunel University already has a collection (including one on how to do it by Professor Sid Urry).

Audio-visual material is very seldom seen as part of an education package. Although components are used to form part of such a rounded event on occasion, they seem to be perceived more often as events in themselves. One example of how a rounded event might be organised is in an education kit designed by the CEU. This deals with fire safety in new health buildings and consists of a source book (DHSS guidance), commentaries on it which lead the learner through salient points, backed up with audiotapes, tape/slides and tape/booklets, a workbook of examples and as the central experience, a one-day design exercise which can be mounted in the office. Learners thus deal with instructional material and with discussion and discovery opportunities: put another way, they are led through data, concepts and application. The kit has been widely used in the NHS and has been found to be a popular alternative to the more usual course. Its advantage over a course is that once published it can be mounted rapidly, can be put on in response to a relevant need and because the material it deals with is a demand new to designers, it can reach far more people than courses could ever cope with. This market of large numbers of people needing updating on new design guidance helped get over the major disadvantage of an education kit of this kind: it is time-consuming and more expensive to produce than a course.

Exhibitions

Finally, mention should be made of exhibitions. There is some difficulty in deciding whether exhibitions should be thought of as Formally or Personally organised. Some exhibitions (e.g. Lutyens at the Hayward Gallery) are clearly Formally organised. Trade exhibitions on the other hand depend on the attender to select and file the data which is presented without an overall interpretation. No mention was made in the first set of interviews about the Formally organised kind of exhibition; many were made about the second and this is pursued in the next chapter. In the second set of interviews, the distinction between these types was not made clear, so the responses have been arbitrarily split in two and half allocated to each arena. This means

that the data is not very useful as an overall guide. Some points can be drawn out, however, all indicating that exhibitions are not currently considered a valuable learning resource. They are rated at a strength of 1.4 out of five - the lowest of all average ratings. They are used in 22% of projects - not a bad score, and probably indicating, together with the rating, that they are a back-up rather than a prime learning resource. Architects and engineers intend to use them considerably less in future than they do at present; the small number of QSs did not mention them at all in either their postulated or proven records.

OBSERVATIONS

The remainder of this chapter consists of a commentary on the data so far presented.

FOUR ARENAS

1: An arena of Formally planned education

Of all the arenas of learning that will be described in Part Three, the Formally organised one is the best understood and it scarcely needs elaboration to make the point that it is a collection of methods very common in continuing education.

2: Relatively low use of Formally planned education

Surprisingly in the light of the extensive use made of Formally organised media - and the coverage some of the methods have received in the literature - it only comprises 20% of the methods architects have found significant in their learning. The sources of engineers and QSs bears out this order of number.

3: Relatively high use in postulated education

On the other hand, when architects took a considered look at their future learning programmes, they said they would use the methods more. This overall increase in use does conceal some differentials between methods within the arena. Courses and lectures, etc. are planned to be used much more, Books much less. Engineers show a

similar increase in use.

USE OF FORMALLY ORGANISED EDUCATION

4: Great importance of Books, Manuals and Guides

Architects used Books, Manuals and Guides in 72% of their learning about Energy matters - the second most used resource (Journals were 74%).

Plainly, therefore, they are of great importance. But inexplicably when postulating future learning endeavours architects indicated that they would use them much less. The research shows a drop in usage of 24 points, the third greatest, though not as steep as the 37 points drop of Journals. The reasons for this drop might be usefully explored in future research.

While it is always a much used resource, Books, Manuals and Guides were said to be particularly frequently used in studies of "Form", "Legislation", "Fabric" and "Alternative Energy". They were less used - in sixth rank - in studies of "Services" and "Costs".

(There is a methodological problem in classifying Books, Manuals and Guides as Formally organised. Some Manuals and Books are simply collections of data, in which it is beholden on the user to organise mentally. This would, in the taxonomy used, cause them to be classified as Personally organised. However, it might be guessed that more than half would not be of this kind, so they have been entered as Formally organised. The allocation of Journals to the Personally organised arena is similarly ambiguous. The overall usage of the two arenas might therefore be relatively accurate as the two resources balance each other out).

5: Importance of undergraduate education

Undergraduate education can hardly be thought of as continuing professional development. Nonetheless, mention must be made of the fact that when architects were recollecting the resources and methods they utilised to learn about energy, it cropped up. Its significance lies not in the number of mentions, or the number of learning projects with which it was used - both of these scores were very low - but in its strength rating. Where it was mentioned, it was scored at 3.9 out

of five: the third highest.

6: Importance of Lectures, Seminars and Workshops

7: Importance of Short Courses

Two observations on the data could be taken together. They refer to the use made of Courses and the sub-component, Lectures, Seminars and Workshops. Neither were scored high in projects by the standards set by Books or Journals, Courses used in 25% of projects, Lectures a more comfortable though still unsensational 43%. Their significance lies in the use to which architects intend to put them in future projects. Lectures show a rise of 30 points, Courses of 25 points. These are the two highest.

8: The Short Course is a well established medium for continuing architects' education

In reviewing the data collected in the first set of interviews on Short Courses (mounted in educational establishments or in offices), it is observable that they are well-established as a means of solving the problems architects come across in their daily work. More people spoken to in the interviews found them valuable in whole or in part than found them not valuable for reaching this end. There were 39 mentions of Courses which interviewees spoke positively about; there were 14 mentions of Courses which they found less useful as a means of solving their problems.

9: Many people find the event itself as important as the content with which it deals

Furthermore, the ostensible subject with which the course deals is not necessarily the main reason for architects liking courses. Large numbers of people (one in eight) said that the main value of the learning experience they had had in attending a course was the spiritual refreshment it afforded. This ranged from values like getting away from the work environment to the opportunity to discuss and debate current concerns across the coffee table. Other authors (Hedge and Carter) have made this point and it is well-supported by this set of interviewees.

10: Importance of Kits, Tape/slides and Videos

Tape/slides, Videos and Education Kits were grouped together in the questionnaire, even though they comprise slightly different media. They are used to a very little extent at present - in only 17% of projects. Their importance lies in the rise in intended use attributed to them. This was 16 points, the fourth highest increase.

11: Some less important learning resources

In these observations, mention should also be made of those methods that failed to score highly. Amongst Formally organised methods, the four lowest were Undergraduate courses, Gaming and role playing, Kits etc, and Exhibitions. It has been shown that the first and third of these are, in fact, significant from other points of view. Learners do not plan to use Gaming or Exhibitions to any extent in future. TV and radio are currently used in 36% of projects - not particularly high - and slump in future usage by 14 points. There is a curious anomaly in the use to which the small number of Qs use TV/radio: they score this highest of all Formally organised media.

12: Low scores might be attributed to dislike of a method, or ignorance of it

At this stage, a caveat should be entered about the significance of the opinions expressed by learners about media they use. The purpose of the research is to map and measure learning resources employed. There is no suggestion that some methods should be abandoned simply because they are little mentioned. Gaming and role playing is a case in point. Educators may feel that there is great potential for learning to occur through a device such as role playing. The fact that it is not much valued by learners at present may be more to do with their not having experienced the method than not valuing it. This evaluation could not be made of Exhibitions, which architects are very familiar with indeed.

INTERCONNECTIONS

13: Weak links between Formally organised and other learning activities

In future chapters, this section will deal with overlaps and interconnections between arenas and methods. The Formally organised arena is in the main so well-understood that there is a clarity of definition of most of the components, that they overlap hardly at all. Similarly, the arena itself is quite clearly defined. Such overlap as does occur is quite easy to describe: Lectures are often part of Courses, but in the context here used can be seen to stand on their own as well; Books undoubtedly are closely related to other written material such as Journals, but the argument for keeping them in this arena has been rehearsed; Kits, Tape/slides and Videos are different and might be broken down further, but as they are little used at present this may have led to clumsy manipulation.

14: A mixture of formats may be more valuable than a single format

It seems that a mixture of methods may be a good way of approaching many topics. In the discussion of the building contract and its management, just over half the 17 mentions of ways of learning isolated Courses as being a successful method. While the Contract was among the five topics most liked as a course subject, there were substantial numbers who disagreed with this. The second most frequently mentioned method of learning they mentioned was practical experience. The interviewees quoted earlier seemed to find the different methods good for different aspects of the problem area. ("You might not have to apply your knowledge for two years"; "I didn't know what could go wrong"). So it may be that there is no single way of learning best about some topics, that a mixture of methods is essential to absorb and understand information and concepts on the one hand, and application and relevance on the other. The application of this theory would affect three groups of people: learners (in searching out wider methods when planning their learning); course providers (in seeing the course as a contribution to a wider framework and designing in opportunities for extension into other areas); and the institutes (where CPD is seen only as education which is capable of being measured).

ENRICHING FORMALLY ORGANISED EDUCATION

15: Courses have already been enriched

When Hedge was writing her first report for ARCUK nearly ten years ago, she was able to classify courses into three types: those using the lecture method, those using the seminar method and those using workshops. Today it would be impossible to make a similar analysis as virtually every course uses these three methods in combination. So in this sense, courses have already been enriched (Hedge, 1973).

Furthermore, she pointed to the venue of courses as being possible in the workplace, as well as in away centres. This too has become commonplace today - particularly in education put on by the CEU for the NHS. Again, courses have been enriched by this. So enrichment has occurred of both method and venue.

It comes as something of a surprise, then, to observe that some courses continue to be mounted without these enrichments. This seems to happen particularly when new educators put on events - for example, offices themselves or co-ordinating bodies such as the DHSS. There is no value in enrichment for its own sake. The data earlier described suggests that some kinds of topics respond very well to lectures (the instructional method) alone: the JCT Contract was quoted by learners as being liked in this format. But other kinds of topic may benefit from application experience being designed into didactic formulae. There is a possibility here that education might be directed at new Formal education planners - those who are adopting the roles of Formal education planners - to help them see the potential in doing more than lecturing.

16: Courses are the cornerstone of future policy

It has become fashionable in the last few years to describe courses as being old-fashioned. There has been a tendency to describe continuing education as

"more than just courses"
(Harris, 1978).

It is important to stress that this is true. The two chief reasons for this are: to get more mileage out of relatively neglected methods

valued by learners; and to return to learners the responsibility for structuring education themselves. Both of these are drives in this research.

But courses remain a cornerstone of education and are well-suited to holding within them the characteristics of other learning methods. Thus Visits, for example, could become not simply a day out of the office looking at a building. A Visit could start with a description by the designer of aims, constraints and concepts; go on to the main visit itself, helped by proformas of what to look for, observation checklists; reconvene to discuss and debate the building itself, and the building as a metaphor for housing the activity. An enriched Visit of this kind becomes something very close to a course. The activity of visiting has been taken and manipulated to give the range of learning experiences in a group activity that characterise the classic short course.

17: Videotapes could be packaged with other learning materials to extend their range from an instructional mode into discussion and discovery

An observation made within the outline of data earlier should be extracted here. Films and videotapes are essentially passive experiences for viewers. One way that courses have grown in the post-war period is away from instructional methods (lectures) towards discussion and discovery. Separating out films from their rigidly-packaged contexts (either on a projector which cannot be stopped or as a television programme) into video cassettes means that they can be stopped at will for a discussion or to re-run a complex passage. The use of video or tape/slides as part of a kit in which discovery exercises can take place, or packaged with discussion points to be taken up by viewers, can extend the range of learning methods. This would seem to enhance the learning possibilities of students. It may also extend the range of topics presentable as there are some indications that some subjects are not well suited to the instructional mode.

18: The benefits of undergraduate education need to be better disseminated

Undergraduate education has received a fair amount of criticism -

Chapter Two has outlined why and what. But an observation which can be made of the data collected is that the newly-qualified student is a precious resource in the office. Not only is he recently updated in new techniques (of calculating thermal loss, for example), but he brings to the office new attitudes and values. It is probably these last that are the chief benefit of the undergraduate system as it stands.

This resource could most frequently be drawn on in the office learning context. For example, in office seminars new architects could be encouraged more than they are to present critiques of schemes from the standpoint of the avant garde in design; and scheme assessments not rely on criticism only of building construction and planning. Another way of using the resource is to mix new and more experienced designers in small groups working on in-house education exercises, biasing exercises alternatively to the technical skills each has to offer.

SOME PROBLEMS OF THE FORMALLY ORGANISED ARENA

19: There are often managerial and organisational problems inherent in the learning environment which reduce the effectiveness of education events

As far as the use of lectures, seminars, etc in non-academic settings is concerned, there is an impression from the data that lectures are much utilised, but that there may be limits on how useful other methods are. When members of the CEU have attended in-office events, they have been struck by how a potential seminar (a design review, for example) can end up with a stream of talkers with no questions, let alone challenges. This process needs further exploration: are there devices which can help get free discussion off the ground? Are there methods of reducing the tensions inherent in line-management organisations to allow a technician to challenge a regional architect without putting his job on the redundancy list? Are there techniques for helping reduce hurt feelings and getting designers whose work is being discussed to separate their self-image from the project they have designed? Are there ways of assessing the building (and not just the design drawings) as it is seen by other architects, by professional users, by patients and by society passing its doors?

Without access to these enabling mechanisms, the office event which attempts to deal with design - often mentioned in the interviews as a subject about which architects are concerned - can only address the fringes of the problem.

20: The employing organisation often has different educational priorities from learners themselves

An examination of courses attended differs considerably from courses available and courses desired. It seemed from the interviews that which courses are attended are mainly those chosen by the office managers. A common description of the course planning was that an ARA

"sets up a list of people against courses. Sometimes staff will send a note asking about a particular course"
(Regional Architect).

"The Region ... continues to decide on education on an ad hoc basis. Courses are seen almost as a perk for showing interest and liveliness."
(Regional Architect).

If course attendance does measure what the office considers important, then the major issues are the Building Contract (27%) and Legislation (19%). According to Harris, 1980, architects themselves see these as much less important: or rather, they see other topics as much more important. They mentioned matters to do with the Building Contract 40 times in a total of 516 (8%) and Legislation 24 times (5%). In 1978, course providers publicised in the Architects' Journal Diary two courses on the Contract (out of 91 excluding "other") or 2%, and five on Legislation (5%). While these are very rough and ready figures, they do lead to another observation. If it is accepted that there are some learning needs which the office is so concerned about that it feels it needs to take some action to encourage (they might say "ensure") staff to undertake, then courses are a way of doing this, to the satisfaction of administrators if not of educators. In other words, sending staff on a course on the Building Regulations means that the office is sure that they have been exposed to the material, even if they cannot be at all sure that the individual has learned anything. Admittedly, this smacks of Victorian school rooms, truant officers and class registers. The question it raises is: since the organisation has legitimate concerns which it needs to ensure staff know about; and since staff may not be motivated to undertake this learning themselves;

what educational methods can be adopted to ensure learning?

21: Courses, and education generally, must be relevant to the learner's needs

A conclusion drawn by many educationalists is that education for adults needs to be relevant to their needs. This is well-supported by numerous interviewees, and some of their comments about this have been quoted in the context of the data on subject matter earlier. A regional architect summed up a general feeling:

"I love courses but ... a month after you get back you are dusty. Six months later you wonder 'What the hell was that?'.
(Regional Architect).

So a further observation is that an examination of the interviews confirms a wide-held belief that relevance to material is important. This can mean that the subject is relevant to a job need ("before going the learner found he needed to understand and apply the regulations"); or that the education format can be undertaken at an appropriate time ("If ... there isn't a course until seven months hence, one opportunity is wasted"). Hedge has speculated that relevance can also mean relevance to the organisational framework of an individual's learning style.

"When the professions talk about relevance to practice they may also, perhaps unconsciously, be describing not simply what they do in the office, but their framework of understanding, the whole body of knowledge on which they draw in their work."
(Hedge, 1975, p44).

22: Formal education needs to be planned; but the planning might address processes rather than topics

One of the main themes that has been pursued in the research studies undertaken in the last ten years is one to do with assessing education needs of architects. Hedge attempted to do this in 1973 by analysing what was being provided at present. This method was recommended by the RIBA as recently as 1979 in their Green Document:

"One thing the RIBA could usefully do would be to monitor, or persuade York to monitor, such lists at intervals and analyse the trend of the profession's interests."
(RIBA, 1979).

This method seems to be prediction from the past, and circular.

Hedge in 1975 also attempted to extract from local practices a list of their current interests by circulating a questionnaire, but found the resulting response difficult to analyse and it plays little part in her report. Harris similarly attempted to extract this kind of information and, to quote Carter,

"identifies the 'problems' of mid career education from an ingenious system of interviews with NHS staff."

(Carter, 1979).

Difficulties with these methods are that they make no attempt to consider the office's needs (a previous observation); that they rapidly date; and that they project needs for particular offices on the basis of national samples. Harris admitted these difficulties:

"In the last analysis, any list is only valid for the needs of a particular set of people in a particular situation within particular constraints of technology and legislation at a particular point in time, as seen by a particular set of interpreters. Two further things are needed.

It would be sensible to continue to monitor needs ... so the checklist should be kept up to date.

(There are) great differences between the Regions and (we) indicated that differing needs might be expected to emerge from this. So each office needs to decide its own weighting of importance ..."

(Harris, 1978, pp94/5).

The group at whom Harris' report was aimed accepted the need for planning.

"Many of the people in Regions responsible for the continuing education of the office were worried about its uncoordinated nature:

'People attend ... on a purely ad hoc basis'

'The Health Service completely fails to provide professionally qualified staff with any organised training'

'It is difficult ... to construct a consistent theme of mid career training for staff in the office because of the random nature of the courses that are now available'."

(Harris, 1978, p70).

That this is so can be shown by inspecting the figures of attendance: an examination of what courses are attended fluctuates from year to year within the same Region, and in the same year between Regions.

Harris, in admitting the difficulty of establishing needs,

recommended that a continuing education unit be set up to help establish these more dynamically. The CEU has attempted to do this by offering a one-day workshop on "Planning Continuing Education for the Office".

This deals with the three main criticisms of Harris' work: that it is rapidly outdated; that it is generalised over Regions as a whole; that it reflects individuals' needs only, not the office as well.

"The workshop asks staff to consider their educational priorities from three points of view: (a) for themselves as individuals (b) for their professional group, and (c) for the office as a whole ... At the end of the day, the plenary session pulls together individual, professional and office needs, and staff go on to draw up a continuing education programme for the next few months ..."
(CEU Newsheet, 1981).

This workshop or one similar has been mounted in a number of NHS offices with disappointing results. Although lists were concocted, there was a lot of inertia to be overcome before they could be put into effect.

There seem to be two inherent difficulties. The first is that there is no real office mechanism to enact the decisions. The second is that the list of priorities is just that: a list of topics. It has not (because of the time allowed) addressed the nubs of the problems inherent in each topic, let alone dwelt on what the best methods of responding to the problems are - what are the best methods of learning.

It may be that a way forward is to abandon attempts to discover content needs (leaving these to be decided from time to time, if necessary in an ad hoc way according to demands made by project pressures or personal enthusiasms) and to concentrate instead on processes: to discover what are the characteristics inherent in any one topic and what are the difficulties in translating Formally learned material into application in building projects. This is an area requiring further research: a development project may be the best vehicle in which the topic is selected by a rapid priority assessment, and the bulk of the workshop concerned with exploring the characteristic nubs of the problem, extracting from the experience of users appropriate ways of learning about them, and investigating the office procedures, liaisons and mechanisms that need to be tuned to allow the learning to have a practical effect on designing or building.

23: Courses are very amendable to validation

In making observations about the data presented on courses in the light of CPD, one plain and important characteristic needs to be immediately made: Short courses are very amenable to validation. They have a set number of hours, the content is relatively clear, usually a preliminary examination of their usefulness has been argued prior to a decision to attend. For these reasons, attendance on courses can be clearly seen to have been "education", and it is little wonder that when the professions grow anxious to see evidence of continuing learning they look to this easily-validated form. Clark, Harris and Todd, amongst others, have pointed out the shortcomings of this approach:

"The proposals that arise when CPD is considered in this light are concerned with what can be demonstrated to the outside world ...

The educational consequences are likely to be much less impressive: it fails to acknowledge that individuals learn at different rates and in different styles, and also that meaningful learning can occur elsewhere than in situations formally set up for that purpose. Professional development cannot be equated in any way with a number of hours, and does not necessarily arise from formal learning situations.

Many important kinds of learning cannot readily be quantified into a specific number of hours. Reading and private study, discussions with colleagues and just thinking, for instance, all contribute to the continuing development of a professional, but all defy measurement. The desire to keep formal accounts of continuing education inevitably means that it is the education that can be accounted for that is valued. Attendance is easily measured and this lies at the root of proposals for a fixed number of hours of CPD per annum."

(Clark et al, 1981, p75).

The second set of interviews in this research show that of all "proven" learning experiences considered valuable by architects, courses and their allied methods, lectures, seminars and workshops contributed 6% to the total. All Formally organised media that can be measured by time (that is to say, excluding Books and Exhibitions) contributed 12½% to the total.

Thus, if validatable time is set as the criterion for continuing professional development, seven-eighths of apparently valuable learning is ignored. These points are raised here as preliminary notes arising

from the data in this chapter alone, and in the final Chapter Ten fuller conclusions will be made.

24: Measurements of how effective various education formats are are difficult to assess; more detailed research is required

There are very great methodological problems associated with estimates of the extent to which continuing education is undertaken: measures of time are difficult to come by in arenas other than Formally organised education; measures of effectiveness have not even been approached. Of all the directions of further inquiry thrown up by this research, this presents the greatest challenge, yet also presents the greatest opportunities for better understanding how architects learn. Further research studies must attempt to start from a neutral base (such as the one adopted in the first set of interviews in this research paper: "how have you solved your problem areas?") and not from an assumption that one or other learning experience is more important than another (such as the question "how many hours do you spend attending courses?"). Yet the collection of more hard, less impressionistic data would be helpful to progress understanding of the central question of learning. To do this requires the modesty on the part of educators to believe that adult learners are experts in both their own learning methods and the design of their curriculae.

A further complication of such an assessment is that the excellence of the particular example of the learning method can affect results: a very good course will get a different rating than a poor one, so would score more highly against another learning method because of its quality, not its intrinsic qualities. An illustration of this can be found in the contrasting notes about induction into the NHS.

25: Education providers should attempt to raise learners' awareness of a wider range of educational experiences; and they should help learners plan and utilise these

A point worth making was suggested in the outline of the data. It is not surprising that educationalists themselves should draw on Formally organised education as a teaching method, since this is essentially their domain. The definition used to clarify Formally organised education is that an educational body should have been the

planners of both the content and methods. By definition, then, their utilising other methods, their drawing on incidental Non deliberate learning would draw other methods into the Formal arena. Hopefully, their doing this will enrich the range of methods available. More importantly, however, is that in the planning of Formal events they should leave directions to be explored, and some reinforcement and application of the learning to other arenas: but that they should be sure to make this plain to the user. An example may be found in the CEU Fire Kit, where two independent activities are deliberately pointed out:

"finally, join others in a DESIGN EXERCISE.
And the kit contains design aids you might
find useful in REAL PROJECTS"
(CEU Newsheet 4, September, 1980).

Not only was the finding of an appropriate hospital for the design exercise left to the office and the testing of understanding of the subject left to peer group discussion; but the kit contained algorithms and checklists for use during the practical experience phase contained in real projects.

LINKS BETWEEN CONTENT AND METHOD

26: Some topics appear more suited to the course format than others

Some subjects seem better suited to the course format than others. There were strong indications that Legal topics in particular, but also courses on Building types, were often found less than successful, for example. In other topics, such as Specification and Health planning, interviewees liked the course method to the virtual exclusion of others. In a small sample such as this, dealing with a wide range of topics, there can be no certainty of why this should be indicated and a more detailed inquiry would be relatively easy to design and worth undertaking. There would need to be two strands to such an inquiry: are some topics better suited to course formats? and do some people like the course format better than others?

LEARNING BY OTHER DISCIPLINES

27: Architects and engineers use Formally organised media to much the same extent; QSs seem to differ

Figure 6.3 shows the extent to which architects and engineers have used components of the Formally organised arena. They are very close to each other indeed. Not only is the overall use identical (20%), but the figures relating to each of the methods and resources are very close too. Only TV/radio is significantly different - and the future use of this is estimated at the same kind of level.

Qs - judging from the small sample - differ extensively from the other two professions in almost every way.

Summary

Formally organised education makes a valuable contribution to architects' learning, accounting for one-fifth of all experiences. Surprisingly, short courses and lectures do not emerge as particularly strong methods - though their potential is indicated by the great rise in evaluation by all professions between proven and postulated experiences. The most important learning method that is currently used is

- Books, Manuals and Guides (used in 72% of the projects which were detailed).

Another important resource (though one which has limited application in continuing education) is

- Undergraduate courses (rated at 3.9 out of five for effectiveness).

Also important in view of great rises in intended future use are

- Lectures, Seminars and Workshops (a rise of 30 points)
- Short courses (a rise of 25 points)
- Kits, Videos, Tape/slides (a rise of 16 points).

The short course has already been enriched by the addition and intermixture of other kinds of activities, and there seems potential for more to occur - particularly as architects always use a mixture of methods to achieve their learning. Other packaged media (e.g. videos) could be similarly broadened, and the presence of those recently emerged from undergraduate education better exploited. However, there seem to be some problems in the office setting and priorities that affect Formally organised learning, and as much attention should be placed on methods as is currently placed on content. Some methods of learning - courses are the prime example - are amenable to validation, but this should not rule out those that are not, and raising learners' awareness to the validity of other methods should be concentrated on more by the educators whose domain Formally organised education is,

bearing in mind that courses have been shown to be very suited to some kinds of topics. These observations apply equally to architects and engineers, though Qs seem to use Formally organised media to a different extent.

Chapter Seven

Personally Organised Learning

"For many years we focussed our attention only to the highly visible portion of the iceberg showing above the water . . . the massive bulk . . . consists largely of self planned learning"
(Allen Tough, 1979).

In this chapter, education which has been organised by learners themselves will be discussed. This second arena of learning is part of the first subdivision made in the Introduction - that deliberately undertaken.

What distinguishes Personally organised learning from the other kind of deliberately undertaken learning, Formally organised education, is in its organisation: learners themselves have decided what the content of their learning shall be; they have structured their approach to the learning; they have set their own pace for working through it; they have often sought and found sources of information on their own initiative. In isolating the kinds of resources which are clustered in this arena, the defining question is "was the education organised by the learner, by drawing on or undertaking personal experiences or by organising published material in a personal way?".

In the main, there are three kinds of activities on which this arena relies:

- drawing on the individual's inner resources
- self-structured learning undertakings
- using "cool" data, made meaningful by the learner's objectives.

Figure 7.1 shows what the first set of interviewees identified as significant learning experiences and which have been put together to form this arena. Through the discussion which follows, it is material from this source that is most often quoted. Figure 7.2 and 7.3 show how the detailed responses of the second set of interviews were broken down and these prove a numerical base.

AMOUNT OF ACTIVITY

In the first set of interviews, activities that might be thought of as Personally organised made up just less than one-eighth (12%) of the total. In the second set, which plotted more accurately the

Figure 7.1

Personally Organised Learning: First set of interviews. No of mentions of "proven" and "postulated" (in italics) experiences

	Journals, magazines	Trade literature	Information services	Exhibitions	Visits (e.g. to buildings)	Research	Teaching others	ALL
General: Not specified					2(0)	1(0)	3(0)	
New Ideas	1(0)							1(0)
Building Science	1(0)	1(0)	1(0)	0(1)		1(0)		4(1)
Legal: Legislation	2(0)							2(0)
APM: Management generally						1(0)		1(0)
Design	1(1)			1(0)	1(2)	1(0)		4(3)
Conservation, Maintenance						0(1)		0(1)
Education	1(1)		0(2)					1(3)
Personal (inc. refreshment)					1(1)			1(1)
Other	1(0)							1(0)
Total	7(2)	1(0)	1(2)	1(1)	4(3)	3(1)	1(0)	18(9)

Content not mentioned: Planning, External Environment, Interior Design, Legal: Contract, Services and Structure, APM: Man Management, APM: Project Management, APM: Interdisciplinary Working, Computer Applications, Professional Matters.

Methods not mentioned: Research, Using experience and own skills, Reflecting on experience, Examining plans.

contribution made by these kinds of activities, they proved to be far more important than first revealed. In projects relating to Energy Matters (which roughly covers the spectrum of matters which concern architects), Personally organised learning contributed more than two fifths (44%) to the total. Moreover, the three professions were very close to each other in their opinions about this as Figure 7.3 shows: architects 44%, engineers 43%, Qs 46%.

Figure 7.2

Personally Organised Learning: Second set of interviews with architects

	Archs postulated	Archs PROVEN	No of proven mentions	Strength out of 5	Used in % of 119 projects
Using experience and own skills	62	225	61	3.7	51%
Reflecting on experience	79	204	67	3.0	56%
Visits to buildings*	50	85	26½	3.2	22%
Examining plans	74	123	63	2.0	53%
Teaching others	35	54	21	2.6	18%
Research	82	211	61	3.5	51%
Trade literature	39	244	80	3.1	67%
Source documents	47	200½	74	2.7	62%
Information services	60	125	44	2.8	37%
Exhibitions ø	7½	37½	26½	1.4	22%
Journals and magazines	56	277	88	3.1	74%
Total Personal	591½	1786			
Total all	1830	4097			
% Personal	32%	44%			

* Half no of visits ascribed to "site visits"

ø Half no of exhibitions ascribed to Formal arena

When architects speculated about the future in the first set of interviews, they mentioned Personally organised learning marginally less frequently. It made up 11% of the total. In the more considered second set of interviews, it was also postulated less frequently than it was mentioned as a set of proven methods: 32% in the case of architects. Again, the three professions are close together in their opinions, since engineers intend to use it in 34% of cases, QSs in 30%.

So, while Personally organised resources account for much the greater part of all learning activities, learners intend to use them less in planning future learning projects.

In the next sections of this report, the three subcategories of Personally organised learning will be dealt with in turn.

Figure 7.3

Personally Organised Learning: Second set of interviews with all professions

	PROVEN			POSTULATED		
	Archs (110)	Engs (38)	QSS (12)	Archs (44)	Engs (13)	QSS (4)
Using experience and own skills	55	67	36	34	37	67
Reflecting on experience	50	64	107	43	43	57
Visits to buildings*	21	25	4	27	35	24
Examining plans	30	36	39	40	47	19
Teaching others	13	30	0	19	41	10
Research	52	35	32	45	39	38
Trade literature	60	54	68	21	15	0
Source documents	49	40	28	26	17	0
Information services	31	20	21	33	30	38
Exhibitions ϕ	9	14	0	4	8½	0
Journals and magazines	68	49	125	31	30	48
Total Personal	44%	43%	46%	32%	34%	30%

* Half no of visits ascribed to "site visits"

ϕ Half no of exhibitions ascribed to Formal arena

Figures for each profession have been translated to a figure/1000 of all projects recorded. Total scores for professions were as follows

- Archs proven = 4097 points
- Archs postulated = 1830 points
- Engs proven = 1618 points
- Engs postulated = 536 points
- QSS proven = 280 points
- QSS postulated = 105 points

INNER RESOURCES

Of the two methods of learning that spring from individuals' inner resources, scarcely any mention was made at all in the first set of interviews. In the adult learning projects study, however, they cropped up. And in the pilot seminars that preceded the energy study, they were mentioned in the discussions. They were therefore added to the list generated by the first set.

Using experience and own skills

This heading is used to cover (and uncover) the kinds of activities that are brought to bear when someone sits down to contemplate a problem. In part, the activity consists of analysing the problem: what is it I don't know? Which directions can I take that will help reveal the answer? In other words, it is the preliminary structuring, or ordering, or organising of ignorance together with an isolation of where there are gaps in data or understanding. It is the analysis stage: many problems are the same, only the facts differ. It is also, perhaps more importantly, the process of imagining solutions. In design projects, the process might be thought of as the creative contribution. In learning, there must be a similar contribution made from these kinds of inner resources. Clearly, not all learning can come from external sources or the common pool of understanding could never grow.

Drawing on and creatively using inner resources of experience and skill scored well among methods used by architects, accounting for 5½% of the total and used in 51% of all projects. Engineers used it even more. 6¼% of their total of proven experiences had to do with this activity and this was the highest single score amongst all Personally planned learning. The small sample of QSs used it very much less and this may relate to the nature of the QS's job which is less concerned with devising new solutions, more concerned with responding to other people's designs.

It is a peculiarly powerful method of learning for architects when it is used. Its "strength" (that is to say, the score it got divided by the number of times it was mentioned) is 3.7: the highest rating among all the Personal methods. Its overall rating among architects' methods is ascribable to fewer than average people mentioning it, but those who do mention it rating it very highly.

In Chapter Four, in the section dealing with preferred learning methods for seven topics (Figure 4.10), it was always among the top eight methods used. Overall, it was in sixth place among architects. For the subject area "Services", it got first ranking - partly because engineers used it frequently.

Reflecting on experience

The process of contemplating - of reflecting on experience - emerged as important in the adult learning projects. When tested in the second set of interviews, it was rated in tenth place among architects, used in 56% of all learning projects. Engineers tended to use it slightly more (it was just behind the creative use of experience in their ratings). The small sample of QSs mentioned it very frequently indeed. It account for 10 $\frac{3}{4}$ % of all methods (only reading journals scored higher within this arena).

Among the studies of methods used for seven particular topics, it was always among the top nine preferred. It was the second most used method for learning about "services" and the third most used for learning about "costs". It also was important for learning about "form". Although it was in joint fourth position here, it accounted for 7 $\frac{1}{2}$ % of all methods - well above the mean.

Self-consciously reviewing experience by contemplation has strong links to Non deliberate learning, and will be further explored later.

UNDERTAKING EXPERIENCES

The second subset of learning methods have to do with experiences architects deliberately organised for themselves.

Visits to buildings

There was much comment in the first set of interviews about visits to buildings, visits deliberately undertaken to look at and examine buildings in order to gain an understanding of function, form, details and activities. These are difficult to classify into arenas of learning: are they Personally organised; or are they Formally organised; or are they part of an Office action; or does learning arise Non deliberately in daily experience? Classification must arise according to what can be assumed about the planning of these visits and this is usually difficult to disentangle. However, in the main they appeared to be Personally organised and one quotation will demonstrate the flavour of the comments. A PA on a visit to France had made a trip to a new Breton hospital to see how health care was delivered there,

"It was only the initiative of an individual" he said, "who takes time out of his holiday to go

and visit a common market country."
(Principal Architect).

The value of visiting buildings does not have to be stressed to those who have to learn about architecture at a distance through books and magazines.

"Architects looking for direction in the years after the war toured London with FRS York's book The Modern House in England under their arm; they saw crumbling stucco, rusty windows and warped frames ...".
(John Winter, 1982).

As previously mentioned, the scores given by the second set of interviewees to visits has been divided equally between Personally organised and Non deliberate learning. It is therefore difficult to read the figures with any certainty. When divided it is used in 22% of architects' and engineers' proven experiences: not very significant. (The small sample of QSs mentioned it among proven experiences very seldom indeed). It was slightly above the mean as far as strength is concerned - at 3.2 this is again difficult to make much of.

Examining plans

Many architects will spend considerable amounts of time simply looking at plans, seeing how they work, how the form is generated. It does not really matter where these plans are found - in original documents, books or magazines. It is the examination which is significant and which is seldom paralleled by an explanation. (An exception which demonstrates the rule may be found in the Open University's "History of Architecture and Design 1890-1939").

Examining plans was not mentioned in the first set of interviews; it came up in the pilot seminars. The moderately high rating the medium got (used in 53% of projects) read together with its low strength of 2.0 might be ascribed as being a support activity rather than a prime resource. Scored by usage in projects it is in eighth position, scored by weighted percentage, in 14th.

The small sample of QSs had used the method more than any other group in their past experiences, but planned to use it less. Architects found the method particularly apt for learning about "form" - in sixth place.

Teaching others

One way of learning mentioned in the first set of interviews happens as a result of teaching others. The habit of mind necessary to organise a lecture certainly stimulates thought, though it may tend to gel attitudes. One Region has "good and frequent contact" with a school of architecture, and the Regional Architect and his deputy "frequently lecture there". The CEU has attempted to extend this system by compiling resource lists of NHS staff who are experts on various topics in Regions and circulating them. This arose from an RA saying (outside this interview schedule to a CEU member),

"What we need is a group of chaps travelling around offices giving lectures, etc on suitable topics ... A list of suitable people to contact for these subjects would be useful - we could do the rest."

(Regional Architect).

Teaching others might at first sight be thought to be part of the Formally organised arena. But the prime activity will be organising the material and conceptualising the delivery - and thus part of the Personally organised category.

In the second set of interviews, the method was not mentioned as particularly useful. Engineers tended to have used it more than the others. All professions intended to use it more than they had in the past, but with a strength score of 2.6 it is, apparently, not valued in particular by any of the groups. It was used in 18% of projects.

Research

Research is a title which covers the process of unearthing information (or undertaking new data collection). It is the method that leads directly to the third set of activities classified here as part of Personally organised learning.

Research was sometimes referred to in the first set of interviews, not as an academic activity but as a need for study in depth of issues which affect daily activities. An example:

"A complaint was received from an Area about a building which had had its walls filled with U-foam. The Area thought this was dangerous and done without proper authority. (The Region) greeted the news with delight and are carefully monitoring the performance of the building with an eye to upgrading many of their buildings."

(Assistant Regional Architect).

In the second set of interviews, architects had used this method quite often. It had been used in 51% of their studies and with a high strength rating of 3.5 apparently used to good effect. The other professions had not much used it. Architects use of it in 51% of all their projects puts it among the top ten most used methods. It was particularly liked for studies with "costs" as a theme (second place) and it was in fourth place for studies of "Fabric" and "Legislation".

USING "COOL" DATA

Half of all the mentions of Personally organised learning fell into the category of obtaining information with a view to using it for a personal study.

Trade literature

Some of the sources that have been categorised as part of Personally organised education are closely related to Formal media. What distinguishes the use of Trade literature from Books is that it is in the main simply information. It is the learner's objective in unearthing it and structuring it that gives it meaning - and thus categorises it as Personally organised.

Among the personal methods mentioned, the use of Trade literature was second in frequency. In fact, it was the fourth most used method of all those identified by architects, being used in 67% of all projects.

So Trade literature - manufacturers' data, pamphlets and catalogues - forms a substantial part of the information sources architects turn to in carrying out their jobs. It was, however, infrequently mentioned by the first interview sample, perhaps because it is such an integral part of the activity they go through daily that they did not then recognise the learning that it implies; it may have been subsumed in what they said about incidental learning in connection with office projects.

Trade literature is most commonly held in the form of catalogues, sometimes at the architect's drawing board, sometimes in a central library. The librarian's role here is crucial and might be thought of as an Office action that underlies efficient learning, and this will be mentioned again in Chapter Nine.

"There is a technical library in the middle of the office. The catalogues are quite good, though you can't always find what you want. Often we'll ring (a manufacturer) and get a rep. in."
(Technical Officer).

There are a number of companies which produce rationalised collections of trade literature. RIBA Services produce a set of volumes, RIBA Product Data, which present each product in a standardised way; the Barbour Index Service will update the office library at regular intervals.

Among the other professions there was little difference as to how much Trade literature was used for learning. Compared with architects' 60/1000, engineers scored it 54 and the few QSs 68. All professions intended to use it much less in their postulated projects - architects 21, engineers 15, the four QSs not at all. This dramatic drop is difficult to explain - perhaps in planning they did not think deeply enough about where raw data for their projects would come from.

Source documents

Source documents - Building Regulations, for example - were hardly mentioned in the original set of interviews. Their significance became clear from a project carried out at IoAAS on Fire in Hospitals and the resource was added to the list in consequence. In the second set of interviews, architects used source documents quite often, and certainly more than the other professions. It was used as a contributory resource in many projects, being included in 62% of all the projects architects reported on - the fifth most used resource. But learners did not intend to draw much on this resource in future projects.

There were some negative comments about source documents as a learning resource in the first set of interviews. These may give some insight as to why they are not turned to in postulated projects. It seems from a study of what was said that whichever way information is presented, some subjects need an application event (whether through practical experience or workshops) to fill them out. Legislative Matters seem to need this particularly: Building Regulations and the Building Contract were both mentioned.

"Nobody can learn (the Contract) by reading it. I'm quite convinced of that. Since 1970, I have fluctuated on and off daily experience of it.

Each time I read it eyeball to eyeball with the contractor. That's the way to understand it: sit down and work out claims."

(Assistant Regional Architect).

"Most architects will agree that Building Regs are so complicated that one doubts whether any building was ever built that complied with them all. You can't sit down and read them, learn them, because the event may not arise."

(Principal Architect).

Information services

Another way of obtaining data like Trade literature, and more general information too, is by using some kind of national data bank or information service. Probably the best known of these is Dargan Bullevant's practice which undertakes commissions to improve information flow within particular offices, DHSS commissions and also publishes a source sheet of where more information about various pieces of data can be obtained.

A more specific source of information about building products are the Building Centres located in several of the larger cities of the UK, though there are limitations to their use. They provide a free information service relating (only) to the manufacturers' leaflets that they hold and will supply addresses of other manufacturers. For a fee, architects can subscribe to the "Data Express" service, where the Centre will send leaflets and pass the enquiry to the manufacturers. For a rather larger fee, they will "Find" - institute a world-wide search.

One Region has access to such a service through its computer terminal:

"They have an information service in the main library. You can look through the microfilm and they'll send off to the States, if necessary. You can do a literature search (for example) for information on GRC. It may come back with the information partly (from) BRE or (from) journals in the States, Australia or South Africa. Then they'll send away for it. It uses the Lockheed Data Base. You can home in ... by using key words."

(Senior Architect).

Among the mentions of information services by interviewees, there were three who spoke specifically about a service of this kind to provide information on education. One has been quoted already - data required on what lecturers are available. The others were both in the

same office - from opposite ends of the levels of responsibility. A technical officer said that he had not enough knowledge of what courses are available.

"Following your letter, I 'phoned around to various institutions and the local Poly."
(Technical Officer).

The RA said

"When I got notice of a course ... I send it around. Very, very rarely do I get a response."
(Regional Architect).

But the SA interviewed in this office said

"The information never gets through the net to me."
(Senior Architect).

In the second set of interviews, an addition to the resource was mentioned: The Building Research Establishment (BRE) at Garston, Herts. This is a research section of the Department of the Environment (DoE) with a very good record of investigation into building failures. It also is the main source of tests and British Standards (BSI or BSs) for the UK as a whole.

However, none of the professions scored this resource very high. Architects were most enthusiastic (if that is the word) using it in 37% of all projects. This may be in part due to a failure to understand all that the short title in the checklist covered. Alternatively, it may be that the professions really do draw less on BRE's services than they might. There has been some disappointment expressed in the architectural press which suggests that the three main areas of BRE research on building failures in the past 20 years are still the three most frequent areas of failure today. Engineers and QSs used information services even less than architects. All three professions intend to use it in future at about the rate architects do today.

Exhibitions

Exhibitions were twice mentioned in the original set of interviews. One referred to an office display of schemes. The other to the yearly Building Exhibition once held at Olympia, now at Birmingham's new exhibition centre.

These examples were both "cool" - they did not interpret, were simply displays. As previously mentioned, exhibitions can also interpret

(e.g. the Viking Exhibition in York). In this case, they would be considered Formally organised. Because the interview schedule did not distinguish between these qualities, the scores given have been ascribed equally to Personally and to Formally organised education.

Visits to Building Exhibitions, like visits to manufacturers' works, are a pleasant day out of the office and a way of collecting quantities of trade literature. Many people concerned with data have become concerned about there being too much information available, not too little.

One advantage of exhibitions is that users can see and feel the products they may specify. The DHSS CDB office hold samples of most of the many hundred components included in their data; they report that their clients almost never request to see these and they find it astonishing that architects should select and specify without inspection. Building Exhibitions do allow this.

Office exhibitions are both less specific in their target and more general in their success. They are very wide-ranging. In the visits to offices to conduct these interviews, I saw photographic exhibitions of projects being built by the Regional office, displays of models of schemes, descriptions of trips abroad to see architectural monuments, among others. These appear valuable, not because of the quality of information that is conveyed but because they can help raise staff awareness and promote discussion. A note made at the time:

"The corridor in the architects' section has a pinboard which is used for exhibitions of interesting schemes. These are put up for two weeks, then the space is left blank for two weeks to emphasise the currency of an exhibition. The current exhibition is a thesis scheme for a mentally handicapped unit by a former year-out student in the Region, for which he was awarded a distinction by his architectural school. The ARA showing me this was both proud of the achievement and critical of the scheme which had promoted a fair amount of controversy."

All groups scored exhibitions low in the second set of interviews, the lowest score by each profession for both proven and postulated experiences. It also had by far the lowest effectiveness rating at a strength of 1.4. Plainly, this is not a method whereby architects learn powerfully. However, a low strength score may indicate that the medium plays a contributory rather than a dominant role in learning. Exhibitions had been used in 45% of all projects - well above the mean of 35%.

Journals and magazines

Finally in this section is the use of Journals and magazines. Is this not closely allied to Books - and should it thus not be part of the Formal arena? I would argue not. The articles and product data in the architectural journals do often cover matters of understanding and knowledge, and not just provide raw data. But they are essentially short-run things and it depends on the learner reading them to first of all select what is read and then file the material (either mentally or literally).

There were some negative mentions of journals as a learning resource. One technician, for example, said he

"feels guilty about reading architectural magazines at work, especially when he is under pressure. He also finds the information doesn't stick as well as when it is presented face to face."

(Note on an interview with a technician).

In a sense, keeping up-to-date by reading journals might be thought of as Non deliberate learning, since learners are not in control of the content. Combing them for data to feed their areas of interest is, however, often a deliberate activity. The most popular magazines are "The Architects' Journal", "The Architectural Review" and "Building". All Regions subscribe to these and many get several copies. "Building Design" is sent free to all registered architects and claims to be the most widely read of the professional journals. The "RIBA Journal" is sent free to all members of the RIBA and consequently does not have the same circulation as "Building Design". In the Health Service, three other magazines have wide circulation through the libraries but appear to be less frequently read by architectural staff than their distribution would suggest. They are "Hospital Development", the "Health and Social Services Journal" and "Hospital and Health Service Review". Figure 7.4 shows Regional library holdings of these and other journals, and later in Chapter Nine (dealing with Office action) library policy will be discussed.

Of these journals, "The Architects' Journal" and "Building" are predominantly technical, the "RIBA Journal" and "The Architectural Review" mainly concerned with aesthetics and design, and "Building Design" has a strong line in news stories, but falls rather uneasily and superficially between the technical and aesthetic stools. "The Architects' Journal" and "Building", therefore, have a longer shelf life

than the others as their contents remain relevant for long periods, and in fact "The Architects' Journal" collects its features together from time to time and publishes them as guides. This kind of content is much valued. One was described as

"Useful and enlightening ... It has an awful lot of up-to-date information, reports on schemes and problems."

(Assistant Regional Architect).

A technician mentioned legal matters.

"New amendments to the Regs come as a jolt to people. If you read the journals you can see them coming a long time before."

(Technician).

This kind of information is considered sufficiently important in some Regions for there to be an office policy.

ARA: "The RA and the RWO also send round to staff copies of national magazines. A piece on legal aspects from 'The Builder' is extracted and sent around."

RA: "Magazines are going around anyway, but I'm aware people haven't the ability to go through them all."

(Assistant Regional Architect and Regional Architect).

Most comments made about the journals in the first set of interviews were unspecific, but positive. Only legal matters, technical updating and design aspects were dwelt on at all. In the case of design, there seemed to be an (unsubstantiated) hope that looking at journals would result in improved performance. Two different RAs commented:

"I'd like more people to read the journals, even though it looks like skiving. Their design needs improving."

(Regional Architect).

"Domus is a bible to me. I get my kids to read it. But I have difficulty in getting guys (staff) to look at any magazines. The librarian says I'm the only one who looks at Domus."

(Regional Architect).

One other aspect of journals should be mentioned: in-house magazines. There are several of these, most typified by one thought to be

"a waste of time. It has births, marriages and deaths."

(Student).

One was produced, however, which was very much liked. This had partly to do with its racy style, but it did have an educational function in part:

"It helps in the dissemination of post-course information."

(Student).

In the second set of interviews, the true value of journals was revealed. Overall, it was the second most frequently mentioned resource, being pipped at the post by Books. And if frequency of use is used as a criterion, journals are used in 74% of all projects (Books in 72%). So three projects in four use journals as a resource. Although it had only an average strength score of 3.1, it was almost always high on the list of resources often used in particular topics: first for "form", first for "fabric", second for "general understanding", second for "alternative energy", fourth for "legislation", fourth for "costs". Only in learning about "services" did the medium score less well - tenth rank.

Among the other professions, engineers valued journals less - much less than inner resources. The few QSs, on the other hand, were positively euphoric. They used journals at the rate of 12½% of all media - the next closest method (reflection) scored 10¾%, the third 8½%.

However, one phenomenon difficult to explain is that when speculating about future education, journals were referred to considerably less frequently. They showed a drop of 37 points - the second greatest fall.

OBSERVATIONS

At this stage, it will be worth making some observations on the data in this chapter which are particular to it. In the final chapter, these will be drawn together in overall conclusions.

FOUR ARENAS

1: An arena of Personally organised learning

Chapter Five has shown how important Personally planned learning activities are, reinforcing Tough's findings. This planning is evident in the organising of methods as well. Of Deliberately organised learning methods, two-thirds are Personally managed. And of methods generally, 44% or four-ninths are Personally organised.

So the first point to draw out in a discussion of Personally organised education is the existence of such undertakings. Making this point may seem self-evident. It is surprising, then, to look at the

literature on architects' continuing learning. Most reports pass over Personally organised education with only a doffed hat, many make no reference to it at all. The 1979 RIBA Green Document, for example, discussing Continuing Professional Development in the context of events in which practices can participate illustrates this. The paradox of the Green Document is that it is a model of Personally organised education: the authors have generated a great deal of enthusiasm (which makes the report sparkle) for various events which they have planned - but for others to participate in. The contemporary history of the CPD movement is one in which those enthusiastic for CPD undertake a lot of activity, planning administratively if not academically; and seem to be faced by disinterest on the part of the profession, who imagine they need to merely submit to other people's plans.

A short extract from the Green Document is sufficient to illustrate the point. The first and sixth lines contain the only overt references to Personally organised education in the report.

"The Group considered a list of methods ...

Private and group study
Service on relevant working groups or
committees of a professional body, etc.
Inter firm studies
Staff exchanges
Organised visits
Publishing in journals
In-house lectures, and lectures shared
with other offices
Seminars and workshops
Project appraisals
Courses or study based on learning packages
Master classes, including case histories of
how schemes are designed and constraints
overcome.

The Group had a lively discussion about such methods and considered particularly the attractions of master classes ... They opened up opportunities denied by the conventional methods and involved a kind of personal commitment ... We also lighted upon a delightful variant on our ideas. A member of our Group has been so stimulated by our discussions that his small practice has now booked a room in a local monastery... to discuss practice policies and problems."

(RIBA, 1979, pp11-12).

2: Personally organised activities can relate to structuring raw data as well as drawing on inner resources

Most of the activities classified as Personally organised require

learners to structure material or events themselves. This covers the subcluster of Using cool data (like Trade literature) as well as the subcluster Self-structured events (Visits to buildings). But Personally organised learning also entails drawing on Inner resources - a rather different kind of activity, involving Reflection and creatively using their own abilities. To some extent these two types might have been separated out, but since the resources are all within the domain of the learner they have been grouped together here. The Inner resources subcluster accounts for about 10% of all learning methods - apparently equal in extent to Office actions.

3: Reduction in future usage

However, in the second set of interviews the extent to which this arena is utilised shows a reduction from 44% to 32% among architects, and a similar reduction by the other two professions. This is a drop of one-quarter. There is no evidence in the data about why this should be so. The chief difference lies among the subcluster of methods involving the use of cool data which is used only half as much in postulated projects. This is demonstrated graphically in Figure 4.8. This drop in the use of written materials is comparable to the 35% drop of similar written materials (i.e. Books) in the Formally organised arena. Perhaps reading is a resource used more because there is an absence of other media rather than as a preferred method. The methodology of the study appears to be sound in this area, all professions showing a similar drop and there being nothing atypical about studies of Energy efficiency. Further investigations are required to find out more about this puzzle.

USE OF PERSONALLY ORGANISED LEARNING

4: Great importance of Journals and magazines

One of the two most important methods of learning identified in this research lies within the arena of Personally organised learning. Journals and magazines were used in 74% of all learning projects - three in every four. This resource lies rather uneasily between Personally and Formally organised methods. To a greater rather than lesser extent it does appear to require the learner to make some effort

to co-ordinate the relatively short articles contained and has therefore been grouped here. It is closely related to the use of Books, manuals and guides, and these, too, lie uneasily across the arenas. They tend to present data in a preconceived order, so have been grouped with Formally organised methods. It might be thought that the ascribing of Books and magazines in this way would tend to balance each other out.

One characteristic of Journals, difficult to explain, has been referred to earlier in these observations. In their very thoughtful study of how they would undertake future learning on Energy, all disciplines indicated that they would use them only half as frequently in future as they do at present. This represents a drop in usage of 37 points; the second greatest. Does this imply that learners are dissatisfied with the journal as a method of gaining understanding as opposed to information? Or does it only mean that since the content of journals cannot be predicted, it can not be planned for?

5: Great importance of Trade literature

Trade literature is similar to Journals and magazines in the extent to which it is used in proven and postulated experiences. It is clearly a very important resource indeed at present, being used in two thirds of all projects (67%). Yet it shows a drop of 39 points in future usage (the greatest of any), learners intending to use it only one third as frequently. This drop is easier to speculate about than the drop associated with Journals. In recalling past experiences, learners would have remembered their use of Trade literature; in speculating about future experiences they might not easily foretell the extent to which they would use a resource not ostensibly educational.

6: Importance of Source documents

Source documents are clear examples of "cool data" which need to be interpreted and applied to circumstances by the learner to make them meaningful as learning resources.

They were identified by learners as being important in three out of every five of their projects (62%). Their importance does depend on what is being studied. For example, in studies of "Legislation", Source documents - the Building Regulations in this case - were noted as being

the most important learning resource used. In all other topics analysed, their importance slumped to around tenth place. The average score allocated was 2.7 out of five; rather less than the mean. This, taken together with the rank ordering, implies that they act as support rather than as a prime resource.

In future projects, architects indicated that they would use Source documents much less - they were scored 23 points lower. This may be for similar reasons to the lower use of Trade literature (they are not ostensibly "educational"); or future projects may not have "Legislation" as a subject.

7: Importance of Reflecting on experience

Contemplating experience in order to make sense of it is part of the subcluster of methods termed "drawing on inner resources". Architects used it in 56% of their projects (Qs considerably more). Surprisingly, none of the professions recognises its importance and in future projects all score it less highly. It is scored seven points lower by architects in their postulated projects. In the next chapter, its importance in converting simple experience to learning experience will be commented on.

8: Importance of Examining plans

Plans of buildings are published, or are available, in many places. The journals frequently include them (though not frequently, or clearly, enough), they often form part of exhibitions, and they are available in the office itself. Studying them in order to see how the building functions, how space is manipulated, or how building details are constructed might be thought to be an important learning method, akin to visiting buildings. It is somewhat ambiguous as a method of learning, since it may form part of another resource already covered elsewhere, but it seemed worth including in the list to establish the extent to which architects appreciate it. It is clear from responses that it is an important method, being used in every second learning project (52%). Its strength is rated low, however, at two out of five. Clearly, it is seen as an incidental experience adding to overall learning, rather than a prime activity. In some projects it is used more than others. Studies of "form", for example, put it in sixth

place though it ranks about 15th in other studies. Architects, engineers and QSs use it to much the same extent and the first two intend using it rather more in future; architects rating it ten points higher.

9: Importance of drawing on experience and own skills

This method is intended to cover the process of "inventing" solutions, of creatively using imagination in order to learn; another method of drawing on Inner resources. It, too, was rated as important by architects who said they used it in every second learning project (51%). They intend to use it much less in future (21 points lower), perhaps because they cannot foretell how much they will need it; invention being the son of necessity.

10: Importance of Research

In the first set of interviews, some architects spoke about research they initiated before starting a job, or while it was in progress. This emerged as being generally considered important in the second set of interviews. It appears to be used in every second project (51%) and scores high at 3.5 out of five. All professions value this activity at about the same rate, and its use is more or less constant in both past and future learning projects.

11: Some less important learning resources

Two resources were scored relatively low by architects: Teaching others (used in 18% of projects) and Exhibitions (22%). Although these are not as unvalued as some other resources in other arenas, they are observably much lower than other items in Personally organised learning.

Teaching others as a method of learning might be expected to be relatively infrequently used. In addition to being used in only one project in six, it was also scored at 2.6 on average - below the mean. Engineers were twice as likely to have used it as architects, QSs not at all. All parties showed a little more interest in it as a resource for future learning. What makes the low score noteworthy is the experience common among teachers of how much they learn in teaching others. Recent work among schoolchildren has shown the value to resistant learners of teaching others (Bond, 1982).

Exhibitions also scored low, being used in connection with one project in five and having a strength rate of 1.4 out of five, the lowest effectiveness rating of all the methods listed. (Note that these particular scores are not affected by the methodological error described in the analysis earlier). The noteworthiness of this score lies in the familiarity architects have of exhibitions and in juxtaposition to the high score of the similar resource of Trade literature.

12: Caveats to the importance of learning methods used by architects:
methodological problems

It may be worth entering two caveats to the values architects have placed on some learning methods. One is that some of the learning methods listed subsume others, and thus the importance attached to them does not necessarily mean that the use of Personally organised methods is directly relatable to, say, Formally organised methods. For example, Research may cover the examination of Trade literature to compare products; it may also mean establishing what regulations are to be complied with from Source documents. Adding these together will overestimate the importance of the Personally organised arena at the expense of other arenas if there are not similar overlaps in them. To overcome this methodological problem would require a more sophisticated questionnaire beyond the reach of this first research endeavour.

13: Caveats to the importance of learning methods used by architects:
limitations on experience

Some learning methods little valued by architects are greatly valued by educationalists. One example is the postulated extent to which Journals will be used. As another example, some authorities value the process of contemplation very highly, whereas architects, though scoring it among the top ten methods, indicated that they would use it less in future. De Bono, for example, considers that contemplating the problem and how it may be approached is more important than the process of working through the solution (de Bono, 1982).

So while the importance ascribed by architects to certain methods is of great interest to educators, the obverse is not true. Where architects undervalue certain methods, it may be important to educators to establish why this is so: perhaps because they have little

experience of them; perhaps because they need help in getting access to or utilising them; perhaps because the particular examples they have used in the past were poorly designed and the whole method has been tarred.

INTERCONNECTIONS

14: There are strong links between Personally organised and other learning activities

Mention has been made above of the links between Research, and the use of Trade literature and Source documents. This might be extended to cover Information services and Building visits as well. Similarly, Plans to be examined may be found in Journals and in Exhibitions. Trade exhibitions and Trade literature are different resources, but provide similar kinds of information.

So the categories here listed overlap. This overlap and inter-connection continues across to other arenas as well. Mention has also been made of how important Reflection is in making sense of Non deliberate learning. Journals are closely related to Books in that they have a similar written format, even though the conceptual approaches of the learner is different in either case.

ENRICHING PERSONALLY ORGANISED LEARNING

15: Exploiting the use of Journals and magazines.

The impressive extent to which journals and magazines are used raises the question of whether the learning that thus occurs could be enriched; whether Formally organised events could not draw on them more.

Before considering those matters in further depth, an analysis of journals' content may be appropriate. A typical issue of The Architects' Journal (15th September, 1982) has 134 pages and is analysed in Figure 7.5. The bulk of the magazine consists of trade advertisements. These, together with editorial product data, comprise 83 pages (62% of the gross). Technical articles, for which The AJ is famed (and many of which are later collected into books) make up 13 pages (10% of the gross, or 25% of the net editorial space).

Figure 7.5

Contents of Architects' Journal, 15th September, 1982

		gross	net
Trade literature		83	4
Advertisements	79		
Editorial data	4		
Job advertisements		4	0
Technical articles		13	13
The Contract	1		
Energy	3		
Fire	9		
Descriptive articles		21	21
History	5		
Building studies	12		
Competition results analysis	4		
Current affairs		11	11
Opinion	1		
News, gossip, events	6		
Letters	2		
Book reviews	2		
Sundries		2	2
TOTAL		134	51

Descriptive articles, dealing with a study of a particular building in depth, or an analysis of competition entries comprises 21 pages (15% gross, 40% net). Current affairs - news, opinion, etc - make up 11 pages (8% gross, 22% net). If advertisements are considered part of the essence of the magazine, then, the overwhelming content is Trade literature. If they are not, technical articles and serious building studies account for two-thirds of the content. An analysis of Building would show a similar breakdown, The Architectural Review would be more descriptive and less technical and Building Design more oriented to current affairs.

Could learning from journals be enriched? Plainly, the Trade literature content is part of a "cool data" organising system, and how this can be dealt with will be returned to in the next observation. As far as technical content is concerned - presumably the main area of learning - this might be viewed as the written equivalent of lectures. That is to say, there is no audience participation; the flow of information is unilateral, from the author to reader. Bligh was earlier quoted as finding that lectures are good for learning information, but are unsuitable for stimulating thought or changing attitudes. One way

of enriching read learning would be to link major technical articles (on energy, fire, say) to live events. Education planners could utilise the resources initiated by the journals (authors, exposition of data) in short events. This would capitalise on the efforts that have gone into preparing the articles, amortising them more effectively. It would be an opportunity to use seminars and workshops to give application and discussion experience. And it would bring currently important topics within the range of those who, quote, "learn better in a face to face situation". There would be benefits for the providers, too - more work for education planners, more publicity and sales for journals.

Similarly, Visits to buildings recently analysed might be arranged, together with opportunities for discussion in ways similar to those proposed in the observations to Chapter Six.

15: Further understanding required of how architects learn from written materials

As a separate point, it is clear that very little is known about what parts of a journal architects read, how and when they do this, whether they read articles in one sitting, or when they are current, or if they store the information until it is relevant and read it then. In view of the importance attached to reading, further research should be undertaken with the aims of gaining specific understanding of these matters. Furthermore, the puzzling question of why journals are so little referred to in postulated learning projects needs study and analysis.

16: Learning to learn

The Personally organised arena is the domain of learners themselves, and not only are there opportunities for Formally organised events to be enriched, there are similarly opportunities for learner planned education to be enriched. This possibility was covered extensively in the observations to Chapter Five. Two particular aspects of learning to learn are highlighted in this chapter: learning to reflect; and learning to draw on experience and skills.

The data exposition has shown that while reflection is among the most used methods architects employ, they do not exploit it as much as engineers and QSs do. Nor do they plan to use it extensively in

future projects. Similar comments can be made about the degree to which they draw on their Inner resources of inventing solutions - or approaches to solutions. These can undoubtedly be learned. The contribution Formal education planners can make is not only to deliver hard-edged topic bound events, but more abstract approaches to problem solving itself.

17: Teaching others as a method of learning

The limited extent to which Teaching others has been and will be utilised suggests that this rich learning opportunity can be more exploited. Again, it is a matter of teaching learners approaches rather than content. Two particular opportunities are contacts with undergraduate schools, and in-office events. The two main preliminary steps here are creating formal links with undergraduate schools - made by the office as a corporate initiative perhaps, rather than on the part of individuals - and some thought given to structuring in-office seminars and meetings. The necessary links with Office action are clear.

SOME PROBLEMS WITH THE PERSONALLY ORGANISED ARENA

18: Resistance to learning during office hours

There is one recorded comment by a technician in the interviews that he felt guilty about reading in the office. It is my informal impression that this feeling is quite widespread and it raises the question of how recognized the value of learning at work is.

Some forms of learning are closely related to the job of work itself: incidental learning that takes place as a result of designing a project; research into user needs occurs when planning a building; looking up technical data can happen in the library; office meetings will discuss social and administrative problems; project reviews occur within the office context and during work hours. Other out-of-work learning forms are happily undertaken: sending staff on away or in house courses are the chief of these. Yet other forms seem resisted: unfocussed reading of journals; general reading around a subject.

During the use of the education kit on Fire Safety, a minority of offices expected participants to read through the commentaries in their own time; the implication being that this was an extra-mural

activity. Among those which set aside staff time to work through the written guides, there were comments from participants that they were unable to settle down to working at the kit because of pressure of work or the need to attend to telephone calls or deal with crises.

At one level, this is not unexpected; perhaps it is a manifestation of the non-conformist conscience operating.

At another level, it is surprising. Killeen and Bird (1981) in their study of paid educational leave (PEL) estimated that

"3-4 million people received some sort of PEL in 1976/77. This approximates to 15-20% of the work-force ... and it is estimated to total approximately 26 million days. That is, approximately 6 days per person in-house, and 12 days per person at outside institutions."

(Killeen and Bird, 1981, p102).

Calculations about the amount of education undertaken by architectural staff is rather lower than this. The IoAAS research for ARCUK suggested 5.6 man/days a year. So provided the education is provided in the form of courses, office managers seem willing to encourage staff to participate.

It may be that staff are not encouraged to read during office hours because this is seen as time-wasting, or "skiving". But we know that staff who attend courses often gain no informational benefits from them at all. The previous chapter suggested that one course in four was found "not valuable" by the interviewees. This suggests that reading and study in office hours could include a certain amount of "wasted" time with no loss of benefit to the employer.

Furthermore, there are suggestions from employers and employees that unfocussed learning and refreshment are both valuable inputs into staff competence. Design Matters were the fifth most frequently quoted of the Problem Areas identified by Harris in 1978. This rather broad heading consisted mainly of the unspecific skills and inspiration architects need (specific design skills such as building technology were separately tabulated). In the special study on design in which Harris discusses possible approaches to the problem suggested by consultants and interviewees, the two methods he suggests as being potentially fruitful for dealing with it are holding design seminars and reading journals (Harris, 1978, pp127-129, 148).

It seems that reading the architectural journals, and general reading, are as beneficial to architects as attending courses, though it has (as have courses) some disadvantages to work output. If education has a positive influence on the quality of design work, then one

might expect it to be recognised as a valuable pursuit. It may be that the unfocussed nature of this reading is a reason for offices to frown upon it, nonetheless the nature of one of the problems it attempts to address - design competence - is itself rather unfocussed. Some methods of circulating journals - for example by sending around extracts or contents pages - can help to focus reading, but only general reading can help general problems.

19: Comparative data on Trade literature is difficult to acquire

The use of Trade literature was frequently cited as a major method of learning and there is evidence from other research work among architects that it is a main source of information, and presents some difficulties.

The chief problem encountered is that all trade literature relies on manufacturers for the base data, and some architects feel that this kind of information is biased.

"There are new methods of construction and new materials that could be used. You want information on this from an impartial source though, not a rep."

(Senior Architect).

Mackinder (1980a) has looked at these matters in examining how Building Materials and Components are selected and specified (pp144-151). In a summary of this work (MacKinder, 1980b), she writes

"The standard of technical and product information was ... felt to be generally improving, but a range of faults which still occur were mentioned regularly. Architects were very keen to see more information on comparative performance, or at least to see literature presented in such a way that comparison of products would be easier. There was a universal call for more efficient and widespread testing of products."

Harris (1980) also identifies this problem in discussing learning about materials.

"There seem to be a number of nubs underlying the simple exposition of the problem.

The first is self evident: information is required. There are four characteristics of this information need: people generally seem to use materials they already know about and they look for information to check this knowledge; when they need information on new products it is often because they have been forced to seek it (eg thermal insulation regulations cause them to look for information of thermal blocks); they want information on how to

use materials and not just what they are; the information is often about one material only, and the architect is using it in combination with others and there is a lack of explanation about the interface between them."
(Harris, 1980, p118).

Harris and his consultants thought the best way of getting comparative information was through journals.

"Some journals do provide information comparing manufacturers' products in terms of specification: construction, materials, finishes, etc. Building Design's Productcode series is an excellent example of this: a monumental task of information provision. Unfortunately, prices are not provided in these comparisons - a fundamental failure. It is sometimes argued that prices are dependent on the quantities ordered, or distance, or some such imponderable. It is also argued that information which is meant to last several years becomes invalid as prices change. These defences are both rather weak. Statistical methods in other fields frequently assume standard production runs and certainly use comparative indices instead of figures ("1975 price = 100"). Stockists' catalogues are a useful source of price information if they are read as indicating relative and not real costs. It is apparent that the powerful influence the advertiser exerts upon the publisher restricts the editorial freedom to comment in this comparative way.

Only Which? magazine actually tests one manufacturer's product against another's, although their tests are for the benefit of the home handyman market and they do not test every product available. Nonetheless, their service is a unique one, and a subscription to Handyman Which? ought to be purchased by every library. One of our consultants thought,

6 Testing is a very large issue
requiring governmental action. 9

A better Agreement Board, or following examples set by Sweden, Denmark and West Germany were two suggestions.

The GLC Materials Bulletin, held by most Regional libraries, makes recommendations which are more forthright than many."

(Harris, 1980, p119).

The DHSS in part of the guidance they offer to NHS offices and private practices working on health buildings have produced a series of volumes called Component Data Base (CDB). In these, 11 components are analysed and discussed. Performance specifications are set and products checked for compliance. For each manufacturer's product, catalogues are included which reach the standard required. The CEU has undertaken a series of one-day in-house courses which study selection methods and use the CDB data as a basis for choosing components. A disadvantage is that

prices are not provided in the CDB volumes - though they are in the CEU courses which use CDB.

A 19th observation, then, is that architects and research workers have identified the need for comparative data on manufacturers' products which is not (and probably cannot) be provided by trade literature alone. Some journals, and the DHSS CDB Office, have recognised this and are attempting to address the problem.

20: There is too much information available, rather than too little

However much architects say they use Trade literature, there is another observation that should be made about this source of learning. It is that selection from the literature is difficult simply because there is so much of it. In the CDB workshops mentioned in the exposition, many participants have isolated the problem of choice as being one of "variety reduction".

Harris, in analysing the characteristics of the problem of choosing building components and materials, drew upon a wider range of interviews than recorded in this present study and also consulted information experts. He summarised the problem into three nubs.

"The third (nub) is that the problem is complicated not by too little information, but by too much: how do you select from the vast quantity available? Another aspect of this selection is that the way information is filed is usually subject based, and the way architects require access to it is usually project or problem based."
(Harris, 1978, pp118-9).

Goodey and Matthew (1971), in a study of BRE literature, mentioned some of the ways staff cope with this third problem nub. 81 people in interviews said they were inundated with literature. Most said they were unable to cope. Of those who said they could,

"5 coped because of selectivity, ie throwing away up to 90% of the literature received, 2 coped because they were using a building system which had its own selected literature (eg CLASP) and one conscientious soul coped because he took everything home and read it there."
(Goodey and Matthew, 1971).

So a further observation suggested by the study of how architects learn is that their problem of selection is bedevilled by too much information - and by information too differently presented in Trade literature.

Resolution of the problem seems to rely on two different kinds of learning. On the one hand, manufacturers need to be sensitive to how

architects need to use the literature and this could be supported by critical comparative reportage. RIBA Product Data go part of the way, but the DHSS's CDB is a model for this activity: it set performance standards, conducted or arranged tests of each building component and also persuaded the manufacturers whose products were approved to present them in a common format.

On the other hand, learning needs to take place among users: not about what is available (existing search patterns should take care of that), but how to choose; how to go through an ordered variety reduction process. In the education workshops mounted by CEU to accompany the CDB volumes, this problem is addressed. A case study is a two-hour workshop on ceilings which forms part of the day. The CDB literature is first presented. This has already gone through some variety reduction: it deals only with suspended ceilings, so other types are omitted. The manufacturers' products which have been included have had to reach certain standards, so the variety has been further reduced by performance criteria. Next, participants break into small groups to work on choosing ceilings for a small health building. In doing so, they are offered an outline of a typical design process shown here as Figure 7.6. This outlines steps that the design team takes and variety reduction is shown as a cyclical process. The four considerations are, reaching functional performance criteria (e.g. ease of cleaning in operating theatres), aesthetics, cost and rationalisation (not having too many different manufacturers' products, for example). In carrying out this exercise, participants are given supporting information (ceiling tile samples, costs, etc). Lastly, the teams gather to discuss their schemes and compare their approaches. They also comment on the CDB literature and DHSS tutors process this feedback into the CDB system, amending it where necessary.

So a further observation, suggested by the data in this research, is that learners need access to better selected data and, more importantly, need help in carrying out rational variety reduction activities.

CONTINUING PROFESSIONAL DEVELOPMENT

21: Personally organised education is not amenable to external validation

A continuing theme in the observations to each chapter is the move

Figure 5
Ceilings: Design Sequence Flow Diagram

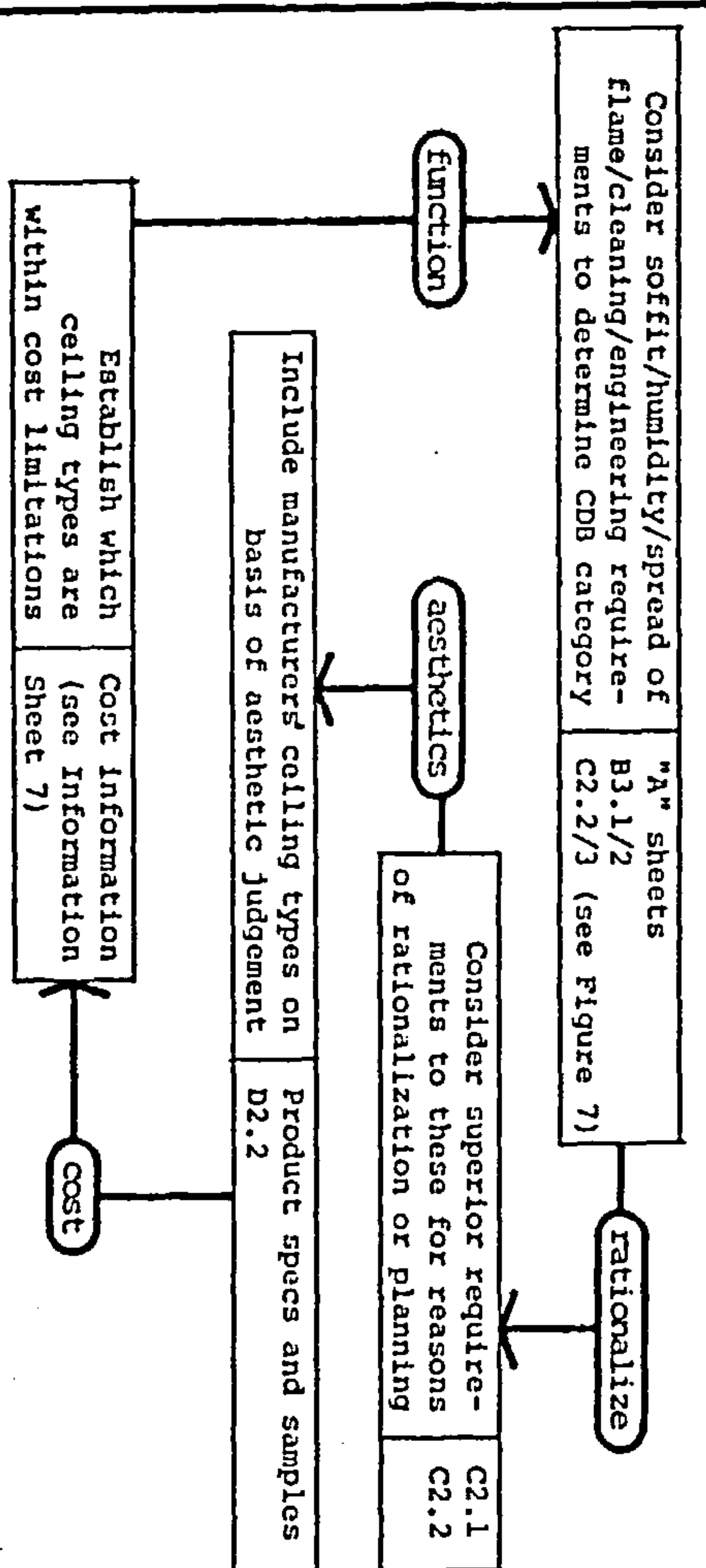
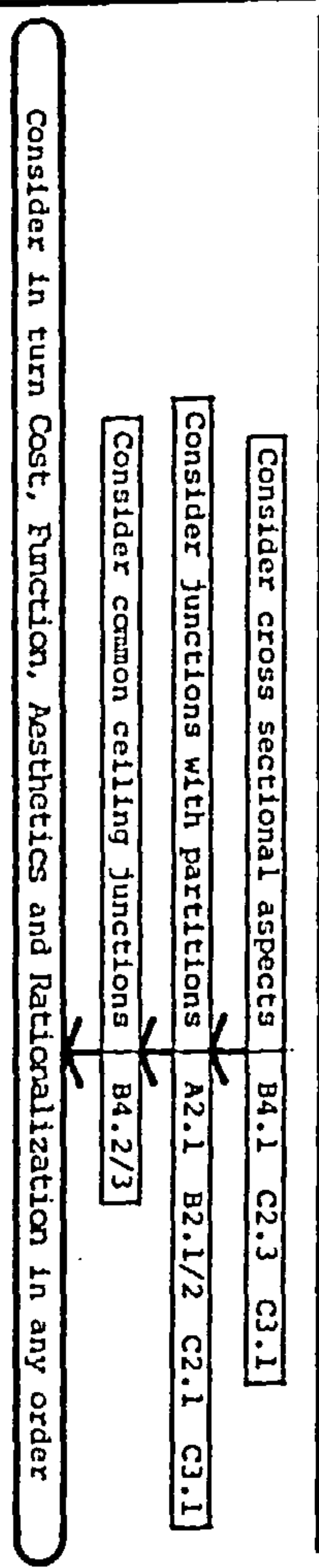
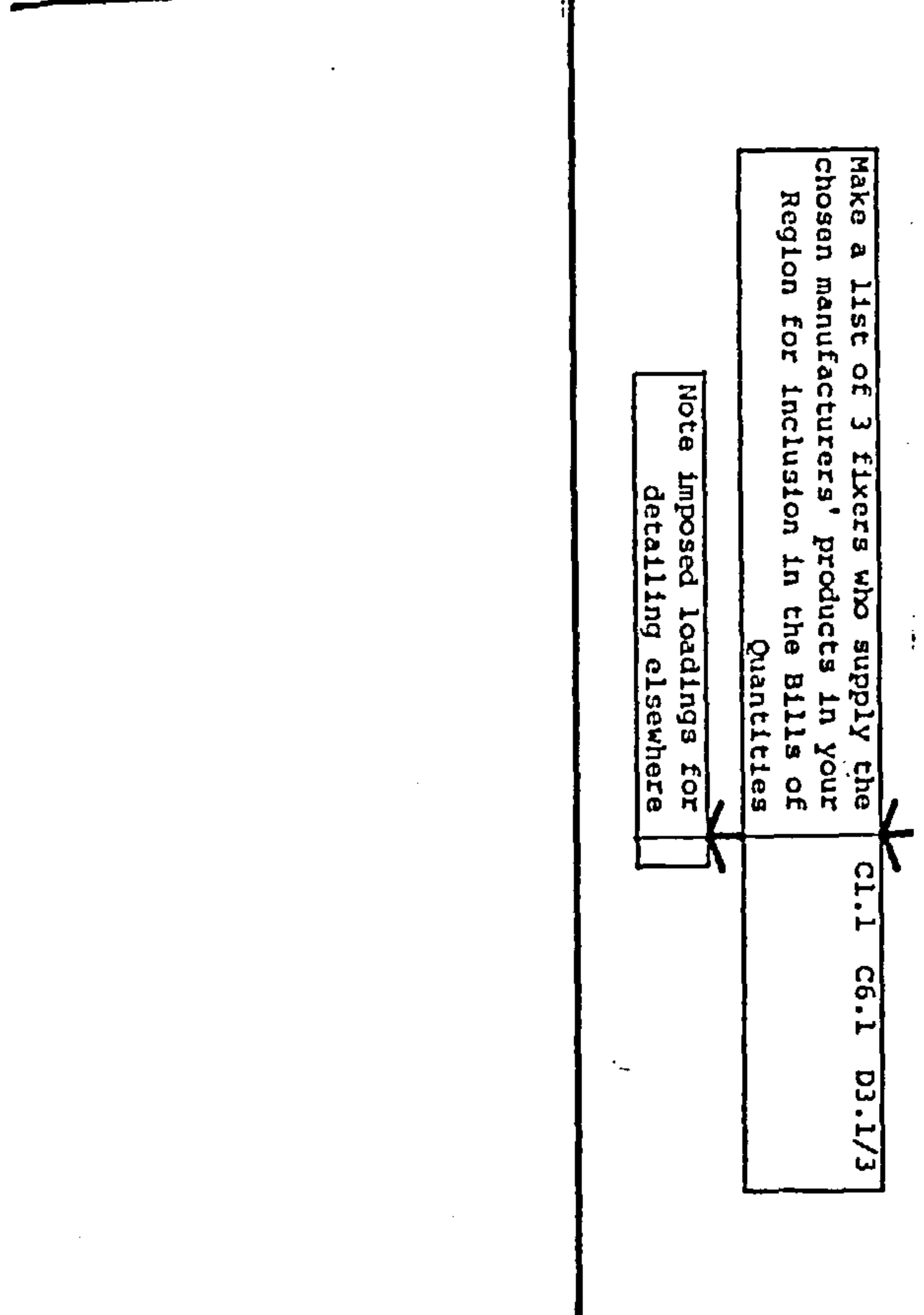


Figure 7.6
CDB Design Sequence:
Variety reduction as a process



CDB Workshop information Sheet 5
Ceilings: suggested design sequence using CDB

This checklist does not include the engineering design and costing activities, but assumes that they are going on in parallel.

Design Team Action

- 1 Cross sectional design aspects: establish ceiling heights, ceiling membrane zone height, and service zone height.

Where to look
B4.1 Dimensional constraints
C2.3 Engineering access
C3.1 Service zone height

- 2 Consider the physical and performance relationships of how ceilings meet partitions and structure. Partitions penetrate through ceilings and the partition can be clad or unclad depending on fire and sound reduction requirements. Check constructional aspects of your design against the vocabulary of ceiling junctions illustrated in B4.2/4.3.

A2.1 Illustration
B2.1 Constituent parts
B2.1/2 Fire and sound characteristics
B4.2/3 Common junctions
C2.1 Partitions
C3.1 Sound absorption

- 3 Consider soffit/humidity/spread of flame/cleaning/engineering access aspects of ceiling performance in each room. CDB categories of ceiling performance deal with these (see also Figure 7 in this booklet). "A" sheets state user requirements.

B3.1/2 Performance characteristics
"A" sheets, C2.2 User requirements
C2.3 Engineering access

- 4 Is it necessary to override the "A" sheet suggested Category for other reasons? Some examples are: where activity space is also circulation space requiring Class "O" spread of flame; or where continuity of ceiling appearance would be preferable; or where a particular category is only for a very small area of ceiling (see chart on C2.2 or the price Index Information Sheet 7).

C2.1 Fire precautions
C2.2 User requirements

- 5 Make aesthetic judgements about which manufacturer's ceiling types in each category to include or exclude.

D2.2/12 Manufacturers offers (Also product specs and samples)

- 6 Establish which ceiling types within each category are within cost limitations. It may be necessary to revise your aesthetic judgements. (Information Sheet 7 provides this information for the workshop exercise).

B3.1/2 Performance characteristics
C2.2 User requirements

- 7 In some cases ceiling types in an alternative category may be cheaper than your first choice, so you could amend your choice appropriately, although there may be certain disadvantages. For example, Category 5 could be replaced by a Category 1 ceiling, if this were cheaper, but engineering access would become limited and you would have to locate specific access points. (The attached price Index sheet shows comparative prices). Of course aesthetic considerations may also affect this decision.

- 8 Make your final list of ceilings systems and three fixers who erect in your Region for inclusion in the Bills of Quantities.
- 9 Make a note of imposed loadings which need to be detailed elsewhere.

C1.1 Preferred arrangements
C6.1 Project documentation
D3.1/3 Ceiling fixers
B2.1 Imposed loadings
C3.1 Wind loading

on the part of professional institutions to encourage CPD. As part of this, there have been suggestions that building professionals should undertake a certain number of hours' education per year. Two simple and related points need to be made here. In view of the importance of Personally organised material, how can the learner make assessments of how long has been spent in these kinds of activities? And how (if that is necessary) can these assessments be externally validated for accuracy and value?

One way is not to consider study time at all, but to examine what has been learned - to test learners. All professional institutes have turned away from this option, worried by opposition from the membership and perhaps by the randomness of exam techniques and from weakening the self-regulating aspects of professionalism.

Two professions have attempted to pass judgements on the time assessment. The American Institute of Architects (AIA) suggests that reading (note: not using any of the other resources such as Reflection) is worth one-tenth as much as sitting in a course (Lecuyer, 1978). The Royal Institution of Chartered Surveyors (RICS) has restricted reading (again, only reading of the resources considered) to "guided reading" of a set list of books (Clark et al, p26).

It is not clear how these Institutions decided on their criteria. What is clear is that Personally organised learning methods, though widely used, are not amenable to external validation in terms of time.

LINKS BETWEEN CONTENT AND METHOD

22: There are some indications of specific links between content and Personally organised education

In the observations to other chapters, it is shown that some topics are particularly mentioned as being learned about using certain methods. There were not useful comments in the first set of data at all. In the second set, the study is restricted to aspects of Energy. Here there was some evidence of appropriateness. The most obvious is Source documents linked very strongly to studies of Legislation. The resource was also moderately scored (third/fourth) in Form, Legislation and Costs studies.

Examining plans was moderately related to studies of Form - and

nothing else strongly at all. Experiencing buildings was the third most strongly-rated method in studies of Form and of Services - in other studies it was relegated to about tenth place. Research was second in rank for studies of Costs, then fourth for Legislation and Fabric - otherwise it was rated in about tenth position. Use of own experience and skills, surprisingly, was the top method in studies of Services; in other studies it was about sixth. Reflecting on experience was again an unusual choice for second rank in Services studies; it was third/fourth for Costs and Form studies but otherwise little used. Journals and magazines were used enthusiastically (first to fourth rank) in every topic - with the exception of Services, where they were in tenth place, seeming to be of little interest to this group for that purpose.

So overall, there do seem to be some indications that some topics draw appropriately on specific methods. Sometimes these links are obvious (Trade literature and Fabric; Source documents and Legislation). In other cases, they are surprising (Reflection and Use of experience in Services studies; low use of Journals in Services studies).

LEARNING BY OTHER DISCIPLINES

23: Architects and engineers use Personally organised learning to much the same extent

Architects and engineers use Personally organised learning for between 43% and 44% of all learning. In postulated projects they all reduce dependence on these methods to between 32% and 34% of all methods.

In detail, there are some differences between them however, though never more than 2%. Architects and engineers were often close to each other in both postulated and proven experiences. The biggest difference was in the minor resource of Teaching others which engineers always valued more highly (about 20 points more in each case). Other differences were Research (engineers 17 points lower in proven, though only six points lower in postulated); and the use of Journals (engineers 19 points lower, but only one point lower in postulated). In the other eight cases the average difference between architects and engineers was eight points and in no case more than 1½%.

So though there are differences between methods used by architects

and engineers, the gaps are small and tend to be closed in postulated learning. The only exception is in the extent to which the minor resource of Teaching others is used.

24: QSs differ from architects in their use of Personally organised methods

Architects and QSs use Personally organised methods to much the same extent in proven experiences (44% to 46%) and postulated ones (32% to 30%). However, there are great differences between them as to which particular resources they draw on within this arena. Leaving aside postulated where there were only four respondents, and turning to the 12 responses from QSs in proven learning, there are two major differences. This small group of QSs used Reflection twice as much as architects - a difference of 57 points (nearly 6%). Another way of looking at this is to look at overall ranking. Architects put Reflection in tenth position; QSs in second. The other difference lies in the use of Journals. Although both professions rated these high (QSs in first rank; architects in second), QSs valued the resources nearly twice as much as architects. There was a difference of 57 points between them. As a third observation of differences, in half of their proven and postulated experiences the two groups were more than 17 points apart.

These differences, based on a small QS sample, can be no more than hints that the two professions utilise different resources. That these are somewhat suspicious is shown, for example, in QSs rating TV/radio in third position compared with the bigger group of 110 architects who put it in 17th! Nonetheless, the hint of difference is there.

SUMMARY

Personally organised education makes a particularly valuable contribution to architects' learning, one that has long been recognised, but long been left unexplored. Although the first set of interviews generated enough comment to define the arena, it has been the second set that has placed it in importance. It seems to account for 44% of learning experiences - four-ninths of the total. Among individual methods clustered together within this arena are eight of the 12 most

used methods.

Very important learning methods in this arena are the use of

- Journals and magazines (used in three out of every four projects)
- Trade literature (used in two out of three projects)
- Source documents (used in 62% of projects).

Other important resources are

- Reflection (56%)
- Examining plans (53%)
- Drawing on own experience and skills (51% of projects, 3.7 average score)
- Research (51% of projects, 3.7 average score).

Personally organised methods interlink strongly, not only between methods in the cluster itself but between other arenas too. Although there are several limitations on their use, there are also great opportunities for expanding and enriching the methods. These rely partly on Formally organised activities and partly on helping learners more effectively exploit the media themselves. There seem to be some topics which rely heavily on these methods and resources, though they are seldom amenable to external validation. And the observations apply equally to architects and engineers, though there is some flimsy evidence to suggest QSs have different preferences.

Chapter Eight

Non Deliberate Learning

"Uncle Arthur (believed that) learning only means misery anyway, and being morbid. Experience is the only real teacher; although in his case She had been an idle and only intermittent instructress, since he had performed the same actions and said the same things almost every day of his life."
(Jeremy Seabrook, The Everlasting Feast, Allen Lane, 1974).

This chapter is about learning which occurs incidentally as a result of carrying out the ordinary activities which form part of an architect's job and life. This third arena of learning is part of the second subdivision made in Chapter Four - that is, Unintentional. The defining question requires the answer "no" to "was there a definite intention of learning before the method was used?".

There are two main subcategories in this section:

- One is learning on the job.
- The other its non-vocational counterpart, learning by living.

Figure 8.1 shows what the first set of interviewees identified as significant learning experience, put together later to form this arena. Figures 8.2 and 8.3 show how the detailed responses in the second set of interviews were broken down.

AMOUNT OF ACTIVITY

In the first set of interviews, activities grouped here as Non deliberate made up 29% of the total. This level was sustained in the second set, accounting for 27%. The three professions were, moreover, very close to each other in rating Non deliberate learning at rather more than one-quarter. By an extraordinary coincidence, the practical experience years in undergraduate education also comprise 28% of that training!

In the first set of interviews, postulations about the future use of Non deliberate learning were hardly made at all, accounting for a mere 5%. It seems likely that learners in that set of interviews had not leaned their minds to a consideration of what comprises learning. This doubt does not apply to the second set of interviews, where a full

discussion and participatory exercise had taken place sensitising them to a wide range of methods of learning. In the second set, learners indicated that they intended to use Non deliberate methods at almost exactly the rate they have in the past - approximately 27% (Qs slightly less). Whether this deliberate use of Non deliberate methods causes them to need reclassification is a question I shall not approach until the concluding chapter!

The methods that cluster under the headings of on-the-job and learning by living will be dissected in this chapter after a reminder of how undergraduate education utilises a similar kind of Non deliberate learning in the formal curriculum.

BACKGROUND

In Chapter Two, architects' undergraduate education was outlined. It was shown there that ARCUK (through the RIBA approval of school curriculae) demands that more than a quarter of student architects' training should take place in real world settings - usually an architect's office, but alternatively in a contractor's firm or on site. It was also shown that earlier this century practical experience in its entirety was a major route to qualification. It was not until 1951 that the formal education model became the major route to practice and it became increasingly predominant until the 1958 Oxford Conference put the seal on schooling, by raising entry qualifications to two "A" levels and eliminating concessions for people who had had prior experience. The RIBA Management Handbook (RIBA, 1980) quotes figures showing how attendance on part-time courses continued to shrink from the early sixties.

"In 1961/62, 26 per cent of new students were entering part time courses ... By 1977/78 this proportion had dwindled to 7.6 per cent ..."
(RIBA, 1980, p33).

These decisions were put into effect in 1961 and at that stage Elizabeth Layton wrote a report for the RIBA, investigating the practical training of architects. She stated the aims of the practical training to be:

- "(i) to complement the teaching in the Schools so as to supply the student with that knowledge and experience which the Schools cannot give.
- (ii) to contribute its share to the guarantee that the young architect on qualification will not fail

Figure 8.1

Details of Non Deliberate Learning

No of mentions of positive "proven" and "postulated" (in italics) experiences

	Practical experience (inc. responsibility)	Discussion with colleagues	Site visits	All
General: Not specified	12(0)	4(0)	0(1)	16(1)
Building Science	2(0)	2(0)	2(1)	6(1)
Legal: Contract	4(0)			4(0)
APM: Project management	2(0)			2(0)
APM: Man management	1(0)			1(0)
APM: Management generally	6(0)	1(1)	1(0)	8(1)
Design	3(1)	1(0)	1(0)	5(1)
Conservation, maintenance	1(0)			1(0)
Personal (inc. refreshment)			1(0)	1(0)
Other	1(0)			1(0)
Total	32(1)	8(1)	5(2)	45(4)

Content not mentioned: New ideas, Planning, External environment, Interior design, Services and structure, Legislation, Interdisciplinary working, Computer applications, Education, Professional.

in his professional responsibilities"
(Layton, 1962, p18).

The RIBA Notes of Guidance state that a student at the end of his period of practical training should be able to show that he is

"fit to take command of any building operation; he should be able to deal effectively, confidently and on equal terms, with all those people connected with building ... He must, therefore, know the rights and duties of each, his own rights and duties as adviser, designer, agent, quasi-arbitrator and arbitrator and also of his obligations to his fellow architects"

(RIBA Notes and Regulations, several years).

Figure 8.2

Non Deliberate Learning: Second set of interviews with architects

		Archs postulated	Archs PROVEN	No of proven mentions	Strength out of 5	used in *% of 119 projects
Working on a design project	111	227	57	4.0	48%	
Site visits*	50	85	26½	3.2	22%	
Asking experts	108	213	67	3.2	56%	
Discussion with colleagues	135	258½	83	3.1	70%	
Experiencing buildings	97	207	62	3.3	52%	
Do-it-yourself	12	114	40	2.9	34%	
Total Non deliberate learning	513	1104½				
Total all	1830	4097				
% Non deliberate learning	28%	27%				

* Visits have been equally divided between building and site visits

Layton thought that the amount they were expected to learn was unfeasible.

"Young architects certainly could not reach this level of competence with two years practical experience, let alone with one" (Layton, 1962, p22).

Among the first set of interviewees, there were a number of students in their year out, or working prior to writing their Part III. Some senior staff - those closest to the students - saw this year as being entirely about learning.

"They're definitely here to learn. If they're not, forget it: it's a dead loss if they're here to work. It's an investment for the future" (Principal Architect).

The intensity of learning experiences amongst year out students seems close to that they will have in later years.

"People don't tell you things a lot. I learn most by seeing other people do things. I'm weak at construction, but I'm picking up details. People

Figure 8.3

Non Deliberate Learning: Second set of interviews with all professions

	PROVEN			POSTULATED		
	Archs (110)	Engs (38)	QSS (12)	Archs (44)	Engs (13)	QSS (4)
Working on a design project	55	67	46	61	54	38
Site visits*	21	25	4	27	35	24
Asking experts	52	56	46	59	52	48
Discussion with colleagues	63	56	75	74	73	105
Experiencing buildings	51	49	54	53	52	19
Do-it-yourself	28	13	29	7	2	0
Total Non deliberate learning	27%	27%	25%	28%	27%	23%

Figures for each profession have been translated to a figure/1000 of all projects recorded. Total scores for professions were as follows

- Archs proven = 4097 points
- Archs postulated = 1830 points
- Engs proven = 1618 points
- Engs postulated = 536 points
- QSS proven = 280 points
- QSS postulated = 105 points

* Visits have been equally divided between building and site visits

tell you you're wrong and you remember. I'd rather have more experience so I could go wrong" (Student).

They find working on some kinds of buildings a greater learning experience than on others.

"My first job was on the enormous Southampton Hospital for three months. I didn't really benefit, I was just a draughtsman." (Student).

"In this year we are supposed to learn a bit about how a job is run and a lot about construction - site visits are very important. A student here last year did the working drawings of a geriatric assessment unit. He followed the

progress and wrote letters. That was a good learning year."
(Student).

Some even find the learning experience sufficiently worthwhile to cause them to question other methods of learning.

"I'm questioning the idea of going back to University next year. I feel I'm learning far more being in an architect's office than in the purely academic world. I think it's more beneficial to have another year out, doing short courses at University ..."
(Student).

But there is another side to the learning experience of having students in the office: the existing staff are exposed to new ideas and new attitudes. An ARA said,

"Having the students in helps to keep us aware, too. It gives you a bit of an edge. It's easy to find yourself reacting, not thinking; assuming it's the same old problem."
(Assistant Regional Architect).

A student mentioned this, too, although he was diffident about how much impact his presence had on attitudes.

"One person can't do that. To change the approach taken here would require action from the top. We have little to do with it. But I have found people are very interested in discussing latest issues with me - Tafuri's work in Venice, Krier's in London"
(Student).

THE INTERVIEWS

Within the general category of learning from experience given by interviewees, many examples were quoted of what was learned, little about how the learning was made manifest. Four particular themes did emerge strongly, however. One was the large, and rather diffuse, number of mentions of practical experience. A second was the related theme of being given responsibility which, said many interviewees, was the key action in their incidental learning experience. A third was learning from colleagues in the office - both by asking them questions and by observing their behaviour. And the fourth was site visits.

In the second set of interviews two of these were directly transferred to the list of possible methods of learning architects were asked to score: discussions with colleagues and site visits. Being given responsibility was not asked about - it seems to operate at the

level of strategy rather than tactics. In this it resembles some of the possible Office actions, and this matter of strategies and tactics will be further explored in Chapter Nine. Practical experience was isolated more clearly in the second set of interviews: "working on a design project" was asked about, since this had emerged more sharply in the adult learning projects research; and "asking experts" was similarly added. These four methods may be grouped together in a subset of methods since they have in common a theme of learning on the job.

A second subset of methods which are Non deliberate is the parallel of learning on the job: learning as a consequence of living. In the preliminary interviews in the energy project, two particular methods were mentioned: the learning that occurs through observation of how buildings operate ("Experiencing buildings") and a method that, it was suggested, might have particular application to energy matters, hobbies - in this case isolated as "do-it-yourself" (DIY).

ON THE JOB LEARNING

Most mentions of practical experience as a way of learning were not very specific in terms of describing the learning experience. They were much more specific about the content of what is learned about. One architect said that architects learn about construction best

"from hard, practical experience. Coming face to face with tradesmen"
(Assistant Regional Architect).

Several again mentioned man and office management. Another topic learned about by several was project management. An ARA described the classic professional experience of moving from technical competence into management - the assumption behind the Peter principle that if you do one thing well, you'll do another thing better.

"I started on the drawing board and acquired increasing technical expertise. I was gradually given bigger jobs to do where at first I required assistance, then was entirely supervising the scheme with a team under me. The next time I was supervising a group of teams. It was a gradual, progressive thing. You wake up one morning and ..."
(Assistant Regional Architect).

Some senior members of the health authority design teams have benefited by gradual learning about managing design teams as the organisation

itself grew.

"My knowledge has been gained purely through experience. When I first joined the Health Service, 17 years ago, it was a make and mend outfit, smallish jobs within a cost limit. It was a small authority. You knew each other, you knew where to go if you needed more money. If you wanted information on a job you went and found out. You met people and you saw the job through. You'd go back to the job so that you were able to know if it was successful; you got feedback. It was a fantastic way to learn."
(Principal Architect).

This method is, of course, not now available to young managers, so other learning methods may have become relevant and necessary. Furthermore, there are alternative methods of managing a project, methods that might not be immediately apparent to a manager learning only by experience; these might be best learned in arenas other than the incidental one, though the liaison necessary between abstract possibilities and practical application in the context of a sometimes rather old-fashioned and rigid system will require Office action as well. Incidental learning by gradually increasing the scale of the work can be contrived by the office, as the first quotation in this section suggests, or by architects running private jobs where they are entirely responsible for all aspects of the work.

An area of learning frequently mentioned by interviewees in which they had learned incidentally was the building contract. Learning about this has been particularly amenable to incidental learning due to a growth in understanding of the individual which paralleled a growth in complexity of the topic. An ARA said that he had learned about the contract

"the hard way. When I first started in the mid fifties, we'd go on site and say 'do this, do that'. We'd get the jobs in on time and juggled with the extras without any variation orders. It got worse in the '60s ... But I learned gradually so that as it got more complicated, I got more experienced."

(Assistant Regional Architect).

In the same office, a student coming up to his Part III said he had seen a small contract through without any difficulties arising. As to having enough knowledge of the contract, he said

"To have that, you'd have to study it full-time! On the job I'm on, I learned about extensions of time when a situation arises or is likely to arise. I learned through experience. On a course

you might not have to apply your knowledge for two years. Then you'd have forgotten it, or the contract would have changed."

(Student).

Not everyone thought this.

"As far as design and contract administration is concerned, well you learn that in the office."

(Technician).

Many people would question whether design is learned in the office. Certainly at the turn of the century this was the common practice, but the growth of the studiowork system in universities has been paralleled by a growth in the belief that students of design need to spread their wings in a situation free from the pressures of commerce and time in order to learn to manipulate space, planning, aesthetics and cost benefits.

Only one architect commented on the assumption that everything learned by experience is naturally right and good. Speaking about the contract, she said

"I learned about it at college. Then I had practical experience.

When I went on a Building Arbitration course it terrified the life out of me.

Because my jobs had always run smoothly, I didn't know what could go wrong!"

(Senior Architect).

A subtheme that emerged within the category of practical experience was that of being given responsibility. This is a particular preliminary state of learning from experience. It is undoubtedly a reference to Office action, and ought strictly to be covered there. It links so strongly, however, to the process of practical experience that it will be explored here. Once again, it is a strategic rather than tactical decision and one that is, moreover, outside the hands of the learner.

Not everyone said that being given responsibility was a necessary preamble, but it is interesting that it should have come up so often.

A student said,

"they're trying to educate us here, they're aware of it. They know I learn by responsibility."

(Student),

and a technician,

"I was given one capital scheme to run when the project architect was moved to another part of the office. I enjoyed that and learned a lot."

(Technician).

Similar kinds of topics emerge as have earlier been outlined.

Technical topics:

"When I started work, I was thrown in at the deep end ... We'd be sent out to survey a house, even if we'd only held the other end of the tape before. It's a very vivid way of learning, a good way."

(Technician).

Office management topics:

"He also allowed me to handle jobs ... He made me visit the site and make decisions, while he would oversee"

(Student).

Being given responsibility is a way of learning, but many architects also see it as being central to their job. In Harris (1978), professional responsibility as a problem area was mentioned 21 times in the interviews.

"We are properly qualified architects, not also rans. We should be able to sign AIs (Architects Instructions to the Contractor) and letters"

(Senior Architect).

Some of the interviewees mentioned that taking on responsibility in settings other than the health authority was beneficial. A senior architect said that most architects and technicians in her authority did private jobs and that this was a useful learning experience. It has to come at the right time in a person's career though. An ARA told me,

"I've just finished building my own house and 20 others with my own hands."

I asked if this was a useful learning experience.

"No."

"'No?'"

"I understand what goes on on a site"

(Assistant Regional Architect).

Working on a design project

Chapter Five has shown how important vocational learning undertakings are to architects. Three out of eight learning projects they complete are dominantly job-related. In assessing how much time is spent on learning, many architects ascribed large numbers of hours in respect of learning in connection with building projects they were working on. In the second set of interviews, therefore, the question

of how important working on a design project is was asked.

The answer was that it is very important indeed. Overall, it was about the fifth most important of all resources listed. Of the particular projects architects provided information on, it kept this kind of position for studies of "Form", "Fabric", "Services" and "General Understanding". It was less used in "Alternative Energy" and "Legislation" studies (tenth/11th positions) and much less in studies of "Costs" (18th). Of 119 learning projects analysed, 48% had working on a design project as a learning method contributing to what was being learned. This is not particularly high. Discussion with colleagues, for example, is used in 70% of all learning projects. However, when it is used, it is well-liked. The average score given out of five in the 57 times it was mentioned was four - very high indeed, the second highest in fact. So the resource seems to be one that is central to learning projects it is used on (because of its strength), not one that has back-up qualities (being used in half the projects).

Site visits

The introduction to this series of paragraphs mentioned learning about the contract by going out on site. Understanding of client needs and user behaviour that will shape the design can also be learned by visits.

"Before we design a department, the client takes us to their building and shows us how it works and what is wrong."

(Principal Architects).

(Visits are also mentioned as Deliberate educational experiences - like visiting the Beaubourg Centre with Richard Rogers, its architect - but these have been recorded separately).

Sometimes the benefits of these visits are specific, for example about construction, as a senior technician commented:

"You learn building construction going out on the site ... What you learn on the site doesn't help you design buildings. But it stops them falling down."

Sometimes the benefits are generalised, closer to spiritual refreshment, as an assistant chief architect described:

"I do a certain amount of moving around the Region, so I don't get as stale as an assistant sitting around grinding out details."

(Assistant Chief Architect).

In the detailed questionnaire about methods of learning, participants were asked to score visits as a learning method. Unfortunately, the questionnaire did not distinguish between site visits (here described as an activity arising from the main job of work and not deliberately educational) and building visits (deliberately educational as in the Beaubourg illustration quoted above). Consequently, the returns made have been divided in two and half allocated to each kind of visit - and consequent upon that, they are not very informative. Engineers tended to have found site visits marginally more educational than architects - and both considerably more educational than the small group of QSs who scored this very low indeed (perhaps because they need to visit the site less often). However, all groups intended to use site visits as a learning resource in future projects - engineers more than the others.

Scores for the percentage of learning projects that used site visits are not affected by the methodological error. They showed up fairly weakly on this criterion at 22%. This is the least effective of all Non deliberate learning methods - though by no means the weakest of all methods. The "strength" rating - that is, the average score it was given - is just above the overall average of 3.2. Again, nothing much can be judged from this.

Asking experts and Discussion with colleagues

The next two methods of learning have much in common and both were much valued in the second set of interviews. In the original interviews, they tended to form a continuum; "discussion with colleagues" (i.e. with peers) is difficult to separate from "asking experts" since almost everyone is expert in some aspect of their jobs. The comments that arose in the first interview are therefore taken together here, before an analysis is made of how the second set of interviewees responded.

Earlier in this discussion, an unexpected aspect of learning from one's colleagues was mentioned: older staff learning from younger. By far the most common, though, is the other way around as younger people learn from their elders.

"Normally if I have a problem I'd go to people before books ... At first I used to listen to people who talked more. Now I'm more taped up. I realise that it's usually the ones who don't

push their advice who can help the most."
(Student).

"You are influenced by those senior to you
... I was influenced at a much earlier stage,
by a group leader at the GLC."
(Assistant Regional Architect).

Learning by modelling oneself on the behaviour of others is the first strand that emerged from the analysis of the interviews. The subject being learned might be thought of as man management.

"John P-, an ARA ... taught me that one architect has this problem of dictating to another and that openness is the best way to handle it, although someone has to make the decision in the end."
(Principal Architect).

In another case, I noted that a senior architect repeatedly mentioned two PAs he had worked for as being models.

"One understood that he could manage people very well, but couldn't design - but once he'd seen the result he could decide. He was a good teacher. He had lots of patience. The other involved me along with him in making decisions."
(Senior Architect).

Another subject frequently mentioned as being learned about incidentally was office management and administration.

"It is very difficult to teach administration at college since it depends on experience of the real world ... All letters and minutes written by junior staff members are read and sent back if they are ambiguous or not good enough."
(Regional Architect).

However, this is not always popular.

"Staff resent having letters checked and signed by their seniors - especially where this causes a delay."
(Principal Architect).

However obvious a badly-phrased letter may be, other learning requirements may be less obvious. Ignorant juniors may be too shy to ask questions - or feel that having been employed to do a job, to ask questions about how to do it might suggest they should not have been appointed in the first place.

"When I came here I was very timid. People don't seem to appreciate that you're totally naive about how things tick. After I'd been here two months, someone mentioned time sheets. I said 'what are they?'

Questions are not verbalised, so when I came

into the project team they didn't realise it and guide me. My ignorance was part of their ignorance. My mask was not to let on that I didn't know things. In retrospect (I realise) I couldn't possibly have known them"

(Student).

Building Types are a more specific subject to be learned about incidentally. There is a suspicion that in the responses to the adult learning projects seminar, some people were thinking of this way of learning, especially when they indicated that their learning projects were taking as much as 1000 hours. This is allowable under the criteria set out in the seminar as long as the learning was Deliberate.

"Now I'm going to start doing a Nucleus Hospital. I don't know anything about Nucleus and I didn't know anything about hospitals, except what one picks up from one's colleagues and the bulletins and the building notes."

(Principal Architect).

Still more specific are questions which arise on technical matters, such as construction. One aspect of this is learning from more distant colleagues - those who are responsible for the building once it is in use.

"We're getting together with the Areas and Districts to make sure defects and design improvements are fed back to us."

(Assistant Regional Architect).

Once again, there is an overlap here with Office action, as an office procedure is introduced which formalises a learning experience.

An ARA suggested that knowledge about building construction is learned by novices in

"various offices, having their drawings supervised and corrected. It builds up slowly. I haven't heard of any courses."

(Assistant Regional Architect).

A technical officer suggested that he was not unique in learning this way:

"A major way of learning is by doing and then being criticised. Clerks of works teach a lot. Their experience over the years gets handed on in discussion on site."

(Technical Officer).

The first set of interviewees were much more likely to mention learning from colleagues among their proven solutions than they were among ways they postulated of learning. An exception was a student who was coming up to his Part III. He thought a good way to learn would be by being attached to an older, more experienced architect who could pass on his

knowledge.

"For example, Bob R- is retiring soon. I've had little dealings with him. When he goes, all of his knowledge goes with him. We should stay with (people like that), go to meetings, do their letters and so on. We'll become equipped managerially in a real-life situation."
(Student).

What this student architect seems to be suggesting is something close to an apprenticeship system. The idea has something to commend it and, if brought about, would move it into the domain of the Office action. A more modern title, perhaps a parallel rather than identical concept, is that of master performer analysis, suggested by Professor Brian Lewis of the Open University. The technique is familiar in craft circles (pottery, for example) and musicianship (even being the formula behind a popular television series).

In the RIBA Green Paper on CPD (RIBA, 1979) this master performer analysis was enthusiastically embraced.

"The Group had a lively discussion about such methods and considered particularly the attraction of master classes at which a distinguished architect would discuss the problems of a particular scheme and draw out the similar experiences of participants."
(RIBA, 1979, p11).

Asking experts

In the second set of interviews, asking experts was frequently mentioned as a valuable learning resource, being used in 56% of projects. Overall, it was in seventh position and showed up particularly strongly in learning about "Alternative Energy" where it was the most frequently-used method, accounting for 8% of all methods.

Engineers were marginally more likely to use this resource than architects, and Qs marginally less likely. In postulated education, architects tended to use it more than the other two professions (but at approximately the same rate as they had done in the past), though again all groups were close together. The method was scored on average at close to the overall average (3.2).

Discussion with colleagues

Discussion with colleagues is one of the most important learning resources of all those identified in the second set of interviews. The

introductory section has included illustrations of what it meant to the first interviewee set.

Overall, the second set of interviewees indicated that it was the third most important learning resource they had identified, accounting for 6½% of all mentions, and used in a massive 70% of all projects. It was particularly frequently mentioned in connection with learning about "Costs" (first place: 8%). It was also very important in learning about "Services" (third), "General Understanding" (third) and "Alternative Energy" (fourth). Though it was in sixth position in studies of "Fabric", it still scored high here at 6% of all methods.

Architects and engineers valued the resource at much the same levels for proven and postulated learning endeavours and their scores are those indicated above. The small numbers of Qs valued it even more than this: a full percentage point higher than architects in learning they had undertaken already, and three points higher in postulations of projects they would undertake in future.

As far as architects' general rating is concerned, the method averaged 3.1 - only just above the mean. But it was very frequently mentioned which accounts for its importance.

LEARNING BY LIVING

In Chapter Five it was shown that of the eight learning projects architects undertake each year, three are directly job related. However, Figure 5.5 shows clearly that not everyone agrees with the majority about what is and what is not job related. Of the 12 people entering learning projects about home building, for example, six considered it indirectly job related. At least as many disagreed. Four considered learning about their home building tasks to be clearly job related; another two considered them not related at all. So the line between vocational and non vocational learning is a broad shallow band rather than a cleft.

In some of the methods so far looked at in other arenas, this continuity is clear. In considering reading, for example, as a resource it is not necessary to attempt to cleave it into vocational/non vocational pieces. However, in thinking about incidental learning that arises non deliberately, there is a great temptation to consider only job orientated experiences. In the pilot seminars to the second set of interviews, it became clear that there are other experiences in

life generally which can be thought of as educational, and which influence the competence of architects. Two that emerged strongly were "experiencing buildings" and hobbies related to home building, "do-it-yourself".

Experiencing buildings

In the research undertaking about adult learning projects reported in Chapter Five, the seminar went on to consider methods of learning. The results obtained referred to a very short list of methods, shown in the proforma questionnaire Figure 5.1. Since that survey was overtaken by the considerably fuller second set of interviews which reached three times as many people, it is not reported here. In the main, the kinds of activities learners were undertaking were aligned with the list that was projected from the first set of interviews. One, however, was not: observing. This was partly related to visits and exhibitions, but also partly related to experiencing buildings in the course of day to day activities. In the pilot seminars for the energy study, this was pointed up by some participants.

"I can't walk through Marks and Spencers without being aware of lighting and heating - the amazing waste."

(Principal Architect).

So the resource "experiencing buildings" was added to the list. Architects indicated that learning from this resource contributed to 52% of all energy-related projects they undertook. This puts it among the ten most utilised methods of learning - though perhaps as a back-up rather than a prime resource (it scored 3.3 out of five on average). As far as links with particular energy topics is concerned, experiencing buildings seems to be particularly important in relation to learning about the "form" and "servicing" of buildings; it was in third place in both.

Architects, engineers and QSs appear to have used it to much the same extent in the past. They all showed it contributing 5% to the total resource list. Architects and engineers propose to continue using it at this rate, but the small number of QSs used it considerably less in postulating their future learning proposals (2%).

Do-it-yourself

Of the specific learning projects architects described in Chapter Five, home building was considered to be mainly indirectly related to the job of work. Of all the indirectly related projects, however, it showed the strongest bias to job relationships. In the preliminary pilot studies to the second set of interviews, DIY matters were mentioned in discussion as contributing to an understanding of energy efficiency. Examples were installing loft insulation, and learning about cost efficiency by considering upgrading insulation of learners' own homes. It was therefore added to the list to test how effective it is as a method of learning.

It proved not to contribute particularly strongly to learning programmes at all, being used in 34% of all projects described and scoring 2.9 out of five on average. These are both almost exactly the means of both scoring methods.

In their past experiences, architects and QSs had used it at about the rate described above. Engineers, surprisingly, had used it far less - only half as much as architects. All three professions were agreed at about using it considerably less than this in future learning projects - it scarcely scored at all. Figure 8.3 shows that it was far the least valued of postulated Non deliberate learning methods.

OBSERVATIONS

From this outline of what architects said of their experiences of learning Non deliberately, there are a number of observations to be made and questions to be asked. As usual, these are set out under headings that will be picked up in the final chapter.

FOUR ARENAS

1: An arena of non-deliberate learning

The first point to make about the material contained in this chapter is to do with the notion of learning non-deliberately. Our literature is choked with references to how people have learned without the learning being their prime concern. In both sets of interviews with architectural staff in this study, this followed

through. Learning while attending to some other demand amounted to about a quarter of the methods architects currently employ.

Moreover, the extent to which this arena is utilised appears to remain constant in postulations architects make about their future learning - again, accounting for about one-quarter of all methods that will be employed. So, while the arena is the domain of no particular group, architects appear content to allow it to continue to make a contribution - a contribution they do not plan in detail, but are content should be there, providing new questions to answer, providing exercise in applying new skills, providing chance involvement in new activities.

2: Vocational learning occurs on and off the job

One of the readily-recognisable general titles that comprise Non deliberate learning is "on the job". In the seminars, discussion often focussed on this research and many helpful suggestions were made about terminology sympathetic to architects (e.g. "learning programmes" not "learning projects"; "energy efficiency" not "energy conservation"). One that was made - and resisted - was that Non deliberate learning is co-terminous with on the job learning. The adult learning projects showed that the line between what is and is not vocational learning is difficult to draw. There were always some people who considered projects described by the majority as "indirectly job related" as being, for them, "directly job related". These projects covered matters like photography, home building, history and so on (Figure 5.5).

Thus it is that a subcluster of activities was formed referring to vocational learning while engaged in everyday pursuits - while living. Although there are only two headings within this subcluster, this almost certainly depends on the topic being studied. Were the topic surveying, for instance, photography would be a very important resource indeed. As it happens, in the study of energy learning one of the headings proved to be an often used resource.

USE OF NON DELIBERATE LEARNING ACTIVITIES

3: Great importance of discussion with colleagues

One of the most important methods of learning to have been

identified in this research lies within the Non deliberate arena. Discussion with colleagues was used in seven out of every ten projects and is among the top three methods used by architects. Adding to this valuation, it continues to be identified in postulations about future learning as being important. Architects showed in planning future education about energy that they would actually employ it more than they do at present. The other two top three methods showed dramatic declines in future usage.

4: Importance of working on design projects as learning

If discussion with colleagues might be described as "very important", working on a design project would be described as "important". It was used as a source of learning in every second project (48%). But adding to this frequency of use is another factor: intensity. The average score for the value of working on a design project was four out of five. This really is extraordinarily strong in the light of the large number of mentions it got (57). It is only bettered in strength by workplace location which average 4.3, but was only mentioned nine times. A third feature of importance in this resource is learners' intention to reutilise it. In their future learning projects, the second set of interviewees said they would use it a little more (six points; the greatest was 32, the least -38). Although this rise might be thought modest, it is sufficient to make the resource the third most postulated.

(Incidentally, QSs differed greatly from architects and engineers in their present and future use of this resource, valuing it considerably less. This may indicate that their job does not throw up the same kinds of learning opportunities as the other two professions?).

5: Importance of asking experts

Another learning resource thought "important" is asking experts about problems or puzzles. It was used in 56% of all learning projects. Like working on a design project, it shows a modest rise of seven points in intended future use. This is sufficient to indicate how much architects value the opportunity: it features as the fourth most used resource in future learning projects.

6: Importance of incidentally experiencing buildings

In the main draft of this chapter, it was explained that experiencing buildings as a method of learning was introduced at a late stage in the pilot seminars. This activity approximates to one of Carter's responses to his question about how architects learn:

"They ... go about with their eyes open ..."
(Carter, 1978).

In the second set of interviews, architects said they found that doing this sort of thing contributed to every second learning project (52%). This is a resource which forms part of vocational education arising not in the workplace, but while living.

INTERCONNECTIONS

7: There are links between Non deliberate learning activities and activities in other arenas

The next set of observations have to do with overlaps and inter-connections between methods of learning.

In the next chapter, a series of office strategies will be described which were mentioned by learners as either avoiding the need for them to learn, or providing opportunities for learning to occur incidentally. The chief one in this latter case is workplace interaction and communication - especially for discussion with colleagues which has been shown here to be a major method of learning.

Also important in learning from experience is being given opportunities to so learn. Many of the respondents in the first set of interviews when talking about Non deliberate learning specifically mentioned the Office action of giving them responsibility to carry out some task as being an important preamble to learning on the job.

The other kind of Office action - focussing on specialists to avoid the need for everyone in the office to become highly expert - also links with Non deliberate learning. It has been shown that asking experts is an important method of learning, and the presence of specialists in the office makes that resource easy to draw on.

In the last chapter, the importance and value of contemplation or reflecting on experience was covered. This process links very strongly with the non deliberately acquired experience that is to be

contemplated. In the next section, observations will be made that demonstrate the importance of this kind of activity.

The importance of reviewing Non deliberate experiences by reflecting on experience is paralleled by an activity which will be described in the next chapter. This is project appraisals (called Formal assessments here). These too draw on the Non deliberate learning that occurs during the design of a project.

ENRICHING NON DELIBERATE LEARNING

8: Educationalists have done little work on exploiting Non deliberate learning

Research workers and architectural educationalists have recognised incidental learning as a valid experience and potentially harnessable learning resource, but little work has been done to exploit it. Hedge, Harris and Carter have all referred to it, but in their papers and articles have spent most space on away and in-house courses and packages.

Even in outside research, there is little written that can lead to a better understanding. Where work has been done - in Revens' projects with managers, for example - the key activity seems to be a raising of levels of consciousness: the introduction of reviews of changes that have occurred in perception of problems or solutions. The York Centre's work on Project Appraisal (1976) covers a similar field. The resources drawn on by participants in carrying out the exercise arose from a consideration of their incidental learning experiences in practice.

Apart from these, the literature merely mentions Non deliberate learning without giving any insights into how and when it occurs.

Self conscious reviews

The next five observations all have to do with one particular form of enriching incidental learning: the self conscious review of experience.

9: Self conscious reviews of experience can make learning manifest

While there is little in the literature that deals with the

process of Non deliberate learning itself, it is clear that self conscious reviews are helpful in articulating and intensifying what has been learned.

Argyris and Schön (in Theory in Practice: Increasing professional effectiveness, 1974) have described a number of case studies where individuals were required to examine their behaviour when coping with difficult problems. These showed that there was a difference between the theory of behaviour which individuals espouse, and the effect of their behaviour in practice. There are numerous examples of this: a simple one is shouting at someone to calm down. They use the term "self actualisation" to mean aligning theory and practice.

Revens (in Developing Effective Managers, 1971) argues that real organisational tasks are the basis of learning, and that significant managerial learning is most likely to occur as the manager grapples with the complexities of bringing about real organisational change. The key activity in the case studies which Revens undertook was that managers from various organisations got together with other managers and reflected upon their activities.

Hedge was the first to suggest that the value of away courses lies as much in the incidental benefits of being away as in the benefit of the course. The discussion of common problems and experiences around the coffee tables and in pubs is also a way of getting the self conscious review of experience that can fix the learning as significant.

Tony Buzan (in Use Your Head, 1974) describes exercises to show that reviewing what has been learned shortly after learning it helps to "fix" it in the memory. So perhaps self conscious reviews can act not only as an educational experience in themselves, making staff conscious of what they have learned, but as reinforcement of the learning as well.

The York Centre in the only piece of action research they carried out in their five-year existence, initiated a method of reviewing building projects. A day seminar was set up at Danbury Management Centre in Chelmsford in which a gathering of practitioners were introduced to techniques of project appraisal, and then tried these out in a workshop. The York Centre published an unusually honest account of the success of the venture and also, usefully, produced some guidelines to help offices work their way through one (York Centre, 1976). Although reviews of design schemes in offices are not unusual,

they are often unuseful. The reasons for this need not concern us here, except to say that if the York Centre agenda and methodology were followed more often, they would be more likely to be successful. There is an overlap here with Office action which will be followed up in Chapter Nine.

There is, thus, a fair amount of research which indicates the importance of self conscious reviews, in making learning which has occurred incidentally significant to the learner.

10: Consciousness of Non deliberate learning can be triggered by the presence of education facilitators

The question of self conscious reviews of experience need not be framed in group activities. Hedge and Harris have both remarked on how their presence as researchers into educational need triggered responses from individuals which caused them to reflect on - and assess - their incidental learning experiences, as well as the content of what they wanted or needed to learn.

Angela Hedge felt that her visits acted as a kind of trigger to her interviewees consciously reviewing their learning needs,

"Many architects are not in the habit of thinking about their learning requirements. The question I posed was obviously one they had not been asked before."

(Hedge, 1975, p9).

This kind of reaction was not uncommon among the NHS interviewees either. In Harris, 1978, the present writer suggested that this was powerful enough to warrant exploiting in the form of a regular trigger.

"A travelling facilitator may be appointed to ... challenge staff to break from set habits of thought ... We have mentioned the effect our presence had in offices."

(Harris, 1978, p105).

This kind of presence may make learners review their learning experience, thereby recognising what they have learned and testing it against their behaviour.

So a further observation relates to the possibility of regular contacts with facilitators being a device for "reminding" or "triggering" the internal review mechanism.

11: Consciousness of what has been learned Non deliberately can occur as a result of habits of review

It may be that an external presence is unnecessary for this to happen if learners are equipped to carry out this procedure as a habit of mind. Perhaps learning to learn includes not only technical devices (such as speed reading), but intermittent attempts to make sense of experience: to ponder the meaning and value of daily learning experiences, and to alter behaviour if necessary.

12: Habits of review can intensify the learning experience

A review frame of mind could help to intensify learning experiences. The better retention of knowledge learned in academic settings quoted by Buzan may have a similar (perhaps not so dramatic) effect if applied to incidental learning.

It might be argued - I would argue - that it is not until incidental experiences are reviewed and the learning made manifest that experience becomes learning. Otherwise, the potential learner is simply being bombarded with sensations and may, like Seabrook's uncle, continue to perform the same actions, say the same things almost every day of his or her life.

In the investigation into content needs which paralleled the investigation reported in this submission, one of the education needs revealed was introducing new staff to the procedures of the Health Service. In a special study in Harris, 1978, the topic was discussed and the two solutions seen, as being potentially fruitful, and worth developing further, were mixed media kits and a formalisation of learning from colleagues - this last very much part of the incidental learning spectrum.

"Could a member of staff be reminded that new entrants have a need for understanding and have his job description written to include this in his duties? This suggestion suffers from the same disadvantage that staff find with informal information from their colleagues at the moment: good intentions break down over time. Nonetheless, it also has the same benefits: social side effects ..."

(Harris, 1978, p146).

"Is there an argument for doing nothing specifically educational to meet the needs which staff articulate? Given they acquire their knowledge in

a patchy way, but for all the attention it received in the interviews we conducted, there is no doubt that staff do eventually get to understand how, for example, the NHS Regional system works. The advantages of continuing as at present are many: social interaction is helped by the need and excuse for conversation and staff get to know each other; junior staff get an answer exactly in response to their query (though not necessarily exactly correct); their learning is keyed to their ability to understand; senior staff get a cosy glow of helping and, maybe, an (essential?) chance to articulate their criticism, to gripe; and it is an ideal vehicle for passing on informal ways of bucking the system that could never be written down!"

(Harris, 1978, p105).

In one of the discussions which followed publication of the 1978 report, an educationalist suggested that the complaints new staff made about not knowing the NHS system was possibly not related to specific difficulties but rather that, as novices, they felt outside the system and in need of contact with their new colleagues. If this is a factor, it is only by ensuring that the education comes in a form which would incidentally meet this covert demand as well as the overt problem that a satisfactory outcome could be ensured: formal courses or tape/slide kits would not meet the unstated need.

13: Reviews can help suggest learning needs as well as help learning

So far in making observations about self conscious reviews, it has been implicit that what is being understood is learning that has occurred. Self conscious reviews can also be helpful for raising questions about what has not been learned. In part, this can be a failure by the learner to observe and adjust behaviour. In another part, it can be a failure in the environment to recognise the learner's need to learn. In other words, reviews can help articulate the questions a learner should be asking - often the most difficult part of any study. The comment of a student quoted earlier is very relevant here:

"Questions are not verbalised, so when I came into the project team they didn't realise it and guide me. My ignorance was part of their ignorance."
(Student).

So a further observation of deliberate reviews is that they can help identify what has been learned by experience, but also what has not been

learned.

SOME PROBLEMS OF NON DELIBERATE LEARNING

14: Learners need to be open to their need to learn

At this point two severe limitations on the pattern of learning from experience became evident. The first that the potential learner may not realise that there is a learning need at all; the second that experience may not expose the learner to the gamut of possible ways of doing things.

"My ignorance was part of their ignorance" said one learner. In this, probably common experience, potential learners avoid potentially stressful situations for a variety of reasons - pride, shyness, ignorance. One way out of this resides in the application of habits of mind as Argyris and Schön and Rogers have all suggested. The obverse of this coin is openness on the part of the organisation - a willing reduction in the external appearance of threat. Once again, there is a linkage to the organisation's action. In this case it involves learning on the part of the organisation itself to be open enough to allow the individual to grow. This is not easy. In the steering group which advised the author on the investigation into the mid career education needs of NHS architectural staff, one of the possible learning needs - design - was strongly resisted since it was argued that this skill, if any, was what the individual had been employed as having. So another observation is that for the data to be accumulated which make incidental learning possible, there needs to be openness on the part of both learner and employer. Schön himself has plotted some of the difficulties this represents in the book of his Reith lectures Beyond the Stable State in which he coined the phrase "dynamic conservatism" to suggest the way that organisations actively resist openness and any new behaviour which could rock their stability.

15: There are limits to the amount and kind of learning that can arise as a result of experience

Perhaps the most important observation residing in the set of interviews, however, is the suggestion about limitations on learning from experience which arises from the notion that incidental experiences

may not include all possible solutions. In other words, that there are two conditions on how much can be learned from experience. One is awareness on the part of the learner to what is happening to him or her; the other is exposure to sufficient experiences which can act as learning vehicles.

The quotation by a senior architect about the contract and "I didn't know what could go wrong" suggests the limitation. In other fields this limitation is more vividly revealed. Training pilots to fly aircraft by simply sitting them behind the controls would be very expensive as a way of learning if it resulted in writing off hardware. Hence, pilot training schools use simulated screens to a large degree: Formal education. Again, learning project management - frequently mentioned by interviewees as being well absorbed from practical experience - will be limited to the traditional way a project is managed within the organisation. In some cases, radical methods may be used, but it is more likely that straightforward methods are employed, with all the limitations of information flow and trades attitudes. In a formal setting, experts who have studied alternative methods can present and argue the case for alternatives to these methods which depend on fast tracking information flow and striking a fresh attitude to the contractor. Ironically, in the project management course run by the NHS Continuing Education Unit, the senior lecturer who presents these kinds of alternatives is not academically qualified, but learned his knowledge from the practical experience of running contracts for many years. So a further observation is that practical experience does not always expose the potential learner to all knowledge and that other forums have a part to play.

16: Learning from experience is very time-consuming

Related to this is a question of intensity of the learning. Practical experience revolves around the time-consuming activity of actually carrying out various methods, and though it may be necessary for a few people to do this in order to make comparisons, the whole advance of Western Civilisation depends on passing knowledge about best methods in a form other than experience. At a simple level, no-one would buy five egg beaters to see which is best if they could buy Which? magazine. At a broader level, few people (other than Steiner, perhaps) think it necessary to chip stone tools before using

metal ones. So another observation is that the time consumption implicit in incidental learning can be shortened by academic learning.

CONTINUING PROFESSIONAL DEVELOPMENT

17: Mandatory CPD could be linked to the undergraduate practical experience years

In the observations to earlier chapters, the point has been repeatedly made that making CPD mandatory suffers from a number of limitations; among them difficulties of recording valuable experience, and the question of whether random attendance at lectures can affect the quality of product and architects' competence.

Elizabeth Layton has made the point that even two years of practical experience can scarcely be a guarantee that the new graduate is "fit to take command of any building operation" or "to deal effectively, confidently and on equal terms, with all those people connected with building". Professor Douglass Wise has made the suggestion that the practical experience years could be reordered and linked to CPD activities in addition to Non deliberate learning. While the i's and t's in this suggestion have not been dotted and crossed (and ought not to be until the profession has debated them), the general drift is that practical experience training might be extended to something like seven years. During this time, the log book currently in use could be adapted to be not only a record of kinds of tasks undertaken, but also a record of self conscious reviews (whether in groups or personal), books read and Formal education embarked on. It might be expected that the log book should be more than a number of pages of ticks - one page abstracts of books, project reviews, report backs on courses attended might also be appended.

This suggestion seems to me to have a number of virtues. First, it gets away from the obsession with recording the number of hours spent in lecture rooms that permeates other mandatory CPD ventures such as the surveyors'. Second, it enriches the practical experience years by introducing self conscious reviews of what is being learned - as has been demonstrated earlier Non deliberate learning benefits from these processes. Thirdly, the habits of mind set in the seven year probation might continue to be exploited throughout the new graduate's career. Fourthly, it addresses some of the limitations of the undergraduate training programme. Fifthly, a weakness with

mandatory CPD as often practised is that it is not assessed, and "booking up 30 hours" of any kind of course whatsoever could be cynically indulged in. Sixthly, it may be politically a good time to introduce such a notion, with falling student roles and the profession, underemployed during the economic recession, keen to demonstrate its seriousness about remaining competent.

Of course, the suggestion has a number of weaknesses too: after seven years the architect is undoubtedly professional and needs to be examined by a jury of peers, not in the present rather condescending "lecturer" interview. There is also a suspicion that logbooks are simply filled in prior to the Part III examination and this could happen in the extended practical experience period (though this is not necessarily a bad thing: an A4 report of a project review, if ably done, is valuable whether made at the time or the night before an interview).

So a further observation is that the material recorded in this set of interviews about how architects learn Non deliberately is sympathetic to the notion of an extended practical experience period linked to CPD as a habit of mind.

LINKS BETWEEN CONTENT AND METHODS

18: Management topics and Building Science were frequently mentioned as being learned Non deliberately

In the observations to Chapter Four, it was noted that different kinds of resources are drawn on when particular topics are learned about. There is some supporting data in these interviews.

Many Management topics were recalled by interviewees as being learned about through practical experience. Nine of the 29 specific examples given about Non deliberate learning were to do with learning management by experience. So working on a design project seems a fruitful way to undertake learning of this kind. It should be noted that short courses were also well-liked; interviewees mentioned seven positive experiences of having learned management techniques that way, though two had experienced courses and not found them helpful. (All the practical experience mentions were positive).

Building Science was also mentioned, though not nearly as frequently as Management. There were a total of six out of 29 topics

mentioned which were to do with construction or materials. They were spread evenly through experience, discussion and site visits. In the Formal arena, Books and courses were also found good methods of learning.

QUALITIES OF MATURE LEARNING

19: Relevance of what is to be learned is paramount

One interviewee mentioned that an advantage of learning about the building contract while working on a design project was that its advantage over a course was "you might not have to apply your knowledge for two years".

So a characteristic here is relevance, mentioned by both Rogers and Hedge.

"Significant learning takes place when the subject matter is perceived by the student as having relevance for his own purpose."
(Rogers, 1969).

"The professions in all the educational settings observed, stressed the necessity for what is learned to be relevant to practice ... When the professions talk about relevance to practice they may also, perhaps unconsciously, be describing not only what they do in the office, but their framework of understanding, the whole body of knowledge on which they draw in their work."
(Hedge, 1975, p10).

Hedge's perception of relevance relating to an organisational framework held by the learner is an interesting one that can affect all four arenas and underlines the importance of education about attitudes. It also reflects on the content of what is learned: many people believe that topics are almost irrelevant - that the key thing to learn is how to learn, becoming prepared and equipped to learn. This can mean understanding some of the Tools For Thought in Waddington's phrase; or simply being open-minded enough to be able to observe conflicts between espoused theory and theories in use in Argyris and Schön's phraseology. Rogers too believes

"The most socially useful learning in the modern world is the learning of the process of learning, a continuing openness to experiences ..."
(Rogers, 1969).

20: Admitting failure is important in learning from experience and this can be painful for professionals

The corollary of being given responsibility is being allowed to fail. This is a great problem, related to the reluctance to admit a learning need since the employee was employed because he knew his job. Admitting failure is a difficult thing to do: learning from an examination of that failure even more so. It is difficult to see how this valuable process can be capitalised upon in attempting to exploit incidental learning since a public expression needs a great deal of confidence in personal values. Argyris and Schön (1974) and Carl Rogers (1969), among others, consider that the process of examining failure is central to the learning process.

"Learning which involves a change in self organisation - in the perception of oneself - is threatening and tends to be resisted ... those learnings which are threatening to the self are more easily perceived and assimilated when external threats are at a minimum"

(Carl Rogers, Freedom to learn, 1969).

Rogers, of course, is best known for his work on T-groups where sensitivity training addresses personal growth. Not surprisingly, in the light of the stresses set up by attempts to examine failure, there was only one overt mention of it in the interviews (though many comments covertly imply self-criticism).

"This office is directed to a particular approach - computers ... It's admirable and correct in its way ... but there are other things missing: the social implications to health that can't be put in a machine ... On the M- hospital we're working on ... we purposely kept away from Joe Bloggs out in the sticks. I'd have liked to have gone out and met the action groups. We didn't because that's not part of the accepted normal system.

I hope that what I've learned over M- will cause me to tackle a similar problem in a different way: 'Will the real client please stand up?'.
(Principal Architect).

OTHER DISCIPLINES' LEARNING

21: Architects, engineers and QSs use Non deliberate learning methods to much the same extent

All three building professions use Non deliberate learning methods

for about a quarter of all methods listed. This applies to their postulated projects as well. Architects, engineers and QSs scored the methods at 27%, 27% and 25% for proven experiences and at 28%, 27% and 23% for learning they postulated.

As far as particular methods are concerned, the professions were within 12 points of each other (just over 1%) in either proven or postulated scores for all methods.

There are some differences between them, however. The biggest differences were in QSs' postulated scores for experiencing buildings (34 points less), discussion with colleagues (31 points more) and working on a design project (23 points less). All these cases were based on only four returns, and in each of them the proven scores were much closer. Among proven experiences QSs rated site visits 17 points less, but narrowed the difference to three points in postulations. Engineers rated proven DIY activities 15 points less, but all disciplines discounted this method in postulated learning, engineers being within five points of architects.

So though there are differences in the use of methods, the most exaggerated come from a tiny QS sample. Engineers and architects are particularly close, differing importantly only on their use of DIY activities, activities neither had found particularly useful.

SUMMARY

Non deliberate learning makes a major contribution to architects' education (and undergraduate courses attempt to model this reality). 27% of weighted learning experiences could be attributed to methods that can be clustered together under this title. The three professions are very close to each other in the usefulness they ascribe to these methods. A very important learning method in particular is

- Discussion with colleagues, which was used in seven out of ten projects.

Other important resources are

- Working on a design project (scored relatively infrequently but highly at four out of five).
- Asking experts (used in 56% of all learning projects recorded).
- Experiencing buildings (52%).

Although learning non deliberately is a valid and important resource, there are limitations on its use which relate to the length

of time it takes and whether it covers all potentially fruitful solutions to problems.

Furthermore, to best benefit from non deliberate learning requires some kind of self conscious review and comparison: this covering both learning itself and what is to be learned. In some cases, this can be an internal assessment, requiring habits of assessment, in others can best take place in seminar groups, triggered sometimes by the presence of facilitators. There is sometimes a need for the environment in which the learning is taking place - the office - to undergo parallel learning experiences. To gain most from the experience requires great openness on the parts of individuals and employers, and it may be that this itself can be learned. At all times, the relevance of what is to be learned is paramount. It appears that some topics are very well suited to being learned incidentally.

The domain of non deliberate learning belongs to no-one in particular. Paradoxically, attempts to make use of it move the experience into other arenas - planned arenas - which belong to the office, to educationalists or to individuals' Deliberate learning undertakings. There is scope to link this to undergraduate training.

Nonetheless, it seems that non deliberate learning is widely recognised (though little explored) as a way of continuing learning and one that could be utilised more in attempts to plan architects' continuing education. While it may be intermittent, it need not be an idle instructress.

Chapter Nine

Office Action

"Downline teaching - management or teaching, call it what you will"
(Interviewee).

In the three previous chapters, repeated mention has been made of the need to co-ordinate office policy with Formally and Personally organised education events. And in some cases, it seems that office procedures could be introduced which would make Non deliberate learning manifest.

But the comments made by learners went wider than that. In clustering, in trying to classify the learning experiences mentioned by the first interview group, there are a substantial number which do not comfortably group with Formal, Personal and Non deliberate learning. They seem to have in common a theme of action on the part of the employing organisation which either forms a necessary preamble to a learning experience, or eliminates the necessity for learning to take place. It has been titled "Office action". The defining question is "did the learning depend on some organisational aspect of the main job of work?"

Among the first set of interviewees, references to organisational action represent one-sixth of all responses (19%). Figure 9.1 shows how comments were distributed.

In the second set of interviews about energy, which attempted to plot the extent of the arenas, Office action did not emerge as strongly. It represented 9% of proven and 14% of postulated solutions. This may be, in part, because the energy topic addressed did not include some potential applications - sidestepping, for example. More importantly, many of the Office actions might be thought of as operating at a strategic level - out of the control of learners and therefore outside the frame of reference. It seems highly likely that Office action as a method of learning is underscored in the energy study.

In the analysis made, there seemed to be three sub-clusters of particular solutions for organisational action. One may be thought of as

- real alternatives to education
- another as a way of focussing education on individuals and
- a third as sidestepping altogether certain kinds of problems that

would otherwise need education.

REAL ALTERNATIVES TO EDUCATION

Workplace location

The problem area most frequently identified by architectural staff in Harris' 1978 survey was "interdisciplinary working". This has to do with the intermeshing of various professionals (architects, engineers, quantity surveyors) in the unusually complex building forms of hospitals and other health buildings. The problem is complicated by the intense involvement of other health professionals in the project team, and by procedures necessary for the Health Service to be seen to be accountable in public. This problem has been recognised for many years, and education programmes have been mounted to deal with it. Some of the interviewees commented favourably on weekend design collaboration exercises they had attended:

"The one York course that has remained with me is the Design Consensus Exercise - and that was ten years ago."
(Chief Architect).

In these exercises, individuals from various disciplines are brought together, formed into teams and spend an intensive three days analysing and designing a project.

But, based on their experience, the solution given most frequently by interviewees for dealing with the problem of interdisciplinary working was by rearranging the workplace layout, so that different disciplines worked at adjacent desks. This Office action was also their favourite postulated solution to the problem area. (This was unusual in the first interviewee set's postulated solutions, for respondents turned most often to Formal education when predicting solutions to problems).

In one example, a technician who claimed to get on well with quantity surveyors quoted his experience of having sat next to a QS in an office, and he found the propinquity helped them sort out problems quickly and, indeed, prevent them arising. A senior architect, talking of engineers, said

"When they're three boards down you become friends and can avoid a lot of unpleasant memo writing about who missed a target date."
(Senior architect).

Figure 9.1

Details of Office Action

No of mentions of positive "proven" and "postulated" (in italics) experiences: First set of interviews

		Office procedures	Checklists	Office expert	Office meetings	Computer meetings	Job rotation & exchange	Job team organisation	Sabbaticals	Sidestepping	All
General: not specified				1(0)		0(1)					1(1)
New ideas			1(0)	1(0)							1(0)
Building science	1(0)		1(0)				1(0)				3(0)
Legal: contract	1(0)	1(0)	1(0)								3(0)
Legal: legislation	1(0)		3(0)								4(0)
APM: man management							3(0)				3(0)
APM: interdisciplinary working								4(5)			4(5)
APM: management generally			1(0)	1(1)	1(0)	0(1)					3(2)
Design		1(0)		3(1)				0(1)	3(0)		7(2)
Education	0(1)										0(1)
Personal (refreshment)						0(1)	0(1)	0(1)			0(3)
Other					0(1)						0(1)
Total	3(1)	2(0)	6(0)	6(2)	1(1)	0(3)	3(0)	5(6)	0(2)	3(0)	29(15)

Content not mentioned: Planning, External environment, Interior design, Services & structure, Project management, Conservation, Maintenance, Computer applications, Professional matters.

Other examples quoted suggested the workplace as being good for working with contractors and with health planners. It was also thought good by one technician for learning technical knowledge, and this

Figure 9.2

Office Action: Second set of interviews with architects

	Archs postulated	Archs PROVEN	No of proven mentions	Strength out of 5	Used in x% of 119 projects
Workplace location	27	39	9	4.3	8%
Sabbaticals	18	0	0	-	0%
Office meetings	29	64	25	2.6	21%
Formal assessments	42	58	20	2.9	17%
Job rotation & exchange	15	9	3	3.0	3%
Giving responsibility	-	-	-	-	-
Specialists	24	72	29	2.5	24%
Office procedures	26	66	27	2.4	23%
Checklists	39	47	21	2.2	18%
Library	-	-	-	-	-
Computer modelling	44	18	8	2.3	7%
Team organisation	-	-	-	-	-
Sidestepping	-	-	-	-	-
<u>Total Office action</u>	<u>264</u>	<u>373</u>			
<u>Total all</u>	<u>1830</u>	<u>4097</u>			
<u>% Office action</u>	<u>14%</u>	<u>9%</u>			

strand overlaps with the Non deliberate learning of technical knowledge by asking colleagues - perhaps asking colleagues from other disciplines in this case.

Propinquity, nearness of place, is not in itself the complete solution. Taylor (1967) has mentioned the influence of furniture arrangement on the effectiveness of lecture rooms. Some environmental psychologists have also demonstrated how social contact in old persons' homes is affected by whether chairs in sitting rooms are arranged facing each other or side by side. So the detailed workspace arrangement can influence the opportunities there are for interdisciplinary working.

At a less readily-testable level, there seem to be some influences on the ambience of the office. The workplace arrangement, and indeed mixing disciplines itself, can be a metaphor for readiness to communicate. As an illustration of this we have, at IoAAS,

Figure 9.3

Office Action: Second set of interviews with all professions

	PROVEN			POSTULATED		
	Archs (110)	Engs (38)	QSS (12)	Archs (44)	Engs (13)	QSS (4)
Workplace location	10	9	0	15	7	0
Sabbaticals	0	3	0	10	0	0
Office meetings	16	15	7	16	37	29
Formal assessments	14	15	0	23	20	0
Job rotation & exchange	2	6	0	8	6	0
Giving responsibility	-	-	-	-	-	-
Specialists	18	12	14	13	17	29
Office procedures	16	7	18	14	24	19
Checklists	11	12	0	21	15	0
Library	-	-	-	-	-	-
Computer modelling	4	19	0	24	28	38
Team organisation	-	-	-	-	-	-
Sidestepping	-	-	-	-	-	-
Total Office action	9%	10%	4%	14%	15%	12%

Figures for each profession have been translated to a figure/1000 of all projects recorded. Total scores for professions were as follows

- Archs proven = 4097 points
- Archs postulated = 1830 points
- Engs proven = 1618 points
- Engs postulated = 536 points
- QSS proven = 280 points
- QSS postulated = 105 points

arranged seating to encourage debate in what we tell course participants is a "House of Commons" shape. Another example is in seminars we have held in which DHSS officers who are explaining guidance notes they have written remain open to comments by the architect users about their content or form. In these instances, we have arranged seating so that there is no seat which is apparently more important than any other.

Surprisingly in the light of the number of comments made in the first set of interviews, workplace location did not emerge as a particularly strong method of learning when architects checked a list of methods in connection with learning about energy - surprising

because workplace location is thought to be good for interdisciplinary contact and this is a prime factor in energy matters. It was used in 8% of all projects - very low indeed. Architects did consider it marginally more important in postulated projects and did consider it marginally more important than engineers did. The small number of Qs never rated it at all.

However, these average figures do conceal a peculiar strength. When an assessment is made of how powerfully the method works (by dividing the total score by the number of mentions), it rates 4.3. In other words, of every three people who had used the medium, one had scored it five, two scored it four. This is far and away the highest ranking given to any method. The next highest average score was 4.0 for "Working on a design project".

So, in summary, a little used method; a little appreciated method; but where used, well-liked.

Sabbaticals

In talking about their problems, it was most usual for office staff to refer to hard-edged difficulties to do with their work, like construction or contract management. There are other equally real problems, however, which are less hard-edged. One principal architect spoke for many others when he talked of the need for courses

"which give you spiritual motivation - no, that's too romantic - let's say a spur to the psyche."

Angela Hedge (1975) has described the less sharply-focussed needs and suggested that courses often meet them incidentally. Another way of meeting this need was by sabbaticals, postulated by one member of staff:

"You need varied visual experience. I've been 15 years on hospitals. It would be ideal for me to have 6 months' sabbatical, to go and look at other people's solutions."

This, the second in the list of office alternatives to education, was also postulated by a junior architect who saw it as a chance to learn about health centres. There was very little experience of sabbaticals in the second set of interviews. The one exception was an engineer who had taken a year out (funded by his office) to read an MA at Reading on energy-related topics. Not surprisingly, he scored his experience "five".

Office meetings

A third activity suggested by staff themselves which may be thought of as an office procedure acting as a real alternative to Formal education is office meetings. These were mentioned very often as having worked in practice. Sometimes their purpose was flow of information, sometimes to discuss grievances, sometimes for appraising projects being designed:

"No-one is obliged to attend. We put up a design by one of us and everyone has a go at it; there are no problems with personal attacks. Then every Christmas we have a general talk about the theory of design."
(Chief Architect).

"These meetings ... are the opportunity to put over new ideas - say in the conservation of energy. Feedback gets its first airing there. We have informal chats about specific problems. It's a sort of self help, informal education."
(Principal Architect).

Meetings of this kind appear to be real-world equivalents of seminars, though they do not appear to be deliberately modelled on the seminar format. The York Centre has argued that with a little self-conscious preparation, the benefits of these kinds of meetings could be intensified. (York Centre, 1976a, 1976b).

The second set of interviews gave credence to the idea of office meetings being a learning resource, but there is nothing remarkable about the scoring. They were used in 21% of all leading projects. In engineers' postulated solutions it scored higher than any other Office action. This may imply that engineers do not have the same number of opportunities as architects to get together: it would be interesting to know more about NHS office procedures here.

Formal assessments

There were no mentions of Formal assessments (like project appraisals) in the original interviews. In Chapter Eight the point was made that learning that has occurred Non deliberately might be captured by a self conscious review. One such review is "reflection", described in the chapter on Personally organised learning (and much valued by learners). Another kind of review depends upon Office action to set it up - a Formal appraisal.

In the second set of interviews, it appeared to be used in a rather non-descript way - about 14% of engineers and architects had used it. Put another way, architects used it in 17% of all projects. In the postulated solutions architects indicated that they would use it more frequently: it was the joint-first choice of postulated Office actions.

Paradoxically, seeing that reviews of this kind were not over enthusiastically scored, the follow-up session in the energy efficiency study was just such a review! Furthermore, in that project appraisal, there were many suggestions that similar appraisals should take place as a regular office routine. In other words, participants in postulating solutions they have not experienced can give pretty random impressions. This point will be explored further in the Observations section at the end of the chapter.

Job rotation and exchange

The idea of job exchanges were, like sabbaticals, always among the postulated solutions, rather than achieved by any of the interviewees in the first sample. A management consultant attached to an office said:

"Architects don't really get experience of construction as a logistic exercise. Perhaps they should be in charge of small jobs at Area rather than at Region: Principal Architects don't see the building process as time and movement."

Job exchanges have occurred in the Health Service, usually for administration convenience rather than engineered as a Deliberate learning experience. In one Region in the sample, the chief engineer was seconded to the Middle East, his place being taken by an area works officer, whose place was taken in turn by an assistant regional architect.

Revans (1971) has described a way in which formalising this administrative procedure can have educational benefits. He argues that real organisational tasks are the basis of learning. Part of the formalising of the learning has to do with getting managers from parallel organisations to attempt to bring about organisational change in their new environment; part to do with them self-consciously reflecting on that activity with other managers. Usually, in this analysis, this kind of learning happens incidentally and has been

classified as Non deliberate learning. Interestingly, learning about management was the kind of topics mentioned most frequently in this regard by the architects in the sample.

In the second set of interviews, job rotation as a learning method scored very low on all counts. It is worth noting that the comments quoted above come from outsiders and top managers. Perhaps learners themselves cannot easily manipulate these kinds of Office actions.

Real alternatives

The terms being used to describe office activities in this sub-cluster - workplace layout, job exchanges - are familiar from another point of view: industrial management techniques. Their purpose in that context is usually to improve output and raise levels of job satisfaction (see, for example, Davis and Taylor, 1972, for a discussion of this). Though there are overlaps between needs expressed as spiritual refreshment in this study and job satisfaction itself, the specific instances mentioned illustrate responses to education needs outside the sphere of those usually thought of as education.

Warren Piper (1978) distinguishes staff training from staff development and suggests that there is a hierarchy of choice:

"that a number of factors may be considered as means of improving performance, training being one of many."

(Warren Piper, 1978).

Amongst others he quotes are work methods, workplace layout, encouragement, pay and incentives and so forth.

Perhaps these and other industrial management techniques like job rotation and job enlargement will prove to be useful tools in this widened range of "educational" response. It is noticeable, for instance, that many interviewees in the first set of interviews, when speaking about on-the-job learning, specifically recalled that "being given responsibility" was a significant Office action that aided their learning. What they said was recorded in Chapter Eight, but might be equally applicable here.

FOCUSSING EDUCATION ON INDIVIDUALS

Specialists

The second series of comments that have been sub-clustered are about focussing education on certain individuals in the office who act as specialists. The average office in this survey had 44 members. Focussing on a specialist leaves the other 43 members in need of broad education only, leading to understanding of the problem area. It also leaves them available to specialise in some other area. A favourite topic for specialisation in the offices interviewed in this survey was legislation: almost all Regions had a member of staff with special responsibility for this. Four had building control officers whose sole job was the application of building legislation and law:

"I don't think everyone should be an expert on building regs. The policy here is that the estate man is up-to-date on the newest regs. If you need help, you go to him."
(Assistant Chief Architect)

Another area of specialisation was the Building Contract and a third was liaison with the firms of private architects to whom the Regions often "subcontract" work. Less formally, there tend to be certain people in the office who are more knowledgeable about certain areas, like construction.

In the second set of interviews, participants were asked to score office experts as a way of learning. Architects marked this resource highest of all in this arena, using it in 24% of all projects. There may be a hint in the lower score they gave in postulated education that they would actually like to know more about the specialism themselves rather than relying on others. They gave specialists a low to medium strength rating too (2.5), indicating that this is a support resource. Overall, then, they were rather unenthusiastic.

Plainly, there is a strong educational theme to these comments which is how do specialists learn? However, the point at issue is, given that specialists exist, they reduce the need for other staff to learn and they can also act as "tutors" when a learning need is relevant to other staff. This is seen at its sharpest in an ordinary business procedure of employing a management consultant:

"The (office) is very orientated towards management efficiency. Management consultants have given in house sessions ... (and) developed a simple checklist to follow through the contract process. People within the office come straight to him with problems."

Office procedures

The "simple checklist" referred to in that quotation is a variation of the specialist system: office procedures and standing orders. Sometimes these are as simple as having the letters junior staff write checked by their seniors; sometimes they are a ban on changes to design once construction has begun (to avoid mistakes and contractor's claims). Sometimes they were office manuals:

"We have a manual - it's called the Good Book - that covers a good many things an architect would need to know about. There's a detailed summary of statutory regulations and approvals, extremely detailed instructions on how to get fire approval ... It refers to obeying Capricode; the methodology of handing over buildings"

(Chief Architect).

And in some offices any variations to the contract have to go through the specialist member of staff earlier mentioned, most often if clauses in the contract that involve extensions of time or extra expense are invoked.

In the second survey, office procedures scored more or less evenly across all disciplines and across proven and postulated projects, architects using it in 23% of all projects. The exception is in engineers' proven experiences, where it scored far less. Again, its strength rating (2.4) indicates a support resource.

Checklists

The use of checklists was separated out in the second set of interviews and did not appear particularly significant. They were used in 18% of all projects. Architects did, however, double their reliance on them in postulated projects.

Library

A theme emerging in Chapters Six and Seven from the outline of what the first set of interviewees said about education relying on written materials is the role of the office library. In Harris (1978), all Regional libraries were contacted and asked which books and magazines from a standard list they had in stock. Figure 7.4 in Chapter Seven shows what they said. It appears that almost all

subscribe to the Architects' Journal, Architectural Review, Building, a number of Health Service journals and the GLC Materials Bulletin. Of the free publications, Building Design and the Brick Bulletin are widely held. Among books, the standard technical guides and books of Standards and Regulations are kept almost universally - and the more design-oriented books are not kept as universally. Clearly, the libraries are technical in their content: the only printed source with design theory as its main characteristic that is easily available is the Architectural Review.

(Many architects have their own subscriptions to journals and their own collection of books: the free journals are widely read on a personal subscription basis, including the RIBA Journal; there were frequent comments that Mitchell's "Building Construction" is kept by individual staff).

When it comes to circulating journals, there seems to be no ideal solution, judging by the wide variety of ways in use in the Regions. Figure 9.4 summarises the methods used. All have advantages and disadvantages. The Region which circulates no journals has the advantage of putting them on display immediately - there is always a pile-up in a circulating system while someone is temporarily too busy to read the journal. On the other hand, this leaves it up to staff to find the time to visit the library shelves and the regional architect in this very Region found shortcomings in the way the library is used:

"I'd like to remove our departmental library from this building and put it together with the Regional library in that building over there - preferably with the architectural section at the back, so that to get to it you have to walk past all the other magazines and book covers. It would be rather like a department store, encouraging you to impulse purchase."
(Regional Architect).

There is also national (and international) library provision. The British Library, and local libraries too, will obtain rare or awkward books and pamphlets (at a price). The King's Fund not only has an excellent stock of journals and books related to medical matters, but helpful and well-informed staff.

Of the other methods, the circulation of selected articles to specific members of staff seems sound. In one Region, these are selected by the architect with responsibility for R+D, in two others by readership panels. Thus the items which are of particular concern

Figure 9.4
Methods of Circulating Journals

No of offices using method*	Method used
15	Journals circulated
(2)	to RA upwards
(1)	AJ to some ARAs upwards
(4)	AJ, Architectural Review, Building to all ARAs upwards
(2)	to PAs upwards
(1)	PAs upward circulated with their choice of 3
(5)	All staff circulated with their choice
3	Contents page circulated
6	Excerpts circulated
1	Put on shelf immediately
17	Put on shelf eventually

*Some offices use more than one method

to certain staff get directly to them, leaving it up to staff to acquire general understanding and information. In Harris (1978) this method was particularly well-liked.

"This last method, although subjective (and the meat chosen by one man perhaps being poison to another) overcomes a huge and worrying difficulty attending the way people learn from journals. We were often told that staff feel guilty about reading the AJ at work; or that they had no time ... (but) the question must be raised of how often technical articles are studied and understood in staff's relaxation time at home. One would hope that the more appealing material - photographic articles on new buildings perhaps - would be, but even this may be delusion. Photocopying material and circulating it seems to have a lot to recommend it if it means staff stop what they're doing and concentrate on the information they've been sent." (Harris, 1978, p70).

The importance of the library in acting as a co-ordinator and acquirer of trade literature has been recorded earlier.

In the second set of interviews, this resource was not asked about: it appeared too vague to anticipate a reasoned response.

Computer modelling

Another form of inanimate specialist used by some offices is the computer. There are two quite different ways a computer can be used in

design offices. One is to use it as a working tool for checking out the implications of strategies and testing a number of hypothetical solutions before the office has committed itself to one. This is a powerful method of design and one used by one of the offices in this survey. However, there is a more prosaic use of computers that cause it to be mentioned in connection with organisational action and architects' learning needs. It can be used as a drawing machine and as a store of information - on costs, for example. This not only relieves the need for staff to learn and remember data; it also means that the refreshment need arising from repetitive tasks becomes less urgent. Once again, there are linkages here to other forms of education for the specialists who operate the machines.

Computers are not much used in offices and the second set of interviewees had little experience. They had actually been used in only 7% of past learning projects. The attraction of computers can be demonstrated by the fact that architects entered their use six times as often in their postulated programmes. The few participating QSs had not used them at all, but again were enthusiastic about their potential. They scored computers at much the highest rating they gave any resource in this arena.

SIDESTEPPING PROBLEMS

The third sub-cluster of comments refer to approaching problems by not allowing them to arise in the first place: by sidestepping them altogether.

Team organisation

Personality conflicts can be avoided by the organisation of the team. Balancing the make-up of design teams (on small jobs commonly one or two architects and a technician; on large jobs a principal architect with several senior architects, technicians and draftsmen) is a way some chief architects have used of sorting out man management problems: an illustration of learning, or of avoiding learning, on the part of team members themselves.

Neither this resource, nor the next one, were asked about in the second set's pro-formas - again, because the title seemed too vague for the relevance to be readily understood.

Sidestepping

One major problem was mentioned by a number of chief architects.

One said:

"I wouldn't like to see us take on jobs worth more than £6m. It's tremendously destructive in morale, spending more than three years on a job. It's very difficult to motivate people on jobs when all they can see is month after month working their way through schedules ... Architecture is very boring once you've gone through the cream - the initial design stage."
(Chief Architect).

Sidestepping the problems of large buildings was quoted a number of times. Other examples from outside this survey are the way some well known offices limit the range of materials they use, and the reuse of standard construction details to avoid the need to learn about and solve new problems.

In a colloquium "Training and Professional Career Development", held at York University in November, 1978, Professor Brian Lewis of the Open University intervened in a long discussion on the difficulty building professionals have in dealing with the increasing demands new legislation makes on their time and competence. He suggested that they should simply refuse to take on any more restrictions. To turn, in fact, from attempting to cope with or from sidestepping the problem, to confrontation. This view was greeted with astonishment and some derision by the practitioners present. However, in his summary of the conference, the chairman, Lord James, said:

"Professor (Lewis) did suggest that faced with new building regulations which expect too much of our knowledge, we should at some point say 'No, enough is enough. We cannot and will not comply'. I think that his argument may have more weight than I was prepared to concede at the time. There may come a point at which the volume of technical knowledge he is supposed to possess may become so great that no architect, certainly no single architect, can be expected to cope."
(IoAAS, 1978).

OBSERVATIONS

In this part of the chapter a number of observations on the preceding data will be made. These are set out under cross-headings that will be collated in Chapter Ten.

FOUR ARENAS

1: There are ways of responding to problems which lie outside the range of educational media: a fourth arena

The first point worth making in reviewing this exposition and commentary is about the existence of a fourth arena of learning. In this connection the methodology of the study is important. It did not set out to inquire about educational methods, but about problem-solving. When approached in this way, a considerable number of the comments made by architects about dealing with problems made reference to activities which, while they may not be considered education, certainly helped solve the problem to be faced and involved learning.

In the second set of interviews, the contribution that the cluster of methods called Office action makes appears to account for about one tenth of all methods (9% by weighted scoring, 10% by number of mentions). This is much lower than the 19% recorded in the first set of interviews. While the first set was not intended to provide an accurate assessment of the amount which arenas contribute, the second set seems rather low. This may be because the strategies which make up some of the learning methods in the fourth arena are outside the concern of learners who have decided to undertake a specific project related to energy efficiency. Certainly, there is some underscoring in the second set as three methods identified by the first set were not asked about at all: Sidestepping problems; Team organisation; and the role of the office library.

So there appear to be some reasons to suppose that the second set of projects interviewees provided information on underestimated the extent to which this cluster of resources has been used. In their postulated education, while they still did not have the three methods listed above before them, they said they intended to use the resources which were listed to a greater extent: 14% of all weighted methods come within the scope of Office action. This is largely because of increased usage of computers.

Many of the methods included under the heading Office action are not overtly "educational". Nonetheless, problems which concern architects do appear to respond to them and they involve learning - albeit learning sometimes on the part of the organisation rather than the individual.

USE OF OFFICE ACTION

2: Importance of Workplace location

None of the activities under Office action could be described as "very important" as defined in other arenas. Workplace location is definable as "important", however. Although it is only mentioned in a tiny percentage of projects - 8% - it was scored 4.3 out of five in these. (Figure 4.6 shows its position graphically). This is by far the highest average score given to any method. It shows a slight rise in the extent to which respondents said they would use it in future. From the first set of interviews, it is clear that Workplace location has resulted in improvements in the problem area addressed: in some cases it was said to have worked as well as Formal educational events had. In some cases evidence has been quoted of its effect on hard-edged problems, but the no-less real but soft-edged problems (of spiritual refreshment, for example) appear to respond as well.

3: Importance of Computer applications

Another resource that is considered "important" in a similar way to Workplace location is Computer applications. This did not score highly in the extent to which it is used at present (in 7% of all projects), but it shows a considerable rise of 20 points in the extent to which learners intend to employ it in future.

4: Some less important resources

Two resources scored very low indeed in architects' experience. Sabbaticals had not been experienced by any of the sample - at least not in connection with energy projects. Nor did it appear to be particularly relevant in future learning about energy, showing a rise of ten points. It was mentioned to a greater extent in the first set of interviews.

Also scoring very low is Job rotation and job exchange as a method of learning about energy. This had been used in 3% of projects (slightly more by engineers) and shows a very modest rise of six points in future use. It was mentioned to a greater extent in the first set of interviews.

5: Caveats to learners' views on importance of learning methods

Plainly, there is great value in establishing which methods architects have employed with success and interest in those methods they show interest in. However, an obvious caveat should be made about their knowledge of relatively unusual methods. If they have had no, or little, experience of some learning method, they can easily over- or underestimate its value. Sabbaticals and Job rotation have been recorded as being of little value in their eyes. This should not eliminate these methods from the resource list, since properly applied they could show great dividends. In the chapter on Formally organised education, it was shown that there is great interest though little experience of the use of education kits. Here, too, learners' expressed interest is not necessarily a guide to value. In the education kit "Fire Safety in Health Buildings", designed by the CEU, it was noticeable in debriefing seminars that participants had been naive about the amount of work entailed. There were hints there that participants were less enthusiastic about using the method after having tried it than they were beforehand. Use of computers might show a similar pattern. I would guess that both kits and computers have a fashionable image, have totemic values, but both entail great amounts of hard work.

Secondly, related to this, the quality of design inevitably affects the impression learners have of media. In other words, there are both well- and badly-designed courses as well as kits; and a poor course can bias learners against the medium.

So some caveats should be entered about the extent to which learners' impressions of the worth of various media should be taken at face value.

INTERCONNECTIONS

6: There are strong links between Office actions and other arenas

Since this is the last of the arenas to be discussed, most interconnections between the Office actions and other learning methods have already been noted. They are mentioned here in summary.

Workplace location is a prerequisite for learning Non deliberately - especially by discussion with colleagues. An Office action such as giving employees responsibility was often mentioned in connection with

learning while working on a design project. An office decision to focus on specialists improves other learners' opportunities to learn by asking experts. The presence of a library enables readers to be in touch with a wider range of journals and books, and to be in touch more readily. The value of librarians (or some other member of staff) circulating contents sheets of journals to encourage reading and personal study has been mentioned in the text. Formal assessments (project appraisals) and office meetings link with seminars: they are the real world equivalent. And project appraisals need to draw on the Non deliberate learning that occurs while working on a design project.

Decisions to focus on specialists - whether human or computers - bring in their train the need for those specialists to learn or be learned about. It will depend on the nature of the specialist which method is employed, but Formally organised methods such as courses and Non deliberate learning such as working on a design project were both mentioned in connection with legislation learning (a specialism) and are offered by companies selling computers.

ENRICHING LEARNING BY OFFICE ACTIONS

7: Office actions could be more exploited

In the observations at the end of other chapters, it has been shown how learning methods - particularly Formally organised ones - can be enriched. Most of the Office actions require not to be enriched, but simply to be exploited. Workplace location as a method of helping interdisciplinary working could be more widely used; sabbaticals are almost unknown in the Health Service works department (in extensive contacts with Regions over the last four years, I have only come across one deliberately educational); job exchanges are viewed with suspicion, but interviewees have pointed out the benefits of swapping Regional and District staff; moving staff from feasibility design to executive design, or from liaison work to either is undertaken as a deliberate policy by only the Wessex Region.

8: Project reviews could be better structured

By contrast, many offices have reviews of projects underway - though by no means all and by no means regularly. The York Centre has

shown that the benefits of these could be intensified by making them more than an occasion when the building designer gets up and "explains his scheme". Devices common in Formally organised education, such as role playing or brain-storming, could be employed on these occasions.

9: Office meetings could employ workshop methods

Office meetings generally have a seminar format and this has been a source of good understanding in Formally organised methods about how well that can work. Office meetings are often more than that though. On occasions, they are the venue for reports-back on courses attended. Where these do happen, they are invariably in the form of a "lecture" or talk by the attender. Could the attender not be encouraged to use some other methods - exercises or workshops for instance - to make the office conscious of the value of a course? To do this, methods of reporting-back would need to be outlined during the course itself.

ROLES IN CONTINUING EDUCATION

10: The role of educators

Who plans education in each of the arenas? Tough (1979) has shown that the main planners of independently organised education are, in the main, learners themselves. Similarly, by definition, Formally organised education is planned by educational experts - usually teachers. Again, by definition, Non deliberate learning goes on without any ostensible planning, though to benefit from it the learner must often be able to recognise it and adapt to it. The fourth arena of organisational action seems to be the domain of the employing organisation: it needs to decide on strategies, it controls the work environment; it is responsible for integrating learning from other arenas into the work environment. Yet here again, it is individual learners themselves who represent the organisation's learning, as Argyris and Schön["] argue (1980). In an exposition of domains in this way, educationalists (perhaps the main readers of this research) are mainly concerned with the Formal education arena: nonetheless, in order to exploit all learning opportunities educators need to explore and negotiate within the other arenas. Educators clearly need to look beyond Formally organised education when presenting learning

opportunities to adults. It will depend on the point of view adopted whether the proportion of comments about Formally organised education made by the NHS sample of architects is considered "only" or "as much as" one-fifth of all their experiences.

11: Before embarking on education, organisational alternatives should be considered

The sequencing of decisions about whether to undertake education - when to bring it on stream - seems to be significant. The interviewees in this sample made frequent reference to specialists and to sidestepping problems. Therefore, in any organisation there seems to be the need for a preliminary assessment of why problems have arisen and whether by reorganising the work environment these could be eliminated. Put another way, education is sometimes resorted to as a curative remedy when preventive measures might be more effective.

12: There is a need for greater integration of education and office practice

What use is there learning about new methods of management if there is no way of grafting these into the office framework? An Office action that has not been raised in the list of resources is the planning by offices of what staff are required by them to know. It is clear from Chapter Six that offices send staff away on courses to learn matters which are of concern to the office - legislation and Building Contract courses are the most-frequently attended. In deciding that staff should attend these, the corollary decision about enabling that which is learned to be applied should be considered too.

13: Should education be focussed on one individual, or spread throughout the staff?

Developing from this, once decisions have been taken to invest in education, the question needs to be addressed of whether this is to be concentrated in one person who becomes a point of authority and further teaching, or whether it is to be generally spread.

LINKS BETWEEN CONTENT AND METHODS

14: Particular kinds of needs may be susceptible to learning as a result of Office action

There may be linkages between education needs and learning experiences which further analysis or separate studies could reveal. Are there, for example, special kinds of needs that are particularly appropriately responded to by Office action? In the commentary on what architects had said about their learning, interdisciplinary working was referred to in this connection, and there may be other examples. Conversely, there may be some kinds of learning that can only take place in Formal education environments, either because they are appropriate to the subject matter or because the risks of trying alternatives are too great. (Pilot training on simulated screens, for example).

LEARNING BY OTHER DISCIPLINES

15: Engineers resemble architects in their use of Office actions, QSS may not

Architects and engineers currently use Office actions at between 9% and 10% of all methods; they intend to use it in future at between 14% and 15%. The small sample of QSS currently use it at 4%, but intend to use it more in future, raising it to 12% of all methods. So overall, QSS differ from architects and engineers at present, but in future seem to come closer to them in the value they ascribe to these methods. However, this generalisation conceals some big differences.

Architects and engineers are within five points (i.e. ½%) of each other in either present or future use in all but one method - office procedures which engineers use much less at present and intend to use much more in future. So a detailed examination confirms the general trend of parallel learning.

The principal difference in the small group of QSS was not so much that the levels recorded were very great (all were within nine points, or less than 1%), but that many methods were not used at all. Of the eight or nine methods architects and engineers used, QSS had used only three in their proven experiences (office meetings, specialists and office procedures). In their postulated experiences

they intended to reuse these three to a greater extent than before and introduced computers which they intend to use considerably more than architects or engineers.

Once again, it must be said that the figures for Qs are absurdly small, but that they contain suggestions of differing methods. Engineers, on the other hand, are close to architects in both the detail and the general use of methods.

SUMMARY

In the first set of interviews, it emerged that architects were learning, or avoiding the need to learn, by some aspects of Office action. In the second set of interviews, it appeared that this kind of arena contributed about one-eleventh of the total. There are, however, strong reasons for believing that this underestimates the contribution made - many of the examples of learning by Office action articulated by the first set were not asked in the second set of interviews because they were not in the control of learners defining their own experiences.

There were no activities or resources that would rank with those described as "very important" in other arenas, but one method was particularly valued and one showed potential for future use:

- o Workplace location (scored at 4.3 out of five on average)
- o Use of computers (a rise of 20 points in intended future use).

In addition to overtly education ways of solving problems, architects also rely on organisational arrangements to help their learning. Sometimes they arrange their practice so that the work context provides learning opportunities. Sometimes they limit the numbers of people that will have to learn by focussing on specialists. Sometimes they sidestep problem areas that will cause them to need to learn.

There are strong interlinkages between the job which throws up the need for learning and the opportunities this provides for learning itself. Indeed, it can be argued that the most apt forms of education rely on some management action to make their relevance felt in the office setting.

Furthermore, many Office actions are a necessary preamble for other kinds of education to become useful. This affects both Non deliberate (learning from colleagues) and Deliberate learning (attending a course on project management).

Although there is great potential for the future use of these

kinds of methods, resources and procedures, it is in the field of planning education that the main direction forward lies. There are lessons here for both educationalists and for office managers.

Some kinds of Office action are particularly suited for learning particular things. These apply to both architects and engineers, who utilise the resources to similar extents, but the data on QSs though inconclusive suggests they have different preferences.

Chapter Ten

Observations

"That's all very well in practice, but what about the theory?"
(Apocryphal course attender).

At the end of each chapter in Parts Two and Three, a set of conclusions and observations on the data has been made. These have explored at length - perhaps too great a length - the material presented in the chapter. In this concluding section, these piecemeal observations will be brought together succinctly. (The figures in brackets here refer back to the chapter and paragraph numbers).

PLANNING CONTINUING EDUCATION

The question the thesis sets out to explore is a simple one: how do architects learn? The main focus of the research is on the methods and resources employed, but a distinction is drawn between planning education and organising resources. The word "planning" is used to cover the overall strategies and approaches, "organising" to deal with tactics and methods in detail.

The Appendix provides a survey of the literature on planning education, drawing on the work of Allen Tough. A series of interviews were carried out to relate this work to architects in the UK, and to seek further understanding of methods employed. A major conclusion is that architects spend considerably more time and energy in continuing learning than previous research in Continuing Professional Development has shown - and that Tough's findings are substantiated.

The research finds that architects undertake an average of eight learning projects each year - much the same as white collar workers internationally (A.2, A.3). Three of these are directly related to work, and a further two are indirectly related - and many architectural subjects are not considered to be job related by most architects (A.4, A.6). The average learning project an architect undertakes lasts more than 100 hours (A.1). Looking specifically at learning projects directly related to work - at CPD - the research finds that the average architect spends about 378 hours each year. This is considerably longer than previously suspected. It is estimated that as much as 140 hours of

this may be comparable with other UK studies suggesting only 37 hours Formally organised learning a year - that is on courses, reading books, etc (A.5). The overwhelming main reason given for vocational learning is because of demands of the job itself - not for other reasons such as certification or as an end in itself (A.8). More than two-thirds of all directly and indirectly job related learning is planned by learners themselves (A.9). Experts alone plan 11% of all learning, but are involved in 35% of all undertakings (A.10).

FOUR ARENAS

What methods and resources do they use in their learning? Chapter Four approached this question without preconceptions. A first set of semi-structured interviews concluded that a wide range of methods is used (4.3).

A taxonomy of classifying these has been presented, dividing methods utilised into those which are deliberately employed to learn and those in which learning occurs unintentionally. The first division has been further subdivided into what is termed the Formally organised arena - methods organised for learners - and into the Personally organised area - organised by learners. Unintentional learning is also subdivided into Non deliberate learning - happening as a result of experience both on and off the job - and Office action - the activities of the employing organisation. It is concluded that this is a convenient classification, being dynamic and isolating who is responsible for action in each case - whose domain each is (4.1).

It is noted that this is not the only method that might be employed and two alternatives are discussed. Learning methods are not genetically related, so there can be no "correct" taxonomy. The purpose of classification is, first, to make a mass of data easier to set out, second to bring each into focus so that both educators and learners can better understand them, and, third, to recognise the characteristics of methods in order to use, blend and amend them. This last is the most important: the purpose of analysis is synthesis (4.2, 4.7, 4.8).

Chapter Five shows how the list of methods and resources generated was expanded and evaluated (5.1). Subject to the limitations of sample size and the bias introduced by the selection of Energy matters as a vehicle, it is found that Formally organised education accounts for 20% of all methods; Personally organised for 44%, Non deliberate learning for 27%; and Office action for 9% (5.2 and Figure 5.14, 6.1, 7.1, 8.1, 9.1).

That Formally organised education comprises only one-fifth of all methods architects use to learn by is considered significant, but probably accurate, since the sample of engineers and the rough order of use in the first set of interviews bear this out (6.2). (It might be added that live Formally organised events - lectures, courses, etc - comprise only 8% of all methods).

The research finds that Personally organised learning is the major set of methods architects use to learn, and it is surprising that the literature on architects' continuing education concentrates on courses (7.1). It is suggested that the activities classified in the Personally organised arena comprise both the self-structuring of raw data - 34% - and drawing on inner resources - about 10% of all methods (7.2). This is related to the finding that of Deliberately planned education, 71% is the responsibility of learners themselves (5.9).

In the first set of interviews, learners mentioned that learning from experience was a very frequent occurrence. This rather vague title was expanded on in the second set of interviews and the arena of Non deliberate learning evaluated, and it is found that this accounts for one-quarter of all fruitful learning (8.1). It is suggested that vocational learning occurs both on and off the job (8.2). Indeed, a third set of interviews found that learners are very divided about what is, and what is not, job related (5.6).

A major finding of the research is that the first set of interviewees made reference to a number of ways of dealing with problems which, while not ostensibly "educational", certainly helped solve the problem and involved learning. This cluster is termed Office action and comprises at least 9% of all methods. It is observed that the research focusses on individual learning and that many of these methods operate at a strategic level - avoiding problems - and thus the arena may be more important than here shown (9.1).

So far, this resume has been about the past experiences of learners - proven learning experiences. The second set of interviewees were taken through an elaborate pre-sensitisation to and familiarisation with these methods, and they then made considered postulations about future learning. The research finds that significant differences then occur. Formally organised education expands by a quarter to comprise 25% of all methods used (6.3). (It should be added that this is largely due to the increased use of live events, moving from 8% of all methods to 14%). Personally organised learning drops by more than a quarter, the total contribution being 32%. This is due to decreased reliance on cool data (7.3). Non deliberate learning remains constant, but it is found that Office action is increasingly relied on, increasing its

original contribution by more than half, to 14% (8.1, 9.1). Why? Because they've learned as much as they can by Personally organised means? Or because their view of learning still tends to preconceptions about provider centred events?

USE OF LEARNING METHODS

Within each arena, some methods have been more frequently used than others, some are intended to be used more than others, some are significant for other reasons.

Methods used in combination

But a significant finding in the research is that methods are scarcely ever used in isolation. In the second set of interviews, there was an average of 12 methods (out of 33) used in each project, in the third set, 96% of the projects used multiple methods and sources (5.3, A.11).

Commonly used methods

Some methods and resources of learning are more commonly used than others. The most frequently mentioned were Books/Manuals/Guides and Journals/Magazines, both used in nearly three out of four projects (6.4, 7.4). Trade literature forms part of two out of every three projects (7.5) and Source documents come in to 62% of projects (7.6). So written materials are clearly a very important resource indeed. The only other method of learning mentioned with the frequency of written materials was Discussion with colleagues, which is used in seven out of 10 projects (8.3).

There were six further methods that also scored well, though not as frequently as the five already mentioned. They were Reflecting on experience (7.7), Drawing on own experience and skills (7.9), Personal research (7.10), Asking experts (8.5), Examining plans (7.8) and Experiencing buildings (8.6). All were used in between 51% and 56% of all projects. These, together with Working on a design project (8.4), comprise the 12 most used methods.

(It should be noted that there are alternative methods of assessing the importance of resources which give slightly different results from these. The list above takes no account of the weighted score. Were this done, the list would remain much the same, but positions change. Figure 10.1 provides details).

Highly valued methods

One method that was very infrequently mentioned was consistently

Figure 10.1

Most Frequently Used Methods and Resources

Method/Resource	Use in % of projects		Weighted Score	
	Rank	% of projects	Rank*	% of total
Journals/Magazines	1	74%	2	6.8%
Books/Manuals/Guides	2	72%	1	7.0%
Discussion with colleagues	3	70%	3	6.3%
Trade literature	4	67%	4	6.0%
Source documents	5	62%	11	4.9%
Reflecting on experience	6	56%	10	5.0%
Asking experts	6	56%	7	5.2%
Examining plans	8	53%	14	3.0%
Experiencing buildings	9	52%	8	5.1%
Using experience and own skills	10	51%	5	5.5%
Research	10	51%	8	5.1%
Working on a design project	12	48%	5	5.5%

*Lectures, etc in 12th position, Information Services in 13th.

highly valued by learners. Workplace location scored 4.3 out of five on average. No other method approached this level, although the data is probably distorted by the low numbers of mentions - only nine (9.2).

Although no other methods approached Workplace location in frequency of use, there were four others which scored well. Working on a design project has already been mentioned as being among the top 12 most used methods. It also did well as far as strength is concerned, scoring an average of 4.0 in 57 mentions (8.4). Undergraduate education, although not clearly a part of continuing education, was mentioned ten times and scored 3.9 on average (6.5). Using own experience and skills - which may be thought of as creative invention - scored 3.7 on average among 61 mentions and has been previously mentioned for frequency (7.9). And Research, also among the top 12 most used methods, scored 3.5 on average among 61 mentions (7.10).

Future usage

Some methods, although not scoring particularly well in the past experience of learners, were frequently mentioned when they postulated future learning. Lectures/Seminars/Workshops showed a rise of 30 points, moving it to second most postulated (6.6). Short courses rose by 25 points, moving it to the sixth most postulated method of learning (6.7).

Two resources that show significant rises in intended future usage, but still do not score highly enough to put them in the top ten, should be mentioned. They are the use of Computers, which shows a rise

Figure 10.2

Weighted Scores for Postulated Learning

Method/Resource	Rank	Weighted score	% of total
Discussion with colleagues	1	135	7.4%
Lectures/Seminars/Workshops	2	122	6.7%
Working on a design project	3	111	6.1%
Asking experts	4	108	5.9%
Experiencing buildings	5	97	5.3%
Courses	6	88	4.8%
Books/Manuals/Guides	7	84	4.6%
Research	8	82	4.5%
Reflecting on experience	9	79	4.3%
Examining plans	10	74	4.0%
Using experience and own skills	11	62	3.4%
Information service	12	60	3.3%

of 20 points, and Kits/Videos/Tape-slides, which show a rise of 16 points (9.3, 6.10). Although neither of these have proved themselves as highly significant in the experience of users, they might be described as having great potential.

One significant finding in the data concerns some resources that are very much less used in postulated projects than in proven ones. The chief of these is Journals/Magazines, which drops out of the top 12 altogether, from the first or second place. Comprising 6.8% of the total past weighted score, it makes up only 3.1% of the future weighted score (6.4). Another drop, though not of the same magnitude, affects another set of written documents, Books/Manuals/Guides, reduced from 7.0% to 4.6% of the total weighted score (6.4). Furthermore, two other written resources valued in past experience were not mentioned often or strongly enough for them to show up among the top 12 most postulated. Trade literature decreases from 6.0% of the total to 2.1%; and Source documents decreases from 4.9% to 2.6% (6.5, 6.6). So written materials show a dramatic decline in intended future usage. Four different kinds made up 24.7% of the weighted total of proven learning experiences. When architects thought seriously about their future learning, they only turned to these to make 12.4% of the totals (6.3).

Some little used methods

Some resources on the list were not significantly used by any of the criteria so far set out: frequency, strength or rise. Two possible reasons are ignorance of the resource (a failure to recognise their potential) and dislike of the resource. There are ten resources which were used in less than 25% of proven experiences and which contribute less than 2.5% to either proven or postulated total weighted scores. Figure 10.3

Figure 10.3
Little Used Resources

	% of projects	Proven weighted score	Postulated weighted score	No of proven mentions
Sabbaticals	0%	0%	0.9%	0
Job rotation	3%	0.2%	0.8%	3
Gaming/role playing	9%	0.8%	2.0%	11
Formal assessments	17%	1.4%	2.2%	20
Checklists	18%	1.1%	2.1%	21
Teaching others	18%	1.3%	1.9%	54
Office meetings	21%	1.6%	1.5%	25
Exhibitions	22%	1.8%	0.8%	53
Office procedures	23%	1.6%	1.4%	27
Specialists	24%	1.8%	1.3%	29
Total	-	11.6%	14.9%	-

shows those that are not significant by any of these criteria (6.11, 7.11, 9.4). There is no evidence in the data to indicate whether the resources are lowly valued because of dislike or ignorance, except a suspicion that those which have a relatively high number of proven mentions might have been disliked and those with a low number be ignored. Dislike would then focus on Exhibitions and Teaching others; ignorance on Sabbaticals, Job rotation and Game playing.

This research is about learners' views and experience of educational resources; their likes and dislikes, but also their ignorance (6.12, 7.12, 7.13, 9.5). If some of their experience has been circumscribed, and some not beneficial, this does not mean that the resources should be abandoned, simply that educators need to give considerable thought to how they are used and pay special attention to acclimatising learners to them. This comment applies particularly to resources such as Job rotation, Game playing, and Teaching others, which independent assessments rate very highly. This comment would be more difficult to make about Exhibitions, with which architects are exceedingly familiar, and which they do not value highly.

Strategic undertakings

The first set of interviews revealed some approaches to learning that operate at a strategic level, and were beyond the reach of the second set which dealt specifically with the learner's experience (9.1). These had to do with action on the part of the employing organisation which eliminated the necessity for an individual to learn: Giving responsibility, The office library, Team organisation, and Sidestepping problems. Further research studies of a different slant need to be

devised to plumb these.

OBSERVATIONS ON METHODS

Since most previous research has been about the Formally organised arena, there are few comments to be made about the way that this research reinforces knowledge of other methods. There is clear confirmation of spiritual refreshment being a value in away courses (6.9). The mixture of methods (if only lectures and workshops) in contemporary courses is shown to reflect the way architects learn from a range of experiences (5.3). The high value placed on discussion similarly reinforces this pattern in courses (6.15).

There is some negation of contemporary trends. Courses are shown not to have contributed a great deal to learners' understanding (6.8). Exhibitions are not much valued - though Information Services are.

INTERCONNECTIONS

Many methods and arenas interrelate to a great degree. Formally and Personally organised learning are both deliberate; Non deliberate learning and Office action both do not have learning as an ostensible purpose (4.6). Because Formally organised education is the best recognised of the arenas, its overlaps are small (6.13). Since Office action is largely a strategic action, the activities it covers are frequently a prerequisite to Non deliberate learning (8.7, 9.6).

Workplace location provides the opportunities for Discussion with colleagues to occur. The presence of Specialists in the office means that Experts can readily be consulted. Their training may depend on Formally organised education. Non deliberate experiences provide the material to allow Contemplation to take place, and Contemplation or reflection is the activity that makes Non deliberate activities become learning. Formal assessments similarly rely on the experience of Working on a design project. The presence of a Library means easier access to Books, Journals, Trade literature and Source documents. Office meetings are the real world equivalent of Seminars. Lectures are a subcomponent of Courses, but can stand on their own. Books and Journals are both written materials and the difference between one and the other sometimes becomes blurred (8.7, 9.6, 7.14, 6.13).

ENRICHING CONTINUING EDUCATION

The point has already been made that natural learning exploits a range of methods and resources (5.3, A.11). Many courses already use a range of Formally organised devices to exploit instruction, discussion and discovery (6.15). But many others - particularly those put on by new educators - do not. Courses remain the cornerstone of continuing education, but could be enriched by the exploitation of resources outside the Formal arena (6.16).

Visits to buildings could have assessments, presentations and discussion feathered into them (6.16). Films and Videotapes could be more than a passive viewing experience by structuring in discussion periods, and indicating further activities such as reading and project work (6.17). The benefits of Undergraduate education could be better disseminated, with new students in the office acting as tutors to older members, instead of only the other way around (6.18). Technical and critical articles in Journals and Magazines could be linked to live events - visits such as those described above, or debates (7.14).

In Non deliberate learning, some work in enrichment and exploitation has already been pioneered. Project appraisals and job exchange have been well described in the literature, and architects could benefit from exploring these methods more (8.8, 9.7, 9.8). The research suggests that self conscious reviews are a very fruitful direction for continuing education - by making learning manifest and by learning habits of review (8.9, 8.10, 8.11, 8.12, 8.13). Teaching others in itself is a neglected resource (7.17).

One of the two chief reasons for wanting to seek new directions in continuing education is to enrich it as described above. The other is to return to learners the responsibility for structuring education themselves (6.16).

The key to this is teaching learners how to learn - not only about habits of study, but how to reflect and how to think inventively (7.16). This kind of learning can be helped by the presence in the office of facilitators, rather than teachers (8.10).

Office action is newly recognised as a fruitful contribution to learning and needs not to be enriched, but simply exploited. Workplace location as a method of helping interdisciplinary working could be more widely used, Sabbaticals are almost unknown, Job exchanges viewed with suspicion, Job rotation little used (9.7). Project reviews

could be better structured (9.8) and Office meeting could employ seminar and workshop methods, not just reporting (9.9).

SOME PROBLEMS IN CONTINUING LEARNING

Two major problems for learners in vocationally related continuing education are finding time, space and interruption free opportunities; and being able to focus on education as a competence-improving device, not as an end in itself (6.21). There are often managerial and organisational problems inherent in the learning environment which reduce the effectiveness of education events - lack of opportunities and skills to debate rather than instruct, threats to self image, threats to office image, lack of opportunity to put newly-learned skills into practice (6.19, 9.12). The employing organisation often has - rightly - different educational objectives from learners themselves (6.20). Planning of Formal education usually concentrates on topics, seldom on processes (6.22).

There are some problems of understanding of how learning occurs - and surprising puzzles about the extent to which some methods (reading, for example) are used in pre-planning (7.15).

There is often resistance to using some methods in office time. Staff are happily sent on courses, but there are inhibitions to unstructured or self-structured time out for learning by reading (7.18). Some resources are themselves inadequately filled out: Trade literature seldom provides comparative data on prices or shows how materials may be used in combination (7.19), and there is often too much, rather than too little, information (7.20).

When deciding on their educational undertakings, learners need to be open to their need to learn - and so do offices (8.14). Deciding on how to learn can be difficult. Not enough is known - certainly not to non-professional learners - about the advantages and disadvantages of various methods. There are limits, for example, to the amount and kind of learning that can arise as a result of experience - and it is very time-consuming (8.15, 8.16).

CONTINUING PROFESSIONAL DEVELOPMENT

Mandatory CPD has been an issue through the research period, and the thesis suggests some directions that this might fruitfully take.

Because the option of periodic examinations has been avoided (7.21), those who advocate mandatory CPD have suggested validation by time spent learning as the criterion. The thesis suggests that while time spent attending courses is easy to validate (6.23), this represents only a small proportion of architects' learning (6.2). Large amounts of time are already spent learning (A.5) though little is understood about how intensively useful various methods are (6.24). The material collected about how architects learn is most sympathetic to an alternative to mandatory CPD: extending and enlarging the prequalification practical experience years to act as training to habits of continuing to seek to develop professionally (8.17).

LINKS BETWEEN CONTENT AND METHODS

There are indications that some methods are better suited to learning about some topics than others (5.4 and Figure 5.15). The research strategy is not broad enough to cover this question in any depth, but Figure 10.4 shows a list of topics that were mentioned and methods that were suggested as being suitable (6.26, 7.22). It should be remembered, however, that different learners have preferred styles which override this (5.4), and that a mixture of methods is more common than a single method (A.12).

LEARNING BY OTHER DISCIPLINES

Engineers and architects are very close to each other in the extent to which they use the four arenas in both proven and postulated experiences (5.5, Figure 5.17). There are minor differences in the employment of some resources: TV, Teaching others, Research, Journals, DIY and Office procedures. In postulated education, architects and engineers are more closer to each other in these particular activities (6.27, 7.24, 8.21, 9.15).

The sample of QSs is too small to make a viable comparison with engineers and architects (5.5, etc). They appear to differ in almost every way from the other two professions, and this suggests further research is required. It also hints that the designing professions may utilise resources in a different way from others: and thus that these findings cannot be transferred to others. In return there must be a suspicion that strategies for architectural education cannot be borrowed from other disciplines.

Figure 10.4

Links Between Content and Methods

	Very Much Liked	Liked	Little Liked
ENERGY RELATED MATTERS (from 2nd set of interviews)			
Form	Journals, Books, Experiencing buildings	Trade literature, Reflection, Designing, Examining plans	Asking experts
Fabric	Trade literature, Journals, Books	Research, Designing	
Legislation	Source documents, Books	Trade literature	Examining plans
Services	Experience and own skills	Reflection, Discussion	Examining plans, Journals
Costs	Discussion, Research	Reflection, Journals, Trade literature	Examining plans
Alternative energy	Asking experts, Journals, Books	Discussion	Source documents, Examining plans
GENERAL MATTERS (from 1st set of interviews)			
Contract Management	Courses Courses, Practical experience (eg Designing)	Team organisation	
Design	Courses	Experience, Office meetings, Sidestepping	
Legislation		Office expert	Courses
Building Science	Courses		
Personal (inc. refreshment)	Courses		
Interdisciplinary Working	Workplace location		
Building Types			Courses
Specification	Courses		
Health Planning	Courses		

Source: Figure 5.15, Figures 6.1, 7.1, 8.1, 9.1.

ROLES AND RESPONSIBILITIES

One of the roles of educators is well-recognised: designing education. The research also suggests a parallel role to that - helping learners shape, carry out and share their learning (A.10) and to look beyond Formally organised and Non deliberate experiences when doing so (9.10, 6.25).

The research establishes the important role learners play in planning education (A.9) and draws out from other research the kinds of problems this presents. The importance of equipping them to learn has been mentioned.

The role of the office is a new area raised by the research. It is concluded that before embarking on education, organisational alternatives should be considered: prevention rather than cure (9.11). There is a need for a greater integration of education and office practice (9.12). And the office needs to decide whether education should be focussed on one individual, or spread throughout the staff (9.13).

Part Four

To Demonstrate Utility

Chapter Eleven

The Content of an Energy Learning Programme

"They sought it with thimbles, they sought
..it with care;
They pursued it with forks and hope;
They threatened its life with a railway-share;
They charmed it with smiles and soap."
(Lewis Carroll The Hunting of the Snark Fit 5
The Beaver's Lesson).

Chapter Five has described the seminars held with building designers about the learning they had undertaken to do with energy. This chapter supplements the description of methods they had used by outlining the content of what they thought important. It leads to the final chapter describing education designed to meet their needs.

Altogether, 12 groups of designers were met in all parts of the UK; nine were from NHS Regional Works Groups and three were private architects' offices who undertake a large number of health buildings. Figure 5.2 showed the distribution, location and professions of the 117 people met.

The seminars

The basic seminar conducted took three hours, including a break for tea or coffee. In the last three seminars a further module was added to the event, appraising a building design, and this took another 1½ hours. As previously mentioned, almost all the seminars were held in conference rooms in or near the practice; two were held in less formal surroundings in easy chairs. The offices themselves set up the administrative arrangements, tea, and invited members of the office to take part. Wherever possible, the seating was arranged around tables to form a complete circle, so that each participant (including ourselves) was approximately equal and there was no emphasis on any one person. The building appraisals were held in a horseshoe arrangement, focussing on the drawings of buildings themselves.

The four-page proforma used in the seminars has been detailed in Figure 5.1. It will be further described as parts become relevant.

The goal of each seminar was to get participants to write detailed specifications for learning undertakings for themselves. The aim of this was to help improve the performance of the office. To reach this point, individuals had to be helped to identify their own strengths and weaknesses as far as their knowledge of energy matters was concerned,

and to raise their awareness of their own learning styles.

At the start of the seminars, three objectives were outlined which included and subsumed these goals. These objectives applied to both ourselves and participants, though the form they took for each individual would be different.

- First, to gain an understanding of energy efficient design and how much each member knew about the issues.
- Second, to help develop learning programmes for the future.
- And third, to act as a 'learning to learn' forum.

THE SEMINAR

Ecology or economy?

The seminar was started with a review of why conserving energy is important. The objective of this discussion was to clarify the motives of the members of the seminar for saving energy.

It was suggested to the group that many of them had developed interests in energy through an ecological concern for conserving non renewable resources, as well as a social awareness of the inequalities of energy use in the developed and developing countries. This 'moral' view of energy use had now to be seen in the context of arguments for saving fuel that were entirely financial and based on cost effective formulae. Thus the objective of saving energy at all costs has come into conflict with an objective which limited the savings to a pay back period of three or four years.

These approaches were put into perspective by calculating that the hoped-for 25% saving in energy use in health buildings represented only a half of 1% of the UK's total energy use: not large. That ½% saving would, however, represent £16m of the National Health bill. Thus although all might agree that they had sympathies for the ecological argument, the reality of the situation is that in designing for energy efficiency they were primarily saving money rather than fuel. There were many who then pointed to the frailty of a financial argument based on unrealistic and volatile fuel prices coupled with a lack of any long term national energy policy.

General discussion

Next, we went around the table, getting participants to introduce themselves and to say what their particular interest was in energy. The seminars differed very widely here. In some, participants were terse and the discussion was later returned to by presenting the diagram of

energy usage shown in Figure 5.1 for debate. In other seminars, this opportunity to debate issues became very animated, and on two occasions participation had to be cut short simply in order to allow the last few people around the table to introduce themselves. Notes were kept of what was said in this period and two examples of the direction discussions took are shown in Figures 11.1 and 11.2.

Learning programmes

In the next stage of the seminar, the learning that participants had undertaken in the recent past were turned to. Chapter Five describes this at length. Briefly, each participant made a list of their learning undertakings which had energy as a theme. In some cases, these would have been deliberate - by reading a book or attending a course, for example. In other cases, it would have been non deliberate - by working on a design project, perhaps - and in these cases participants were asked to recall what had been learned and post rationalise it into a clear programme.

Next, participants were asked to select two of their programmes and to score the list of learning methods. The result of this is shown in Figure 5.4.

The energy diagram

Having discussed energy in a forum, participants were asked to think of their own energy-learning experiences. The discussion to that point was summarised by showing the aspects that had been identified in diagrammatic form - illustrated again in Figure 11.3.

The energy diagram not only attempts to state important aspects of energy efficiency, but also attempts to indicate relationships between them. The Client Needs aspect is usually represented by the brief for the building - though this seldom contains any mention of required energy performance. Building Form includes the shape of the building, siting, orientation and control of the micro-climate. Building Services are the active engineering systems which provide and maintain temperatures, air changes and other environmental standards.

These three aspects have energy implications for new building design. They are related to three others which, while being important in new design, also have a strong influence on the energy performance of existing buildings. Building Fabric - the walls, roof and so on which enclose the building - is closely related to the form of the building and its services. Environmental Controls are related to the

Figure 11.1

W Midlands: Discussion of content by a public authority office

financial and ecological reasons generate the need for

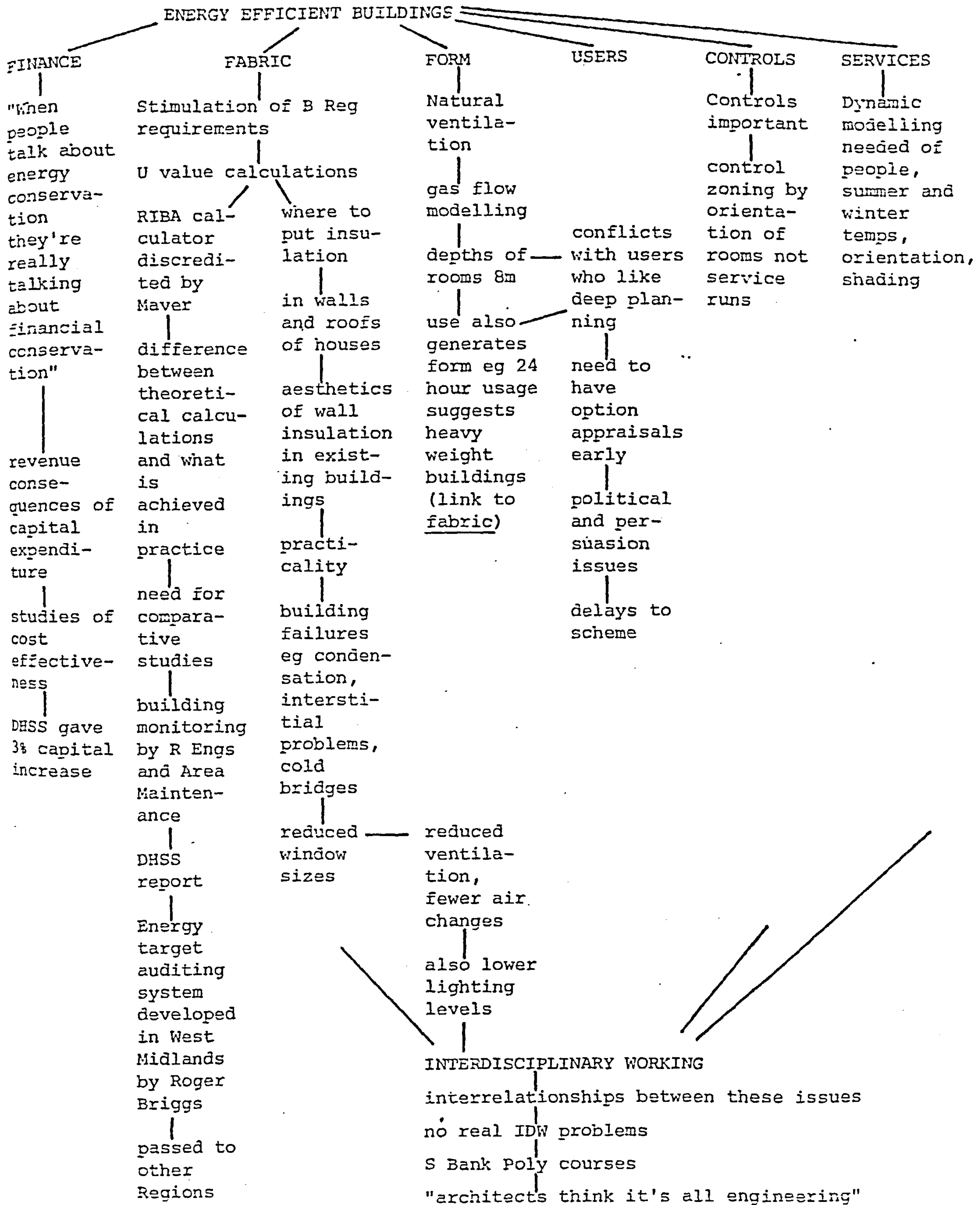


Figure 11.2.

Huddersfield: Discussion of content by a private architectural practice

financial and ecological reasons generate the need for

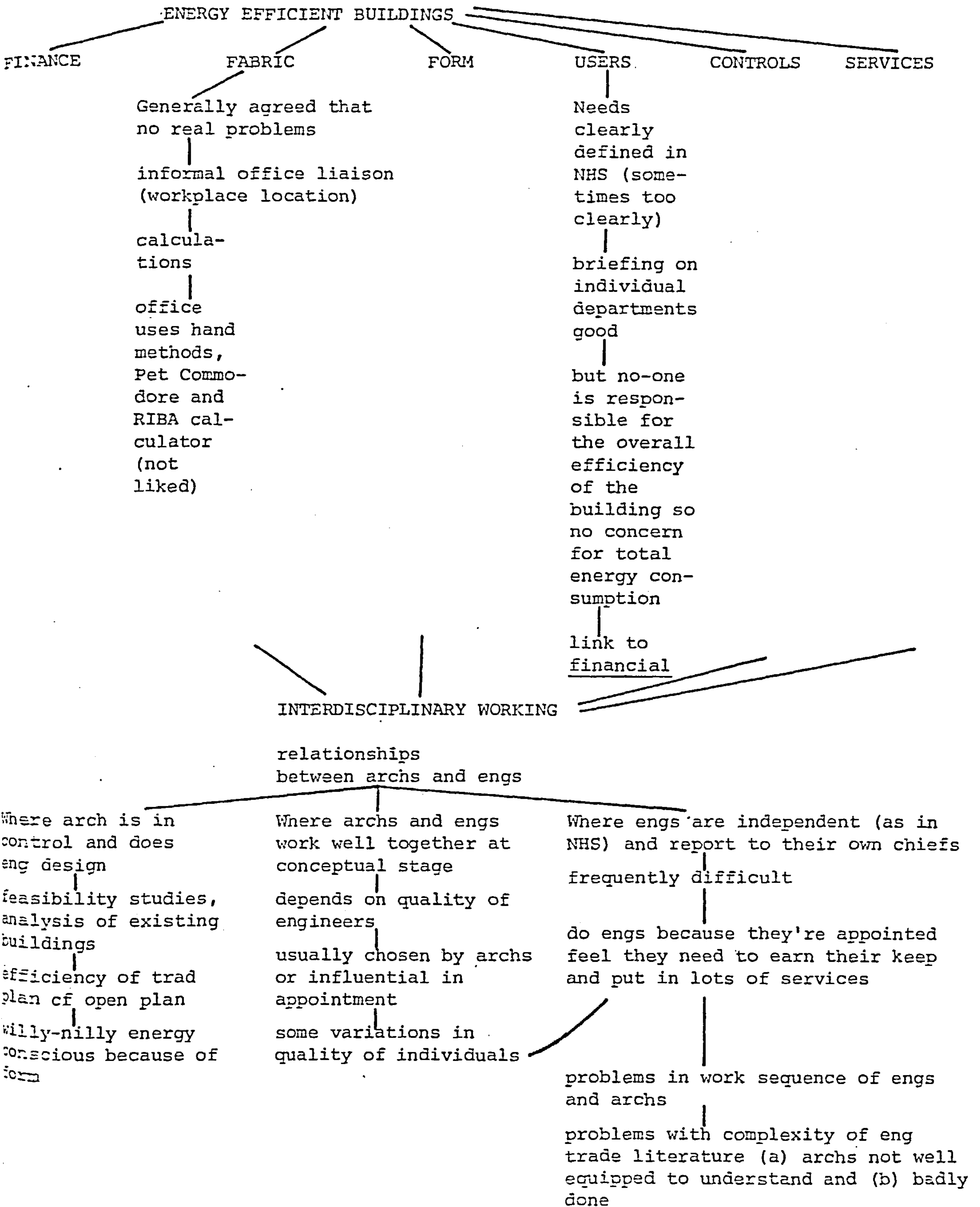
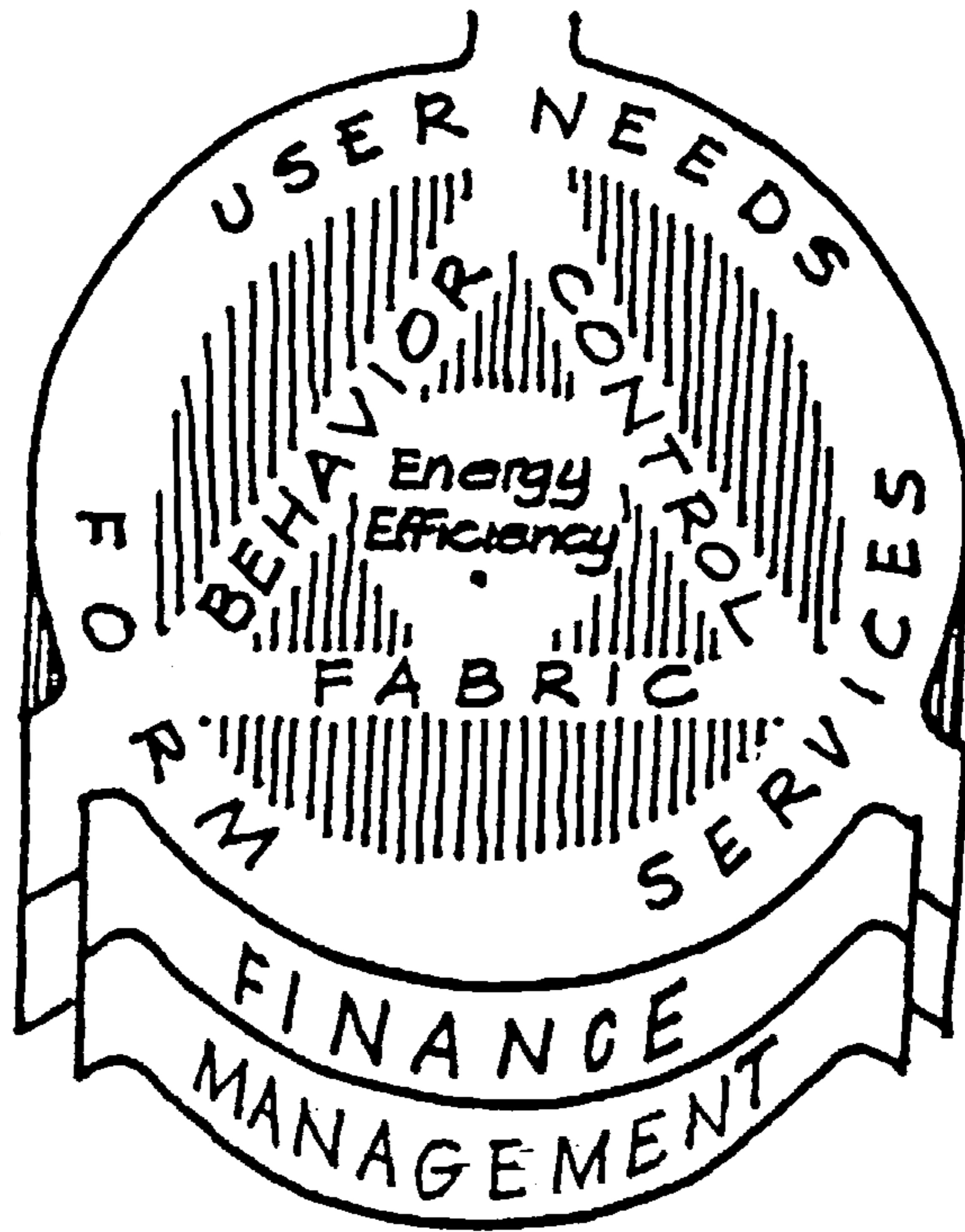


Figure 11.3
Aspects of Energy
Efficient Buildings



Services and to the needs of the Client. And the Behaviour of the Users is conditioned by the expression of client needs and the form of the building.

The energy diagram also indicates the context within which decisions on energy efficiency are made and the traditional interests of the professions involved. In the discussions the important contextual aspects turned out to be Finance (how much is available and how it is controlled) and Management. Two facets of Management were particularly identified which depend on roles of individual members of the design team. One was to do with the management of the team and is related to the importance of maximising skills, as well as agreeing objectives. The other has to do with how energy is managed in the functioning building.

In the diagram the clusters of interests of professional groups could be shown, as well as where these interests overlap. For example, the architect is traditionally involved in decisions about form, the building fabric and realising the client's brief. However, in energy efficiency terms the nature of the building fabric will have implications for the engineering services and vice versa. Similarly, the predicted behaviour of users should influence the way the client shapes his brief. Thus the three aspects of Fabric, Behaviour and Controls become the negotiating ground for interdisciplinary work.

How knowledgeable were participants?

What were participants' strengths and weaknesses as far as knowledge of energy in buildings is concerned? Having summarised the discussion in the seminar with the energy diagram, this question was turned to.

A matrix (Q5 in Figure 5.1) listed the eight aspects of energy efficiency that had been identified and participants were asked to answer three questions. The first was how influential they thought the aspects are in the design and management of energy efficient buildings: in other words, how important in the overall context? The second question was to what extent these aspects are within the control of their particular discipline: how much influence does each profession have? The third question was what they considered to be their strengths and weaknesses in their knowledge of these aspects? Participants were asked to score their answers to each of these questions in the matrix on a scale from 1 (meaning low) to 5 (meaning high).

It was hoped that this exercise would signal to each participant where he or she was most exposed and, in the light of how much influence their disciplines had on the aspect, whether they should undertake further general or specific learning. What this learning should be follows from a personal analysis of what needs to be learned, and the way this was handled in the seminar is described later.

Outside comments

It was felt that not only learners should be consulted about their energy-learning needs, so various kinds of experts were invited to comment on matters relating to energy efficient design of health buildings.

One such group was a Regional Authorities Energy Working Party consisting of Regional Engineers, Regional Architects and DHSS representatives. We attended three meetings with them to discuss the work in progress, and they kept us informed of parallel research work and projects. For example, the experience and findings arising from the design and building of a low energy hospital in the Isle of Wight was a topic learners would not yet have known about, and this was later incorporated in proposed education events.

Secondly, 15 National experts were sent an amended copy of the first two questions on the matrix - the overall importance of aspects and the influence of the professions. There were nine useful replies. The experts were to give their opinions so that comparisons of views from inside and outside the professions could be made. It is worth saying that this was not intended to produce any 'right' answers: the experts' views are only opinions. In some cases, practitioners will have a much better knowledge of their trade than outsiders. Also, the experts chosen were not necessarily familiar with conditions in the NHS, and again the seminar participants may have a better grasp than they of essential matters.

LEVELS OF KNOWLEDGE

Figures 11.4 to 11.6 summarise what each discipline considered important. The characteristics of each profession are next outlined before looking at what they have in common.

The knowledge of Quantity Surveyors

Eight Quantity Surveyors (Qs) were interviewed in the seminars: 7% of the total and a small number, even in the light of Qs forming a minority of the building professionals employed in the Regional tier of

Figure 11.4

QSS' Impressions of their Knowledge

ASPECT	How important overall		How much influence QSSs have		QSSs' personal knowledge rating
	QSSs' views	Experts' views	QSSs' views	Experts' views	
Client Needs	2-3	3-4	1	1-2	2
User Behaviour	3	4-5	1	1-2	1-2
Form	3	3-4	3	2-3	3-4
Fabric	3	4	3	3	3-4
Services	3	4	2-3	2-3	2
Controls	2-3	4-4	1-2	2	2
Finance	4-5	3	3-4	3-4	4-5
Management	4	4	2-3	2	2-3

the Health Service. It would not seem prudent therefore to read too much into an overall summary of where they considered their competence to lie. Figure 11.4 refers.

Given this caveat, QSSs (not surprisingly) considered financial matters to be the most important aspect of energy efficiency: overall, they scored it between four and five on the scale of ratings. Experts disagreed. They scored financial considerations lowest of all their ratings, at three. So perhaps QSSs overrate the importance of this, or perhaps experts do not appreciate its importance within the Health Service. QSSs were happy that they knew a fair bit about financial matters - again scoring this between four and five: their highest score by far. Experts did not find the QSS's role in any aspect to be particularly overriding.

QSSs considered managerial matters to be next in overall importance. This is a wide-ranging heading covering project management through to organisational aspects of the Health Service. Experts, too, scored this at four. Here QSSs were less happy with their knowledge, but they and experts considered that they have less influence on this than on most other aspects. Of course, the sample is small, but QSSs might have been expected to have rated their influence higher in the light of their generally expressed ambition to undertake more project management work.

QSSs thought they were weakest in two areas over which they said they had little control: Client Needs and User Behaviour. Additionally, they considered Client Needs to be relatively unimportant amongst the aspects which affect energy efficiency in health buildings, scoring it at two. In this they differed from the other professional groups,

and the experts, all of which scored Client Needs above three.

Qs also rated Controls low in the scale of overall importance - as low as Client Needs. They considered that they have little influence (1-2) on Controls anyway, and rate their knowledge low (2). Furthermore, they rated their influence on Services at 2-3. While this is not exactly surprising, it is worth remarking on. The profession of Quantity Surveyor is unknown in America and in most of Europe: their valuable role in UK building life is circumscribed by the peculiar tradition that they do not assess services costing: hence their low scores for Services and Controls. What is worthy of remark is that the aspects which affect energy efficiency are tightly interrelated, and giving cost advice of one technique against another becomes difficult if the first technique is to do with savings resulting from insulation to walls, say, and the other to do with savings in respect of insulation to steam pipes.

In general, Qs almost always rated their knowledge of any aspect higher than their influence over that aspect: Services is the sole exception with a knowledge rating of two and an influence rating of 2-3.

The knowledge of Services Engineers

27 Services Engineers were interviewed in the seminars: 23% of the total interviewee sample. Two did not fill in the matrix completely and they were excluded from the assessment. In addition, the two questions relating to Finance and Management were added after the first four seminars, so the answers to those were completed by only 19 Engineers. Figure 11.5 summarises the Engineers' opinions.

Engineers were much happier about their state of knowledge of aspects of energy than the other professions. They were particularly happy with their knowledge of matters relating to Services and Controls. They also scored their influence over these topics particularly high and thought them important in the overall context. Experts agreed with them.

Like Qs, Engineers felt least happy with their knowledge of User Behaviour, and also of Client Needs. Although they consider they have little influence over these, they acknowledge their importance (unlike Qs who consider these aspects relatively unimportant).

The knowledge of Architects

There were 70 Architects and 10 Technicians in the sample. They have been taken together in this study and comprise 69% of the total.

Figure 11.5
 Engineers' Impressions of their Knowledge

ASPECT	How important overall		How much influence Engineers have		Engineers' personal knowledge rating
	Engs' views	Experts' views	Engs' views	Experts' views	
Client Needs	3-4	3-4	1-2	2	2
User Behaviour	3-4	4-5	1	2-3	1-2
Form	4	3-4	2	2-3	3
Fabric	4-5	4	2-3	2-3	3-4
Services	4-5	4	5	4	4-5
Controls	4-5	4-5	5	4-5	4-5
Finance	4	3	3	2	3
Management	4	4	2-3	2-3	3

Nine people did not complete the matrices and they have been excluded from the analysis, giving a total of 71 people who answered the first six questions. The remaining two questions relating to Finance and Management were not asked at the first four seminars, and the average for these in Figure 11.6 are based on 39 responses.

As far as their ratings of personal knowledge is concerned, the Architects were modest, scoring nothing above four and only one below two. This compares with Engineers and Qs who both scored their knowledge of User Behaviour between one and two. Qs scored their knowledge of Financial matters 4-5; Engineers scored their knowledge of Services and Controls at 4-5.

In particular, Architects scored their knowledge of Form and of Fabric highest and also considered they had most influence over these matters. Experts tended to agree with them.

They did not think they had much influence over User Behaviour (1-2), but thought they knew significantly more about the matter (2-3) than they had influence. Experts did consider that Architects influence behaviour - perhaps a naive view.

Architects considered their knowledge weakest of Finance and Controls. However, they rated their influence over these at the same level as their knowledge.

THEMES

Getting participants to fill in the matrix was a way of summarising the discussions which had taken place. In the next paragraphs of this exposition, various themes are suggested that emerge from an analysis of what was said.

Figure 11.6

Architects' Impressions of their Knowledge

ASPECT	How important overall		How much influence Architects have		Architects' personal knowledge rating
	Archs' views	Experts' views	Archs' views	Experts' views	
Client Needs	3-4	3-4	2	2-3	3
User Behaviour	3-4	4-5	1-2	3	2-3
Form	4	3-4	4-5	4	4
Fabric	4-5	4	4-5	4	4
Services	4	4	2-3	3	2-3
Controls	3-4	4-5	2	2-3	2
Finance	3-4	3	2	2	2
Management	4	4	2-3	2-3	2-3

Knowledge and influence

All of the professions rated their knowledge high of aspects over which they considered they had a great deal of control. (Qs rated their influence over Financial matters the highest at 3-4 (a full point higher than anything else) and rated their knowledge at 4-5 (again, a full point higher than anything else). Engineers rated their influence over Services and over Controls at five - astonishingly high scores, two points higher than anything else in their list. They rated their knowledge of both aspects at 4-5: a full point higher than anything else. Architects rated their influence over Form and over Fabric at 4-5, two points higher than any other score. They rated their knowledge of these two aspects at four, a point higher than any other aspect of their knowledge).

These averages were not calculated until the full set of seminars had been held. They reinforce the impression gained during the discussion periods in each seminar: generally speaking, the level of knowledge the professions have over aspects of energy that concern them most vitally is high. From this it was concluded that broad education about energy directed at professional competence is unnecessary. Individuals will, of course, have gaps in their understanding, but these need to be selectively plugged (probably by personally undertaken study) not addressed by across-the-board education. There will always be new knowledge and attitudes that emerge, and education about these will need to be provided. So it is further concluded that selective education about very specialised aspects of energy would be appropriate for the professions.

This represents the major finding in the investigation of the education needs of the building professionals. Its significance emerged during the investigatory period and it raised a further important question. If the professions' general level of knowledge is high, does this get translated into energy efficient buildings? Put another way, is knowledge applied? A further stage was therefore introduced into the seminars to investigate this: conducting an energy appraisal of recently-completed buildings. This is reported on later.

If you believe that ...

The scores generated by professions themselves have been used as a guide to whether they need further education. To what extent are these trustworthy?

In one regard they cannot be trustworthy at all. If there is a new development affecting energy that they have not yet heard about, they cannot score their ignorance. An attempt was made to deal with this by meetings held with researchers, the Energy Working Party and our outside activities. These new areas undoubtedly exist. For example, the experience arising from designing a new hospital in the Isle of Wight has pointed up new perceptions in what is and what is not effective when it comes to putting energy-saving techniques into practice. In the new education programmes formulated as a result of this study, it was intended to introduce a study of this experience.

It must be said, however, that we were impressed by the high level of discussion in the seminars with learners and we are inclined to trust the scores of self-knowledge they ascribed to themselves. The new directions in understanding the set of experts mentioned did not undermine this perception: it reinforced it. The main finding is that general understanding is high; that specific upgrading of knowledge is required. This is consistent with the new areas experts identified: the new knowledge is specific. It can be introduced by selective educational undertakings.

Here a point made before must be reiterated. General levels of knowledge are being discussed in this analysis. Personal competence will always show a spread from high to low. So some individuals will undoubtedly need more education than others. This should not be thought of as an argument for across-the-board education: the knowledge of individuals must be upgraded. Perhaps this can best be addressed by personal learning programmes: an approach to this is later outlined.

Broadly-based education

If high knowledge scores imply that the professions need selective specialised education, do low scores mean that they need grounding in basic principles? For example, all three professions scored their knowledge of User Behaviour low: should they be given education in its fundamentals? This may not necessarily be the case. The key to the need for basic education lies in the view the professions took of the overall importance of the aspects.

A general competence in energy might be expected to have two strands: one is a high level of knowledge about issues central to the discipline; a second is a generalised appreciation of the importance of other aspects in the overall context. It was earlier indicated that the professions provided a guide to the importance of the second. Figure 11.7 lists their view in the first column, and lists in the remaining columns the ratings that the three disciplines ascribed. Architects and Engineers had a fair respect for the aspects outside their control. The indications about need for general education affects Quantity Surveyors: their scores are much lower. To some extent, the data is insufficient to draw a firm conclusion since there were only eight Qs in the sample. But, pending further investigation, it is suggested that some general education about energy efficiency should be directed at Qs.

One interesting approach to an investigation of this kind would have been to have asked each profession how knowledgeable the other two are. Since they work closely with each other they might have been able to give an informed opinion: it is regrettable that this was not included in the original set of enquiries. Incidentally, it would not be particularly useful to ask outside experts their opinion of this. Not working daily as part of the building team, they might not have the same experience of parallel professions as the sets of learners interviewed. Furthermore, they would undoubtedly base their opinion on the quality of the building product and it is arguable that a failure of buildings to express energy efficiency arises from considerations other than ignorance of key factors.

Interdisciplinary working

One clear implication of what has been said about areas of professional influence being linked to high professional competence is that none of the professions can function in isolation. The corollary

Figure 11.7

Overall Importance of Aspects of Energy Efficiency

ASPECT	Experts' view	QSs' view	Engineers' view	Architects' view
Client Needs	3-4	2-3	3-4	3-4
User Behaviour	4-5	3	3-4	3-4
Form	3-4	3	4	4
Fabric	4	3	4-5	4-5
Services	4	3	4-5	4
Controls	4-5	2-3	4-5	3-4
Finance	3	4-5	4	3-4
Management	4	4	4	4

of the suggestion that it is acceptable for Architects not to have a high level of knowledge about Controls, is that they work closely with the Engineers who do.

In the discussion periods, questions of interdisciplinary working frequently cropped up. (An illustration of this was shown in Figures 11.1 and 11.2). As will be shown, designers frequently designed interdisciplinary meetings into their future learning programmes. And Harris (1978) showed that NHS Architectural Staff identified interdisciplinary working as far and away the most urgent of their problem areas.

From this it may be concluded that future education programmes should include opportunities for the professions to work together. The purpose of this is to give them practice in bringing forward the knowledge that each has about its particular areas of influence to form a united whole.

There is an incidental benefit in such a programme. Working together provides a forum for incidental, non deliberate learning to take place: Architects increasing their understanding of Services, Engineers of Form, QSs of both.

The missing professions

In asking the professions about their areas of influence, it was found that QSs rated themselves 3-4 in Finance, Engineers rated themselves at 5 for both Services and Controls, and Architects scored themselves at 4-5 for both Form and Function.

The panel of experts tended to score all aspects of energy efficiency in full: that they saw none which could be dropped without reducing the efficiency of the others.

All three professions rated their influence on Management at

2-3; experts at 4. The Management category is a fairly ambiguous one, covering topics close to the professions' daily work in Project Management; but also some aspects of Service Management remote from the professions. If none of the three building professions claim expertise over this area, should not Health Service Administrators be invited to join in interdisciplinary exercises? Again, there would be two benefits. Firstly, the Administrators can make their contribution to the commonwealth of expertise necessary to develop an energy efficient health building. Secondly, Administrators can go through the non deliberate learning experience of finding how management procedures prevent fully energy efficient buildings from being realised.

The same sort of comment applies to Client Needs and User Behaviour, of which no building profession scored their influence higher than 2 but experts at 3-4 and 4-5 respectively. Nursing and Medical Planners whose area of influence this is need to be invited into the design team exercises.

FUTURE LEARNING PROJECTS

After asking participants about their past learning and getting them to identify where they needed more education, they were next asked to review their knowledge in the light of the discussion. They were invited to devise a learning programme for themselves drawing on the way of learning they had identified as being particularly apt for themselves. They entered a written description of their future programme X on the proforma (Q6 in Figure 5.1) and gave details of the learning methods they would probably use. The final half-hour of the seminar was spent sharing and developing each person's proposal. The education design implications of this exercise are returned to later.

APPLICATION

So far, the overall impressions gained in the seminars of how much the various building professionals know about the matters that are of direct concern to them have been shown. Plainly, there is a general feeling that they were coping with learning about these matters. This impression is reinforced by an examination of the learning programmes the participants entered: they are wide ranging and numerous.

In the seminars another impression was gained from participants: by and large they knew a fair bit about areas in which they have a great deal of influence (and knew that they did not know a great deal about other key topics and hence were able to identify new learning

programmes for themselves); but somehow this knowledge was not being translated into the buildings they were designing. In the last three of the seminars held, a new exercise was introduced at the end.

For the last 1½ hours of the extended seminar, a recent building design was pinned to the wall and, using the key aspects which had been isolated in the early part of the seminar, an energy related project appraisal was carried out.

The first seminar

The first attempt at an appraisal took a different direction from that intended. No drawings were produced. Instead, three schemes were shown on slides and they were described as the carousel moved on. This method meant that participants did not have anything physical to focus on in the discussion afterwards. Also, the amount of time spent in describing the projects was dictated by the number of slides available. What discussion did take place (mostly the slide presenters did the talking) was rather stilted. This may have been related to the presence of outside architects in the audience: perhaps criticism of the schemes would have looked like betrayal.

Nonetheless, some interesting points did emerge. The two chief ones were to do with management and with the balance of capital allocations and revenue consequences.

The second and third seminars

The other two appraisals were more successful in meeting the objectives set. In these it was made sure that there were drawings, and the number that were pinned up were severely limited; comments were deliberately drawn from a large number of people; the schemes were methodically discussed under the eight aspects; and an attempt was made to downgrade any feelings of defensiveness by starting the discussion with the question "What would you do now in this scheme that you didn't do then?".

Why were the schemes unsuccessful as energy conscious designs? The main reason given was that they were all designed three to four years previously, before energy consciousness had percolated through to design attitudes. A second reason, about which there is little that can be done, is that the sites were awkward: there was an inevitable trade off of desirable aspects (such as energy efficiency in building form) against essential aspects (tight sites, the need for single storey development because geriatrics used the building). It should be

stressed that none of the buildings examined were award winning designs - they were respectable attempts to marry demanding health planning constraints with a domestic character. As such, the architectural language used drew on the traditions of the last 15 years: brick, pitched roofs, rooflights, sloping ceilings in large rooms, etc. The grammar and phrasing which energy conscious design suggests had not yet become part of the daily language of the designers: differently shaped windows on north and south elevations; the use of passive building characteristics such as atria, or heavy construction in parts of the building which have 24 hour use.

Form

The second building project looked at was a classic example of Form being generated by articulating the functions: two wings, one holding the GP/medical activities, the other the social services; linked with common spaces such as entrance and waiting areas. Orientation of both schemes was north/south; the major rooms were disposed so that they got maximum incidental solar gains; little thought had been given to siting in sheltered areas (though on the second site this was impossible); rooflights were a common feature. "It is almost", said one participant, "as if the building has been designed for energy loss."

So, the Form of the building had not yet become suggestive of energy efficiency.

Fabric

Fabric was very much more competently handled as far as could be judged from the drawings. During the design of the buildings, new Building Regulations had come out which demanded higher insulation values, and the building fabric had been upgraded during the design period to increase thermal performance.

The assessment teams mentioned that there were some aspects of Fabric that could not be assessed from the drawings. For example, how well constructed is the building: are there gaps around windows? Have any condensation problems occurred? (Incidentally, the interdependence of Form and Fabric was mentioned. As the external Fabric becomes increasingly well insulated, so the Form of the building becomes less important as a factor in conserving energy usage).

Services

Similarly, Services were really quite sophisticated. For example,

zoning of the buildings in respect of solar gains had been achieved. Having the Services Engineers present was useful as they could explain that the absence of certain techniques was deliberate. For example, both groups had undertaken studies of heat recovery devices and both had found them not to be worthwhile in these schemes.

Some of the ways the building and services had been made had arisen from Client Needs, not ignorance of their energy inefficiency. Examples are the remote location of the boiler room; the use of low temperature central heating so that geriatric patients do not burn themselves accidentally.

Controls

Controls were less easy to examine from drawings: an interview with users would be a better way of determining their adequacy. As earlier mentioned, there were unavoidable trade offs that become necessary in health buildings when energy efficiency comes in the way of medical techniques.

An example of this is in geriatric wards where carpeting is used because of its comfort and environmental qualities. Where urine penetration occurs, the technique of nursing staff is to open windows and thoroughly ventilate the ward - removing odouriferous air, but removing warmed air as well. A solution suggested to this was to build such rooms in heavy thermal conductance materials which would reradiate warmth after the windows have been closed.

Another example of trade offs is the desire to provide more user control by zoning the heating to small clusters of rooms to be independently controlled. The price of this is more sensitivity in the control mechanisms - and more that can go wrong.

User Behaviour and Client Needs

The Behaviour of the users was significant here. As commonly happens, the building was used in unexpected ways. For example, in a health centre the controls were set to turn heating off on Saturdays and Sundays. After the centre opened, one doctor held Saturday morning sessions and the heating controls were overridden by users for that period, but forgotten about and left on for the remainder of Saturday and Sunday as well! There is a suggestion here that the designers need to educate the new users into what the building can do - perhaps by making an energy manual on the lines of a car manual.

In the paragraph on controls the inverse benefit ratio of more controls equalling more that can go wrong was mentioned. Note that the Saturday morning doctor had to heat his whole zone (a cluster of consulting and examination rooms) just to heat his own consulting room.

The classic problem of User Behaviour in energy efficiency is persuading people to turn down heating levels to reduce overheating rather than opening windows.

Another reason for designing buildings that are less than energy efficient had to do with Client Needs. There was a consensus during the discussion periods that in formulating the brief and working through the feasibility stages, the project team (consisting of the Medical and Nurse Planners, the Architect and Administrators) had not written in a demand for an energy efficient building. So the disposition of rooms (and the planned mounting of surgery sessions) related entirely to traditional medical patterns with no thought being given to how these could be rearranged to respect energy usage. There was no suggestion that patients should not come first, merely that there are a number of ways of meeting their needs, some of which could lead to energy efficiency more easily than others.

Financial matters

Another reason that influenced the failure of knowledge to be translated into design was to do with Financial matters: mainly accounting systems. It is often necessary to spend more on the building initially in order to make savings when it is running. There are several problems in the way the Health Service's budgets are drawn up which make transfers of money from revenue costs to capital allowances difficult. There is a formula in existence which permits this (10% of capital can be transferred to revenue; 1% of revenue can be transferred to capital) but this is by no means commonly applied across the UK. Nor is such a flat rate necessarily the best method: a five-year amortization period calculation in respect of specific proposals was favoured.

Management

Finally, Managerial systems were blamed. The chief of these is that during the design period, projects go through various public accountability stages: the Capricode justification is the chief of these, where a check is kept of expenditure. Participants acknowledged that there is no reason why a voluntary energy assessment should not be

made from time to time. (In one seminar this idea was developed and in the discussion was called 'an Energy Gate'). Were this an accepted Management procedure, it would be more likely to be gone through.

The discussion developed several possibilities for the Energy Gate assessments: the use of proformas; an appraisal similar to the one being participated in; the drawing of Sankey diagrams showing where energy comes from and how it is spent; the possibility of setting performance targets for different types of health building; the problem of fees payable to consultants; etc.

The appraisals

Summarising the discussions that took place in the project appraisal sessions, three main themes emerged.

First, the schemes looked at were fairly old. Participants felt that their energy knowledge was more likely to be applied today than it was a few years ago.

Second, there are some procedures which affect funding, management arrangements and the way the brief is conceived, that need a fresh approach. These are matters that are long term and political; and they lie outside the area in which architectural educators have influence.

Third, holding the project appraisal seminar appeared to help participants summarise for themselves their state of knowledge and become conscious of how it was being applied. The introduction of 'Energy Gate' assessments at various project design stages would help translate knowledge into application.

EDUCATION DESIGN

Our understanding of the discussions that took place in the seminars, supported by an analysis of the matrix and the project appraisal sessions, suggested a number of approaches to energy related education.

First: across-the-board education is unnecessary. Architects, Engineers and QSs need selective education aimed at them as highly competent professionals.

Second: individuals within each profession may need greater educational inputs than this allows. They should be encouraged to develop in the areas they have identified themselves as being weak.

Third: Quantity Surveyors may need some general education dealing with principles of energy efficiency.

Fourth: cohesive interdisciplinary working is the bedrock of

energy efficient design. An interdisciplinary approach should be taken to all education - and Administrators, Nurse Planners and Medical Planners should join these whenever feasible.

Fifth: there are some new advances in knowledge about efficient energy design in hospitals, and learners should be told about these.

Sixth: self conscious assessments should be introduced at critical design stages to review progress and direction.

Chapter Twelve

The Education Proposals

"Many forms of learning which are given little or no attention in educational institutions have a vital role in adult life."
(Howe, 1977).

A major finding of the analysis of how architects have learned in the past reported in Chapter Five is that they use a great variety of resources in any learning project they undertake. The education proposals put forward here are framed as a series of episodes which focus on both the weaknesses and the opportunities identified during the seminars. Some of them are aimed at gaps in knowledge, some are aimed at enriching the information sources from which independent learning endeavours can start and some are designed as personal reviews. So it should be recognised that selective education mounted can form part of a larger learning programme of each architect: a contribution, not the whole.

Selective education

The first education package put forward relates to the finding that selective education on some aspects of energy design is necessary. A chief item that came up during discussion periods had to do with calculations. This covers the assessment necessary of the extent to which the external fabric of a building insulates it. To make the assessment, it is necessary to calculate U values based on the extent to which the various materials in a wall, roof or floor resist heat transmission. Moreover, used in the wrong order, highly insulated materials can lead to condensation and this too can be calculated. So a half-day live education session 'Brush Up Your Calculations' was designed which covers these matters and shows how computers can be used to get rapid readouts of what are laborious sums. The event is designed as a live one because as participants carry out a series of exercises on calculations, and the presence of a tutor is helpful in correcting and explaining further. Also, using a computer is essentially a 'hands on' experience, not one that can be related verbally or visually.

A live event based on this was offered to NHS offices, but to date none have taken up the half-day session. Although it remains available, it does not appear to have been attractive to the office planners responsible for deciding what events are to be mounted: perhaps it is

too 'dry'. A modified version dealing with a cruder form of calculation has been introduced into the next education proposal to be described.

Interdisciplinary activities

To cope with another major item identified in the seminars, that of interdisciplinary working, a workshop event was designed by Stuart Sutcliffe and I in which a design exercise is carried out by teams of architects, QSs and engineers. We took as a starting point a competition run some years ago by the Gas Board in which a small local hospital is to be doubled in size, while using no more energy than it does at present. The event started by dividing participants into teams (of two architects, one engineer and one QS) who spent the first half day analysing data and making preliminary conceptual proposals. Teams then developed their first proposals which were assessed in a plenary gathering and then worked in groups making final proposals which were assessed in a final 'crit'. They were required to present their schemes and show something of their working methods and calculations.

The advantage of the design exercise is improved working relationships between the disciplines, in which the roles of each are made clearer. Traditionally, the architect makes the running in the design strategy, and the other members of the team are brought in when there is a firm proposal to consider. In recent times, this method has been seen to have disadvantages and designing energy efficient buildings means bringing QSs and Services engineers in at a much earlier stage. The tight interrelationship between decisions about servicing and fabric (shown in the diagram, Figure 11.3) illustrate the co-working necessary between architect and engineer. The presence of a QS early on in the design sequence can help to establish cost-effectiveness: the basis, such as it is, of the NHS energy strategy.

The second advantage of team working in the design exercise relates to our observation that while levels of knowledge about energy are high, they are patchy. To fill the possible gaps in knowledge of individuals means increased reliance on the team as an efficient mechanism.

This relates in turn to a third advantage: peer group learning. It is commonplace for younger members of the office to learn from those older - especially about construction. The reverse learning opportunity does not always take place, where younger members (fresh out of college with a grasp of new ideas and knowledge, for example, of how to do

calculations) can teach older ones in a non-competitive setting, and where the ignorance of the older members is not made a face-saving issue.

The design workshop has been mounted in six NHS offices over the last year, and has gradually been modified to take account of comments made by participants.

The first session was held in Northern Ireland where we mounted a whole week's education dealing with various topics including fire planning, conservation, computers and project management, as well as sessions on education specifically. The energy workshop's building design was used as a linking theme through these, with teams attending morning sessions on the other topics and returning in the afternoon to work on their energy schemes. A great deal of enthusiasm was generated, with participants working together well beyond the time limits we had set. The schemes presented showed that the members had become very involved in attempting to reflect energy efficiency not only in the function of the hospital, but were working towards an expression of this in the way the building looked. However, they often had difficulty with the detailed calculations necessary and spent a great deal of time fumbling to find the appropriate level of calculation. Since the 'Brush Up Your Calculations' module had not then been taken up, we decided to include this in the workshop on future occasions.

A further problem was that the preliminary schemes the teams designed tended to be worked up holus bolus as the final scheme. The limited amount of time available made this a tempting option: they appeared to be very driven towards completing a design for presentation even if they were not satisfied with it. Our view is that a partially completed scheme which confronts energy issues is better than a fully detailed one that does not. However, we recognise that a 'sense of product' is important in design workshops and that participants are seldom happy with unreconciled schemes no matter how much they might have learned from them. We therefore decided to tighten up the initial presentation stage, requiring teams to present at an early stage at least three design options for their scheme. We also assessed these fairly brutally and directed teams towards the energy ideas they were starting to articulate. We were quite open about this, and in the 'options' appraisal said that there was nothing wrong with teams borrowing ideas from other teams: the architecturally 'unique' solution was not an issue.

One aspect that we were content with was that of interdisciplinary

working. The teams developed strong bonding qualities. They all worked together while they were sketching out ideas early on, and then tended to separate later with the architects doing drawings and engineers doing calculations. Invariably, in presenting the schemes at the end, more than one team member would describe their scheme and sometimes all made part of the formal presentation.

Two further workshops were held which incorporated these amendments, in Wales and in Sheffield. At this stage, we amended the workshop again to deal with two further problems that emerged. Consistently, the interdisciplinary working aspect of the event proved popular and effective. We wondered, though, whether the teams' efforts could be speeded up.

In Northern Ireland, the total time available had been the equivalent of two days. We wanted to cut this down to a day and a half to make less demands on office time. We achieved this in two ways. First, we started the event by adding a one-hour session of gaming to speed up the teams' familiarity with each other and break down preconceived notions of their roles. We obtained permission from the Open University to adapt a 'desert survival exercise' to do this. (An aircraft crashes in the Arizona desert and teams have to develop a strategy for survival using a random collection of items they are able to rescue from it).

We also contemplated the mass of documents teams were given from the Gas Board's Heanor Hospital competition. Part of the exercise is extracting from this the relevant information. We decided to reduce this data to a compact booklet easier for them to absorb. Although this represented a loss in the complexity of the workshop and an aspect of learning, we agreed that the consequent benefit of enabling teams to get down to work more rapidly was a penalty worth paying.

In the three most recent workshops held in Newcastle, Winchester and Oxford the programme is now as shown in Figure 12.1.

We carried out formal appraisals of these, sending questionnaires to participants. The results are shown in Figure 12.2, which should speak for itself. Three interesting characteristics are worth commenting on, however. Five learning objectives were listed and the scores show that all offices valued the team working experience very highly, and the approach to energy design nearly as highly: both dealing with issues isolated in the seminars.

The general levels of satisfaction reported are all above the

Figure 12.1

Energy Efficiency Workshop: Programme

DAY ONE

2.00-2.30pm	Introduction
2.30-3.30pm	Survival exercise
3.30-3.45pm	Tea
3.45-5.00pm	Three Design Options for development
5.00-5.30pm	Options appraisal

DAY TWO

9.00-10.00am	Lecture: strategies, form, approaches
10.00-11.15am	Scheme development
11.15-11.30am	Coffee
11.30-12.30pm	Lecture: tactics, calculations
12.30 - 1.30pm	Lunch
2.30 - 4.00pm	Scheme development
4.00 - 5.30pm	Scheme appraisal

median three score, so the targets we set appear to be met. As usual with IoAAS events, enjoyment scores higher than usefulness.

The Winchester office (which had a high questionnaire return rate) enjoyed the event very much; the figures returned are the highest of any IoAAS event ever appraised in this way. Extraordinarily, the Newcastle participants scored the event at just over the median for enjoyment. The only difference between the Winchester and Newcastle events was the venue (poor in Newcastle) and the participants themselves. This demonstrates both how important the environment is, and how learners vary in their preferences. There were comments from some at Newcastle that they liked pure 'lecture' events on the whole.

So overall, the Energy Workshop has been a successful and popular event. Together with the 'calculations' module, it represents an education design from the Formally organised arena. In this respect, it is similar to the energy course described in Chapter Three. The methods it uses are workshops, gaming and lectures. Like the Chapter Three course, the venues used are local centres or office accommodation removed from the workplace itself. Its success relative to the Chapter Three event results from it being pitched more accurately at learning targets defined by understanding the nature of the problem NHS designers face, not in drawing on methods outside the Formal arena.

Quantity Surveyors

We have not been able to respond to the needs identified by

Figure 12.2

Energy Efficiency Workshop at Newcastle, Oxford & Wessex: Questionnaire

John WILLOUGHBY'S
 first lecture
 (strategies, form, approaches)

Comments:

Not at all 1 2 3 4 5
 Very much

How enjoyable 1 2 3 4 5
 How much you learned 1 2 3 4 5
 How useful 1 2 3 4 5

John WILLOUGHBY'S
 second lecture
 (tactics, calculations)

Comments:

Not at all 1 2 3 4 5
 Very much

How enjoyable 1 2 3 4 5
 How much you learned 1 2 3 4 5
 How useful 1 2 3 4 5

The main workshop on
 HEANOR HOSPITAL
 (2nd day)

Comments:

Not at all 1 2 3 4 5
 Very much

How enjoyable 1 2 3 4 5
 How much you learned 1 2 3 4 5
 How useful 1 2 3 4 5

How suitable was
 the VENUE?

Comments:

Not at all 1 2 3 4 5
 Very much

Was the event of
 the right DURATION?

Comments:

Not at all 1 2 3 4 5
 Very much

Why did you attend?
 (Please try and be more specific than
 saying "general interest"!)

Is a particular day of the
 week more suitable than another
 for this kind of event?

Have you actually applied
 anything that arose in the
 event in your work?

Has your awareness been
 heightened, and thereby
 indirectly affected your work?

Do you have any comments to
 make about the RUNNING OF
 the event?

Do you have any comments
 to make about the
 ADMINISTRATIVE arrangements?

Should an event like this be seen
 in isolation or as part of a comprehensive
 CPD (continuing education) programme?

To what extent can your
 CPD needs be met by
 self-education and
 publications?

Comments:

Not at all 1 2 3 4 5
 Very much

Would you be
 interested in any
 of these related
 energy events and/
 or publications?

Not at all 1 2 3 4 5
 Very much

Low Energy Hospital Study Day
 Brush up your calculations
 Resource file of publications & videos
 Design appraisals
 Office Procedures appraisal

1 2 3 4 5
 1 2 3 4 5
 1 2 3 4 5
 1 2 3 4 5
 1 2 3 4 5

Thank you for your help - Stewart Harris

Continuing Education Unit
 ENERGY EFFICIENCY WORKSHOP
 Questionnaire

You will remember that you attended a 14 day workshop on Energy Efficiency in Health Buildings at on. It will be a great help to us to get your views of the event. All replies will be treated confidentially and no attributed comments will be published.

We ask you to score most questions for (a) how enjoyable that part of the event was, (b) how much you learned from it and (c) how useful it was. There is a scale from 1 to 5 for you to circle, where 5 means "very enjoyable/useful indeed" through to 1, meaning "no use at all". Then there is a space for you to explain what you mean, and what affects your judgement. The fuller you can make your comments, the more use it will be to us.

Name _____ Position _____
 Profession _____ Office _____

Comments:

Not at all 1 2 3 4 5
 Very much

We had some learning
 objectives in mind in
 mounting this workshop.
 To what extent were
 they realised?

Not at all 1 2 3 4 5
 Very much

New knowledge and
 information 1 2 3 4 5
 Concepts of energy
 efficient design 1 2 3 4 5
 How to approach energy
 efficient design 1 2 3 4 5
 Team working experience
 at early design stage 1 2 3 4 5
 Spiritual refreshment 1 2 3 4 5

THE EVENT AS A WHOLE

Comments:

Not at all 1 2 3 4 5
 Very much

How enjoyable 1 2 3 4 5
 How much you learned 1 2 3 4 5
 How useful 1 2 3 4 5

SURVIVAL

Comments:

Not at all 1 2 3 4 5
 Very much

Exercise

Comments:

Not at all 1 2 3 4 5
 Very much

How enjoyable 1 2 3 4 5
 How much you learned 1 2 3 4 5
 How useful 1 2 3 4 5

DESIGN OPTIONS

Comments:

Not at all 1 2 3 4 5
 Very much

Appraisal

Comments:

Not at all 1 2 3 4 5
 Very much

How enjoyable 1 2 3 4 5
 How much you learned 1 2 3 4 5
 How useful 1 2 3 4 5

Figure 12.2 continued

Energy Efficiency Workshop at Newcastle, Oxford & Wessex: Responses

"to what extent were these LEARNING OBJECTIVES realized?" *

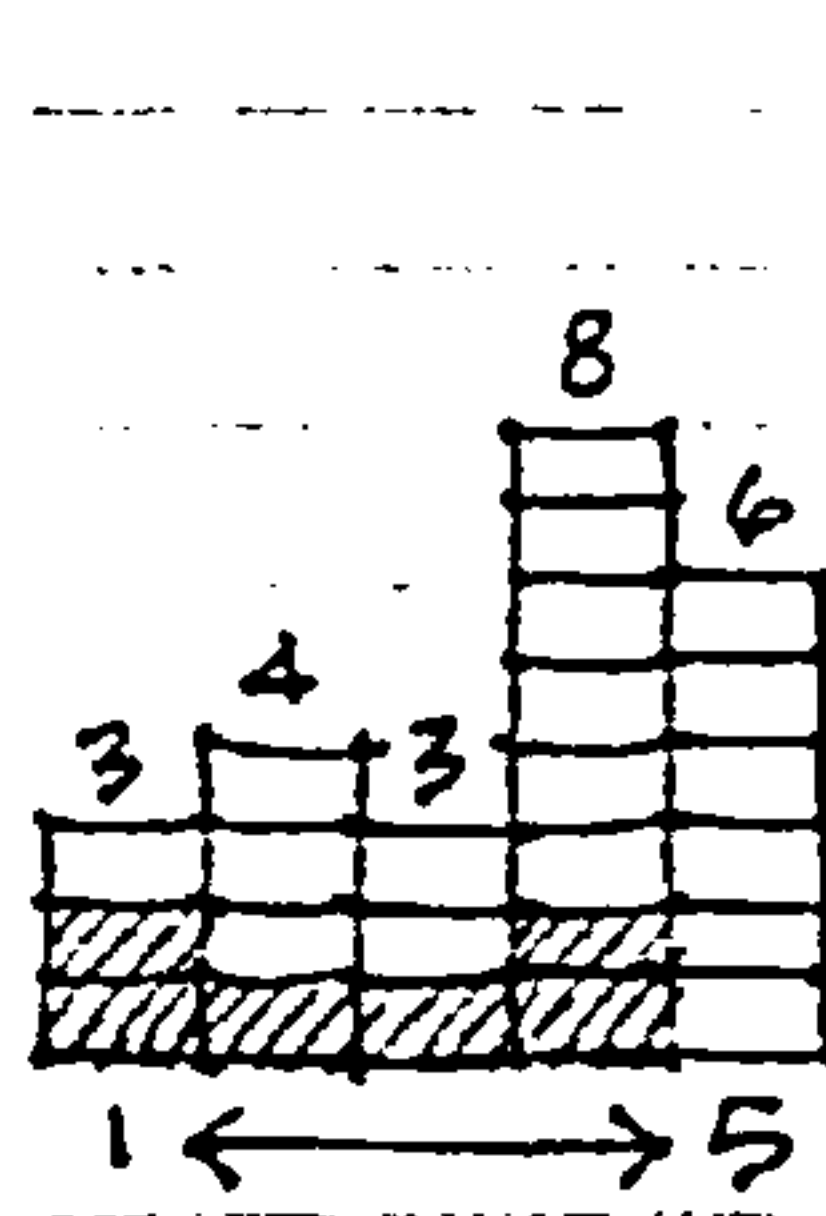
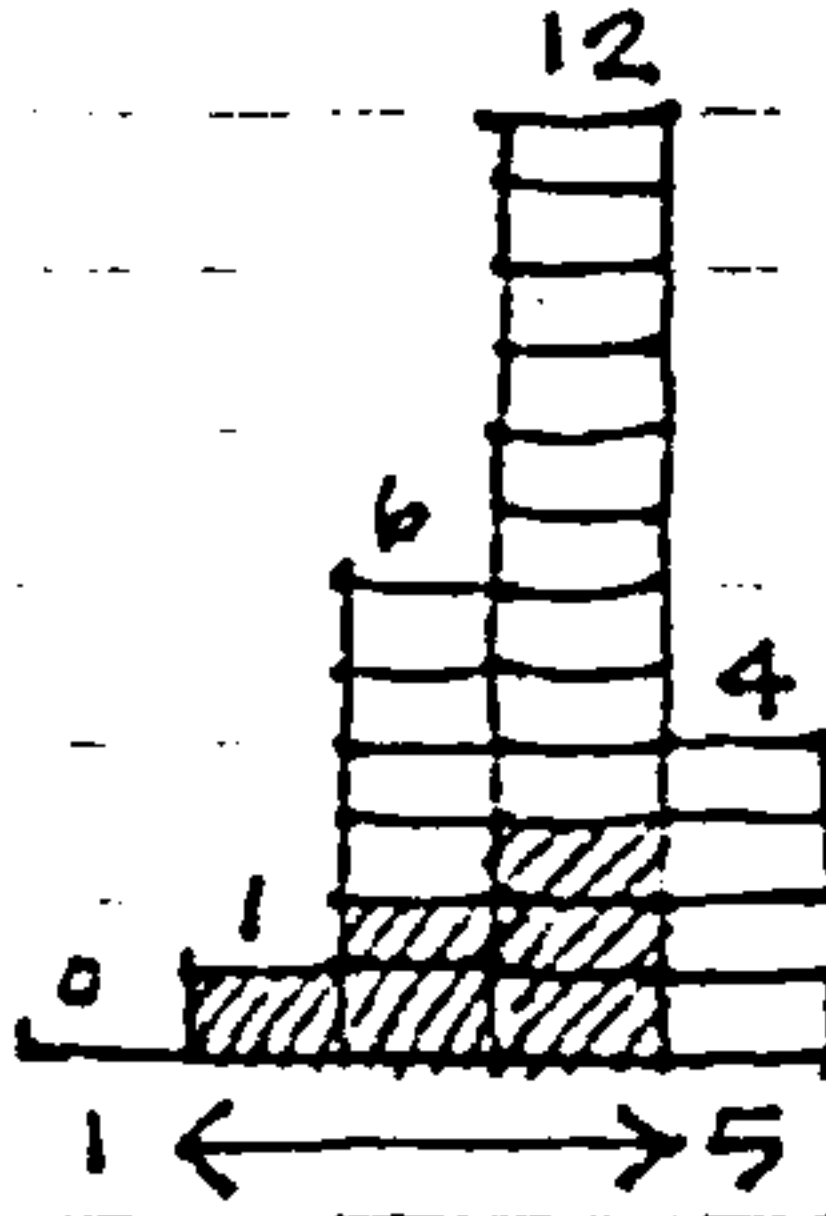
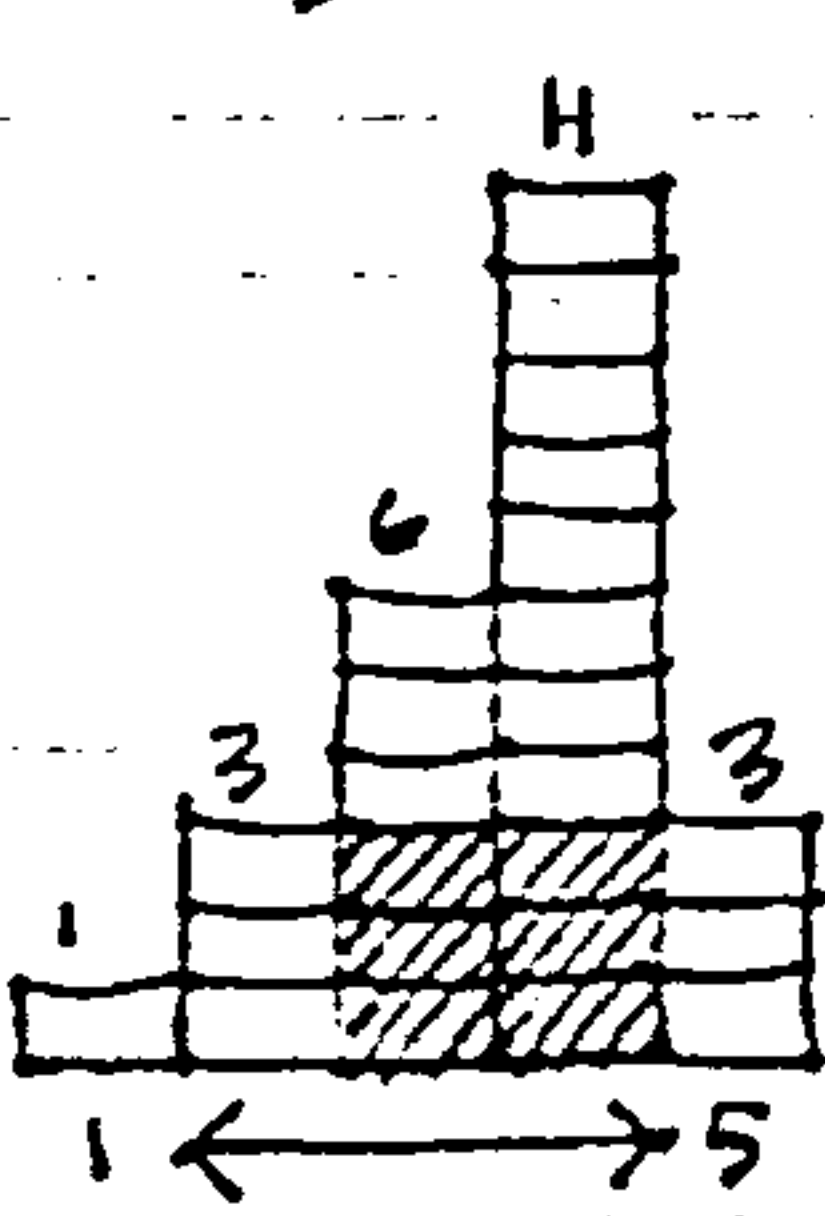
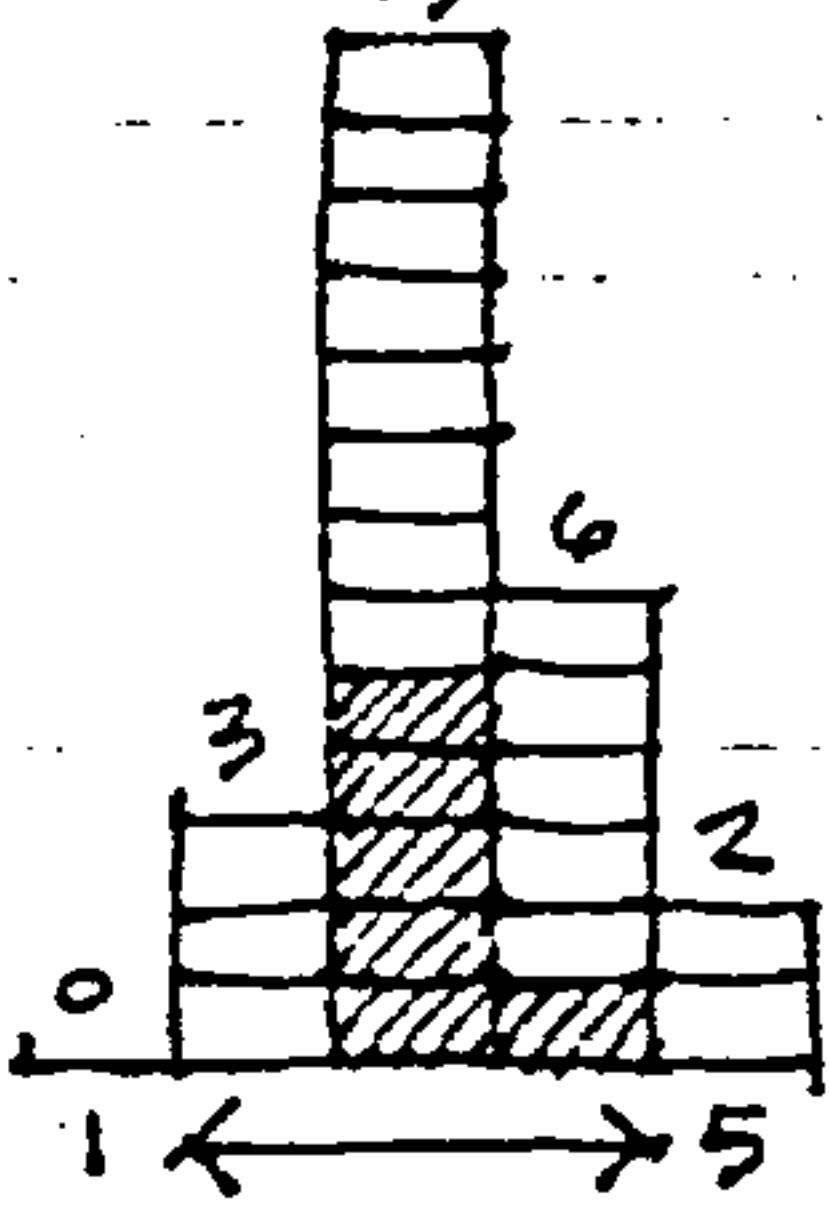
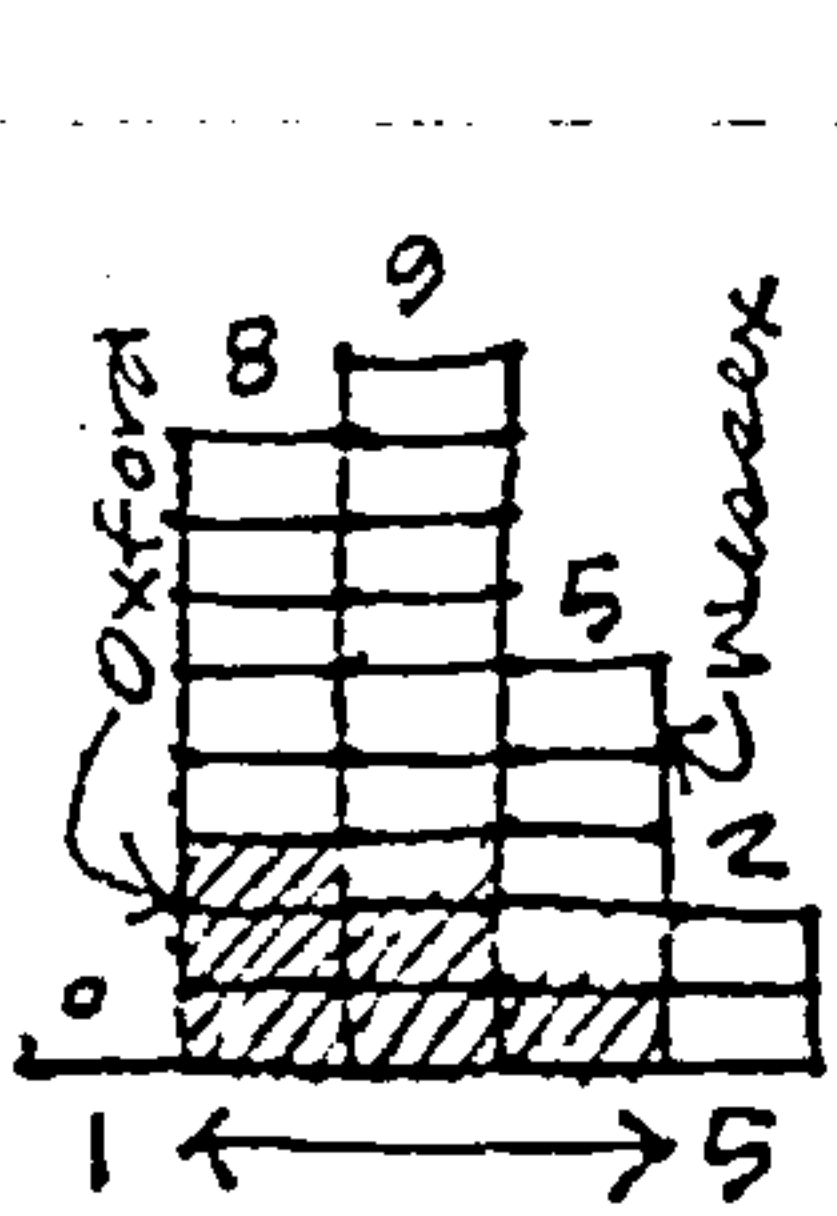
New Knowledge & information ...

Concepts of energy efficient design ...

How to approach energy efficient design ...

Team working experience ...

Spiritual refreshment ...



"How ENJOYABLE WAS..."

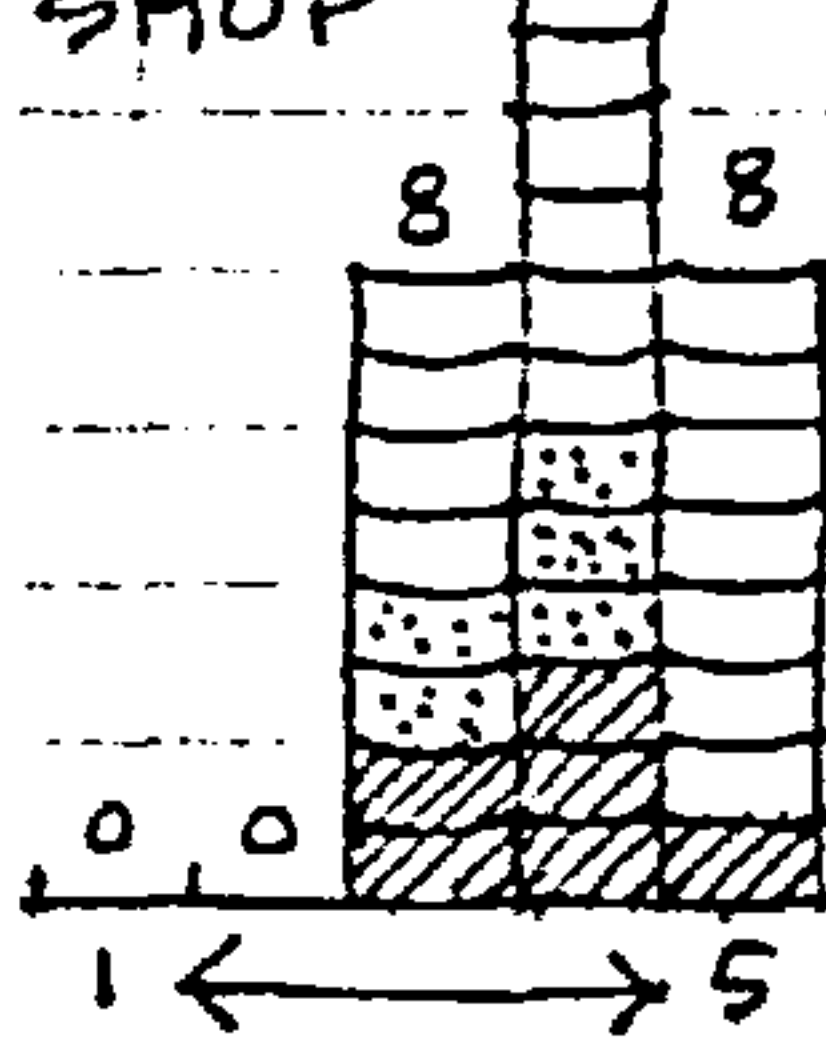
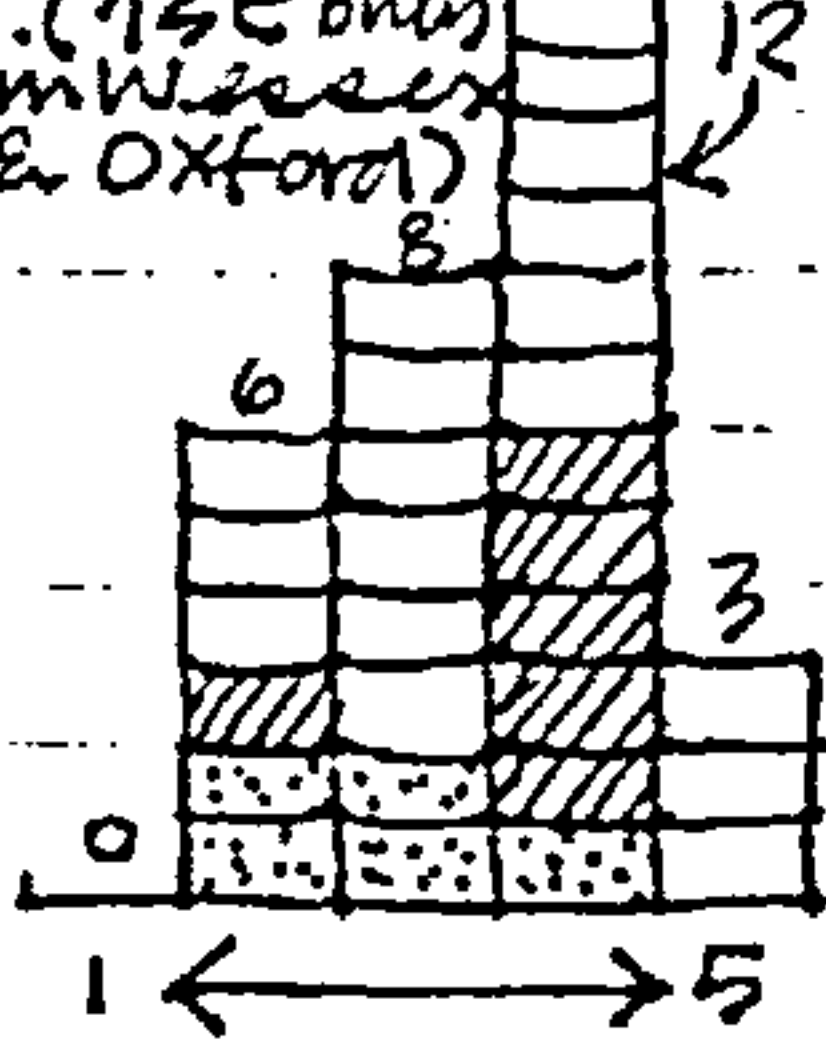
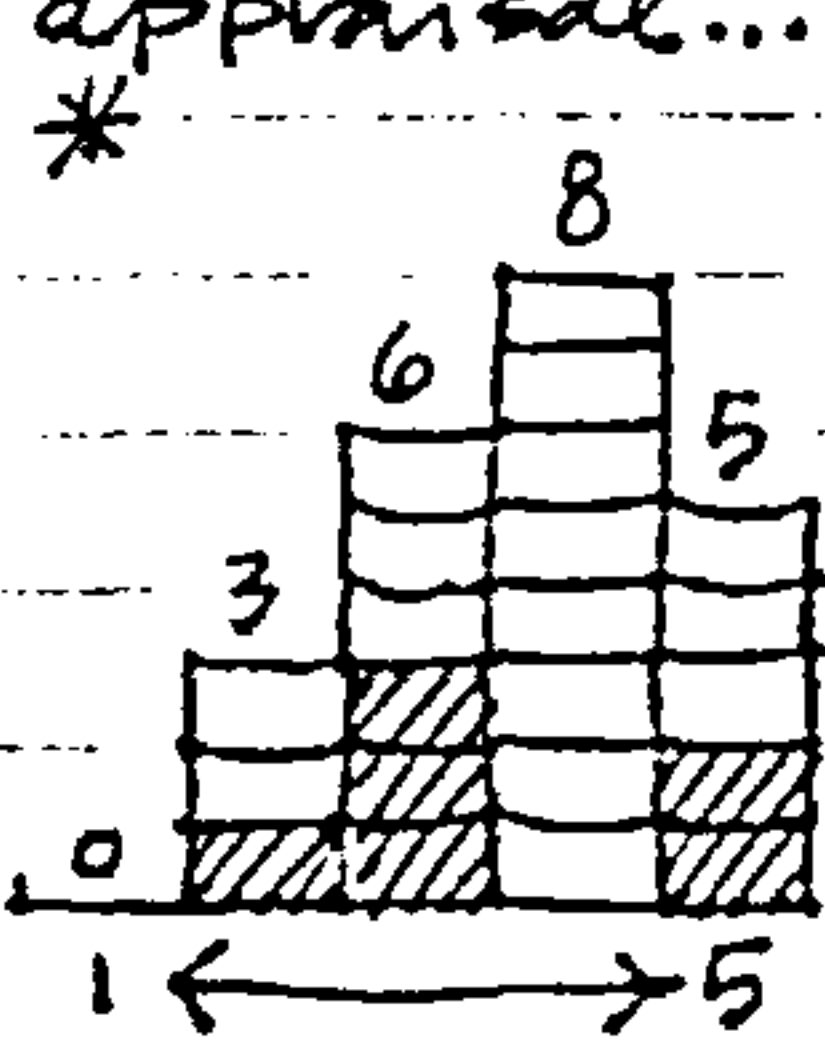
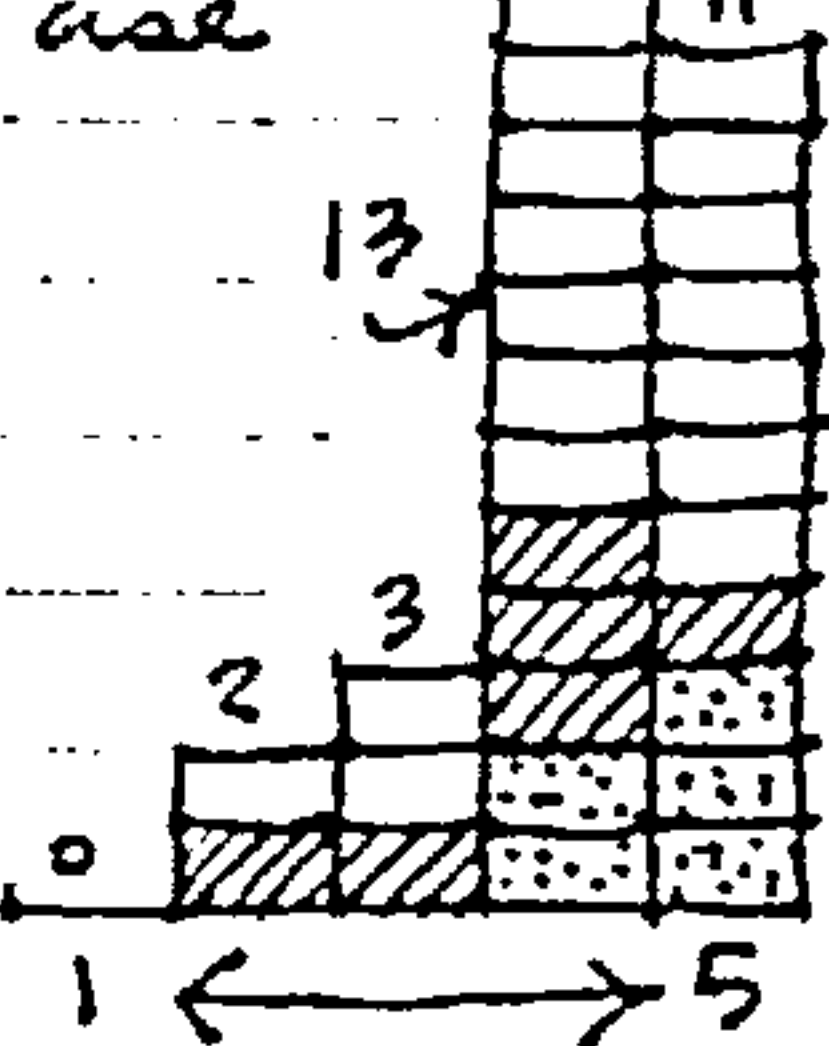
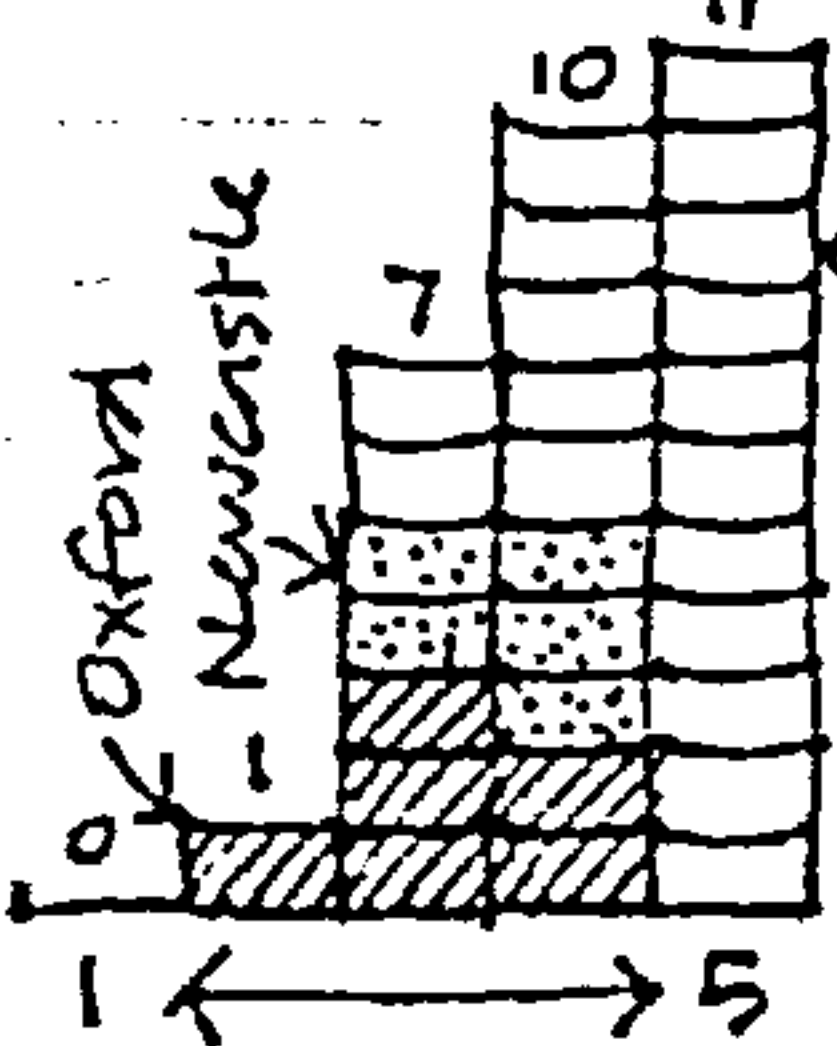
THE EVENT AS A WHOLE ...

THE SURVIVAL exercise

THE DESIGN OPTIONS appraisal ... *

THE LECTURES ... (1st only in Wessex & Oxford)

THE WORKSHOP



"How USEFUL WAS..."

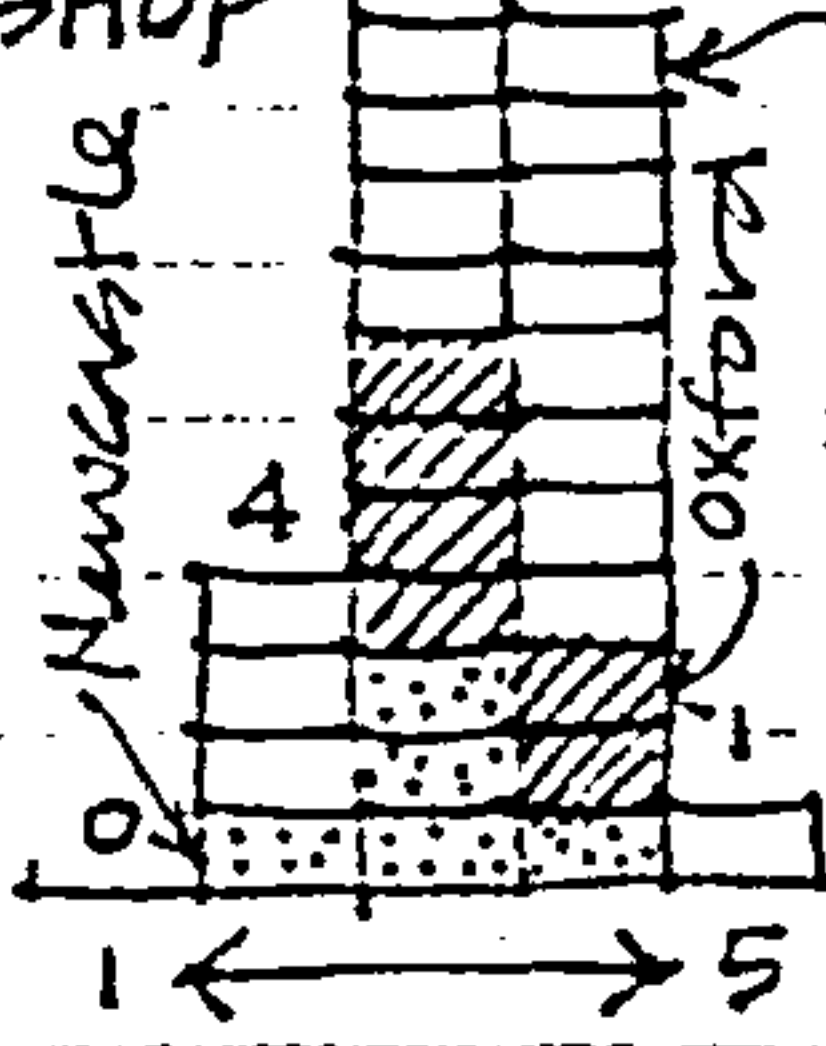
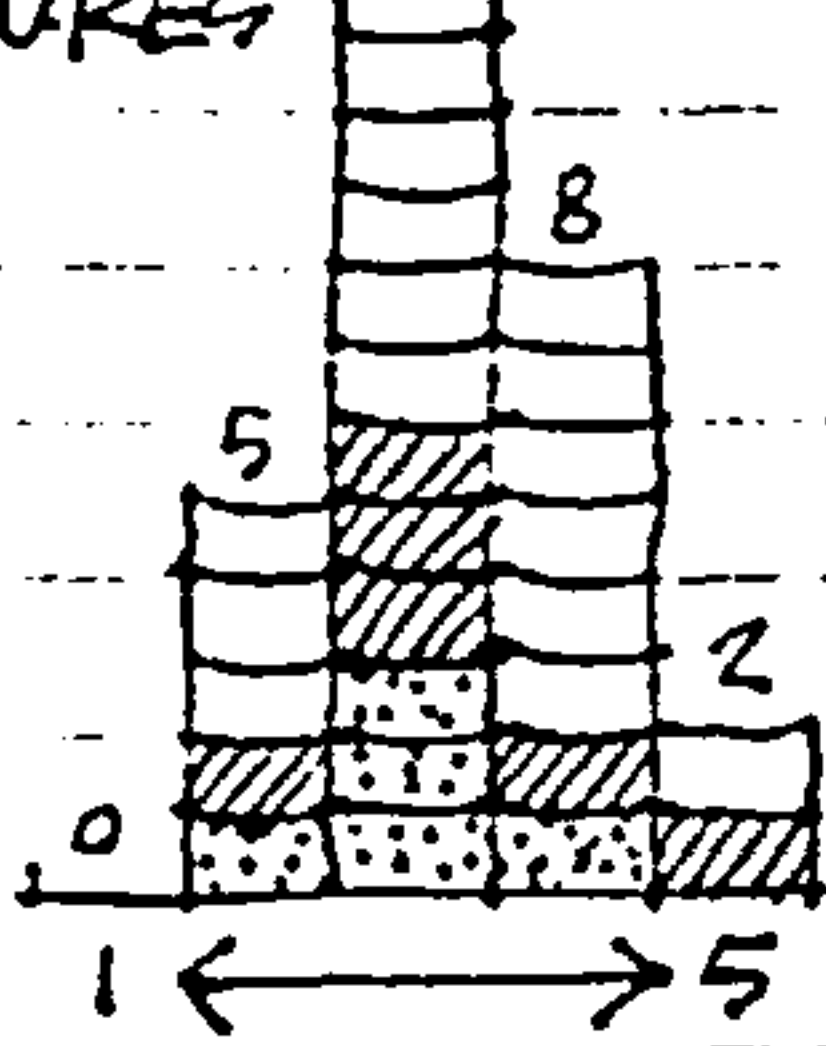
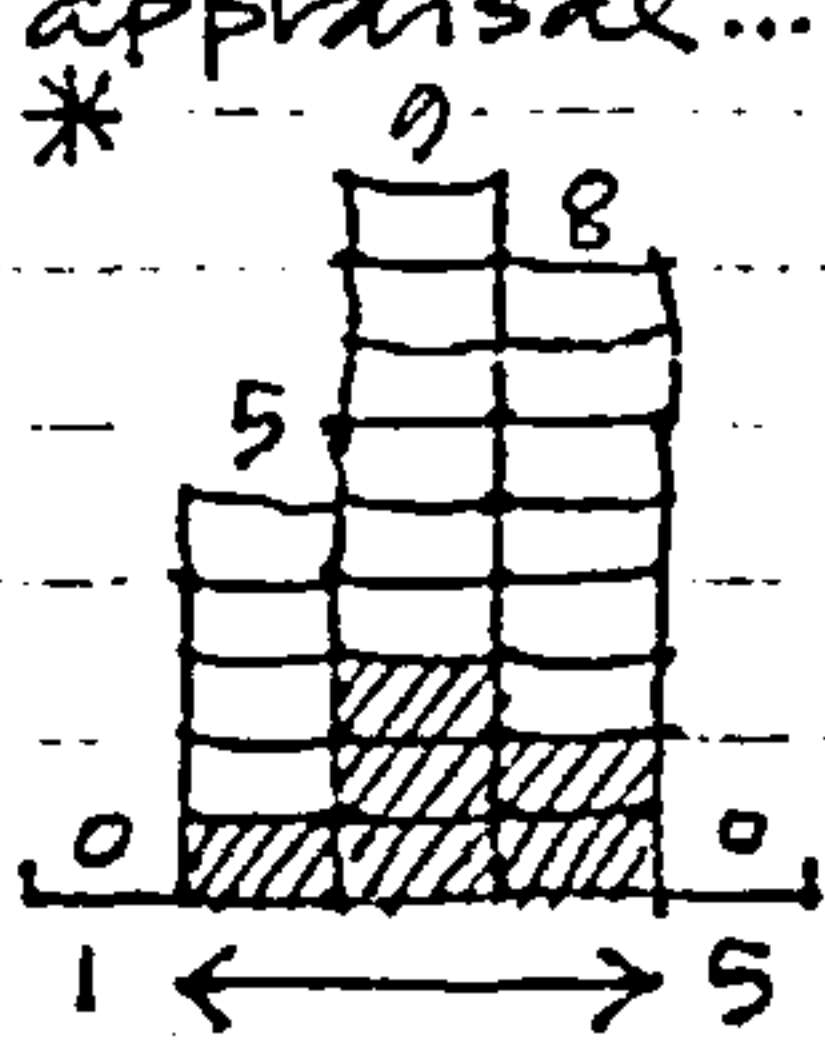
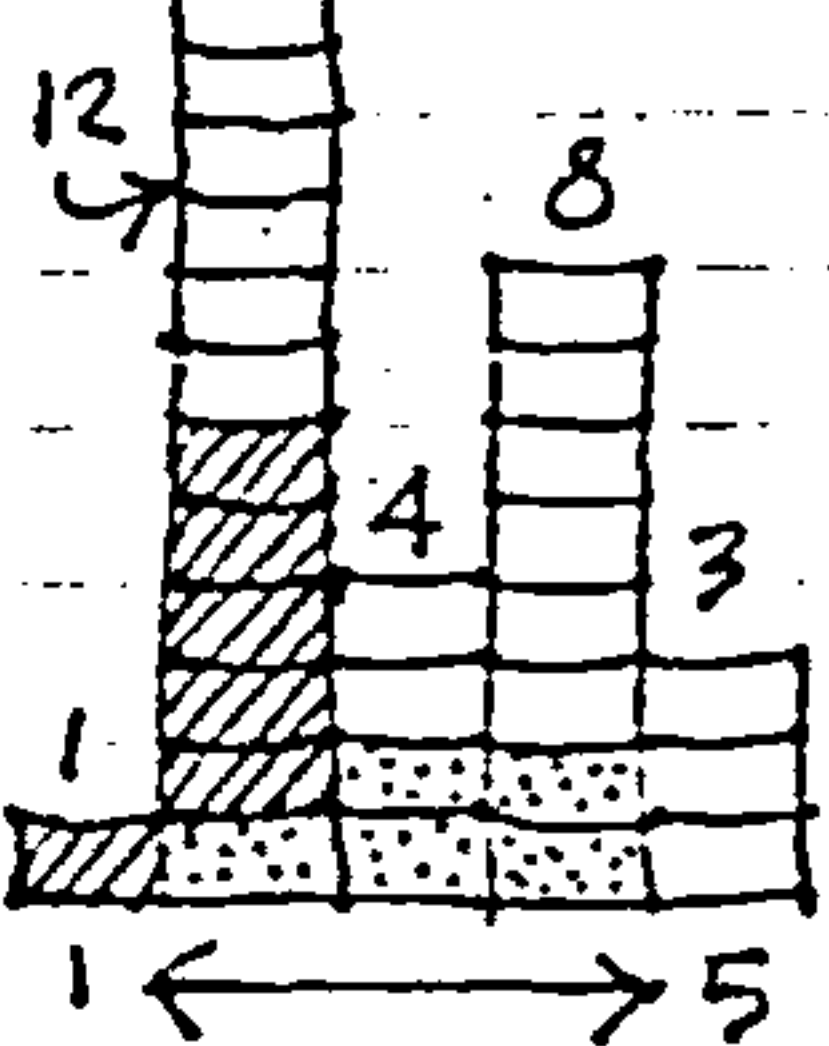
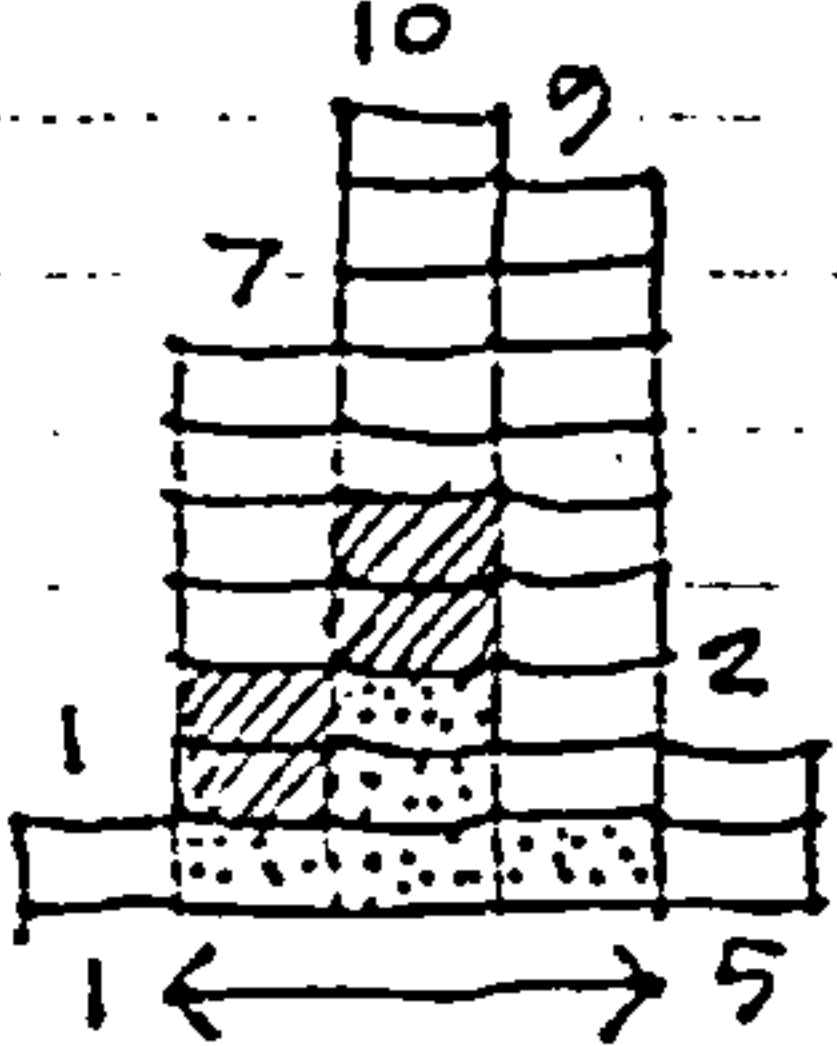
THE EVENT AS A WHOLE ...

THE SURVIVAL exercise ...

THE DESIGN OPTIONS appraisal ... *

THE LECTURES

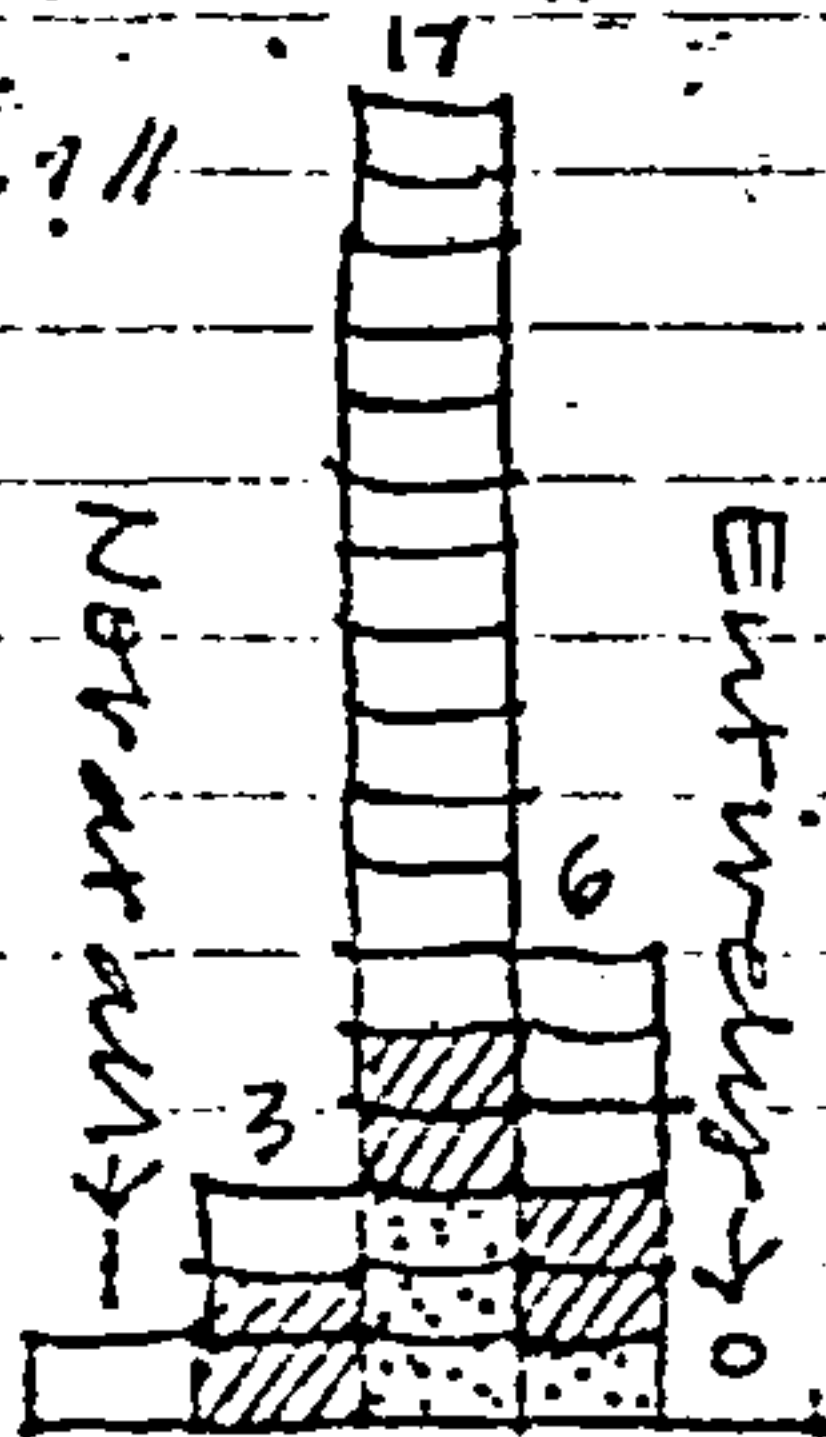
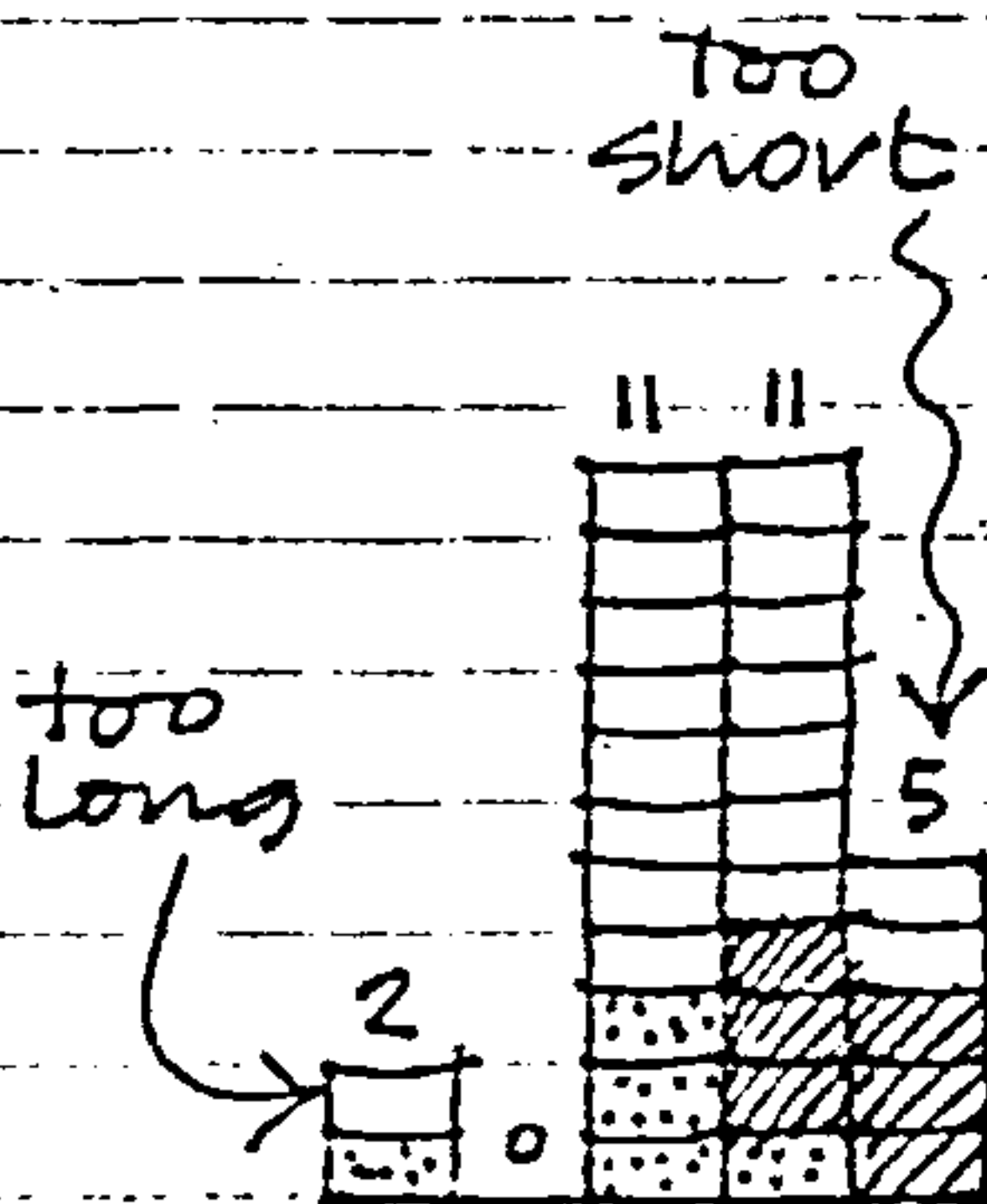
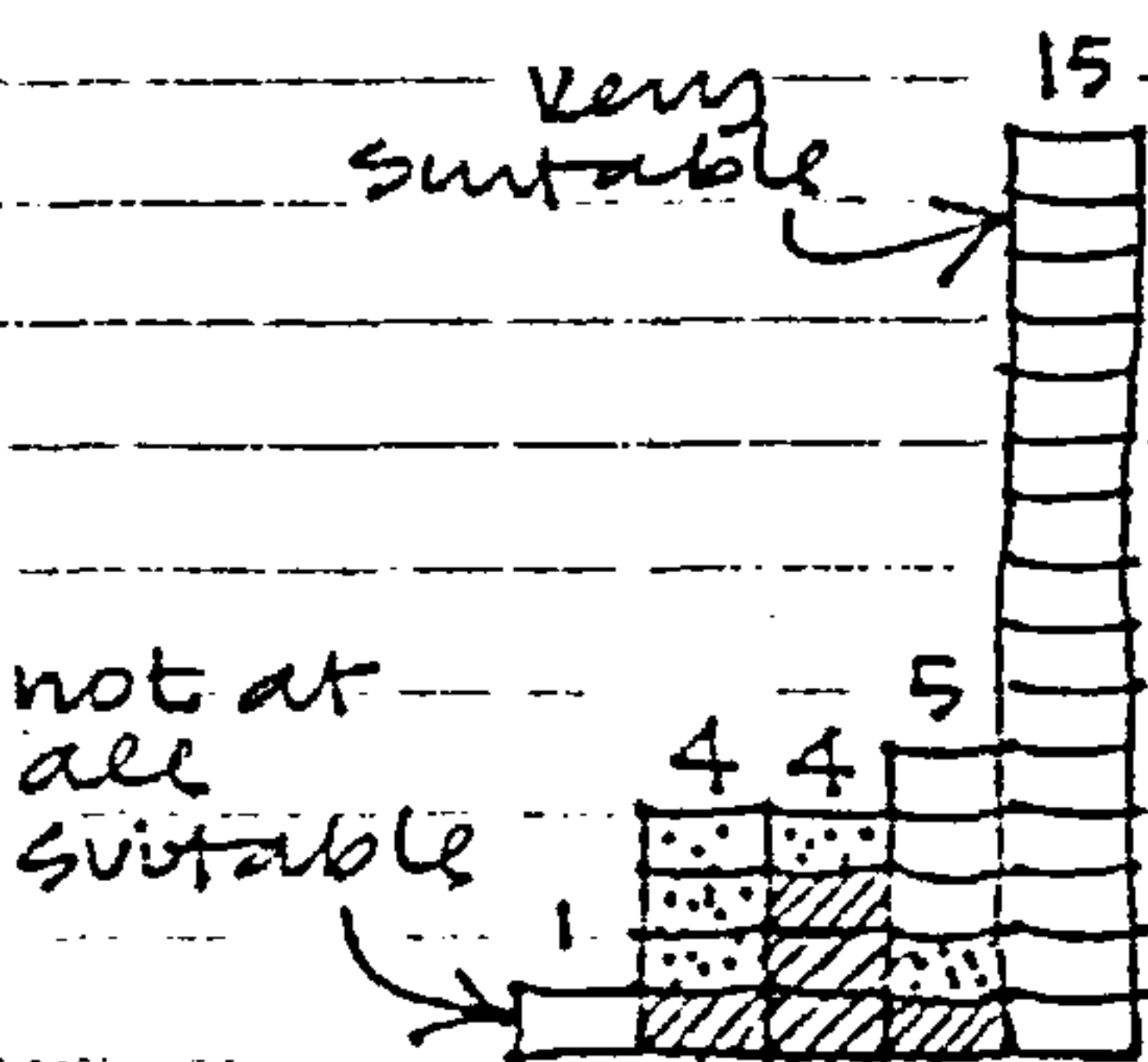
THE WORKSHOP



"THE VENUE WAS..."

"THE DURATION of the event was..."

"Can CPD needs be met by self-education and publications?"



* = not asked in Newcastle

Quantity Surveyors, because the NHS brief to the Institute of Advanced Architectural Studies does not run that far. We can, however, include Qs in multidisciplinary exercises.

New knowledge

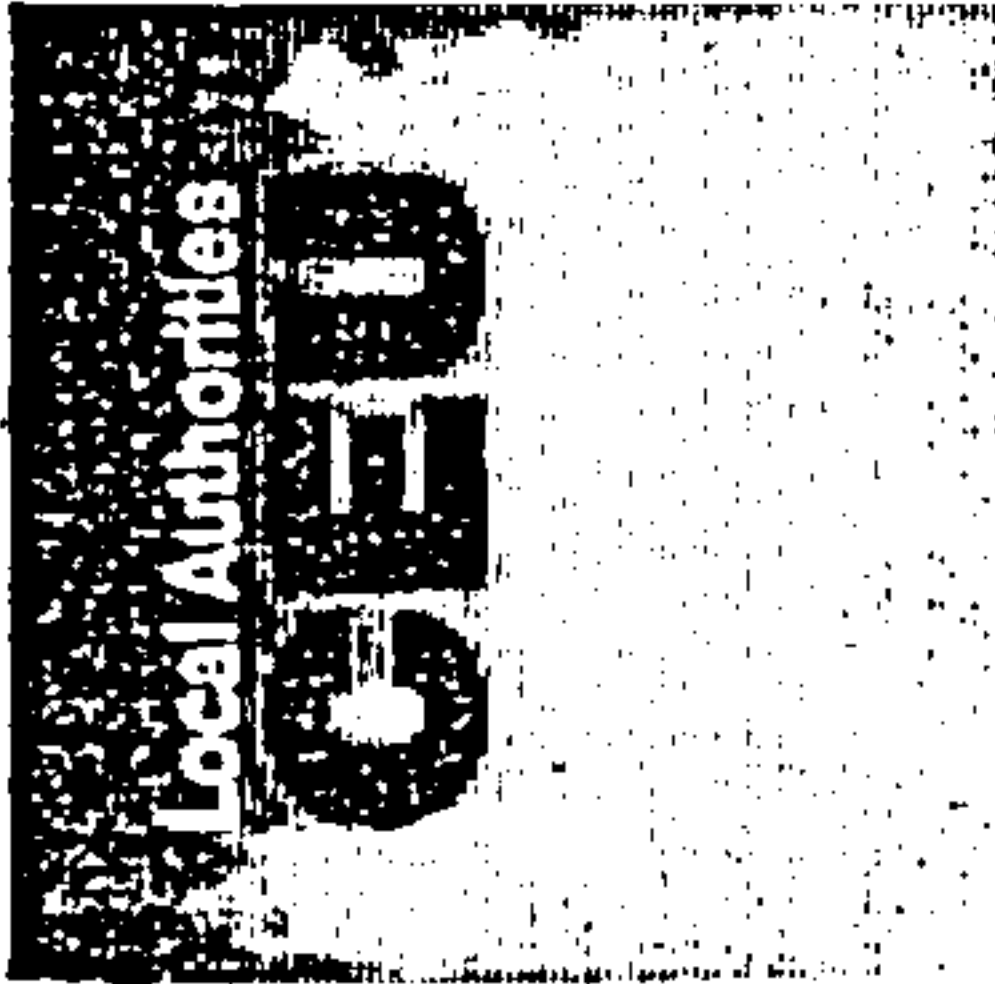
The consultation with experts showed us that there is new information and understanding becoming available which designers do not yet know about. An example of this is a hospital designed in the Isle of Wight (backed by the Region and DHSS funds) which uses 54% less energy than one of standard design.

The NHS CEU approached DHSS with an education design proposal for making a video film about the work. I developed a proposal based on the idea of showing the better understanding there now is about rules of thumb that have emerged which make early sketch schemes more accurate; and to show in consequence the hospital. Thus the video would give viewers not only a description of the hospital, but an idea of what the lessons are that might be learned from it. DHSS considered this proposal for some time; they had in fact intended to make a video themselves. Eventually, they commissioned a facilities house to make a 15-minute film for £20,000 instead.

This is not yet complete, but does not appear to adopt the 'rule of thumb' approach, preferring instead a straightforward presentation of the Isle of Wight scheme. Nonetheless, we hope to use the material in an education event about new understanding of energy usage.

This research shows that resources are seldom used in isolation and it might be hoped that the video would form only part of an education event: it would be useful to link an opportunity for discussion with it in which viewers can both ask clarifying questions, and make a personal assessment of how their own thinking is changed by it. Harris and Rymer's research paper about various Continuing Professional Development formats, "Case Studies in CPD", deals in part with videos and how they can be used in this way in continuing education.

This kind of event comes again from the Formally organised arena: the section on packaged education. Recently, the UGC has funded IoAAS for a two-year study on the possibility of extending the NHS CEU into local authorities. I have been appointed to set up the unit and in the first six months, two in-office video events have been mounted following the pattern of half-hour video plus half-hour structured discussion used in "Case Studies in CPD". As presently structured, this pattern demands



USING VIDEOS IN THE OFFICE

CPD PRACTICE NOTE No 3

This is a guide to choosing and using audio visual materials in the office. It tells you how to find out about A/V materials, what administrative arrangements you need to make, and how best to run the events.

DO YOU WANT TO USE A/V?

Deciding to select A/V materials suggested that you have already considered a range of learning methods - for example, a short in-office course, an evening lecture, an office meeting or project appraisal, a building visit, etc. Have you?

WHAT ARE YOUR OBJECTIVES?

Your choice of material and the way you run the event will be conditioned by the objectives you have decided on.

If you have a social objective in mind, almost any well produced A/V material will do, because your main purpose is the opportunity to get together and exchange views.

Sometimes you may have consciousness raising as your objective. You will want the material you select to raise some issues and these will need to be discussed. It will be useful if the material emphasises the points by putting questions. But almost any content will do, provided you are prepared to interpret it.

Often the main objective is instruction. Here the content is vital, so you need to get really good A/V material - which can be difficult as there are no independent assessments available and word of mouth is the usual way of finding out how good they are. A further difficulty is that you can't ask questions. It can be really worthwhile to discuss and apply what's being presented. Very occasionally this is built into the A/V package (e.g. Open University ones) but usually it will have to be provided by you or others.

FINDING MATERIAL

BISFA and the Building Centre Trust have published a Guide to Audio Visual Material for the Construction Industry (1983) which costs £11.50. Ron Brewer, the editor, can run a computer print-out of particular subjects for you for a modest fee.

Local Authorities
Construction Education Unit
Stewart Barr's Hatch East RA1
100 May 1st Way

Institute of Advanced
Architectural Studies
University of York
The City Centre
York YO1 1EP
0302 2304

Some films can be hired either from the distributors or from local societies - the Yorkshire RIBA Region for instance. Films are almost always more expensive than videos. You may need to book well in advance.

WHAT KIND OF A/V TO USE?

You can set up tape/slides using a slide projector and cassette player. They give a good clear picture so can be used for large or small groups, but they are fussy to use and changing the slides correctly requires some concentration. There may be an audible signal on the tape, or the projector may be activated by a signal on one of the channels of a stereo tape. You need to check that your equipment is compatible. Showing a tape/slide needs a room with blackout. The programme can be stopped in order to discuss a point (though this needs group consensus - often difficult to get!).

Videos are becoming more common and look as if they are the future market leaders. You need a recorder/playback machine and a monitor (a TV screen will do). It is essential to check that the playback machine and the tape you have are compatible - you can't play a VHS tape on a Betamax machine (these two types are the most common). The room you use needs dim out, and the number of people attending is limited by the size of the screen - though one machine can run more than one monitor. If anything, videos are easier to stop than tape/slides if you want to discuss a point.

Most A/V material comes on film - usually 16mm. The difficulties are that the projectors are noisy and often require a separate booth. Films are good for large groups, but they can't be paused for discussion. Blackout is required.

SUPPLEMENTARY ACTIVITIES

If your objective is a social one, you need to carry out some administrative arrangements. Who orders the wine? Books the room? Sends out invitations? Hires equipment? Tests the equipment in advance? Brings the spare bulb for the projector?

If your objective is to raise consciousness, you will have to make the administrative arrangements as well. In addition you will want to decide some other things. Who will lead the discussion? Is it better to prepare some discussion points in advance? Will someone sum up afterwards? Should the discussion be in a forum or in small groups - or both? Are any additional materials required - agendas, questionnaires, notepads? Can a list be obtained of follow-up reading or exercises?

If your objective is instructional you will have to consider all the questions listed above in addition to the following. May it be useful to carry out an exercise to enrich the understanding of the materials? Who will choose or design it? Who will monitor it? Will the report back be about the facts in the film, or about the processes that underlie it? We think a structured discussion period after the film is the biggest single thing you can do to translate the event from a passive experience into one which has immediate relevance to work.

THE VENUE

You need to find an appropriate room with blackout or dim-out facilities. This can be in or out of the office. If you are going to discuss the material, or carry out an exercise in small groups you need to rearrange the furniture. This is very important: the row by row arrangement suitable for seeing the screen doesn't allow easy discussion, so rearrange the chairs in a circle.

FEEDBACK

After the event, its often useful to obtain feedback from participants about the value of (a) the material and (b) the event itself - even poor material can result in a useful social or professional event and raise issues. At the very least you might be able to improve the event for next time. And what about follow-up visits or discussions about the practical implications of what has been learned?

the presence of an educator to chair the discussion period. However, there is the opportunity here to make the Formally organised event totally packaged by providing a guide to offices on running the whole event from their own resources. To help them do this, a series of 'Education Practice Notes' is being produced by the CEU. The second practice note is on Video events and is shown, reduced in scale, as Figure 12.3. It presents the argument for extending a video event beyond the passive viewing of a film; gives guidance about the administrative steps necessary to set up the event; and shows how a discussion period might be allied to it. Thus, while the event is a Formally organised one, it develops the 'domains' concepts which arise from this research into the office's habitat.

Appraisals

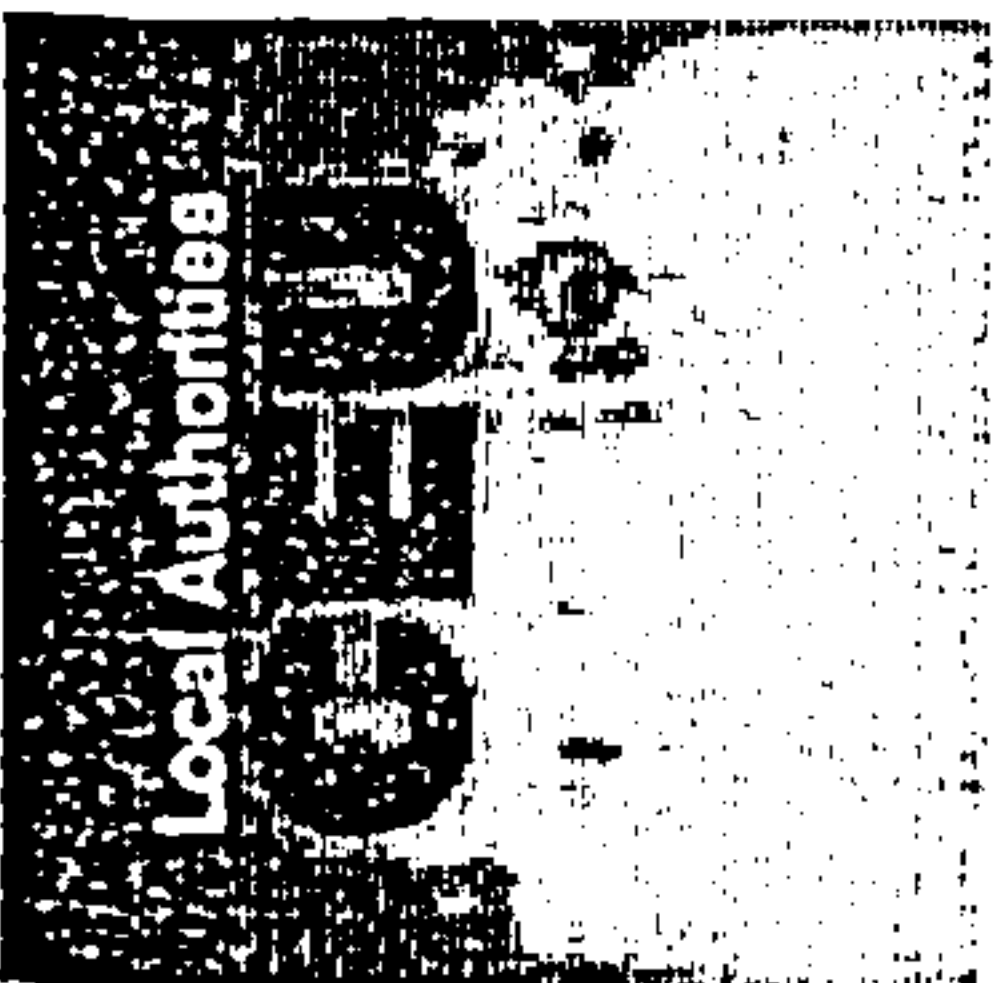
Another of the learning modules suggested in Chapter Eleven were project appraisals. These belong to the arena of Office action. Our proposals for dealing with the need we identified for self-conscious appraisals were of two kinds.

First, we have continued the project appraisals we designed as part of the research study. To date, we have run six appraisals focusing on energy efficiency. These have settled down into half-day events. They start with a short introduction from the CEU to stress the objectives of the meeting. The scheme is then presented by the designers, followed by clarifying questions. As major issues arise in the discussion, the chairman attempts to put them into the wider context of the office in order to take the pressure off the particular scheme and the presenters. This, hopefully, avoids the need to take up defensive postures which can inhibit the openness of the meeting. Towards the end of the meeting, the group is encouraged to formulate recommendations that will improve or avoid some of the problems identified, and repeat the successes. These are then summarised at the end of the meeting.

Just as the running of video events can be moved into the Office action arena, so too could these project appraisals. In fact, they could be moved totally into that arena since they do not even use core material (like the video itself) prepared in the Formally organised arena. To help offices do this, a further 'education practice note' has been prepared which is shown in Figure 12.4.

Energy Gates

The second appraisal we have designed relates not so much to



Appraisals

Project appraisals are one of the most valuable kinds of ways of undertaking CPD. They can be an occasion for part of the office to hear about what another part is doing; they can be 'dry runs' of the presentation a design team is going to make to the client; they can be a way of keeping a check on the quality of the work an office is doing; they can help maintain the design identity of the office; they can be an occasion for staff to get together and talk about design.

Mostly, though, they aren't.

Mostly, they consist of the architect explaining his scheme, the engineer explaining how the serving bits fit in, and the QS saying how the building comes in under the cost target. Often this takes up nine tenths of the time allotted, and is followed by a few desultory questions asking why a specific material was used, or why part of the plan looks the way it does. These are met with blocking statements: "The alternatives are too expensive", or "The client wants it that way".

Occasionally this last section takes on a kind of courtroom overtone. A 'jury' is spoken of; judgements are handed out. Usually the appraisal has little effect on the design: it has happened too late. No-one wants to revise a lot of drawings they have poured their artistic souls into.

But project appraisals needn't be like that. There are a few ground rules that have emerged from the appraisals we have attended that can be set out quite simply.

OBJECTIVES

First, decide why you want the appraisal. We mentioned some objectives earlier - checking the quality of work for instance. Write this down. Don't have too many objectives, you are sure to run out of time.

Second, make sure the scheme you are looking at is at a suitable stage for this kind of discussion. If the production drawings have been completed, its no use having a discussion of planning relationships.

Third, start the appraisal by restating why you are looking at the building and try to set some criteria. For example, if the objective is to have a dry run of a presentation, think what the client will want to know and make sure you have the kind of data available that will be convincing. Don't just describe what

Figure 12.4
CPD Practice Note: Project appraisals

decisions have been taken that are shown in the drawings; mention the alternatives you rejected - and why.

SETTING UP THE APPRAISAL

This is the boring bit: the administration. You need to

- Pick a place - preferably a 'home base'
 - Set a time
 - Make sure everyone who needs to know is advised in good time
 - Lay on some refreshments if you can and close down the telephone lines
 - Get the project team to collect the drawings, figures, opinions, documents, slides etc that will be relevant
 - If you're looking at a completed building, get the appraisal team to visit the site. Maybe you can arrange the visit as a preamble to the assessment itself
 - Nominate a chairman and a rapporteur (to deal with the follow-up)
- Most offices find that up to half a day needs to be set aside: 45 minutes for presentation; an hour for the discussion; and 30 minutes to formulate recommendations.

THE APPRAISAL

The session should start with the chairman explaining the objectives of the appraisal. Take care, particularly in the case of a first appraisal, to allay any fears about the organisers motives. We find that if the chairman puts the issues into the wider context of the office, it takes the pressure off the particular scheme and the presenters. This hopefully avoids the need to take up defensive postures and thus inhibit the openness of the meeting.

The presentation will normally be made by the project team. Their job is to feed into the appraisal all the relevant information: no less and no more. How they do this is up to them. Some information can be circulated in advance. Two golden rules are don't mumble (difficult when you are talking to the drawings and the audience is behind you) and practice first (in your mirror the night before; you feel very self conscious but at least you know how long you're going to talk. You always take longer than you think you will: cut down on what you will say; cut out as much fumbling for words and for papers as you can).

The next part is the most difficult - the appraisal itself. In many cases the exercise stops short at this point: The appraisal team can be a single person or a small multi-professional panel convened for the purpose, recruited from within the organisations linked by the project team. Outsiders can be brought in to introduce an element of neutrality or to bring a particular skill or viewpoint to bear, if this is desired. The chairman has

Local Authorities
CONTRIBUTING ORGANISATION UNIT
Stewart Harris March Est R61
Soc May Est R65

Institute of Advanced
Architectural Studies
University of York
The People's Manor
York YO1 3PE
(LOCAL COPY)

a crucial role in managing the appraisal: ensuring that misunderstandings are avoided or cleared up; that all the criteria selected are explored; that a fair balance is struck between fact and opinion, and between one aspect of a project and another; that the objectives are, as far as possible, reached; and that the conclusions are translated into an appropriate form. It is often best to get the appraisal itself going with a question-and-answer and develop this into a discussion of a number of themes or issues. Each will be different, and only experience will suggest how best to play it. Appraisal is a 'personal' activity, run by and for the participants.

In our experience, the appraisal quickly shows up any difficulties or flaws in the procedural systems or processes adopted by the office. These may be to do with information flow, team working or the management of resources. Presenters find it easy to talk about these issues - perhaps because they feel they are outside their control and responsibility. The appraisal is often less clear about the technical performance of the product either because the data has not been produced or if it has, it is considered too detailed for the event. It may also be that a technical description is thought to be less appealing than one about social interaction. We think that strong chairing is needed to bring out technical deficiencies which are related to individual responsibility and competence. The motivation and morale of the members of the team are sometimes mentioned. Poor communication, lack of objectives and bad interdisciplinary relationships are thought of as depressing motivation but it is not clear whether the reverse conditions improve it.

Finally the chairman should summarise what has been agreed. If possible, someone should be asked to review the quality of the presentation and discussion.

FOLLOW UP

The rapporteur (who may be the chairman, one of the participants or someone else) must be committed to the presentation and circulation of the follow-up material. This is as important in relation to the appraisal as minutes are to a site meeting. It is also worth using this material as a point of reference for a subsequent appraisal. Three key words may help: AVOID IMPROVE REPEAT. If the appraisal throws up a topic for further study, consider arranging a seminar, workshop or course as appropriate. The CEU can help set these up at short notice.

POSTSCRIPT

When you do run an appraisal session or series, please let us know how you get on. If Project Appraisal proves, on balance, to be helpful the CEU will feel justified in encouraging its development and wider adoption.

Much of the initial work on Project Appraisal was done by the York Centre for continuing professional development of the building professions. The CEU is grateful to Richard Gardner, who developed the techniques, and Stuart Sutcliffe, for their help in preparing this document.

particular designs as to office procedures. Health service designers go through a series of checks on designs to ensure that the brief is being realised and that cost budgets are being met. This is known as Capricode (see Moss, 1974). We have suggested that a similar series of energy checks could be gone through - they have come to be called 'Energy Gates'. In these, energy targets are identified at the early design stage (involving the non-design members of the project team) and at Capricode stages the energy targets too are assessed.

This suggestion for dealing with learning, and the processes that aid learning, belongs entirely to the arena of Office action: it is management advice rather than 'education' conventionally understood: a further illustration of the usefulness of inquiring how architects learn.

Self development

In the seminars, participants identified areas in which they needed continuing education by isolating where their weaknesses and interests lay. They each designed a "Programme X" of learning they would undertake in future. These are essentially personal undertakings and we have some confidence that learners are competent to embark on them. To help them draw from a richer stock of available material, the NHS CEU funded and I compiled a 60pp "Energy Resources File" which was mailed to each of the participants in the seminars. This takes each of the resources that were scored and lists the key material widely available. So it acts as a bibliography, filmography, lists useful trade literature, gives details about how to find out about courses and exhibitions, lists appropriate television and radio programmes and also computer programs that are available. The contents page is shown, reduced in scale, as Figure 12.5.

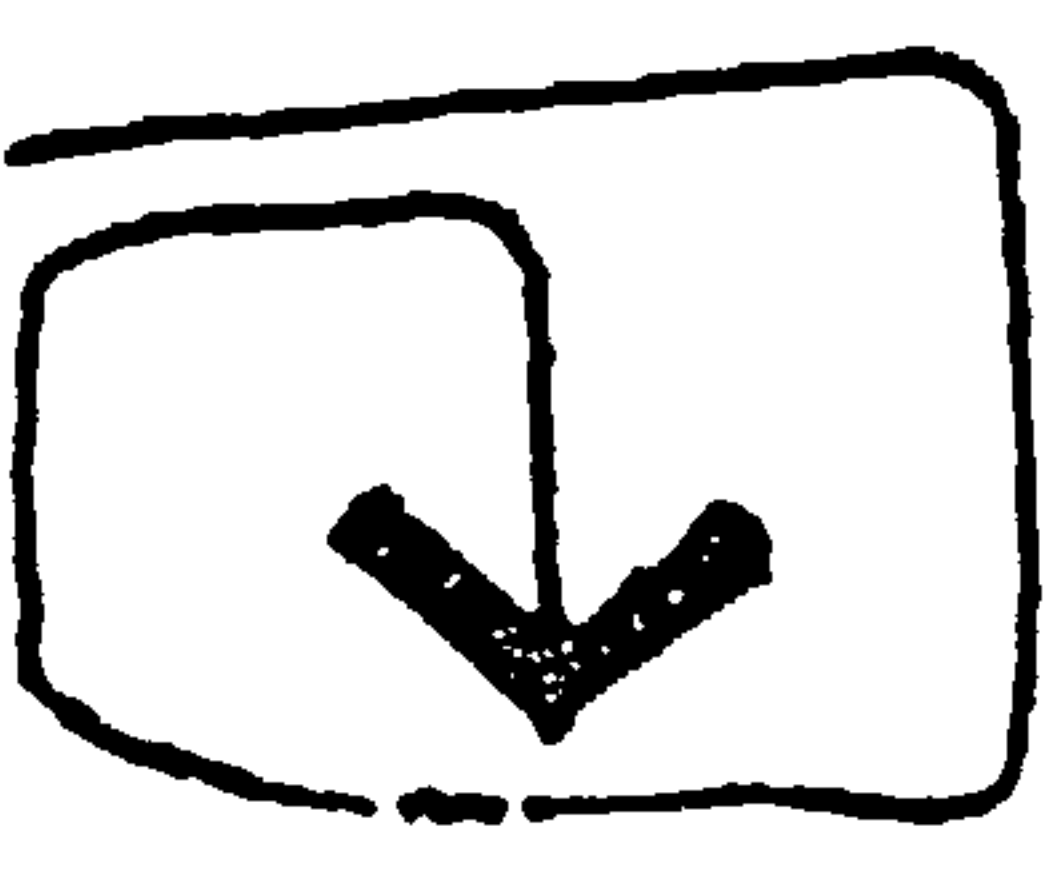
The objective of this Resource File was to encourage learning arising from the Personally organised arena. The introduction to the File summarises this research and the learning modules described in this chapter. It concludes

"Meanwhile, this Resource File is to help independent learners get on with their own education"
(Harris, 1983).

The Resource File, besides being sent to the seminar participants, was also sent to each Region's library. The DHSS has ordered a further 170 copies to be sent to all NHS Districts and made it available for general

ENERGY RESOURCE FILE

Figure 12.5
Energy Resource File: Table of contents



RADIO AND TELEVISION	
Where to find out about TV and Radio programmes are currently being broadcast	44
EDUCATION KITS AND DISTANCE LEARNING	
How to find out about Distance Learning Courses	46
What Distance Learning is currently available	46
COMPUTER PROGRAMS AND EVENTS	
How to find out about Computer Programs	48
What Computer Programs are available	48
SHORT COURSES AND EVENTS	
How to find out about Short Courses	50
What Short Courses are currently available	51
RESPONSE SHEETS	

TRADE LITERATURE AND CATALOGUES	
How to find out about Trade Literature	26
What Trade Literature is currently available:	27
Openings	27
Ironmongery	28
Roofing and Cladding	28
Heating and Ventilating	29
Lighting	29
Brickwork and Blockwork	30
Sheet Materials	30
Insulation	31
Adhesives	31
SHOWS AND EXHIBITIONS	
How to find out about Exhibitions	32
Permanent Exhibitions	32
Temporary Exhibitions	33
FILMS, VIDEOS AND TAPE/SLIDES	
How to find out about Films, Videos, and Tape/Slides	36
What Audio Visual Materials are currently available	36
Addresses	37
Principles and Approaches	38
Environmental Engineering	38
Calculations	39
Applications: General	40
Applications: Housing	41
Applications: Offices	42

CONTENTS	
INTRODUCTION TO THE FILE	
Introduction	4
BOOKS AND MAGAZINE ARTICLES	
Bibliography	6
How to find out about Written Materials	6
Libraries	7
Reference Works	7
Journals	8
What Written Materials are currently available	9
National and International Strategies	9
Principles and Overall Reviews	10
Climate	11
User Behaviour	11
Cost, Finance	12
Management	12
Building Regulations	13
Design Approaches	13
Computers	14
Ambient Energy	14
Environmental Physics: Calculations	15
Environmental Physics: Condensation	16
Building Types: Hospitals	17
Building Types: Offices	18
Building Types: General	18
Existing Buildings	19
Construction	19
Materials and Components: General	20
Materials: Insulating materials	21
Services	22
Electrical and Lighting	22
Heating: General	23
Heating: Air conditioning	24
Heating: Heat pumps	24
Ventilation (Natural & Mechanical)	25
Controls	25

HOW TO USE THIS GUIDE

This resource file has been produced by the CEU to help designers get access to published material on energy in buildings. It is broken into a number of sections dealing with books, videos, computer programmes and so on - the contents page opposite lists them.

In each section we list the data in two ways. First, we give a list of key people and organisations that can be contacted to get up to date information. We call this "How to find out about ...". Second, we provide a list of information that was available as we went to press in the summer of 1983. We call this "What is currently available".

We hope to keep the file updated from time to time. We can do this by monitoring new published material, but we also need to get feedback from users about their impressions of the data we have included. If you have any comments to make - about material you have used and found good or not so good - or if you have come across material we have not included at all, please let us know so that the next edition can include them. At the end of the file are a number of tear out sheets that can be used for this purpose.

Stewart Harris, for the CEU team
RHS Continuing Education Unit for Architectural Staff
Institute of Advanced Architectural Studies
University of York
The King's Manor
York YO1 2EP
Tel: (0904) 59861 ext 864

sale.

Summary

Part Four has attempted to show how an understanding of how the methods used spontaneously by architects in their learning can be utilised.

Chapter Eleven examined the necessary content of energy learning by holding seminars with designers. It was found that their corporate knowledge of energy matters is high, though individuals had a patchy grasp. It was also found that there is a lack of application of that knowledge to design proposals. Furthermore, there is a steady accumulation of new information which needs to be disseminated.

Learners showed that they engage in a large number of spontaneous learning endeavours, using a wide range of resources and methods. It was concluded that these should be encouraged and reinforced, and that the methods and planning approaches used should be utilised in new education design.

Chapter Twelve described six selective education events that were designed to deal with the needs we identified: an Energy Resource File to help independent learning (from the Personally organised arena); a video and discussion pack to disseminate knowledge of new information (combining the Office and Formal arenas); an interdisciplinary design exercise to help team working, provide peer group teaching, and deal with approaches to design (from the Formally organised arena); specialised education about calculations; project appraisals to help the better application of knowledge into building performance (combining Office and Formal arenas); and the introduction of office procedures to act as a focus for reaching energy targets (from the arena of Office action).

This research started by questioning which methods architects recognise: it concludes by showing the use of those methods (or their relatives, dragged kicking and screaming into the Formal Arena that is our habitat). Apart from the specific instances listed above, the pedagogic intention is to provide a range of learning opportunities, not only because learners showed that they use a large number in any one 'learning project', but hopefully to provide a range of styles, suitable to a range of preferences. The solutions proposed in this case study do not arise inexorably from the investigation into methods architects employ; they are choices made in the light of a knowledge of what those

methods are.

The finding of the research is that a large palette of educational response is used by learners in practice. By utilizing it, education designers can draw on a series of methods identified by learners themselves as being useful. This is not a prescriptive formula. Education design, like all other forms of design, depends on an inspired response to an adequately articulated problem. But it is an attempt at enlarging the folk memory of educational solutions to which designers refer when thinking up unique learning strategies.

As these events continue to be mounted, we have the opportunity to continue monitoring how effective they are, introduce new material about new information, and learn more ourselves about designing education for designers.

REFERENCES

- Anson, Brian "Grand Design that Should Go Back to the Drawing Board" in Times Higher Educational Supplement, 17th April, 1981, p10.
- Architects' Journal "Tomorrows Architects", 8th March and 15th March, 1978, pp437-466 and 491-512.
- Architects Registration Council of the United Kingdom Annual Reports 1945-1981.
- Argyris, Chris and Schon, Donald "Theory in Practice: Increasing Professional Effectiveness, Jossey Bass. 1974.
- Argyris, Chris and Schon, Donald "What is an Organization that it may learn?" in Lockett, Martin and Spear, Roger Organizations as Systems. Open University Press, 1980, pp130-7.
- Aylward, Graeme (ed) Stimulus Papers: The Making of an Architect Conference, held at the University of York. SAC. 1978.
- Beard, Ruth Teaching and Learning in Higher Education (3rd ed), Penguin, 1976.
- Beard, Ruth "Course Design, Teaching Methods and Department Decisions" in Warren Piper and Glatter (eds), op cit, 1978.
- Beard, Ruth M; Bligh, Donald A and Harding, Alan G Research Into Teaching Methods in Higher Education (4th ed), Society for Research into Higher Education. April, 1978.
- Beishon, R John and Peters, Geoff Systems Behaviour, 2nd edition, Harper and Row. 1976.
- Bligh, Donald A What's The Use of Lectures? University Teaching Methods Unit, London. 1971.
- Bligh, Donald A "Are Teaching Innovations in Post Secondary Education Irrelevant?" in Howe, op cit. 1977.
- BISFA Catalogue of Architectural Films and Audio Visual Materials (forthcoming).
- Bond, Jean "Pupil Tutoring: the educational conjuring trick" in Educational Review, November, 1982, pp241-252.
- Bottomley, Derek S "Professional Development, Education, Aspiration and Isolation" in Yorkshire Architect, March/April, 1978.
- Boydell, T Experiential Learning, Sheffield City Polytechnic, Manchester Monographs 5, 1976.
- Brearley, Michael Interview in Sunday Times, 12th July, 1981.
- Building Design "The need for continuing education", Editorial, 3rd March, 1978.
- Building Design Letters columns, 1978-1981.

- Buzan, Tony Use Your Head, BBC. 1974.
- Carter, John "What can be done about architectural education?" in The Architects' Journal, 14th April, 1976, pp743-761.
- Carter, John "Continuing Education" in The Architects' Journal, 26th April, 1978, pp797-812.
- Carter, John "Educating the Architect" in The Architects' Journal, 21st November, 1979, p1085.
- Chadwick, AF and Fielden, RDS Approaches to Research in Adult Education. Rediguide 27, Nottingham University School of Education, 1979.
- Checkland, PB "Towards a Systems-based Methodology for Real-World Problem Solving" in Beishon and Peters, op cit, 1976.
- Child, Dennis Psychology and the Teacher (3rd ed) Holt, Rinehart and Winston. 1981.
- Clark, Tim; Harris, Stewart and Todd, Frankie Surveying the Surveyors: A Background Study of Building, Land and Estate Surveyors in NHS Regions. Institute of Advanced Architectural Studies, University of York (privately circulated in NHS). 1981.
- Continuing Education Unit for NHS Architectural Staff Newsheet Issues 1-9, Institute of Advanced Architectural Studies, University of York. 1979-1982.
- Continuing Education Unit for NHS Architectural Staff Fire Safety in New Health Buildings: An education kit. Institute of Advanced Architectural Studies, University of York. 1980.
- Continuing Education Unit Audio Visual Materials: Resources For In House Learning: A catalogue of audio visual materials for health building professions. Institute of Advanced Architectural Studies, University of York. 1981.
- Continuing Professional Development in Construction Group CPDC Newsletter No 11, CPDC, September, 1983.
- Cox, Anthony "Where Are We?" in Aylward, Graeme (ed), op cit, 1978.
- Cunningham, Allen "Educational Transitions" in Aylward, Graeme (ed), op cit, 1978.
- Current Information in the Construction Industry (formerly Ministry of Works Library Bulletin), 1945-1982.
- Daniel, John "Learning Styles and Strategies: The work of Gordon Pask" in Entwistle and Hounsell, op cit, 1975.
- Davis, LE and Taylor, JC Design of Jobs, Penguin. 1972.
- de Bono, Edward de Bono's Thinking Course, BBC Publications. 1982.

- Entwhistle, Noel and Hounsell, Dai (eds) How Students Learn: Readings in Higher Education I. Institute for Research and Development in Post-Compulsory Education, University of Lancaster. 1975.
- Fryer, Barry "Managing on Site" and "Learning in Action" in Building, 15th June and 22nd June, 1979.
- Gagne, RM The Conditions of Learning, Holt, Rinehart and Winston. 1965.
- Gardner, Richard "The Development of Architectural Education in the UK", The Architects' Journal, 9th October, 1974, pp873-881.
- Gardner, Richard; Stuccliffe, Stuart and Taylor, Jeremy Continuing Professional Development for Architects: A report for ARCUK. Institute of Advanced Architectural Studies Research Paper 20, November, 1981.
- Gerlanter, Mark Design Knowledge and Design Education: A critique of design education's traditional concept of the source of form and an alternative proposal. Paper delivered to "The Project as Teaching Method", IoAAS, University of York, 23rd/24th February, 1978.
- Gibbs-Kennet, Peter "CPD is Back in Fashion" in Building Design, 26th June, 1981, pp26-27.
- Glaser, BG and Strauss, A The Discovery of Grounded Theory: Strategies for qualitative research, Chicago. 1967.
- Goodey, J and Matthew, K Architects and Information. Research Paper 1, Institute of Advanced Architectural Studies, University of York. 1971.
- Harris, Stewart Mid Career Education Needs of NHS Architectural Staff, Research Paper 16, Institute of Advanced Architectural Studies, University of York. 1978.
- Harris, Stewart "The Fourth Arena: Organisational action as a component of architects' learning" in Studies in Adult Education, September, 1982.
- Harris, Stewart (ed) Energy Resource File: A guide to published material on energy efficiency in health building design. Institute of Advanced Architectural Studies, University of York. 1983.
- Harris, Stewart and Rymer, David Case Studies in Continuing Professional Development. Research Paper 22, Institute of Advanced Architectural Studies, University of York. 1983.
- Hartley, James and Brunhill, Peter "Understanding Instructional Text: Typography, layout and design" in Howe, op cit, 1977.
- Hawrylyshyn, Bohdan "Management Education: A conceptual framework" in Taylor, B and Lippet, GL (eds) Management Development and Training Handbook, McGraw-Hill. 1975.

- Hedge, Angela Mid-Career Education for the Building Professions - a study related to learning needs, Research Paper 6, Institute of Advanced Architectural Studies, University of York. 1973.
- Hedge, Angela Mid-Career Education for the Building Professions - a study of learning needs and learning styles. Second Report. Research Paper 10, Institute of Advanced Architectural Studies, University of York. 1975.
- Hedge, Angela "Continuing Education" in RIBA Journal, March, 1976, p110.
- Hillier, Bill "Notes for a Theory of Practice" in Aylward, Graeme (ed), op cit, 1978.
- Holt, John How Children Fail, Penguin. 1976.
- Houle, Cyril A Continuing Learning in the Professions, Jossey Bass Publishers. 1980.
- Howe, Michael JA (ed) Adult Learning: Psychological research and applications. John Wiley and Sons. 1977.
- Howrie, AJ Architectural Education and Practice, Occasional Paper, Sheffield Centre for Environmental Research. 1974.
- Institute of Advanced Architectural Studies Training and Professional Career Development, Post Conference Report, University of York. 1978.
- Institute of Advanced Architectural Studies Catalogue of Audio Visual Materials for Building Design and Construction: No 1: Tape/Slide and Slide Sets; No 2: Films and Video, University of York. 1981b.
- Killeen, John and Bird, Margaret Education and Work: a study of paid educational leave in England and Wales 1976-77, National Institute of Adult Education. 1981.
- Lawson, Brian How Designers Think, Architectural Press. 1980.
- Layton, Elizabeth Report on the Practical Training of Architects, Royal Institute of British Architects. 1962.
- Lecuyer, Annette "Continuing education - how it works in the US" in Building Design, 25th August, 1978, p22.
- Lindsay, PH and Norman, DA "Human Information Processing" in Entwistle and Hounsell, op cit, 1975.
- Mabey, Richard Children in Primary School: The learning experience, Penguin Books. 1972.
- MacEwan, Malcolm "What can be done about incompetence?", The Architects' Journal, 19th November, 1975.
- MacKenzie, Norman; Eant, Michael and Jones, Howel C Teaching and Learning: An introduction to new methods and resources in higher education, The Unesco Press. 1976.

- Mackinder, Margaret The Selection and Specification of Building Materials and Components, Research Paper 17, Institute of Advanced Architectural Studies. 1980a.
- Mackinder, Margaret Selection and Specification of Building Materials and Components. Short Report. Institute of Advanced Architectural Studies. 1980b.
- McLagen, Patricia A Helping Others Learn: Designing programs for adults, Addison-Wesley Publishing Company. 1978.
- Males, AR "The Education of the Architect" in Turner, JD and Rushton, J (eds), Education for the Professions. Manchester University Press. 1976.
- Maslow, Abraham "Goals and Implications of Humanistic Education" in Entwistle and Hounsell, op cit, 1975.
- Moss, Raymond Hospital Design and the National Health Service: An assessment of the main methods used to give guidance on planning and design and the procedures to be followed, MARU, The Polytechnic of North London. 1977.
- Millard, Leslie Adult Learners: Study skills and teaching methods. Department of Adult Education, University of Nottingham. 1981.
- Open University History of Architecture and Design 1890-1939, Open University Press. 1975.
- Pask, Gordon and Scott, BCE "CASTE: A system for exhibiting learning strategies and regulating uncertainties" in International Journal of Man-Machine Studies Vol 5, pp17-52. 1973.
- Powell, J; Napper, JH and Territt, CJ Continuing Education, ARCUK. 1971.
- Revans, RW Developing Effective Managers, Praeger. 1971.
- Riegel, KF "Dialectic Operations: The final period of cognitive development" in Human Development Vol 16, No 5, pp346-370. 1973.
- Rogers, Carl R Freedom to Learn, Merrill Publishing. 1969.
- Rogers, Jennifer and Groombridge, Brian Right to Learn, Arrow. 1976.
- Rogers, Jennifer Adults Learning (2nd ed), Open University Press. 1977.
- Rowntree, Derek Developing Courses for Students, McGraw-Hill. 1981.
- Royal Institute of British Architects The Architect and His Office, RIBA Publications. 1962.
- Royal Institute of British Architects Guidance Notes and Regulations. Several editions including 1969, 1972, 1975, 1977, 1979.
- Royal Institute of British Architects Board of Education 1972/73 List of Advanced Short Courses for Architects and Others Concerned with the Built Environment. RIBA, November, 1972.

- Royal Institute of British Architects Continuing Professional Development ("The Green Document"). A report from the Continuing Professional Development Working Group. RIBA. 1979.
- Royal Institute of British Architects Handbook of Architectural Practice and Management. Fourth revised edition. RIBA Publications Ltd. 1980.
- Russell, Sir Lionel: Committee of Inquiry into Adult Education report: Adult Education: A plan for development (Report of a committee under chairmanship of Sir Lionel Russell), London, HMSO. 1973.
- "
Schon, Donald Beyond the Stable State, Maurice Temple Smith. 1971.
- Seabrook, Jeremy The Everlasting Feast, Allen Lane. 1974.
- Skinner, BF "The Science of Learning and the Art of Teaching" in Entwistle and Hounsell, op cit, 1975.
- Sutcliffe, Stuart The Design and Use of Audio Visual Material in Continuing Education, Institute of Advanced Architectural Studies, Working Paper, Spring, 1981.
- Taylor, Jeremy The Science Lecture Room, Cambridge University Press. 1967.
- Thomas, Laurie F and Harri-Augstein, E Sheila "Learning to Learn: The personal construction and exchange of meaning" in Howe, op cit, 1977.
- Tough, Allen Learning Without a Teacher: Tasks and assistance during self-planned learning projects. Ontario Institute for Studies in Education, Toronto. 1967.
- Tough, Allen Why Adults Learn. Monographs in Adult Education No 3, Department of Adult Education, The Ontario Institute of Studies in Education. 1968.
- Tough, Allen Major Learning Efforts: Recent Research and Future Directions. Paper issued by Department of Adult Education, Ontario Institute for Studies in Education, Toronto. 1977.
- Tough, Allen The Adult's Learning Projects. Ontario Institute for Studies in Education, Toronto. Second edition. 1979.
- Waddington, CH Tools for Thought, Jonathan Cape. 1977.
- Wallen, Norman E and Travers, Robert MW "Analysis and Investigation of Teaching Methods" in Gage, NL (ed) Handbook of Research on Teaching, Rand McNally. 1963.
- Walter, Gordon A and Marks, Stephen E Experiential Learning and Change: Theory design and practice, John Wiley and Sons, New York. 1981.
- Warren Piper, David "The Design of Courses for Staff Development" in Training and Professional Career Development, Institute of Advanced Architectural Studies. 1978.

- Waterson, Geoffrey "Continuing Professional Education: A challenge for the eighties?" in Journal of Further and Higher Education 8(1). Spring, 1984.
- Wickett, Reg Workshop on Adult Learning Projects delivered at Conference on Continuing Education, Manchester. 1980.
- Wigfall, Valerie and Fischer, Robert Follow-up of ex-students of Architecture, research at University College London. 1971.
- Winter, John "Goldfinger at 80" in The Architects' Journal, 15th September, 1982, p54.
- Wise, Professor Douglass "The Needs of the Professions for Career Development Programmes" in Training and Professional Career Development, Institute of Advanced Architectural Studies. 1978.
- The York Centre Project Appraisal: a guide, The King's Manor, York. 1976a.
- The York Centre Project Appraisal: follow up papers, The King's Manor, York. 1976b.

BIBLIOGRAPHY

- Abercrombie, MLJ "Improving the education of architects" in Innovation in Higher Education, ed. KG Collier. NFER Publishing Co. Ltd. 1974.
- Abercrombie, MLJ and Hunt, SM 1960-1970: Ten Years of Development in a School of Architecture, University College London. 1977.
- Ackoff, Russell L "A Management Scientist Looks at Education and Education Looks Back" in Dobson, L op cit, p9415. 1975.
- Advisory Council for Adult and Continuing Education. Towards Continuing Education, Leicester. 1979.
- Advisory Council for Adult and Continuing Education. Present Imperfect, Leicester. 1980.
- Allonard, Pierre "The Present Situation of Continuing Education in France among Engineers and in Schools of Engineering", The School and Continuing Education, Unesco, Paris. 1972.
- American Institute of Architects Journal, No 45, pp44-54, "PDP" (Professional Development Program). 1968.
- Architects' Journal "Luder the President", 1st July, 1981, p8.
- Architects' Journal "Professional Polish", 21st October, 1981.
- Architects Registration Council of the United Kingdom and The National Council of Architectural Registration Boards of the USA. Report of 1974 Third International Conference on Architectural Registration. 1974.
- Barry, Charlotte "Study leave that pays its way" in Times Higher Educational Supplement, 13th March, 1981, p25.
- Beard, Ruth "Course Design, Teaching Methods and Departmental Decisions" in Warren Piper and Glatter (eds) op cit, 1978.
- Beard, Ruth M; Bligh, Donald A and Harding, Alan G Research Into Teaching Methods in Higher Education (4th ed) Society for Research into Higher Education. April, 1978.
- British Broadcasting Corporation Carry on Learning. 1975.
- Brown, Hedy "The Individual in the Organization", Unit 10 in Open University People and Organizations. Open University Press. 1974.
- Chappell, David M "More to Learn" in Building Design, 16th June, 1978, p14.
- Christopher, Jack "Off-The-Job Training" in Building Design, 27th January, 1978, p27.
- Consumers Association "Professional Advice for Building Work" in Which? November, 1972, p346.

- Continuing Education Unit Project File, Institute of Advanced Architectural Studies. 1981.
- Cook, Keith "Freshen Up" in Building Design, 23rd January, 1981, pp22-23.
- Costin, F "Lecturing vs Other Methods of Teaching: A review of research" British Journal of Educational Technology pp4-31, January, 1972.
- Cotterell, John L "Matching Teaching to Learners: A review of a decade of research" in Psychology in the Schools p106, January, 1982.
- Cropley, AJ Lifelong Education: A psychological analysis. Pergamon. 1977.
- Cunningham, Allen "The Case for Continuing Education", RIBA Journal, January, 1980, pp45-46.
- Cunningham, Allen "Educating Around Architecture" in Studies in Higher Education, October, 1980, pp131-145.
- Darke, J "The Primary Generator and the Design Process" in Rogers, WE and Ittelson, WH (eds) New Directions in Environmental Design Research pp325-337. EDRA, Washington. 1978.
- Dave, RH and Lengrand, P (eds) "Lifelong Education and Learning Strategies", International Review of Education, Vol 20, No 4, 1974.
- Department of Education and Science Continuing Education: Post experience vocational provision for those in employment: a paper for discussion. October, 1980.
- Dobson, L; Gear, T and Westoby, A Management in Education Reader 2, Ward Lock Educational and Open University Press. 1975.
- Dubin, SS (ed) Professional Obsolescence, English Universities Press Ltd. 1971.
- Dubin, SS "Psychology of Lifelong Education: New developments in the professions", International Review of Applied Psychology, Vol 23, No 1. 1974.
- Dunbar-Nasmith, Professor James "Training and Professional Career Development: The responsibility of the institutions" in Training and Professional Career Development, IoAAS. 1978.
- Ellison, Jim Memorandum on AIA/MGI Professional Development Study. Privately circulated. 1981.
- Floyd, Ann "Cognitive Styles" in Personality and Learning: Block 5, Open University Press. 1976.
- Fordham, P (ed) Access to Continuing Education: a national conference held in Oxford, Open University Press. 1976.
- Frandsen, Philip E "continuing Education in Architecture: The process, the issues, the challenge" in Continuum, The National University Continuing Education Association Quarterly, Vol XV, No 1, 1981, pp25-36.

- Freeman, James; Butcher, HJ and Christie, T Creativity: A Selective Review of Research (2nd ed) Society for Research into Higher Education. 1971.
- Freeman, James; Carter, George and Jordon, Tom "Cognitive Styles, Personality Factors, Problem Solving Skills and Teaching Approach in Electrical Engineering" in Assessment in Higher Education Vol 3, pp86-121, March, 1978.
- Galbraith, John Kenneth A Life In Our Times: Memoirs, Andre Deutch. 1981.
- Gardner, Richard "An Account of Architectural Education in the UK" in Third International Conference on Architectural Registration, ARCUK. 1974.
- Gardner, Richard "Continuing Education, UIA/UNESCO Seminar" in RIBA Journal, February, 1978, p71.
- Gardner, Richard "The Current State of Training and Provision" in Training and Professional Career Development, IoAAS. 1978.
- Gardner, Richard "Why Professional Development?" in Yorkshire Architect, March/April, 1979.
- Gardner, Richard "Education Wrapped Up" in Building Design, 29th June, 1979, pp32-33.
- Gardner, Richard "Continuing Professional Development", Building Design, 25th January, 1980, pp28-29.
- Gelpi, Ettore A Future for Lifelong Education, introduced and translated by Ralph Ruddock in 2 volumes. Manchester Monographs 13. 1979.
- Glatter, Ron Management Development for the Education Profession. University of London/Harrap. 1972.
- Glatter, Ron "Off the Job Staff Development in Education" in Pratt, Simon (ed) Staff Development in Education, Councils and Education Press, 1973.
- Gordon, Alex "Self Motivation in Career Development" in Training and Professional Career Development, ARCUK. 1974.
- Gretler, Armin The Training of Adult Middle-level Personnel, UNESCO, Paris. 1972.
- Grotelueschen, AD and Darrell, N "Model for Studying Determinants of Intention to Participate in Continuing Professional Education", Adult Education (US), Vol 28, No 1. 1971.
- Groves, Philip "Continuing Education in the UK" in Third International Conference on Architectural Registration, ARCUK. 1974.
- Hancock, PHD "Procedures for Assessing Employees' Career Development and Training Needs" in Training and Professional Career Development. ARCUK. 1974.

- Harris, Alan "Decisions, Decisions ..." in Dobson, L, op cit. 1975.
- Hatchett, Michael; Thurley, Keith and Trill, John Site management education and training: An experiment in mid-career training, Institute of Building, Ascot, Berks. 1975.
- Health Services Planning and Research Steering Committee First Phase of an Investigation into the Education and Training Needs of Health Facility Planners: Report of the Study Group. Research Report No 1, MARU, Polytechnic of North London, June, 1973.
- Health Authorities' Regional Quantity Surveyors' Association Report on the Training and Development of the Quantity Surveyor in the National Health Service. 1979.
- Hilgard, ER and Bower, GH Theories of Learning, Appleton-Century-Crofts. 1966.
- Hoggart, R After Expansion: A Time for Diversity, Advisory Council for Adult and Continuing Education, Leicester. 1978.
- Howe, Michael A The Psychology of Human Learning. Harper and Rowe. 1980.
- Illich, Ivan Deschooling Society, Calder and Boyars. 1971 (and in Penguin, 1973).
- Institute of Advanced Architectural Studies Reports 1962-1979.
- Institute of Advanced Architectural Studies Health Building Seminar: A review of the role of Works Departments in the NHS. Papers and reports assembled from discussion groups taking part in the conference, including a speech given by the Minister of State. University of York. 1978.
- Institute of Advanced Architectural Studies Continuing Professional Development for Architects: CPD expenditure in offices. Short report for ARCUK, IoAAS, November, 1980(a).
- Institute of Advanced Architectural Studies Continuing Professional Development for Architects: Results of a survey of CPD expenditure. Working Paper. IoAAS, November, 1980(b).
- Jennett, FS "In house Provision: An office's present endeavour" in Training and Professional Career Development, IoAAS. 1978.
- Johnson, Paul The Profile of Professional Management, HCIMA. 1977.
- Jones, Deborah; Ball, Kay and Shellens, Michael Education for Management: A study of resources, HMSO. 1972.
- Kay, JH "Architecture Education Needs a New Blueprint". Change, Vol 7, No 5, pp34-38. 1975.
- Knowles, Malcolm The Adult Learner: a neglected species (2nd ed) Gulf Publishing, Houston. 1978.
- Lindsay, Peter and Norman, Donald Human Information Processing: An introduction to Psychology (2nd ed) Academic Press. 1977.

- Lovell, R Bernard Adult Learning, Croom Helm. 1980.
- McIntosh, Naomi E "To Make Continuing Education a Reality", Oxford Review of Education, Vol 5, No 2. 1979.
- McKeachie, WJ "Research on Teaching at the College and University level" in Gage, NL (ed) Handbook of Research on Teaching, Rand McNally. 1963.
- McKean, John Maule "Horses for Courses" in The Architects' Journal, 27th July, 1977, pp157-8.
- McKean, John Maule "Look - no students" in RIBA Journal, May, 1979, p230.
- Macleod, Robert "Continuing education at York", The Architects' Journal, 5th January, 1972, pp13-15.
- Mant, Alistair The Experience Manager: A major resource. British Institute of Management. 1969.
- Maslow, Abraham Motivation and Personality (2nd ed), Harper and Rowe, New York. 1970.
- Morris, JF "New Teaching Methods in Architecture" in RIBA Journal, July, 1966.
- Morris, JF "Developing Managers in the Construction Industry" in Training and Professional Career Development, IoAAS. 1978.
- Nollan, Stanley D "The Current State of Recurrent Education" in Vermilye, DW, op cit, 1977.
- Open University Report of the Committee on Continuing Education (Venables Report). 1976.
- Organization for Economic Co-operation and Development (OECD) Learning Opportunities for Adults. Paris. 1977-79.
- Pask, Gordon and Scott, BCE "Learning Strategies and Individual Competence" in Whitehead, JM (ed) Personality and Learning, Hodder and Stoughton/The Open University Press. 1975.
- Rae, John Untitled article in "Education" column of Building Design, 27th January, 1978.
- Richards, John Paper delivered to RIAS Seminar on Continuing Education, Edinburgh. 1980.
- Rogers, Archibald "Continuing Education in the USA" in Third International Conference on Architectural Registration, ARCUK. 1974.
- Roper, Hugh "The Role of the Institutions" in Training and Professional Career Development, IoAAS. 1978.
- Rose, SW "A New System for Professional Growth". AIA Journal, No 57, 1972, p14.

- Rowntree, Derek "The Systems Approach" in Yearbook of Educational and Instructional Technology. Cornmarket Press. 1969/70.
- Royal Institute of British Architects Board of Education (Chairman Alex Gordon) Report from the Continuing Education Working Group, 16th June, 1970.
- Royal Institute of British Architects Board of Education Paper on continuing education summarised in RIBA Journal, 22nd July, 1970.
- Royal Institute of British Architects "Continuing Education: Joint body needed" in RIBA Journal, No 77. 1970.
- RIBA Journal letters, various dates.
- Royal Institute of Chartered Surveyors A Directory of Post Qualification Training Courses of Interest to Chartered Surveyors. RICS. 1979.
- Royal Institute of Chartered Surveyors Continuing Professional Development, a Guide for Members of the General Practice Division. RICS. 1980.
- Royal Institute of Chartered Surveyors CPD and the Building Surveyor. 1980.
- Schmertz, MF "Design for the 1970s: A new professional conscience". Architectural Record, No 148, 1970, pp118-127.
- Schuller, Tom and Megarry, Jocquetta World Year Book of Education - Recurrent Education and Lifelong Learning. Kogan Page. 1979.
- Spier, Marilyn "AIA Sponsorship of Marketing Courses" in RIBA Journal, September, 1977, p395.
- Squires, Geoffrey Cognitive Styles and Adult Learning. Department of Adult Education, University of Nottingham.
- Stock, Arthur "Guidance and Counselling Services for Adults in the United Kingdom" in OECD Learning Opportunities for Adults. Paris. 1979.
- Stringer, David Analysis of Responses to the Advisory Council's Discussion Paper "Towards Continuing Education". Advisory Council for Adult and Continuing Education. 1980.
- Sutcliffe, Stuart What do you understand by the words Continuing Education? Paper delivered to IoAAS Seminar on continuing education, York. 1978.
- Taylor, John "The Advisory Council for Adult and Continuing Education" (A review of the first year's work). Adult Education, Vol 51, No 4. 1978.
- Taylor, LC Resources for Learning (2nd ed), Penguin. 1972.
- Thomas, Percy, Partnership Building Design Information and Aids. Unpublished study for BRE. 1981.

- Thompson, EK "A New Look at Registration and Licencing". Architectural Record, No 150, 1971, pp9-10.
- Todd, Frankie Review of "Continuing Learning in the Professions" by Cyril Houle in CEU Newsheet, December, 1980.
- Todd, Frankie "Fostering the Development of Professional Skills: The work of the NHS Continuing Education Unit for Architectural Staff" in British Journal of Educational Technology, Vol 13, No 2, May, 1982.
- Tulloch, John "Furthering Education" in Building Design, 24th February, 1978, p2.
- UNESCO The Continuing Education of Engineers: Proceedings of the FEANI-Unesco Seminar, Helsinki, 21st-24th August, 1972. Unesco Press. 1974.
- Vermilye, Dykeman W (ed) Relating Work and Education, San Fransisco. 1977.
- Warren Piper, David The Longer Reach. Opening paper of a conference on university staff development, April, 1974.
- Warren Piper, David and Glatter, Ron The Changing University: A report on the Staff Development in Universities Programme 1972/4. NFER. 1977.
- Wecks, David R "Organizations and Decision Making", Unit 12 in Open University People and Organizations, Open University Press. 1974.
- White, W; Greenslade, RJ and Taylor, MB Improving our Education and Training, Building Design Partnership, Preston. 1979.
- Williams, Gareth Towards Lifelong Education: a new role for higher education institutions, UNESCO. 1977.
- Woodhall, Maureen "Adult Education and Training" in OECD Learning Opportunities for Adults, 1977, pp317-358.
- The York Centre Annual Report(s) 1, 2, 3, 4 and 5. The King's Manor, York. 1976-80.
- The York Centre Continuing Education: Can we learn together? The King's Manor, York. 1976.
- The York Centre and RIBA Eastern Region Project Appraisal: A multi-disciplinary workshop. The King's Manor, York. 1976.
- The York Centre Review: Project Appraisal: a multi-disciplinary workshop. The King's Manor, York. 1976.
- The York Centre Back to the Grass Roots. The King's Manor, York. 1977.
- The York Centre Continuing Education for the Building Professions: a pilot study into practitioner-led activities. The King's Manor, York. 1977.

The York Centre Continuing Education: The Institutions and Incentives: a comparative study. The King's Manor, York. 1977.

The York Centre Policy on Continuing Education: a report with recommendations for action. The King's Manor, York. 1978.

The York Centre Continuing Professional Development: proposals for a new executive unit. The King's Manor, York. 1979.

Ziegler, WL (ed) Essays on the future of continuing education worldwide. Syracuse University. 1970.

ABBREVIATIONS

ACACE	Advisory Council for Adult and Continuing Education
AIA	American Institute of Architects
AJ	Architects' Journal
APM	Advanced Practice and Management
ARA	Assistant Regional Architect
ARCUK	Architects Registration Council of the UK
BISFA	British Industrial and Scientific Film Association
BRE	British Research Establishment
CAA	Commonwealth Association of Architects
CDB	Component Data Base
CEU	Continuing Education Unit for NHS Architectural Staff
CICI	Current Information in the Construction Industry
CPD	Continuing Professional Development
DES	Department of Education and Science
DHSS	Department of Health and Social Security
DIY	Do It Yourself
GLC	Greater London Council
IoAAS	Institute of Advanced Architectural Studies
JCT	Joint Contracts Tribunal
MA	Master of Arts
NHS	National Health Service
OU	Open University
PA	Principal Architect
QS	Quantity Surveyor
RA	Regional Architect
RIBA	Royal Institute of British Architects
RICS	Royal Institution of Chartered Surveyors
RWO	Regional Works Officer
SA	Senior Architect
UCL	University College London
UK	United Kingdom

LIST OF FIGURES

- 2.1 Trends in Course Provision: Number of courses, conferences and meetings held in October from 1945 to 1982
- 2.2 Trends in Course Provision: Graph
- 2.3 Subjects to be Undertaken in Schools of Architecture
- 2.4 Subject Divisions in Undergraduate Schools of Architecture
- 2.5 Postgraduate Education Undertaken after Graduation

- 3.1 ARCUK CPD Report: Menu 1, Item C
- 3.2 Upgrading Thermal Performance of Schools: Programme
- 3.3 Energy Conscious Design: Programme
- 3.4 Bedford questionnaire
- 3.5 Hampshire questionnaire
- 3.6 Bedford responses
- 3.7 Hampshire responses

- 4.1 First Set of Interviews: Participants
- 4.2 Successful Learning Experiences: The first interview
- 4.3 Unsuccessful Learning Experiences: The first interview
- 4.4 Preliminary Classification of Learning Methods and Resources
- 4.5 Proportions of Successful Solutions Mentioned

- 5.1 Second Set of Interviews: Questionnaire
- 5.2 Participants
- 5.3 Age Range of Participants
- 5.4 Architects' Methods of Learning About Energy
- 5.5 Percentage of Projects Using Various Methods
- 5.6 Strength: Score out of 5
- 5.7 Number of Mentions
- 5.8 Rise: Difference in extent to which methods will be used in future
- 5.9 Summary of Four Arenas of Learning in the First Set of Interviews
- 5.10 Comparison of First and Second Set of Interviews
- 5.11 Content and Methods: No of mentions of positive proven experiences in first set of interviews
- 5.12 Weighted Results Compared with Number of Mentions
- 5.13 Internal Comparison of Architects' "General Understanding" Projects
- 5.14 Classifying Learning Methods: Taxonomy of second set of interviews
- 5.15 Preferred Learning Methods
- 5.16 Twelve Most Used Methods
- 5.17 Engineers', Architects' and QSs' Use of Arenas

- 6.1 Formally Organised Education Methods: First set of interviews
- 6.2 Formally Organised Education: Second set of interviews with architects
- 6.3 Formally Organised Education: Second set of interviews with all professions

- 7.1 Personally Organised Learning: First set of interviews
- 7.2 Personally Organised Learning: Second set of interviews with architects
- 7.3 Personally Organised Learning: Second set of interviews with all professions
- 7.4 Regional NHS Offices' Architectural Library Holdings

- 7.5 Contents of Architects' Journal, 13th September, 1982
- 7.6 CDB Design Sequence: Variety reduction as a process

- 8.1 Non Deliberate Learning: First set of interviews
- 8.2 Non Deliberate Learning: Second set of interviews with architects
- 8.3 Non Deliberate Learning: Second set of interviews with all professions

- 9.1 Details of Office Action: No of mentions of "proven" and "postulated" experiences: First set of interviews
- 9.2 Office Action: Second set of interviews with architects
- 9.3 Office Action: Second set of interviews with all professions
- 9.4 Methods of Circulating Journals

- 10.1 Most Frequently Used Methods and Resources
- 10.2 Weighted Scores for Postulated Learning
- 10.3 Little Used Resources
- 10.4 Links Between Content and Methods

- 11.1 W Midlands: Discussion of content by a public authority office
- 11.2 Huddersfield: Discussion of content by a private architectural practice
- 11.3 Energy relationships
- 11.4 QSs' Impressions of their Knowledge
- 11.5 Engineers' Impressions of their Knowledge
- 11.6 Architects' Impressions of their Knowledge
- 11.7 Overall Importance of Aspects of Energy Efficiency

- 12.1 Energy Efficiency Workshop: Programme
- 12.2 Energy Workshop: Responses
- 12.3 Advice about Using Videos
- 12.4 Advice about Project Appraisals
- 12.5 Energy File Contents

- A.1 Adult Learning Projects: Questionnaire
- A.2 Participants
- A.3 Numbers of Adult Learning Projects Undertaken
- A.4 Adult Learning Projects: Time spent
- A.5 What Learning Projects Architects Undertake
- A.6 Reasons for Undertaking Learning
- A.7 Main Planners
- A.8 Common Styles

Appendix

Adult Learning Projects

"Highly deliberate efforts to learn take place all around you. The members of your family, your neighbours, colleagues and acquaintances probably initiate and complete several learning efforts each year, though you may not even be aware of it. When asked about their learning efforts, many of our interviewees recalled none at first, but as the interview proceeded, they recalled several recent efforts to learn."

(Allen Tough, 1979).

In Chapter Four, it was shown that architects use a wide variety of sources in carrying out their learning. Chapter Five gave further insights into how much these methods are used in the context of one subject. What sorts of subjects do architects learn about, and how long do they spend in learning? To help answer this question, a minor research study was undertaken, involving 35 architects and technicians, and looking exclusively at Deliberately undertaken learning. The interviews were actually carried out between the first and second sets already reported, but are referred to here as the "third set of interviews".

Allen Tough and his colleagues have undertaken work which attempts to plot the amount and nature of learning projects which adults undertake (Tough, 1967, 1968, 1977, 1979). He and his colleagues have conducted in-depth interviews with adults which help participants remember what they had set out deliberately to learn in the previous year, and get some knowledge of who planned the learning, what methods were used, why they found it necessary, and so on. The methodology he uses was adapted by Wickett (1980) into a simple questionnaire which could be rapidly administered to a group. It would seem possible to adopt and adapt these methodologies to better understand how UK architects continue their vocational education after graduation.

METHODOLOGY

Several private and public architectural practices were contacted about the possibility of holding a seminar in the office about learning projects staff had undertaken. Three offices agreed to participate:

two NHS offices and one large private practice. Information on the seminar was circulated in advance, and staff volunteered to participate. In the case of the private practice, the event was held over an extended lunch period. Altogether, 55 people participated. 35 of these were architects or architectural technicians, and only their responses have been examined in this analysis.

The questionnaire used is shown in Figure A.1. It was, in fact, modified between the three seminars in the light of comments by participants of ambiguous or insufficiently searching sections. (The amendments will be picked up in the description which follows).

In the seminar, a short account of Tough's work was given, together with an outline of the objectives of the research. Participants were then invited to try and recall any learning activities they had undertaken in the previous year. Tough's definitions of what a learning project were used: mainly that a project could be made up of disconnected episodes; that there should have been a central focus for the learning; that it had been deliberately undertaken; that the knowledge should have been retained for two days; and that the total time spent should have been at least seven hours.

After about two minutes in which participants tried to recall their activities by themselves, they were helped by a suggestion that they should think about new skills, information or understanding they had acquired, about topics of interest to them, about problems or decisions they had had to take, or learning activities they had undertaken.

After a further period of about seven minutes, allowing them to consider this, a list of possible projects was put up on the board (e.g. a new baby; energy conservation).

Overall, this activity took about 20 minutes. Participants were then asked to mark the projects they had recorded according to whether they considered them directly related to their work, indirectly related, or not related at all.

In the first seminar (the NHS Midlands office), participants were interested in exploring why the learning had been undertaken and helped generate a set of possible reasons, and this additional question was asked at the second and third seminars. All groups were asked who the main planner of the education was.

Seminars one and two were then asked what sources of information they used and what were the main methods of learning. Their replies

to this were statistically interesting, but insufficiently detailed. I had hoped to gather material revealing to quote from. In the third seminar, therefore, participants were asked to write three lines on how they went about learning. In fact, this proved too difficult for them to do and the response was disappointingly uninformative. This part of the interview schedule is not reported here since it was overtaken by a more searching study in the second set of interviews.

All seminars were then asked how long they spent on each project. Finally, there was a space for them to note any comments they wanted to make, and their names, age, profession, sex and level of responsibility were monitored.

Participants

Of the 35 architectural staff whose responses are analysed here, all but three were male. The participants were spread through all levels of responsibility. As a private practice made up one-third of participants, it is not possible to estimate the proportions in which the levels were represented, but if Harris' 1980 figures of NHS staff were used, higher levels in the office tended to be over-represented, lower levels under-represented. (Figure A.2 relates).

THE LEARNING PROJECTS

Overall, there were 288 projects recorded. 105 of these were considered directly related to the job, 69 indirectly related and 114 not related at all. On average, therefore, participants had undertaken

Figure A.2
Adult Learning Project: Participants

	Private Practice	Midlands NHS	West NHS	All
Regional Architect/Senior Partner	2	0	0	2
ARA/Junior Partner/Associate	4	3	5	12
Principal Architect/Project Architect	4	5	0	9
Senior Architect/Architect/Student	0	4	4	8
Technician/other architectural staff	1	0	3	4
Males	9	11	12	32
Females	2	1	0	3

Figure A.3

Numbers of Adult Learning Projects Undertaken

	Private Practice	Midlands NHS	West NHS	All
No of participants	11	12	12	35
Directly related	32	45	28	105
average	2.9	3.8	2.3	3
Indirectly related	28	21	20	69
average	2.5	1.8	1.7	2
Not related	36	54	24	114
average	3.3	4.5	2	53.3
All	96	120	72	288
Average per participant	8.7	10	6	8.2

8.2 projects each year. Directly related projects averaged three, indirectly related projects two, and projects not related to the job at all averaged 3.3 per year (Figure 5.3 relates).

Tough's work does not explore vocational aspects of learning projects undertaken. His summary of international research undertaken, based on the methods he devised, suggests that

"The typical learner conducts five quite distinct learning projects in one year. He or she learns five distinct areas of knowledge and skill. ... some populations yield lower figures, of course, while others are much higher."

(Tough, 1979, p192).

The architectural staff in this sample were among those who yielded higher figures - getting on for twice the international average.

How long each project was

Participants were only asked to give detailed information on the job related projects - and then each gave data on only four or five, though some included incidentally related projects in their analysis. So the detailed analysis of how long they spent on this learning is based on a sample of the 288 projects. It might be assumed that the projects they gave data on were uppermost in their minds and therefore represented the more significant ones. Figure A.4 shows the results.

Overall, 139 projects were cited, 126 of these being about directly job related learning. The overall average time spent on the 139 projects was 111 hours. This compares with the many hundreds of projects on which Tough has data which average 100 hours. However, the figures from the three architectural sources vary considerably.

Figure A.4

Adult Learning Projects: Time spent

		Private Practice	Midlands NHS	West NHS	All
Directly Related	No of projects cited	25	33	30	88
	average time	209	136	47	126
All Projects	No of projects cited	44	51	44	139
	average time	135	135	60	111

Two offices both reported the average project as being 135 hours, one office as being only 60 hours. The directly job related projects vary even more. The private practice participants claimed to be spending an average of 209 hours on these, the West NHS office only 47 hours. The reason for this is that the private office participants boldly entered "1000 hours plus" for their learning projects which were associated with building projects they were working on. This is quite feasible if they considered application and testing of knowledge as part of the learning process. A major hospital scheme can last as long as seven years, and even a small health building will take three years from inception to completion. 1000 hours represents six months' office time. The West NHS office participants were much more modest, entering figures of the order of "105 hours plus", or more usually around 30 hours. The private office participants had a richer picture of what constituted learning, though they were possibly inclined to inflate this; the West NHS office undoubtedly underestimated their potential.

Content

An analysis of the projects listed by each of the seminar participants shows that there were several common themes in their study. The participants were asked to indicate which of their projects they considered to be job related, which indirectly related to their job, and which not related at all. As examples, it was anticipated that a subject such as building materials would be considered job related; projects on photography might be indirectly job related (since at some stage an architect might need to use a camera in the course of work); and bringing up children might be thought unrelated to the job in any way.

Projects broadly defined as job related were relatively easy to classify. A fair amount of work has been done on what kinds of groupings constitute common themes in learning about building. The RIBA has generated a list of themes in connection with information they used to put on courses available. Harris' 1978 report provided more detailed groupings: 63 in all, including seven supra-groupings of minor themes (RIBA, 1972; Harris, 1978).

Clustering the projects unrelated to the main job of work of the architects was more difficult. Not only are there potentially many more, it is only by attempting a classification that groupings can arise and this is a trial and error process: there is no readily available "correct" outcome.

However rough and ready these groupings are, 55 subject headings were extracted. Some were very infrequently mentioned in this small sample, and have been classified together as "other", reducing the number of clear groups to 28 plus three "other" groups. Figure A.5 shows these groupings.

The four most common job related projects were to do with Building Functions and Types, Energy Conservation, Building Legislation and Law and Computer Applications. Gardening was frequently mentioned among the mainly indirectly related projects, and Cars and Motoring among the mainly unrelated job projects.

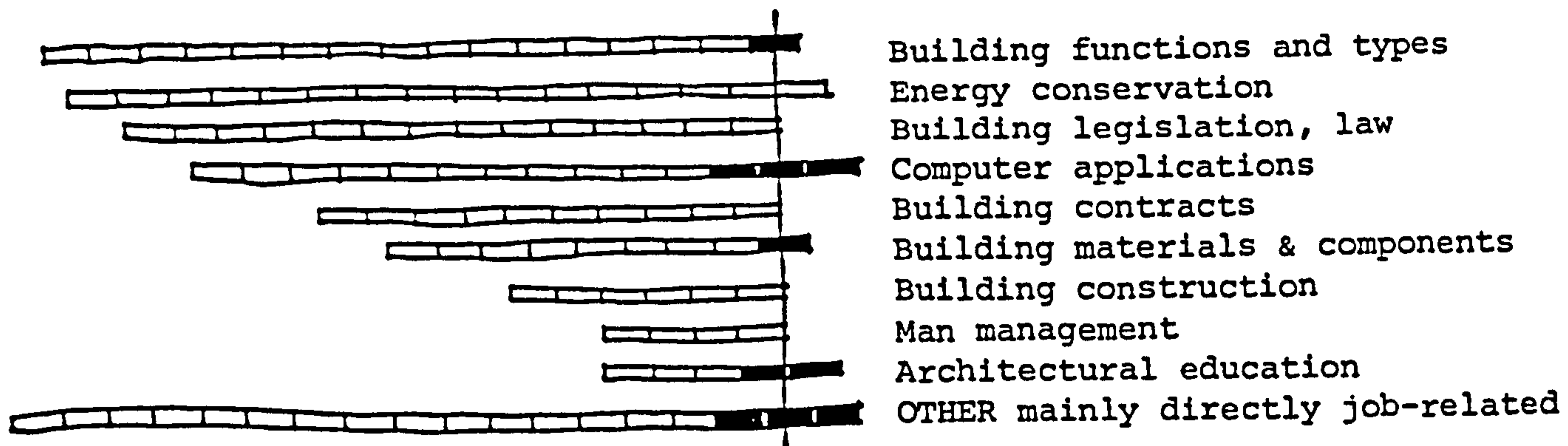
Interestingly, there was seldom complete accord from learners themselves about how projects were related to the main job of work. Three of the nine job related projects were agreed by all to be exclusively job related, but the other six were considered indirectly related by at least some learners - computer applications particularly so. Some of the responses are clearly in the world of building: building legislation, contracts, conservation. Others are clearly in the world of work: man management, career decisions, client matters.

Similarly, three of 12 projects were considered to be exclusively unrelated to the job in any way (including buying and selling property). Among the seven indirectly related projects, most were considered related both to the job by at least a few respondents and unrelated to it at all by a few others. Home building, for example - laying crazy paving path or remodelling the kitchen - was seen by most as being indirectly beneficial to their job. A third of respondents who had undertaken a project of this kind, though, thought that for them it was directly related, and half that number thought it certainly was not.

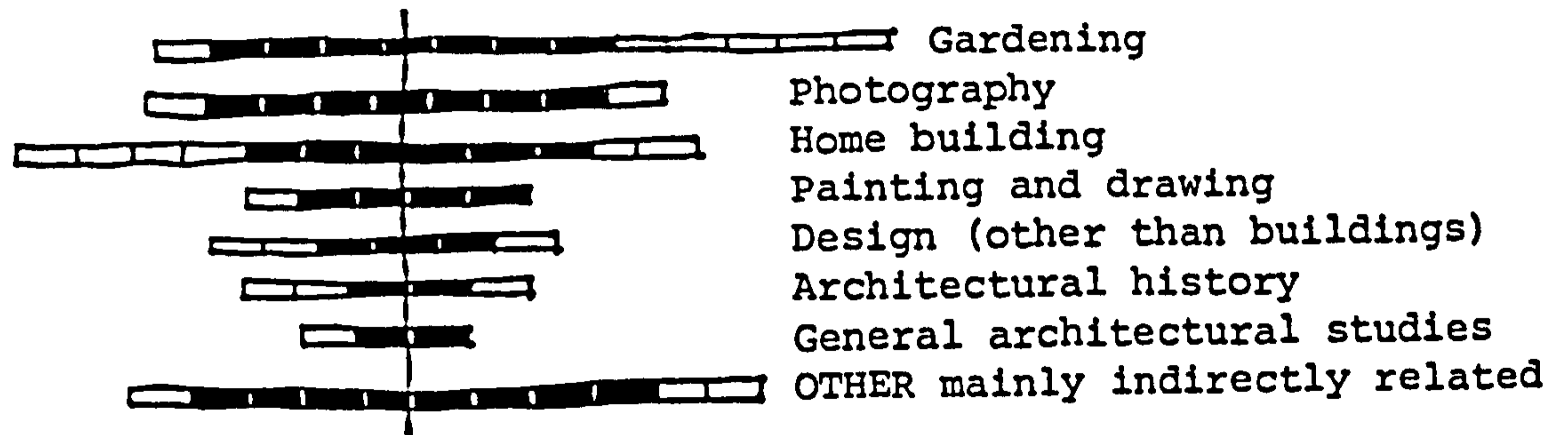
Figure A.5

What Learning Projects Architects Undertake

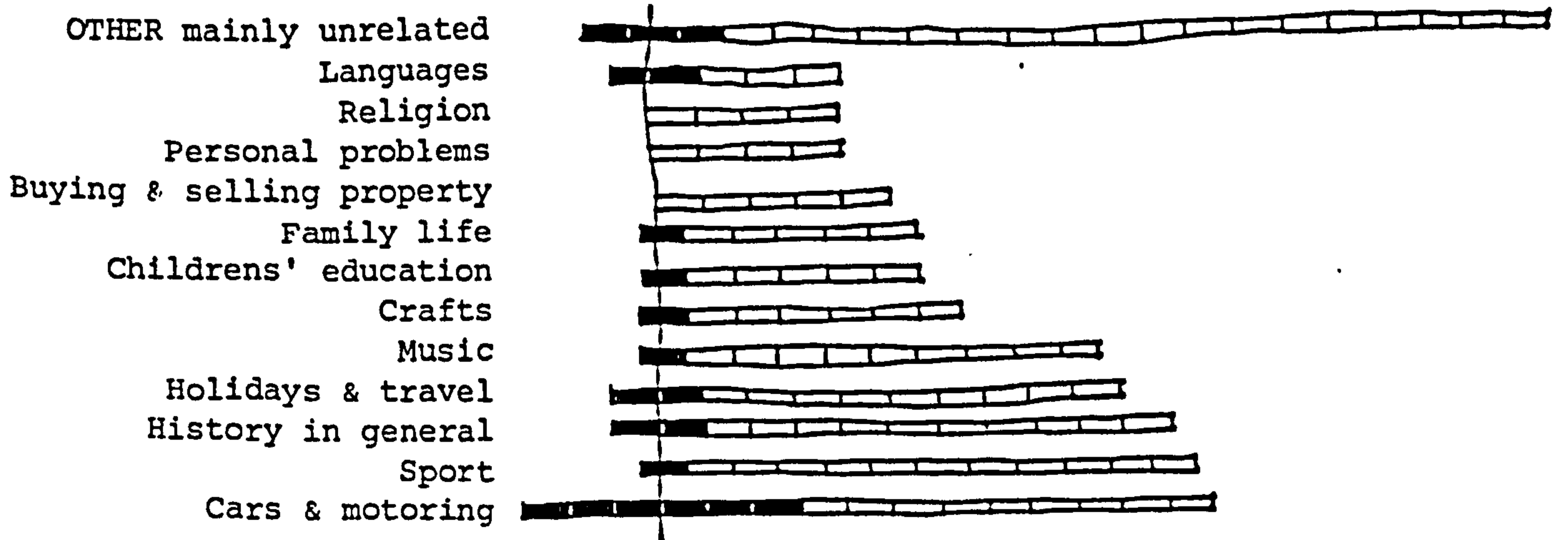
Those they consider mainly DIRECTLY related to their work



Those they consider mainly INDIRECTLY related to their work



Those they consider mainly NOT RELATED to their work



Gardening, too, was illuminated all through the spectrum (with a bias to the unrelated side), while photography is right in the middle.

Why undertaken

In the first seminar held, participants were interested to know why the learners had undertaken their projects. This question was

Figure A.6

Reasons for Undertaking Learning

JOB RELATED PROJECTS

	66% gave a single main reason		34% gave several reasons		TOTAL %
		%*		%*	
Pleasure/interest	1	2	13	11	13
Self esteem	0	0	2	2	2
Demands of others	7	12	6	5	17
Credit, certification	0	0	0	0	0
Promotion, higher pay	0	0	1	1	1
Demands of the job	29	49	16	13	62
Future need	2	3	4	3	6
Total no of people	39	-	20	-	-
Total no of reasons	39	66	42	34	100

INDIRECTLY JOB RELATED PROJECTS

	55% gave a single main reason		45% gave several reasons		TOTAL %
		%*		%*	
Pleasure/interest	11	34	14	20	54
Self esteem	0	0	2	3	3
Demands of others	3	9	8	11	20
Credit, certification	0	0	0	0	0
Promotion, higher pay	2	6	1	1	7
Demands of the job	2	6	4	6	12
Future need	0	0	3	4	4
Total no of people	18	-	15	-	-
Total no of reasons	18	55	32	45	100

*Contributory percentage: the percentage given is the number of mentions over the total number of mentions taken as a factor of the contribution single or multiple reasons make to the total. Thus in single reason job related projects, pleasure/interest scores 1, divided by 39 (total number of reasons), multiplied by 66% (contribution single reasons make to the total).

included in the other two seminars; the first of these helped generate possible reasons. Figure A.6 shows the responses made. Not everybody was able to give a single distinct reason for undertaking the project: 63% of the private practice did for their directly related projects and for 42% of their indirectly related projects. The West NHS group had single reasons for 69% of their directly related projects and 71% of their indirectly related projects. The Figure takes account of these variations. (See the footnote).

Figure A.6 is complicated, but has a single main feature. The overwhelming single reason given by both groups for undertaking learning endeavours directly related to their jobs is because of demands generated by the job itself (76% and 73%). Even when there are mixed reasons for undertaking learning, each group only mentioned

two endeavours that did not have this as a contributory reason. Overall, this reason accounts for 62%.

Indirectly related projects are as clear. Among the single reasons, nearly two-thirds of the projects were undertaken for pleasure - for enjoyment or just general interest. The private practice participants when mentioning mixed reasons only recalled one project where pleasure was not a contributory reason; and the West NHS mentioned none at all. Overall, this reason accounts for 54%.

Obversely, pleasure was seldom mentioned as a single reason for undertaking job related projects. And though demands the job makes did influence one-fifth of the West NHS staff's indirectly related projects, it influenced none of the private practice's. Note that not one person mentioned certification as a reason.

Planning the learning

The participants in the three seminars differed considerably about who was the main planner of their learning projects. Tough has found that

"In most projects there is clearly a single planner"
(Tough, 1979, p79).

Figure A.7 shows who was the main planner among the architects interviewed. Overall, there was a single planner in nearly two-thirds of cases - and directly job related projects did not differ from indirectly job related. This is considerably fewer than Tough experienced. There were considerable differences between offices in this regard, ranging from 76% to 55%; and in particular instances, the West NHS direct projects had a single planner in 81% of cases, the Midlands NHS direct projects a single planner in only 48% of cases.

It is, however, the individuals' scores which are most important. Among the 57 participants providing details of who planned their learning endeavours, 43 gave details of more than one project. Figure A.8 shows common themes within each individual's planning. The number of projects described varied between six and one. This figure analyses individuals' projects to see whether they tended to use the same planner in all cases. Among directly job related projects, 37% of individuals always used the same planner (self, say, or live plus inanimate expert); among indirectly job related projects, 25% always used the same planner. The same planner was used for two-thirds of projects by more than half the group: 56%. At the other end of the

Figure A.7
Main Planners

The distribution of single and multiple planners was ...

	No of projects	Single	Multiple	
Private Practice	46	30 (65%)	16 (35%)	
Direct	27	19 (70%)	8 (30%)	
Indirect	19	11 (38%)	8 (42%)	
Midlands NHS	47	26 (55%)	21 (45%)	
Direct	31	15 (48%)	16 (52%)	
Indirect	16	11 (69%)	5 (31%)	
West NHS	50	38 (76%)	12 (24%)	
Direct	32	26 (81%)	6 (19%)	
Indirect	18	12 (67%)	6 (33%)	
All	143	94 (66%)	49 (34%)	
Direct	90	60 (67%)	30 (33%)	←
Indirect	53	34 (64%)	19 (36%)	←

Where there was a single planner it was ...

	Self	Non Expert	Expert	(Live)	(Inanimate)	
Private Practice	23 (77%)	4 (13%)	3 (10%)	0	3	
Direct	14 (74%)	4 (21%)	1 (5%)	0	1	
Indirect	9 (82%)	0	2 (18%)	0	2	
Midlands NHS	19 (73%)	4 (15%)	3 (12%)	3	0	
Direct	10 (67%)	3 (20%)	2 (13%)	2	0	
Indirect	9 (82%)	1 (9%)	1 (9%)	1	0	
West NHS	30 (79%)	4 (11%)	4 (11%)	4	0	
Direct	20 (77%)	3 (12%)	3 (12%)	3	0	
Indirect	10 (83%)	1 (8%)	1 (8%)	1	0	
All	72 (76%)	12 (13%)	10 (11%)	7	3	
Direct	44 (73%)	10 (17%)	6 (10%)	5	1	←
Indirect	28 (82%)	2 (6%)	4 (12%)	2	2	←

Where there were multiple planners they included ...

	Self	Non Expert	Expert	(Live)	(Inanimate)	
Private Practice	9 (56%)	4 (25%)	14 (88%)	9	10	
Direct	5 (63%)	3 (38%)	6 (75%)	5	4	
Indirect	4 (50%)	1 (13%)	8 (100%)	4	6	
Midlands NHS	11 (52%)	7 (33%)	17 (81%)	11	8	
Direct	8 (50%)	5 (31%)	13 (81%)	8	7	
Indirect	3 (60%)	2 (40%)	4 (80%)	3	1	
West NHS	9 (75%)	3 (25%)	9 (75%)	9	2	
Direct	6 (100%)	0	6 (100%)	6	0	
Indirect	3 (50%)	3 (5%)	3 (50%)	3	2	
All	29 (59%)	14 (28%)	40 (82%)	29	20	
Direct	19 (63%)	8 (27%)	25 (83%)	19	11	←
Indirect	10 (53%)	6 (32%)	15 (79%)	10	9	←

Summary

90 DIRECTLY RELATED PROJECTS							Total
	Self	%*	Non Expert	%*	Expert	%*	Mentions
67% single planners	44	49	10	11	6	7	60
33% multiple planners	19	12	8	5	25	16	52
TOTAL		63		16		23	

53 INDIRECTLY RELATED PROJECTS							Total
	Self	%*	Non Expert	%*	Expert	%*	Mentions
64% single planners	28	53	2	4	4	8	34
36% multiple planners	10	12	6	7	15	17	31
TOTAL		65		11		25	

* Contributory percentage: explanation in Footnote to Figure A.6.

Figure A.8

Common Styles

In a total of 27 cases where learners entered two or more direct projects, they used the same combination of planners in ...

	100% of cases	75% or more	66% or more	65% or fewer	never
number	10	13	15	12	8
%	37%	48%	56%	44%	30%

In a total of 16 cases where learners entered two or more indirect projects, they used the same combination of planners in ...

	100% of cases	75% or more	66% or more	65% or fewer	never
number	4	4	9	7	6
%	25%	25%	56%	44%	38%

Overall, the figures for the 45 cases are ...

	100% of cases	75% or more	66% or more	65% or fewer	never
number	14	17	24	19	14
%	31%	38%	53%	42%	31%

scale, 30% of learners never used the same planner more than once for their directly job related projects, and 38% never more than once for their indirectly related projects. So there appear to be few common themes among individuals' approaches to planning.

Turning to who the main planner was, there are very common themes indeed as the summary included in Figure A.7 shows. Among projects overall, whether these were single or multiple planners, learners themselves played a major role in 64%. Experts of one kind or another - tutors, experts, books, programmed materials, for example - played a major role in the planning in 24% of cases. There was almost no difference between this balance in directly and indirectly job related planning.

The role of the individual who is to undertake the learning also planning it is particularly striking in the two-thirds of projects which have single planners. In these, 73% of direct projects and 82% of indirect projects are planned by learners, compared with around 11% by experts.

Experts' roles in planning are more striking in the multiple planning cases. Around 82% of both direct and indirect projects involve them as key planners compared with between 53% and 63% having the learner as a key planner.

OBSERVATIONS

In Chapter Ten, overall conclusions will be drawn relating to Parts Two and Three. At this stage, some observations on the

material contained in this chapter are made.

ARCHITECTS' LEARNING

- 1: The average learning project an architect undertakes takes more than 100 hours.

Tough's work has shown that the average adult undertakes five learning projects a year, each lasting 100 hours. The evidence emerging from this study is that architects spend about this amount of time on their projects, but that they undertake many more projects. There was some variation between the three offices in this regard, with the members of two offices averaging 135 hours, another 60 hours. Together, these average 111 hours. Further seminars would have to be conducted in a representative sample to get a truly national picture, but it is observable that the participants in this survey spent considerable amounts of time on learning projects: more than 100 hours on each.

- 2: Architects undertake an average of eight learning projects a year.

The offices were closer together on the number of learning projects they undertook. The lowest was six, another eight, the third ten. Overall, this averages 8.2 projects per person in a sample of 35 people: well above the average international number recorded by Tough. Again, a national survey is necessary to extend this figure to all architects, but it is observable that architects in the sample had undertaken a considerable number of learning endeavours in the previous year: more than eight each.

- 3: The average architect spends more time learning than people in general.

This is a lot more than the average adult internationally. However, Tough's own research indicates that the amount of time spent does vary. For example, the average adult in a sample in Ontario undertakes eight projects a year, with senior university lecturers averaging 12, teachers 10.1, lower white collar male workers 9.1, and so on down to factory workers at 5.5. It is in his 1979 postscript

that he provides international figures of five projects per person. So, the figures relating to the numbers and length of projects undertaken by architects are astonishing, but merely bear out Tough's work.

- 4: The average architect undertakes three projects a year which are directly related to work, and a further two which are indirectly related.

Another question asked in the seminars, which breaks into territory not explored by Tough or his associates, is how many of the learning projects architects undertake are related to their work. The sample of 35 people listed a total of 105 being directly job related, and a further 69 indirectly related to the main job of work. The overall average is thus three projects per year directly job related and two further projects indirectly related. These general figures conceal some variations. One office averaged 2.3 job related projects a year, another 3.8. There were wide variations between individuals. Only one participant listed no projects which she considered directly job related; the highest number recorded was seven. Tough reports that 90% of adults undertake at least one major project a year; all participants in the seminars reported here undertook at least four projects of all kinds in the last year.

CONTINUING PROFESSIONAL DEVELOPMENT

- 5: The average architect spends about 378 hours a year in learning projects directly related to work - considerably longer than has been previously suspected.

So, although there are wide variations between one architect and another, the average architect in the sample undertakes three job related projects a year, all of which in turn amount to 126 hours: an overall of 378 hours' learning in a year.

In the RIBA Management Handbook, an outline of what Continuing Professional Development consists is given, and it clearly covers all the activities which architects listed in their learning project lists, including the incidental learning arising from their design projects - item 1 in this extract,

"The term 'Professional Development' is used to denote a consciously adopted plan, however flexible, comprising

a range of activities aimed at developing the competence and potential of an individual or an office. It can include the following:

1. The main professional activity being undertaken, eg practice, teaching, research or administration;
2. Other professional activities;
3. Self directed learning activities;
4. Structured courses;
5. Formal courses carrying some form of accreditation."

(RIBA, 1980, p39).

It has been shown that architects' overall learning activities are in line with education undertaken by other professional groups, e.g. teachers, so the findings relating to this small sample seem reliable. By extension, the amount of time spent on learning projects directly related to their work seem equally reliable. This is substantial: an average of 378 hours per year. This is considerably more than any other research into architects' learning has found, due to the wide definition (in line with the RIBA's definition) of what comprises education. The most recent relevant research into architects' education showed that among voluntary respondents to an enquiry by ARCUK in 1980

"The average annual investment in CPD over the two year period proved to be: 5.6 man/days + £75 direct costs per member of technical staff. Put another way, this represents the equivalent of rather more than one working week or 42 hours per year per member of staff.

The corresponding figures for 1970/80 were similar, but marginally higher: 5.8 man/days + £78 direct costs per member of technical staff."
(Gardner et al, 1981, p14).

Extracting Non deliberate educational activities from that list - that is to say, those activities which are not ostensibly educational, such as committee work and staff assessments - the ARCUK survey shows 37 hours a year being spent in CPD. However, that survey's suggestions about what comprises CPD would, in this thesis, be considered mainly Formally organised education. Of a list of 17 suggestions tabled in the ARCUK survey to help respondents consider their continuing education, only three would not here be classified as Formally organised - and those three were left till last (reading, study time, library costs). So the ARCUK figures are not directly comparable to the figures emerging from the adult learning projects study.

Figure A.7 showed that 37% of Directly related learning projects were planned by someone other than the learner. More comparable figures

are 37 hours of Formally planned education in the ARCUK survey and 140 hours in this survey (i.e. 37% of 378 hours).

To what extent are the figures emerging from this study likely to be accurate? There are a number of problems with them. First, in reflecting on their past experience, learners had to recall with some precision how long they had spent - they had no records to help them do this. So it is perfectly possible that they recalled imperfectly. Certainly, some of the guesses they made were rough and ready: "1000 hours plus" is an example. It might be thought that there was a tendency to inflate how long was spent. On the other hand, anyone who has filled in time sheets will know that tasks often take a great deal longer to complete than estimates allow.

Second, there may have been interviewer bias present. To write down large numbers of hours is more obviously the "right" or a "good" answer than to write down few. So respondents might have been inclined to inflate their figures to seek approbation. (This does not apply to their data on numbers of learning projects, since each of these was titled).

Third, respondents were asked to provide detailed data on only a selection of their learning projects. It seems likely that the ones they selected were the more important ones, ones they were likely to have spent longer on. The amount of time they spent on these projects has been averaged over all projects - again, possibly inflating them.

On the other hand, a fourth note is that the adult learning project estimates are broadly in line with international figures quoted by Tough (though these, too, may of course be overblown).

But the figures provided in the ARCUK survey need also to be viewed with a certain scepticism. They were compiled from office records. These have a number of shortcomings. One is that records are imperfectly kept. The authors note that a problem shared by offices who gave detailed responses was significant, quoting a respondent

"The major difficulty which has been pinpointed by trying to fill in this form is in identifying what we are actually doing."
(Gardner et al, 1981, p14).

Another shortcoming is that records of time spent tend to focus on the kind of time expenditure which is easily recorded or which has a cost implication - and this means courses predominantly. A third caveat is that office sponsored learning tends to be dwelled upon: the office manager

replying on behalf of staff could not know which RIBA evening lectures, for example, had been attended by which staff.

A fourth shortcoming relates to what respondents consider educational. The difference in postulated solutions offered in the first and second sets of interviews seems to have been partly affected by the considerable presensitisation of the second set of participants to a whole range of learning. It may be that the ARCUK survey suffers from the same disadvantages of the first set of interviewees - having a narrow view of learning.

So, overall, in spite of their alignment with international norms, the adult learning project estimates seem likely to be inflated, the ARCUK assessments to be underestimated. It is clear, though, that even these ARCUK estimates only cover the proportion of activities which are Formally planned and if the percentage of Formally organised methods were transferred to Formal planning, this appears to constitute 20% of learning.

As a fifth observation then, this research shows that architects may spend considerably more time in vocational learning than has previously been suspected. Perhaps as much as 378 hours a year is deliberately embarked upon. Perhaps as much as 140 hours a year is spent in Formally planned education.

Considering only the Formally planned CPD component, this research suggests that architects are undertaking four times as much education as the ARCUK survey showed. It may be that the ARCUK research suffers from one of the same problems as the first set of interviews in this study - learners need to be sensitised to what continuing education comprises or they tend to think of it as 'courses' only.

6: Many architectural subjects are not considered to be job related by most architects.

An interesting minor note in this study is that when participants were asked to classify their learning projects according to whether they were directly related to their jobs, indirectly related, or not related at all, there was seldom a consensus on what constituted being 'job related'. Figure A.4 shows the results of what they said, with their projects grouped together under common headings. Another observation may be conjectured from an examination of this diagram. Some of the topics that are listed in the weekly journals' "events" columns

are very frequently considered by architects to be marginal to their jobs. These "events" columns have been used in the past (by Hedge and by Harris) as indicating the educational events currently provided. Participants indicated that design matters (other than of specific building types) are broadly outside the direct area of relevance to the job. So, too, was painting and drawing, and also architectural history and theory.

There seem to be only casual connections between what is publicly seen as being "architectural" and what architects think of as the central job they do.

There is a table in Harris 1980 which lists events publicised in the Architects' Journal Diary for 1978. The three topics mentioned above account for 30% of lectures and 20% of courses - and there are possibly many more that might have been eliminated. So who decides whether attendance on a course has a vocational benefit or not?

In 1973, the Russell Report answered this question clearly:

"What makes a course of study vocational or not is the student's motive for taking it."
(Russell, 1973, p1).

There is a lesson here for those who wish to make attendance at courses compulsory for architects in order to address the problem of incompetence: many of the educational events that would qualify for inclusion in an architects' attendance register are considered by practitioners to be at best only indirectly relevant to their jobs and would seem to have little impact on their competence.

If, on the other hand, it is argued that indirectly job related learning endeavours are beneficial to the job, then there are at least three kinds of projects which would have to be included in a list of verified subject areas to count towards the hours' attendance on courses by the RIBA or ARCUK, or whichever body governs compulsory learning. Home building, gardening and photography are scored well in the indirect category with at least a few respondents considering these undertakings as having a direct bearing on their work. Home building particularly had four of the 12 respondents calling it directly related and 83% of all the people who had learned about it thinking it either directly or indirectly related. So the observation here is that there is no consensus on what kinds of learning projects are vocational; and that those kinds of learning often so categorised by the Institutions are often not thought to be so by learners themselves.

7: Demands made by the job motivate most architects to undertake job related learning projects.

In two of the adult learning projects seminars, the question of why architects undertake learning was addressed. In both offices, a significant majority said that they were motivated by demands of the job. In the private practice, where a single reason was given, 76% of the reasons arose in this way; and where there were multiple reasons, 80% had demands of the job as a contributory reason. In the West NHS office, 73% of the projects which had a single reason were undertaken because of demands of the job; and where there were multiple reasons, in 80% of cases this was one of the driving forces.

So the overwhelming motivation for undertaking job related learning is because the job itself requires it.

8: In vocational education, relevance to the job in hand is of prime importance.

An extension of this observation is to contrast the motivation for undertaking directly job related learning with reasons given for undertaking indirectly job related learning (no questions about why education was undertaken were asked about non related projects).

The most frequently given reason for undertaking indirectly related projects was for pleasure, or for interest. Where single reasons for learning were given, 63% of the private practice mentioned this, and 60% of the West NHS participants. Where several reasons were given, pleasure was one of them in ten out of 11 cases in the private practice (91%) and in all of the four cases in the West NHS office.

Many authors have focussed upon the importance of relevance of learning to architects. Hedge, for example, in a summary marked "Relevance", writes about

"... the importance of information being meaningful if it is to be remembered and learned. There are several factors here - a proper attention to what the 'learners' might already be expected to know, on the part of those presenting information, so that links can be made, and the salient points stressed ..."
(Hedge, 1975, p45).

Harris, in analysing the problem architects have in using trade literature, wrote that there are three nubs at the heart of this and

"The second is that information (on building materials) is required at a special moment: when it is relevant."
(Harris, 1978, p119).

The term "continuing education" is used to cover a wide spectrum of activity - from adult literacy schemes, through second chance provision to adult education of the WEA kind and to vocational education. Many attempts have been, and are being, made to bring these kinds of continuing education together. The Advisory Council for Adult and Continuing Education (ACACE), for example, is concerned with all of them, as was the Russell Report.

Difficulties arise when these disparate kinds of education are yoked together. All too often the principle of "interest" as the motivating factor is applied across the board by educationalists and teachers. Thus the subject is the organising framework for a course of study: principles are expounded and effects plotted.

The reasons given by architects for undertaking job related projects differ in quite a clear-cut way from the reasons given for undertaking other kinds of education. "Demands of the job" versus "pleasure and interest". So the organising principle underlying vocational educational events might well be reframed too: effects plotted and principles expounded.

An example of this may be found in an education kit for health architects "Fire Safety in Health Buildings" (CEU, 1980) by Sutcliffe and Harris. This included two commentaries on a DHSS document of the same title. Students could choose either of the commentaries to use. One was organised in the traditional way according to the subject matter: starting with a discussion of the nature of fire and smoke, showing how fire prevention and fire fighting measures arise from that, and then progressing to the minutiae of legal requirements. The alternative commentary arranged the material in the order an architect would need it as a design project progressed: at the outline design stage, as detailed planning of departments and rooms was done, and at the fine detailed stage of specification and choice of materials; what requirements are needed at these various stages were outlined and the reasons behind them explained. This kit has now been used in almost all Regional offices, as well as in a number of private practices. The overwhelming choice of the architects was the second guide - the one ordered according to the design project. This seems to bear out the principle of job related learning projects being

arranged to acknowledge the main motivating reason for needing to learn: demands of the job.

PLANNING CONTINUING EDUCATION

9: More than two-thirds of all directly and indirectly job related learning is planned by individuals themselves.

A ninth observation arising from the research data is that individuals are involved as main planners in 71% of cases. There was no difference between projects which were directly related to their work and those indirectly related. This finding is very close to the international figure reported by Tough of 73% being self planned.

UK architects in this sample tend to involve other people in planning their education more than average. Tough's own research shows that Ontario respondents had a single planner for all but 9% of their learning projects. By contrast, architects interviewed in this research used a single planner much less frequently. On average, 34% of their projects had multiple planners.

There were wide variations between individual architects about the use of multiple planners. For example, in directly job related projects the West NHS group used only 19%, whereas the Midlands NHS group used 52%. Further research undertakings are necessary to establish whether these samples have given atypical responses.

An analysis has been carried out to see whether individuals tend to use the same kind of planners consistently (Figure A.9). This is inconclusive. While 37% did always use the same combination of planners in their direct projects (25% in indirect), 30% never used the same combination (38% in indirect).

It seems unlikely that interviewing methods can account for this difference. There may, however, be a flaw in the methodology. Since the definition of a learning project can (rightly in my view) allow it to be an assembly of disconnected episodes, it will depend on the individual to decide whether these episodes, which may have been planned by different people or bodies, should be entered as having multiple planners - one for each episode - or be viewed as an overall project in which the most likely significant link planner is the individual himself. Because of this doubt, I have preferred to use the last part of table A.6, "Projects Overall" rather than the "Single Planner"

part of the table which Tough tends to use.

As far as the observation about the involvement of individuals in planning their learning it makes little difference: the overall figure is 71%, the single projects average is 76%, Tough's figure is 73%.

Thus a major finding in Tough's work can be translated into the approach to self planned learning among UK architects. There are a number of common problems that people come across in carrying out learning endeavours on their own. There is a new role for adult education to help overcome and eliminate these. The Open University's network of counsellors across the country set out to do this - paralleled by tutors whose job relates to academic problems. Their job covers not only admissions advice to applicants, relationships with bodies providing preparatory courses, services for isolated, housebound and disabled students, and advice about future occupations, but also some of the banal but crucial problems adults come across: finding the time, finding a place in the house to work, worries about competence, keeping going when discouraged, and so on.

Tough describes at length the particular kinds of stumbling blocks informal learners come across. They may be summarised as

1. deciding what to learn
2. deciding how to do it
3. deciding where
4. setting targets
5. deciding when to begin
6. setting the pace
7. estimating levels of knowledge
8. detecting factors which are hindering progress
9. getting (or getting to) resources
10. preparing or adapting a room
11. finding necessary funds
12. finding the time
13. keeping going through less interesting phases

(Tough, 1979, pp94-96).

While the OU has set a good model, its concerned approach is difficult to extend to less structured learning endeavours. Perhaps local adult education bodies need to provide fewer courses and more facilitation: difficult at a time of cutbacks in funding.

10: Architects involve expert planners in about one in three of their learning endeavours.

Tough found that learners internationally use an expert to plan 20% of their projects. The architects here surveyed get an expert involved in planning 35% of their projects - irrespective of whether they are directly or indirectly related to their work. Experts alone planned 11% of the groups' projects.

Ironically, before Tough's work was published the involvement of experts in one in three projects would have been considered remarkably few. In the context of his work, however, it is less striking. The difference between these figures here reported and Tough's lies not so much in the planning that experts do of learners' work, as much as in the involvement of planners in work which is partially planned by others, as outlined in the previous section. UK architects already involve experts to some extent, and the comment in the previous section about new roles for educationalists would seem to fall on ground which is partially prepared: some cross-deliberation appears already to be taking place.

ENRICHING CONTINUING EDUCATION

11: Learners almost always use a combination of sources and methods of learning to carry out their projects.

A most important observation which may be made of the data outlined is that it is very common for learners to undertake multiple methods of learning and to gather their information from multiple sources. In 94 projects on which participants provided data, only four used a single method. In other words, 96% of the projects used multiple methods and sources. On average, each project involved the user of three-and-a-half methods; for example, reading, discussing and experimenting.

12: The use of multiple methods may be appropriate in Formally organised education.

Much education is framed on the assumption that a single method is appropriate. Almost all the tape/slide kits available for architects

make this assumption. They rely on the exposition of some topic about which the learner is told in words and pictures.

The implications of this observation for teachers and media producers are two. Firstly, that supporting methods could be used to enhance learning that takes place during lectures, exhibitions, tape/slides and so on. This could take the form of an exercise included in the material in which learners undertake, say, a case study. Or a list of further reading sources could be provided - preferably an annotated list rather than a bibliography. Or discussion points could be outlined so that learners can either join with others to further explore the topic or be encouraged to ponder and debate the implications. Some of the tape/slides and education kits being produced by the CEU take this view: the Fire Kit earlier described is an example; so too is a videotape on Estate Management which includes an exercise; as a further example, the CEU proposed supplying additional exercise and discussion material to accompany a standard tape/slide made by the CAA on energy. In straightforward lectures, it may be thought appropriate for the lecturer not only to allow time for questions and discussion, but to positively draw out students, many of whom may be unpracticed at public speaking or unsure of their knowledge.

The second implication is that teachers may need to recognise that the particular piece of teaching they are concerned with may form only a fragment of a greater learning project being undertaken by the learner. This is unlikely in undergraduate education where the teachers have planned the syllabus. In continuing education, however, it is almost always the case. The kind of impact such a recognition may make on the teaching vehicle could be quite wide-ranging. The previous paragraph suggested that additional activities need to be introduced and the time for these built into the programme. The drift of this paragraph is that the attitude of teachers could be different: as an example, they could establish at an early stage in the lecture what kind of overall concepts the audience have; this may affect both the bias of content of the exposition; it may also affect minutiae such as the choice of examples given to illustrate points being made.

So the extension of the previous observation that in independent learning multiple methods are used, suggests that in Formally organised education better learning may take place if multiple methods are incorporated.

At one level, encouragement to discuss may simply reinforce

learning. Buzan (1974) shows that reviews (independently undertaken as a learning strategy) help memorising and he proposes fairly exact timings:

"Recall after a learning period initially rises, and only then declines ... The decline that takes place after a small rise is a discouragingly steep one - within 24 hours of a one-hour learning period at least 80 per cent of detailed information is lost ... If review is to be organised properly ... a programmed pattern of review must take place, each review being done at the time just before recall is about to drop. For example, the first review should take place about 10 minutes after a one-hour learning period and should itself take 10 minutes. This will keep the recall high for approximately one day, when the next review should take place, this time for a period of 2 to 4 minutes ..."

(Buzan, 1974, p55).

So Buzan suggests that uptake can be improved by the use of reflection as a learning method.

Furthermore, Bligh has shown that some kinds of learning do not take place at all without the use of multiple methods. His major conclusion is that lectures (i.e. instructional methods)

"can be used to teach information, including the framework of a subject, but an expository approach is unsuitable to stimulate thought or to change attitudes."

(Bligh, 1971, p192).

"I shall argue that the lecture method alone is rarely adequate, there is a need to use a number of other teaching methods ... they will need to be combined with the lecture method in some way."

(ibid, p155).

The points these authors make, then, is that learning involves acquiring information, attitudes and stimulating thought and that multiple methods are necessary to cover a range of learning characteristics; and that for acquiring information alone multiple methods can enhance memory.

Sutcliffe (1981) has framed the kinds of learning needs of architects in a way similar to Bligh's, but uses different terminology: the need for a grasp of data (i.e. information), for concepts (i.e. understanding) and for application. He argues that for a complete grasp of a subject, these three kinds of knowledge are required and the reason for needing the knowledge together with characteristics of the subject itself will produce different combinations of the three, with differing degrees of importance.

The education kit on "Fire Safety in Health Buildings", referred

to earlier in this chapter, was designed to explore all three of these. The two commentaries which were available, although they started from premises that Application in one and Concepts in the other were the main expositions, both made reference to all three aspects. In the kit as a whole, data was provided by reference to the main DHSS guidance which provided rules for design, as well as statistics on frequency of fire occurring in various hospital departments and also in a tape/booklet "The Hackney Exercise" which described evacuation tests carried out in a hospital in South London. Concepts were dealt with in a tape/slide in the kit "The Nature of Fire", in the subject-oriented commentary and as explanation in the project-oriented guide. Application was dealt with in a Workbook which set design tasks which were expected to be turned to throughout the learning period; and, in a major team exercise carried out at the end of the event, as the main bias in the project-oriented guide, and as explanation in the subject oriented guide. In addition, links were made and algorithms provided which were intended to be used through real-life projects where incidental learning and practise might be expected to take place. Throughout the learning period covered by the kit, and during the real-life application in design, therefore, instructional methods, discussion and discovery were put over using the main sources and methods of learning identified in the interviews carried out in this research which may be summarised as: reading, listening, doing, observing, discussing and reflection.

In conclusion, it may be noted that among the interviewees in Part Three some suggested that they learn best by application experience ("nobody can learn the Contract by reading it ..."), others that a mix of methods is essential ("If there was a document ... you could start talking to people from there ...").

SUMMARY

In a small research study with 31 architects, it was found that the amount of time they spend in Deliberate continuing education is very much in line with other comparable populations. On average, they undertake eight major learning projects each year and spend 111 hours on each. Three of these projects are directly related to the work they do - and another two have some bearing on their work.

Learners had clearly distinct reasons for undertaking their

learning. Work related learning projects were undertaken for one overwhelming reason: they were essential because of demands of the job itself. Similarly, non-vocational learning had one reason mentioned much more than any other. In this case, it was simply pleasure, or interest, which caused the learning to come about.

So, the research study has collected a good deal of previously-unknown material which is of some interest, in spite of the narrow interview base. The main significance of the study in the context of architects' learning methods is, however, the data on education planning. The focus of the adult learning projects study is on learning Deliberately undertaken. Chapter Five has shown that as far as learning methods and resources are concerned, this accounts for two thirds of all learning. Within that, Formally organised methods contribute one-third and Personally organised methods the other two-thirds.

Organising these methods might be thought of as tactical procedures. Beyond that, there is a strategic level of planning - the level at which the adult learning projects study is concerned. The two levels do not cover the same spectrum; they are not co-terminous. For example, at the strategic planning level it is possible for someone planning their education Personally to incorporate tactics (methods) organised by experts.

So it may be chance that causes Personally organised methods, at 69% of Deliberate learning, to be similar to the 63% contribution made by Personal education planning.