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Canter, David V.

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6 Way-Finding and Signposting: Penance or Prosthesis?

A 70 year old woman up from the country spent three days trying to get out of a hypermarket in Utrecht. She told police who rescued her she was afraid to ask other shoppers how to get out (*Glasgow Herald*, April 1979).

All form of public information and direction finding systems, whether they are maps, signposts, guides, display boards or whatever, exist within the context of the human use of the built or natural environment. The use and purpose of these communication systems is therefore of interest to people, from a variety of disciplines, who also have a concern for the human use of the physical environment, human geographers, architects, planners and environmental psychologists. Furthermore, in order to understand fully the psychological significance of signposting and the like, and thus be able to produce systems which can be more effectively utilised, it is necessary to understand the relevance of the normal use of the physical surroundings. This chapter summarises some of the research into the ways people navigate within, and make sense of, their physical surroundings, of such relevance to the creation and study of public information and direction-finding systems.

Penance or prosthesis?

In many cases signposting is an admission of design failure. It reflects the fact that there are many situations in which the designer cannot rely upon the knowledge or experience of the user for finding the way. Many modern building complexes, notably universities, hospitals, civic centres and shopping precincts, seem to make demands upon orientation skills and way-finding abilities which few people have. These provide situations in which people need to know where something is, but the nature of the design makes it virtually impossible for them to readily gain that knowledge without some form of help. An attempt at signposting, or direction-giving, is therefore made in order to provide prosthesis for a disability, which, we can argue, was created by the design itself. We are in a great danger of studying the design of crutches, on the assumption that somehow or other they can replace our normal means of navigation. We should be spending some time finding out how the incapacity has come about in the first place. Nonetheless, some prosthetic devices can be very effective. It also cannot be denied that there are many design problems relating to site, or to cost, or to the sheer complexity of what has to be housed, which may conspire to make it impossible for people to rely on their

normal day-to-day abilities in order to find their way around. However, even in these situations we should be designing our crutches to make use of the natural processes which occur when those crutches are not necessary, rather than working from the starting point of what is a good design for a crutch. We need to identify what it is about the particular situation which has deprived people of the intellectual resources to find their way without signposting and to identify what resources they do have upon which we can build. If this approach is not taken, then there is a strong risk that signposting systems do not even work effectively as prosthetic devices. Instead they become a public penance, a declaration of the aspects of the design which are incomprehensible.

It should be noted that it is only in the minority of cases that signposting is necessary. The great majority of our orienting, way-finding and location-identifying behaviour is done completely independently of public information and direction finding systems. We do not normally rely upon signposting to find our way home from the office. The cues we make use of to visit a friend in an area we know may often be informal ones. Indeed, there may well be a variety of relatively sophisticated natural processes upon which we draw, but of which we are not aware.

In examining these processes there are four separate topics we should consider. First of all we need to explore what it is that people already know that can be built upon. Having done this we can move on to the problem of representing new information through signs and symbols. This includes exploring both the representation of location and the representation of the relationships between locations. These explorations derive from an implicit theoretical model which it is valuable to make overt. Having done this we are in a position, finally, to examine the various uses which can be made of public information systems, i.e., (a) for emergencies, (b) in order to reach goals and (c) to facilitate the formation of plans.

Existing user knowledge

Where I am

Probably the most fundamental starting point for way-finding is the knowledge which the individual has about his present location. Any future navigation is probably built upon knowledge of present location. From the earliest discussions of people's orienting behaviour it has been recognised that there are different degrees of sophistication in terms of the knowledge a person can draw upon in identifying where he is. Trowbridge (1913) made one of the strongest early statements on this. He argued that there was a difference between civilised minds and the minds of others, in which he included 'birds, beasts, fish, insects etc but also, in all probability, young children' and a large proportion of mankind living in an 'uncivilised state'. He suggested that these primitive groups could only understand their present location in relation to the whole history of their previous

locations, starting with the place of their birth. The civilised mind by contrast could identify its location by reference to some abstract external coordinates, which Trowbridge insisted were the four points of the compass.

It is important to recognise, however, that just as people will differ in their degree of disorientation for any given location. *Places* vary in the amount of 'lostness' they engender. Whilst we are all aware of the individual differences between people, any signposting system should also take into account the variations between places. In one study we carried out in Surrey we explored the possibility of measuring the differences between buildings in order to see what variation in measured lostness could be shown to exist for the different buildings on the university campus. Some of our post-graduate students on the Master's course in Environmental Psychology at the University of Surrey (Agabani and Weaver, 1974) carried out the study. Using the conventional device of a questionnaire which dealt with as many aspects of lostness as could be thought of, these students went round a number of university buildings and questioned people in the corridors about their perceived lostness. A factor analysis of this twenty-one-item questionnaire completed by one hundred and seventy eight people demonstrated that there was a major dimension accounting for 40% of the common variance. This dimension brought together questions dealing with how confusing the building was felt to be, how well oriented the individual felt within it, how easy they found it was to get lost within that building and the amount of time they wasted looking for the way within the building. Items dealing with asking for and giving directions within the building also came up highly loaded on this dimension. Of note was the finding that there were large variations between different buildings on the University of Surrey campus in terms of their mean scores on the derived 'lostness inducingness' scale. The significance of this study is to demonstrate that there are systematic differences between different buildings in terms of how easily the users know where they are in those buildings. In the Surrey study, the aspects of building form which could be most readily related to degree of lostness were how open they were in plan and how simple the overall structure was. Those buildings with many short, winding corridors came out worst, whereas the Students' Union building which consists essentially of a large open, partly differentiated space came out the best. More detailed explorations of this kind would be necessary to identify the particular building properties which seem to induce a feeling of lostness, but this student project certainly served to indicate that such a study would be directly rewarded with design recommendations.

In considering the processes involved in knowing where you are it is worth emphasising that this knowledge would appear to be built up upon knowledge of where you have been. The knowledge of earlier location will then be linked to knowledge of present location by the person's understanding of how he travelled in between. This is a rather complex process. If it is made further sophisticated by the type of external referents to which Trowbridge paid attention, then it is apparent that there is considerable possibility both (a) for errors in this process to occur which can give rise to later difficulties, and (b) for the knowledge, when it is

clearly established, to be so efficient that it will overrule any other information sources which might be available. In the former situation, the example of putting a 'you are here' point on a plan may be quite useless because the individual is not all clear exactly where 'here' is, either in his own cognitive system or in that represented on the map. In the latter circumstances the individual's knowledge that he has reached a particular location by a particular route may counteract any attempt by the signposting system to indicate the nature of his current location in relation to other routes.

Where there is

If we accept the metaphor of the 'mental map' which is used for identifying our current location then a design which ignores the way in which people store and draw upon their internal representations is likely to be more difficult to use. As a consequence, it is much more likely to rely upon the prosthetics of signposting than a design which has a psychologically acceptable structure to it.

The idea that we have an internal representation of an area, which has a map-like form, drew its major impetus from the work of Lynch (1960). By asking people to draw maps of Boston and finding that their maps had certain regular errors to them Lynch pointed the way to the exploration of the type of geographical representation people have available to them for helping orientation and navigation. In fact the value of identifying people's psychological geography was highlighted at least fifteen years earlier by a president of the American Geographical Association (Wright, 1947). But it took Lynch's approach of asking people to draw maps to set research in motion. Since his book *The Image of the City*, a variety of studies have been carried out in an attempt to identify what aspects of the built surroundings people draw upon in forming their internal representations. In a later book by Lynch (1976) a number of examples are given of the use of this approach in relation to detailed planning proposals. Lynch's identification of features such as landmarks and boundaries, as important orienting points, is all too readily forgotten. However, it has been argued at length in another context (Canter, 1977) that an approach which relies *entirely* upon the physical features that people will identify may often miss the socio-emotional processes which are part and parcel of our conceptual systems of places. A simple example of the power of the nature of our interactions with the environment to influence our consequent ability to remember locations is demonstrated by another study carried out by one of our MSc students (Rawlinson, 1976). She carried out a study of children finding their way about London Zoo. She found that the only place that they could all remember, without exception, and which most of them were able to locate on a map was the Zoo shop. This was the only place where they themselves had some active interaction with their surroundings and in which they were not under the direct perceptual control of their teacher. Many other aspects of the Zoo which, from a Lynchian perspective, may have been thought of as dominant features were insignificant when compared with that location where it was possible to buy

something to take home.

Part of the conceptual system we build up for dealing with our surroundings does contain physical or geographical information about the location of places and their relationships to each other. However, this is only part of the information we need to store. There is for example, a research literature to suggest that, in some cases at least, estimates of distance are distorted by whether the distance is to some location which is preferred or a location which is disliked. (See Canter, 1977 for a review of this material.) There are also studies to demonstrate that certain properties of buildings make them more memorable (Appleyard, 1969). However, it is important to recognise that we are dealing with processes which relate to people's interaction with their surroundings, not folded Ordnance Survey maps which happen to be stored in memory.

A number of the recurring findings from studies of how we store physical information are of value to the designer. There is evidence that we store our knowledge of the physical surroundings by converting our experience into relatively simple geometric forms. An elliptical railway system may well be thought of as a circular one (Canter and Tagg, 1975). Although two crossroads may meet each other at oblique angles, they may well be thought of as having the neater, right-angle cruciform arrangement (Pocock, 1973). Rivers such as the Thames and the Seine which wind their way through the centre of large cities are likely to be thought of as simple curves, rather than the convoluted configurations which they have in actuality (Milgram, 1976; Canter, 1977). It therefore seems likely that any design which makes this type of simple storage more difficult will be more likely to lead to user confusion. Given the knowledge we now have about these relatively consistent processes, it is surprising to find recently completed buildings which still manage to break many of the rules of practice which may be derived from these principles, in some cases with direct commercial loss as a consequence.

How places are organised

Besides developing an internal representation of the geography of any place, in order to make use of it we develop more complex *process* knowledge of the typical logical (or psychological) structure of places. A simple example can be given for entertainment buildings which require a ticket from members of the audience. It is usually accepted that people buy or present a ticket before entering a building, rather than in the middle of it.

Indeed, research by Peled (1975) has demonstrated that people may well think of building complexes either as those that house a sequential process through which they proceed more or less as linear in structure leading to a variety of routes and peripheral pockets of activity. It is quite likely that these different types of process have associated with them different strategies for making use of them. Thus, if an airport terminal is thought of as essentially linear, processing people through it, any attempt to provide welcoming corners scattered around the periphery may be very

confusing. On the other hand, if a students' union is conceived of as essentially centrifugal in organisation, enabling students to find semi-private nooks and crannies for a variety of activities, then it will be found uncomfortable, and possibly difficult to orient within, if it is laid out in a form that implies a linear processing through it. This is one area of research in which designers and academics could fruitfully collaborate. The tools for the research have been developed so that it no longer needs to be a massive pilot exercise before we get any usable results. The likely pay-off in terms of more manageable and comprehensible environments give indications of being very great indeed. Furthermore, it is precisely when a design is contrary to popular expectations, or when it is difficult for users to comprehend its organisation, that sign systems are both so important and difficult to provide.

One more aspect of our knowledge of the way in which places are organised bears comment. This is the fact that an important aspect of this knowledge is an understanding of where *further* information about the organisation of the place can be found. For example, one of our students (Nash, 1977) carrying out a study in Euston Station found that railway officials in uniform who happened to be near the notice board, or signpost, were very likely to be asked for details of trains or location of facilities which were written up, supposedly for all to see. No-one has really explored the difference between obtaining information from a person and obtaining information from a notice board or signpost. However, it may be suggested that there are some differences between these two sources of information which are not normally considered.

- (1) A person can give you some indication as to how confident he is of the information he is presenting, whereas a noticeboard always seems to imply that it is 100% correct.
- (2) A person can indicate how up to date his information is, whereas a notice board seems to have been there for all time, and does not normally give any indication as to when it was last brought up-to-date.
- (3) A person can interact with queries and so restructure his information in response to the particular requirements of the questioner.
- (4) Typically, one notice board cannot be checked against another. They are usually monolithic in the information they carry. Two or three different people in uniform can be asked separately. (In some countries this pooling of information from different human sources is often essential if a reasonable accurate picture is to be obtained!)

These are all reasons why in some countries, no matter how clearly a notice is displayed, an official in uniform, or a seemingly knowledgeable member of the public, will be utilised in preference. It is likely that the countries in which this pattern occurs are ones in which mechanical sign systems of other forms of centralised public display have been found to be unreliable in the past. If the system is known to be reliable, then individuals are less likely to be drawn upon for information. However, given the fact that the signposting system does not indicate

its reliability very clearly, it will only take some confusion or hesitation in that system for a reversion to the use of people as information sources.

It can be appreciated, as a consequence, that the use of information systems is part of our utilisation of the knowledge we have of the way in which the environment operates. This in turn is an aspect of the conceptual system we employ to enable us to navigate and orient ourselves. The structural information we have about how the physical world is organised and the process information we have about how any particular facility is used, or how knowledge of that facility is to be gained, are both built upon and provide us with an understanding of where we are at the present time. All this information, therefore, needs to be understood and made use of by the designer, both in creating a particular design, and then in trying to remove the weaknesses in that design by the provision of information and direction-finding systems. Let us now turn to a consideration of the properties of these systems which are necessary to enable people to make effective use of them.

Representing the world through signs and simulations

Once it is accepted that there are weaknesses in the design itself which do not enable individuals to find their way simply by their knowledge of the actual building, then it is necessary to, in effect, provide a comment upon the environment which will enable people to use it. It is fruitful to think of this process as one of simulation. In other words, what is necessary is to represent the environment in such a way that people can relate that representation to their own objectives and draw from it the information they require. There have been a number of studies of environmental simulation which are possibly of much more direct relevance to these issues than has been appreciated in the past. Canter et al (1975) provide a brief review of these studies.

One consistent finding of the studies, which is encouraging, is that it is possible to provide simulations of environments which generate the same responses as do the environments themselves. Typically, the researchers carrying out these simulation studies are more directly concerned with the evaluative or emotive aspects of the environment than with their use. There is therefore considerable work to be done to establish links between making decisions based upon some representation of an environment and making decisions based upon detailed and familiar knowledge of that environment. However, these studies do demonstrate that there are distinct advantages and disadvantages associated with the major forms of simulation which are available; whether they be photographs, line drawings, plans or even verbal description. There is thus a wealth of material available to indicate the types of representation which may be fruitful for particular situations. Indeed, it has been found (BPRU, 1972) that verbal representation of environments can be just as effective as drawings.

Against this background of the optimistic results of this research it is possible to identify two aspects of the environment which need to be simulated in most sign

systems. One is the identification of particular locations. The other is an indication of the relationships which locations have to each other and, associated with that, the distances between them.

Locations

In identifying a location the task is to represent what the location is by reference to some knowledge which the individual can already be assumed to have. The notion frequently used here is that of 'labeling'. However, it must be appreciated that the label is only another form of simulation with all the associated problems of 'validating' that simulation. Some forms of representation may be less effective than others because they fit less readily into people's understanding of the place in question. Simple, relatively ambiguous labels for male and female toilet facilities, for example, may work very well because most people expect such facilities will be provided. If, for example, a decision were to be made to provide toilet facilities common to both men and women, then much less ambiguous signposting would be necessary.

Agabani (1975), for example, developing the study of 'lostness' to compare four university campuses found that the one which was most disorienting (our own at Surrey) was the one for which there were most complaints about the 'confusing changes in level'.

The simulation strategy which would find psychological support would therefore deal with only two dimensions at a time. In other words, items would be designated by floor, but no indication would be given as to their location on a floor until the individual concerned is on that particular floor. Then a further two-dimensional plan or other form of signposting system can be made available.

This proposed strategy is derived in part from a study published in 1970 by Best. He studied people getting lost in one of Britain's larger town halls. He related the degree to which they got lost to the number of choice points in their journey. Best argued that if people could be given some indication as to what choices were coming up, and each choice could be made as simple as possible, the amount of 'lostness' would be reduced. He therefore developed a signposting system which presented people with information from which to make a journey choice, together with advance warning as to when the next choice was coming. Best was able to demonstrate quite clearly that his new system reduced the number of people getting lost. The fluency with which a person would find a route could be reduced if all the minor choices were laid before him. However, it seems quite feasible to identify a hierarchical series of choices whereby people only need to be concerned with major choices of direction until they get quite close to their target, in which case they would draw upon more detailed information available. This may seem a ponderous procedure to go through, and certainly would put great demands upon the graphic ability of those creating it. However, there may well be cases in which such labour is justified. It is also worth noting in passing that the utilisation of 'supergraphics', whereby the graphic symbols become a decoration in their own

right, is a solution to the aesthetic problems posed by these ideas which has not been utilised as widely as would seem justified.

Simulating distances

We rely upon a great variety of distance information in our day to-day movement around the environment. We frequently know how long, how far and how much effort is involved in moving between two points. Furthermore, it has been found in a detailed study on London (Canter, 1975) that people are, on average, surprisingly accurate in the estimates they make of distances between places. There are consistent errors built in to this overall response which have not yet been explored in relation to their implications for signposting. But, to give one example from the study of distance estimation in London, it was found that distances were underestimated below six miles whereas they were overestimated above this point. For some reason, in London at least, people are reasonably accurate when they estimate a distance to be about six miles. This raises the question as to whether there are units of distance with which people can operate and be very accurate, and therefore distances should be provided between points which have this relationship to each other. Certainly it is clear from the research that distance figures could be more fruitfully used to help people navigate. It may well be that for particular situations certain types of distance information are useful. For example, if people are queuing it may be more important for them to know the length of time they will be kept waiting than any absolute value of the length of the queue. If they are walking, it might be of more significance for them to know what proportion of the distance is downhill, and if they are carrying parcels, they may like to find out something of the obstacles to be negotiated along the way. Thus, identifying the appropriate type of distance metric to be provided in any situation as an aid for people in their use of the facilities is an important goal for future studies.

All in all, then, it would appear that if it is necessary to provide the prosthetic devices to enable people to find their way in our modern environment that there are available a great variety of forms of simulation upon which to draw. Furthermore, it would appear to be possible to identify which simulation is most appropriate for which particular setting. In doing this, it is necessary to draw upon the conceptual systems which people employ for making sense of the particular environment in question.

Indeed the converse of this issue, the *power* of the label, also needs to be considered. A number of researchers studying the use of space in buildings (e.g., BPRU, 1972) have reported that the labels assigned to rooms can have a big impact on how readily those rooms are used. People will refuse to give a lecture in a room labelled 'laboratory' even though it might serve the purpose quite well. Indeed, a television crew who put labels on telephone kiosks, indicating that some of the telephones were for men and others for women, was able to produce some very amusing film of 'women queuing up outside a telephone kiosk labelled 'women' even though those telephone kiosks labelled 'men' were empty.

The theoretical point here is that a label is the representation of a location. It may be simply a map reference with which no association on the part of the user is expected. Such labels seem to be only of value to the expert who can relate them to a complex system of conceptualisations. For most other individuals, it is not necessary to know only where the location is, but *what* the location is. The particular local label assigned to that location may be of little value if the person has to come in search of a *particular* use. Terms like 'services', designations of 'levels' in a building, drawings of standing men and a whole host of other symbols which may be perfectly meaningful to one group, yet which do not necessarily carry any implications for people who have another cognitive system to draw upon, frequently only serve to cause confusion.

Descriptive information can be given about locations in order to facilitate understanding of their use. In a conference complex, for example, the sizes of lecture theatres may well help people to gauge their relevance. In other cases, knowing the age of the participants may be of value. Unfortunately the demands of typographical elegance may often reduce the information which people may call upon. Certainly the power of visual representations seems often to be neglected because of the graphic problems of incorporating them. Our visual powers of recognition are very considerable indeed, and visual information provides an important component of our conceptual systems of places. Work on maps for the blind (Armstrong, undated) has demonstrated that, even for those groups, the spatial arrangement of material and the use of textures can greatly aid identification and navigation.

By thinking of the identification of locations as a problem in simulation that is, a problem of representing the physical environment in a way which bears a direct and popularly accepted relation to the actual environment - we may be able to move towards a more systematic set of ways of representing locations.

Relationships between locations

There are two aspects of representing the relationship which locations have between each other in space. One is an indication of direction and the other is an indication of distance.

With regard to both of these aspects of relationships we have similar problems of simulation. Simulating direction seems to be particularly difficult because it inevitably involves some form of geographic *projection* whereby the individual 'reading' the simulation is required to convert the actual geographic direction into some other represented direction. This is a manipulation which requires some sophistication; whether it be through the use of plans, involving the conversion of what is essentially a vertical experience into a horizontal viewpoint (in other words, from the experience of moving through a space to the experience of looking down on it), or more simply the use of arrows or other pointing devices which will invariably be at right-angles to some of the relevant lines of movement.

The difficulty in signposting through both arrows and maps relates to the problem

of unravelling three-dimensional instructions. There is some research evidence to suggest that performing manipulations upon our internal representational processes is one of the more difficult actions for us to carry out (cf. Canter, 1977, Ch. 4). A simulation, therefore, which not only implies the conversion of symbols into actual places but also involves a change in the geometric projection employed would thus appear to have within it great potential for confusion. This confusion is magnified when the representations have to cope in a two-dimensional mode with what is essentially a three-dimensional environment. Thus the shopping precinct or a central city development which contains pedestrian pathways crossing over vehicular roads, in which both transport routes change levels, presents particular difficulties, either in forming a representation or for an individual to formulate an effective conceptual system.

Environmental roles and conceptual systems

Before turning finally to the various uses which can be made of public information systems it is necessary to pause to consider in a little more detail the theoretical model from which much of the ideas presented above have been drawn. This theory is derived from *The Psychology of Place* (Canter, 1977). In this book the theory is propounded that people build up complex, robust conceptual systems of those places with which they interact. As has been illustrated above, it is argued that these conceptual systems include information about physical locations and likely activities, as well as evaluations of those places which compose a conceptual system.

The conceptual system will be built upon whatever information is available, so that even a new, unfamiliar place will give rise to some attempt at conceptualising it, even if it is only based on the building facade, or the first view on entering it. There is a great deal of research to support the argument that people can build up rich and complex conceptual systems of environments for which they have relatively little information. What information is missing will be supplied by expectations drawn up from previous experience. Any information system which ignores the well-developed skills which people need to have will operate more like a badly fitted artificial leg, always acting as a handicap, rather than as a crutch that can be thrown away once the individual has recovered.

There is a further important point about the theory of place which is being presented here. It is argued that the conceptual systems which people have are derived from their interactions with their environments. As a consequence, people who have different roles within an environment, leading to them interacting with it in different ways, will form different conceptual systems of those environments. One very important implication of this is that those people whose essential interaction with an environment is to create it will almost inevitably have an understanding and conceptualisation of it which is different from those whose major interaction with it is to use it. This distinction between user and provider of an

environment, and the consequent differences in ways of understanding that environment, have implications in a wide range of environmental considerations. We have talked about these information systems as consisting of simulations of environments. Indeed the whole notion of information implies that there will be some individuals performing interpretations of stimuli provided by others. If we accept that the users and the providers will very likely need to draw upon different processes for interpreting this information then it is clear how necessary it is for the providers to explore with the potential users the interpretations that they are likely to make.

This exploration with potential *future* users of environments which do not exist at the present time has frequently been heralded as the stumbling-block for systematic scientific research in relation to people's reactions to settings being designed. However, here the possibility of simulating an environment is very positive indeed, for it enables the design team to provide representations and explore the reactions and uses which are made in relation to those representations. By careful sampling procedures and the appropriate use of scientific processes it is now clear that such research activity can take place in parallel to other design processes so that it does not add any considerable time element, or indeed any considerable cost elements, to the creation of the new setting.

It is said that the Japanese built their cities in a complex and maze-like fashion so that any marauding armies or foreign enemies would get lost on their way to attacking the palace. It is now feasible for any group to create an environment which is comprehensible to them but which is an incomprehensible maze to some other group. As our technological systems become more sophisticated and the scale of development of our environments become more complex, so does the possibility increase of our producing environments which are only comprehensible to those who have produced them. The way out of this impasse is through systematic pre-design research on the lines that have been indicated above.

Evaluation and use

No matter how it is generated, it is necessary to evaluate any information/sign system in order to learn from its strengths and weaknesses. Indeed, if this evaluation can be carried out prior to the completion of the design, then such evaluation can have a substantial effect on the development and modification of that design. There is in fact now a substantial literature on environmental evaluation (cf. Canter et al, 1975) but little of it seems to have been directed to the evaluation of public information systems. One reason for this may well be that no detailed attention has been paid to the criteria against which it is necessary to evaluate such systems. I would like to suggest that the evaluation of these systems depends very much upon the uses to which the system is to be put. There are at least three different classes of use which impose different degrees of intensity upon the system and which therefore may well lead to different types of evaluation. These are:

- uses in emergency,
- uses in order to obtain specific goals and
- uses to facilitate the formation of general plans.

Emergency use

Recent research which we have carried out (Canter, 1980) has looked at human behaviour in fires in buildings. This is only one type of emergency situation which is found in present-day buildings. It does serve, nonetheless, to illustrate the general issues involved in the use of information systems for emergencies. Many of the information systems available, whether they be fire alarms, emergency signs or indications of the equipment available, seem to ignore many of the issues identified above. They are typically superimposed upon the environment by a cautious fire officer, with little attempt to understand the details of the context into which they are placed, or the conceptualisations of those who will be using them. As a consequence, it is not uncommon to find alarm bells which are ignored, egress routes which are not effectively utilised or fire fighting equipment which is either not used or is found inoperable when attempts are made to use it.

Considerable costs are involved in the provision of these fire and emergency facilities. Yet it has been found, in a number of fires, that people frequently expose themselves to danger rather than respond to the information presented to them through the alarm signals or in other ways.

In an emergency an individual has to act upon limited information as quickly as possible. In a fire, and probably many other emergencies, the early stages are very ambiguous. Furthermore, the threatening situation is liable to be changing very rapidly, so that up-dating of the state of the emergency may be necessary for effective action. An existing organisational structure is also present which will be utilised in dealing with the emergency. Information systems which ignore the current organisation are liable to add further confusion.

In order to evaluate the provision of public information systems for emergency, then, it is necessary to demonstrate their relationship to existing organisational structures and to the expectations and comprehension of those who will need to make use of the system. Such explorations may well be of more value than the 'dry run drill'. Such a fire 'practice' may serve solely to emphasise the fact that this is a separate system which has nothing to do with the day-to-day activities, with its consequent failure in emergencies.

Goal-directed use

In order to evaluate systems for people who have particular goals to achieve it is necessary to identify what those characteristics are which lead to people needing to rely upon the system provided. It is then necessary to identify what are the family of goals and sub-goals which these users are likely to have. Many assumptions are frequently made in shopping centres, for example, that major goals will be to locate

departmental stores, sometimes referred to as 'magnets', whereas smaller shops will be 'taken in' on the journey. Watts (1978) explored people's shopping behaviour to see how much evidence there was for this belief, and found very little indeed. This serves to demonstrate further that the popular concepts of management, or marketing directors, may well be at variance with what is actually the case.

One significant point to note is that if people are relying directly upon signposting systems in order to achieve specific goals then any direct breakdown in the signposting system can lead to great confusion. For example, a series of direction signs that are relied upon quite heavily, but which then cease, are likely to cause more confusion than some general indication of direction which right from the start is general and intermittent. Another important point is that the pattern of behaviour observed in many situations may well be a function of the information system available. Thus it is necessary for the designers to consider the information system in relation to the pattern of activities which it is wished to generate, or which it is wished to avoid. Placing detailed signposting in a location where it is not wished to encourage people to stop for any length of time can be counter-productive, for instance. However, it might not be apparent that there are many situations in which the source of information and its organisation can have far reaching effects on the pattern of behaviour of people in that place. One example of this is the use of centrally located notice boards in railway and airport terminals. If there is widespread anxiety about missing an important piece of information, then such a location may well generate uneven dispersal of people around the facility.

One further, more surprising, example of this influence of the information system was found by one of our students who carried out a study of dentists' waiting rooms (Ottar, 1974). Another found a similar pattern when looking at doctors' waiting rooms (Reid, 1977). In both cases it was clear that the seats selected by patients were a function of both the location of the receptionist's desk and the nature of the patient call system. It was further possible to demonstrate that the anxiety level of the patients influenced their selection of seats. More anxious patients take seats nearer to the receptionist than the less anxious patients. As a consequence, in these waiting rooms an ecology of seating behaviour was generated by the location and type of information source. Using different types of information systems, whether they be public address systems, notice boards, flashing lights or the assignment of numbers to customers, are all likely to generate different patterns of space usage.

Finally, in considering the use of signposting systems for specific goals it is worth briefly mentioning their use in libraries and museums. A full review of the current theory and practice in this area is provided by Spencer and Reynolds (1977). From that review it is clear that this is a particular case in which directional signing and labelling is of paramount importance for use of the building. These systems may be thought of more as tools for the appropriate use of the facility rather than crutches to help the disabled. Nonetheless, the development and design of these tools would still seem to require acknowledgement of the principles we have discussed above. It will still be necessary to evaluate these systems in terms of the goals which people have and the abilities they have available for the use of the displays

provided.

Plan formulation

One final way in which information systems may be used is as an aid to the development of a plan of action, or to enrich conceptualisations and thus the development of future plans. In this case the signs and information provided can be drawn upon to help the individual elaborate any existing conceptual system. One recent experiment we carried out serves to illustrate the potential implications here. Students (Young et al, 1978) showed slides of buildings whose functions were ambiguous to groups of subjects and asked them to evaluate these buildings. In some cases 'plausible' labels were assigned to the buildings as determined by previous research. In other cases, 'implausible' labels were assigned to the buildings. It was found that the plausibility of the labels had a direct impact upon the evaluation of the buildings. The study served to demonstrate that inappropriate or ambiguous use of signs or symbols, whether they be labels or physical forms, can have far-reaching effects on users' conceptualisations.

In order to evaluate signs and direction systems for the purpose of plan formulation it is necessary to consider their organisational structure. This structure helps or hinders people in building up an accurate conceptual system of the places involved and the relationship those places have to each other. Facilitating this overall conceptualisation may be more important in the case of plan formulation, than in remembering specific details. Hence, clear locations which can easily be remembered and associated with broad patterns of activity may be more fruitful than providing precise and detailed symbols.

An example of this process which comes to mind is the possibility of using, say, large brightly coloured plastic animals instead of the more mundane and clinical building code numbers. The use of sculpture as landmarks is not unknown, but it is rare to use this procedure in a consciously organised way to enable people to build up an accurate conceptual system of any particular facility. A careful arrangement of brightly coloured plastic animals could, for example, enable people to plan in the knowledge that, once they have found the green giraffe, then it is very easy to get to the pink elephant. (The use of English pub signs as landmarks has some relevance here!) In effect, it is being suggested that if the design itself fails to provide an articulated conceptual system then it must be accepted that any sign or symbol system is an attempt to impose upon the building complex an articulated and comprehensible conceptual structure. It is my belief that if we can be successful at this level, and thus enable people to plan effectively their use of a facility, then all the other uses we have indicated will be accomplished.

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