Healthcare Designers and Information Use

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ABSTRACT

In 2005, a survey was undertaken jointly by UNSW and the Royal Australian Institute of Architects (RAIA) that examined the sources of information used by healthcare designers in Australia and New Zealand. At the time health facility design guidelines were being developed for use on all healthcare facility projects across those countries. The results of the survey indicated the low prominence given to the use of written material by designers and their reliance on their own project experience, plus that communicated verbally by their colleagues and clients as being the main sources of information that influenced their design practice. Little use was made of 'research', obtained from academic or other sources.

Clearly, matching information needs to design practice requires further examination of the distinct phases at which designers require 'information', including what they regard as 'useful' in terms of content and format. Investigation regarding the link between information use and design decision making appears useful in determining whether it is possible to supply and encourage appropriate information use to improve the overall quality of design output.

Drawing on the results of the 2005 UNSW-RAIA survey of healthcare designers, this paper reviews decision making and information use by designers. The nature of the (architectural) design process is reviewed and mapped against theories of information use and decision support evidenced in the practices of designers, and other professionals in similar fields of creative endeavour.

Strategies for encouraging the use of 'research' by designers to inform practice are explored. These include emphasising the production of information in forms readily useable by, and accessible to, designers. The need to work more closely with design educators to inculcate in their students a greater awareness and appreciation of research as a positive input to design processes, is also considered.

INTRODUCTION

In 2005, in collaboration with the Royal Australian Institute of Architects, the Centre for Health Assets Australasia at UNSW (CHAA, 2006) undertook a survey of healthcare designers in Australia and New Zealand that explored their use of diverse information sources in performing their work. The survey targeted designers who had undertaken any type of healthcare project within the last five years, whether within Australia, New Zealand or overseas.

The annual capital outlay on health facilities in Australia is approximately $2.8 billion or 3.56% of the annual health budget (2006, Appendix Table S38). The pressure to expend this appropriately and efficiently is thus ever present.

Clear communication of client needs and ensuring that design consultants have the appropriate knowledge and resources available to guide their work are strategies that appear likely to improve the quality of healthcare facility projects overall. As Choo notes, architectural firms like most organizations seek information to fill gaps in their knowledge and to create certainty about the environment within which they operate (Choo, 1998).

The survey was developed to determine which sources of information were most often used and those considered most valuable to the designers who used them. The nature of information use by designers in practice is relevant to the exploration of the attitudes and skills being cultivated in designers currently being educated.

Given that many architectural educators have arrived in academia via architectural practice, they step into the classroom often well steeped in the prevailing attitudes and practices of the mainstream architectural profession. Thus, in terms of the wide range of information sources available to practicing designers, they will hold their own views on what may be useful, what should be considered and what may be of lesser importance in guiding design practice.

This paper considers the context being set for students in the education setting in terms of attitudes to information use often demonstrated by more experienced architectural practitioners. It examines whether these are the attitudes that

we would prefer design practitioners to profess, or whether by broadening the definition of 'information' at the education stage, a more enquiring and reflective stance may be embraced by future practitioners than can perhaps be demonstrated by those practicing at the current time.

I. LITERATURE REVIEW

Design is fundamentally about solving problems and solving problems almost inevitably requires decision-making. Decision-making is comprehensively outlined in management literature (Baird et al., 1990, Marakas, 2003, Choo, 1998). These writers all make the point that organisations require information in order to both reduce uncertainty in their interactions with their external environment and to guide their actions.

Health design projects are usually highly complex and involve large numbers of stakeholders such as the project funding organisation, specialist clinicians, other staff members, patients and visitors. Designers thus need a range of sophisticated coping mechanisms to keep abreast of, and to deal with, incoming information. This information may encompass trends in clinical practice, advances in healthcare technology, regulatory requirements ranging across a number of areas such as clinical practice, occupational health and safety, urban planning and building regulations, and increasingly, energy use and environmental sustainability frameworks.

Information is required for knowledge creation in organisations; the knowledge created and disseminated at an organisational level guides and informs the decision-making processes that are undertaken. Furthermore 'information needs vary according to the *stages of the decision-making activity.'* (Choo, 1998, 191). Discussing information seeking during organizational decision making Choo notes that individual decision makers are driven by different habits and heuristics that each 'has acquired as a result of training, education, or experience.' (Choo, 1998, 195)

Bryan Lawson (2006, 181) reinforces this point in discussing the architectural design process by saying '…it is common for designers to carry some set of guiding principles with them through their working lives. This intellectual baggage is most frequently gathered during that career, with each project contributing to it in some way.'

Lawson discusses the architectural design process extensively in his work including mapping the steps and discussing the translation of such maps into a much more fluid and iterative process in real life than such discreetly defined processes may suggest. There are similarities between the processes described by Lawson and those that encompass the decision making strategies associated with management problem solving – for example see Baird et al, (1990) amongst others.

However, while clear that there are parallels between the processes of management problem solving and design, differences are also apparent. Parallels include some identified parameters for management decision making - those identified by Herbert Simon and referred to extensively by others e.g. (Groat and Wang, 2002, Baird et al., 1990). These include the concepts of 'bounded rationality', 'satisficing', and the rare occurrence of 'optimal decision making – a decision for which the decision maker has full knowledge of all alternatives and chooses the alternative producing the best possible outcomes'. The use of information sources by healthcare designers illustrate some, if not all, of these concepts.

Differences and departures from these management theories are identified by Lawson (Lawson, 1990, 272) who notes that '…In essence designers tend to have relatively little theory that enables them to get from problem to solution. Rather they tend to acquire considerable stores of knowledge about solutions and their possibilities or affordances.' He goes on to say (p.274) that 'a group of designers need(ed) to share a common understanding and knowledge base in order to collaborate.'

Lawson's comments are reflected in the process identified by Choo (1998, 8) whereby the 'tacit knowledge' possessed by the individual in order to become useful to an organisation must be converted to 'explicit knowledge' shared by a group. In a continuing cycle, this explicit knowledge is then further converted to tacit knowledge that is then used by a team of individuals working within the organisation - on a specific design project.

A British study (Mackinder and Marvin, 1982) surveyed information use in an architect's office. The architects were studied performing their work and conclusions drawn regarding the importance of various types of information at different stages of their work. Recommendations were then made regarding how to produce useful information that architects would use.

This study noted the apparent unwillingness of architects to consult written data, preferring to rely on their own personal experience, or where that was inadequate, consultation with colleagues. Where written information was used, it tended to be standards, codes, and technical information such as trade manufacturers' promotional material. Mackinder and Marvin (1982, 10) concluded that 'Experience was found to be the most often quoted influence on design decision making. Experience acquired through the process of design is seen as readily available, quicker to use, and more "palatable" than comparable information in a written form.'

Tetreault and Passini (2003) in a Canadian study drew similar conclusions. They looked at the use of information by fourteen architects in designing therapeutic environments – nursing homes that were constructed in Quebec Canada. This study began its conclusions by noting (p.54) that 'Architects interviewed for this study used few sources of information; they didn't seem to be consumers of research. Information

used is technical and functional, such as regulations and standards…". The authors then posed and answered the question as to how to interest architects in research, and in doing so ensure that the research is used to inform their work.

A third study noted the patterns of professional learning by architects in Oklahoma practices and compared these to those of medical practitioners (Price, 1997). This noted the importance of experience to architectural practice and that: 'Architects most often used learning as a means of making incremental adjustments in practices. Most learning was self-directed and involved informal resources and methods.'

This research echoes Choo concluding for one study '...that in 52 percent of the searches, the first source used was a local source (typically a colleague); 42 percent of the information chunks consisted of performance characteristics and specifications…In more than half the cases examined, useful information was obtained from activity that was labelled "competence building," or was pointed out by others, and not from the outcome of specific searches.' (Choo, 1998, 33)

Lawson (2006), Brawne (1990), Duffy (1998) and others all consider aspects of this in their writings about the practice of architecture and descriptions of the process of design. Brown and Duguid (1991, 48) discuss the nature of learning, noting that 'Learners…learn to function in a community…They acquire that particular community's subjective viewpoint and learn to speak its language…Learners are acquiring not explicit, formal "expert knowledge," but the embodied ability to be able to behave as community members.' They go on to discuss the difference between learning *about* practice and becoming a practitioner noting that this is the 'central issue in learning'.

II. RESEARCH STUDY

The study of information used by health architects was undertaken jointly with the Royal Australian Institute of Architects ('practice members') and the New Zealand Institute of Architects by email distribution of a questionnaire, asking only those who had completed health facility projects (of any type) within the last five years to complete it. This considerably reduced the possible number of responses, with forty-one responses received in total. In addition to data regarding characteristics of the firm responding such as location, size, turnover, type of health projects completed and location of these, the survey listed a range of information sources and asked respondents to note their use of these. It also asked them to rank resources used in terms of frequency of use, perceived usefulness and reliability, and to note the reasons for non use of other resources.

The information categories identified by the survey were similar to those identified by Tetreault and Passini (2003), and by Mackinder and Marvin (1982). In addition, respondents were asked to nominate other resources used if

not these were not included in the survey, including their reasons for doing so.

The survey findings illustrated the wide range of information sources used; it analysed these sources in terms of those most commonly used and the profile of the firms who used them. The full report of the survey (UNSW-RAIA, 2006) includes the survey instrument and provides additional detail and analysis of the results.

The most frequently used resources in terms of categories are summarised in the table below:

No.	Resource Category (from Survey Form)	No. Firms
1	Information gathered from firm's previous projects	40
2	Own / firm's original 'research'	40
3	Information from client	39
4	Other guidelines (includes BCA, Standards, Codes, etc)	38
5	Other consultants / colleagues (within firm, and external to firm)	35
6	Magazines and journals (includes manufacturers' promotional literature and trade journals)	33
7	Health Facility (Design) Guidelines - Australia/NZ	26
8	CPD (Continuing Professional Development)	25
9	Post Occupancy Evaluation (own POE and others)	21
10	Research summaries by others	15

Table 1: Resource Categories: most frequently used by number of firms

Healthcare designers, similar to the architects studied by Mackinder and Marvin (1982) use their own experience with their own previous projects plus their own 'research', followed closely by the information provided by their client (most often project specific), and then applicable technical standards, codes and guidelines to inform their design work. The interest in CPD, POE and research are perhaps disappointingly low but perhaps reflect the difficulties in accessing these in a relevant and widely available format.

Another important finding was that the use of resources varied according to the size of firm, with larger firms using the greatest range and number of resources, including a wider range of books and journals, plus their employees were much more likely to undertake study tours, attend conferences, etc. They were also more likely to use academic studies, e.g. research summaries and to use information from overseas sources such as from the UK National Health Service (NHS) or the American Institute of Architects (AIA, 2006). Interestingly, they were also more likely to engage in Continuing Professional Development (CPD) programs than other sized firms, despite this being a requirement for all registered architect practitioners.

The differing pattern of resource use in terms of size of firm correlates with a tendency by larger firms to undertake larger and more complex healthcare projects - although not exclusively, as many medium sized firms also undertook quite large projects. The project stage at which information

was used was not elicited by this survey, but may be addressed in future studies.

III. DISCUSSION

The research results suggest a personalized and subjective approach to information use by healthcare designers that relies on accumulated expertise and extended experience with a particular project type. It also suggests that the pressures of practice, including perhaps a competitive commercial environment, may result in designers making the decision that the benefits available may be outweighed by the difficulties and costs associated with seeking more widely for information. This may particularly apply to information requiring further digestion to become directly useful for decision making.

As technical standards, codes, etc are often referenced in legislation (and thus their use is not usually optional), there are clearly dis-benefits should this information category be disregarded. On the other hand, academic research, POE and CPD may perhaps be regarded as being more 'optional' in terms of use to inform design practice.

Therefore, with the exception of standards, codes, etc, the quality of information used by health care designers may thus be difficult to assess in terms of quality, quantity and currency. Clearly the most experienced architects will have the most experience to draw on and lesser experienced architects will have less – but this does not necessarily address the issue of quality or currency of information used by either group.

It is also likely that not all designers will be equally familiar with or indeed conversant with all the different types of information available to practising professionals. For example, it is not unusual for there to be one or more 'experts' within a design firm specializing in one (or more) of the different types of detailed knowledge required for effective project design and delivery. There may be an expert in building codes, another may know all there is to know about materials selection and another may be familiar with urban planning requirements, and these are only a representative sample of the experts who may be present. Each requires familiarity with a different subset of information resources yet these overlap for the firm as a whole; each 'expert' knows and respects the breadth and depth of specific knowledge possessed by one or more of their other 'expert' colleagues.

Thus in terms of the nature and extent of information required, design practice information use becomes more recognizable as a 'team sport'. Therefore, the need for a shared understanding of the information needed and available becomes increasingly apparent. The 'team sport' approach is readily replicable within the design studio and should occur as a reasonably true reflection of professional design practice. With the trend towards team-based collaborative design processes, plus the exponentially growing body of

knowledge available, the likelihood of one designer alone possessing all necessary information has substantially diminished, if not already disappeared. In reality, the sole practitioner 'expert designer' is undoubtedly now a very rare beast.

As Lawson noted (2006), not only do designers have little theory to move them from problem to solution, they need to share 'a common understanding and knowledge base in order to collaborate'. Building this common understanding and knowledge base ensures that a group of designers within a practice can work productively together. Architectural education undertakes a similar exercise in acculturating design students into the attitudes and mores of professional practice i.e., into the architectural 'community of practice'.

How then does design education generate an ongoing questioning stance towards information resources in design students that they will take forward with them into practice? As Choo (1990) discusses, for professionals 'tacit knowledge' is their tool kit, and for designers this includes heuristics developed through practical engagement in design problems.

All designers, but especially those with less experience, need to ensure that they are familiar with information sources that may guide their work. Where they rely on their own or their colleagues' experience, a critical stance becomes even more important as the likelihood of being in possession of available, current and high quality information is not always guaranteed.

The corollary to this, perhaps, becomes that those producing resources for designers to use in their work may need to consider in greater depth how and why designers use information resources and what they find most useful. In addition, the link between better informed designers and 'better' project outcomes may also require further exploration as little research appears to exist that investigates whether there is a correlation.

It may also be necessary to consider the development of more pre-digested and directly relevant research summaries that have a more overt correlation with the types of information that designers seek. This may include a more openly practical focus aimed at providing a framework for assisting design decision making. However, it may be even better to address the lack of appreciation for 'research' results at an earlier stage of the designer's career i.e. during the education stage.

To do this, design students should be encouraged to investigate development of information for design practice from practical and applied small scale 'research' exercises in parallel with education in design techniques and processes. Techniques such as post occupancy evaluation and one-off practice or action based research studies intended to assist in the development of useable research outcomes should be developed in the studio setting. This would equip our future design practitioners with the means to develop and provide their own useful sources of information for their design

practice. In addition, it would provide them with a greater range of skills and abilities to enable them to understand and interpret 'research' results produced by others and the associated potential impacts on design practice. Furthermore it would assist the ongoing development of a body of design knowledge, which overall may provide better 'evidence' for design decision making in the future.

IV. CONCLUSION

Sensitising design students to a wider range of information sources during their professional education is an important responsibility of educators – which is no doubt already being addressed to a greater or lesser extent. However, it is important to note that, as suggested by the survey of information resources used by healthcare designers, once design students graduate and move to the practice environment, entrenched work practices, time, and perhaps commercial pressures often seem to militate against wider paths of enquiry.

It seems reasonable to anticipate that better knowledge may result in better design outcomes, which from a practical perspective will certainly gain the approbation of clients thus potentially improving the competitive advantage of the firm that embraces this approach. It may also make practice more interesting and rewarding for the individual practitioner, plus assist in the development and refinement of the architectural body of knowledge over the longer term.

In particular, the contribution that research can make to practice, plus the input available from other professional disciplines and academic bodies of knowledge should be examined to a significant depth and detail during the design education phase. This is a chance to embody an interest and respect for the contribution available from these types of information that if missed is unlikely to occur again to the same degree at subsequent stages of a professional design career.

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